

# Specifications

For:



ARCHITECTURE  
INTERIOR DESIGN  
ENGINEERING  
PLANNING

# Oak Park Townhomes

**E 38<sup>th</sup> and Prospect Avenue  
Kansas City, Missouri**

**MHDC Project No.: #19-408**

**Owner:  
Oak Park Townhomes, LP**

**Project No: 20031  
September 15, 2020  
Firm Submittal**



**TABLE OF CONTENTS**

**DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS**

<b>00 0001</b>	<b>PROJECT TITLE PAGE</b>
<b>00 0005</b>	<b>ARCHITECT'S CERTIFICATION</b>
<b>00 0006</b>	<b>CIVIL ENGINEER'S CERTIFICATION</b>
<b>00 0007</b>	<b>STRUCTURAL CERTIFICATION</b>
<b>00 0080</b>	<b>MEP ENGINEER'S CERTIFICATION</b>
<b>00 3100</b>	<b>AVAILABLE PROJECT INFORMATION</b>
<b>00 4000</b>	<b>AGREEMENT</b>
<b>00 5000</b>	<b>CONDITIONS OF THE CONTRACT</b>
<b>00 5500</b>	<b>MHDC CONDITIONS OF THE CONTRACT</b>
<b>00 7000</b>	<b>GENERAL CONDITIONS</b>
<b>00 7300</b>	<b>SUPPLEMENTARY CONDITIONS</b>
<b>00 9500</b>	<b>MBE/WBE REQUIREMENTS</b>

**DIVISION 01 - GENERAL REQUIREMENTS**

<b>01 1000</b>	<b>SUMMARY</b>
<b>01 2500</b>	<b>SUBSTITUTION PROCEDURES</b>
<b>01 2600</b>	<b>CONTRACT MODIFICATION PROCEDURES</b>
<b>01 2900</b>	<b>PAYMENT PROCEDURES</b>
<b>01 3000</b>	<b>ADMINISTRATIVE REQUIREMENTS</b>
<b>01 3100</b>	<b>PROJECT MANAGEMENT AND COORDINATION</b>
<b>01 3200</b>	<b>CONSTRUCTION PROGRESS DOCUMENTATION</b>
<b>01 3300</b>	<b>SUBMITTAL PROCEDURES</b>
<b>01 4000</b>	<b>QUALITY REQUIREMENTS</b>
<b>01 4100</b>	<b>REGULATORY REQUIREMENTS</b>
<b>01 5000</b>	<b>TEMPORARY FACILITIES AND CONTROLS</b>
<b>01 5670</b>	<b>POLLUTION CONTROL</b>
<b>01 5700</b>	<b>TEMPORARY EROSION AND SEDIMENT CONTROL</b>
<b>01 5850</b>	<b>PROJECT SIGNS</b>
<b>01 6000</b>	<b>PRODUCT REQUIREMENTS</b>
<b>01 7300</b>	<b>EXECUTION</b>
<b>01 7329</b>	<b>CUTTING AND PATCHING</b>
<b>01 7700</b>	<b>CLOSEOUT PROCEDURES</b>
<b>01 7820</b>	<b>OPERATION AND MAINTENANCE DATA</b>
<b>01 7839</b>	<b>PROJECT RECORD DOCUMENTS</b>
<b>01 7900</b>	<b>DEMONSTRATION AND TRAINING</b>

**DIVISION 02 – CIVIL**

<b>02 2200</b>	<b>DEMOLITION DISPOSAL</b>
<b>02 3150</b>	<b>EXCAVATION</b>
<b>02 3300</b>	<b>EMBANKMENT</b>
<b>02 5100</b>	<b>WATER-UTILITY-FACILITIES</b>
<b>02 5200</b>	<b>WATER MAIN SHUT PROCEDURE</b>
<b>02 5300</b>	<b>SANITARY SEWERS</b>
<b>02 6300</b>	<b>STORM SEWERS</b>
<b>02 7400</b>	<b>FLEXIBLE PAVEMENT</b>
<b>02 7450</b>	<b>STREET CUT RESTORATION</b>
<b>02 7600</b>	<b>PAVEMENT MARKING</b>
<b>02 7750</b>	<b>SIDEWALKS-ADA RAMPS</b>
<b>02 7700</b>	<b>CURBS AND GUTTER</b>
<b>02 9310</b>	<b>SODDING</b>

**DIVISION 03 - CONCRETE**

<b>03 0516</b>	<b>UNDERSLAB VAPOR BARRIER</b>
<b>03 3000</b>	<b>CAST-IN-PLACE CONCRETE</b>
<b>03 5400</b>	<b>CAST UNDERLAYMENT</b>

**DIVISION 04 - MASONRY**

<b>04 2000</b>	<b>UNIT MASONRY</b>
<b>04 2613</b>	<b>MASONRY VENEER</b>
<b>04 4313.16</b>	<b>ADHERED STONE MASONRY VENEER</b>

**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

<b>06 1000</b>	<b>ROUGH CARPENTRY</b>
<b>06 1753</b>	<b>SHOP-FABRICATED WOOD TRUSSES</b>
<b>06 2000</b>	<b>FINISH CARPENTRY AND MILLWORK</b>
<b>06 4550</b>	<b>SIMULATED WOOD PRODUCTS</b>

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

<b>07 0523</b>	<b>BUILDING ENVELOPE TESTING</b>
<b>07 2100</b>	<b>THERMAL INSULATION</b>
<b>07 2110</b>	<b>ACOUSTIC INSULATION</b>
<b>07 2126</b>	<b>BLOWN INSULATION</b>
<b>07 2500</b>	<b>WEATHER BARRIERS</b>
<b>07 2600</b>	<b>VAPOR RETARDERS</b>



07 3113	ASPHALT SHINGLES
07 4293	ALUMINUM SOFFIT PANELS
07 4646	FIBER-CEMENT SIDING
07 5423	THERMOPLASTIC POLYOLEFIN ROOFING
07 6200	SHEET METAL FLASHING AND TRIM
07 7100	ROOF SPECIALTIES
07 7123	MANUFACTURED GUTTERS AND DOWNSPOUTS
07 8413	PENETRATION FIRESTOPPING
07 9200	JOINT SEALANTS

**DIVISION 08 - OPENINGS**

08 1416	MOLDED PANEL WOOD DOORS
08 1613	FIBERGLASS DOORS
08 3100	ACCESS DOORS AND PANELS
08 3613	SECTIONAL DOORS
08 5313	VINYL WINDOWS
08 7111	DOOR HARDWARE
08 8000	GLAZING
08 8300	MIRRORS
08 9516	WALL AND ROOF VENTS

**DIVISION 09 - FINISHES**

09 2900	GYPSUM BOARD
09 6519	RESILIENT PLANK FLOORING
09 6816	SHEET CARPETING
09 9113	EXTERIOR PAINTING
09 9123	INTERIOR PAINTING

**DIVISION 10 - SPECIALTIES**

10 1400	SIGNAGE
10 1421	EXTERIOR SIGNAGE
10 2800	TOILET AND BATH ACCESSORIES
10 4416	FIRE EXTINGUISHERS
10 5500	POSTAL SPECIALTIES
10 5723	CLOSET AND UTILITY SHELVING

**DIVISION 11 - EQUIPMENT**

11 3100	RESIDENTIAL APPLIANCES
11 6813	PLAYGROUND EQUIPMENT

**DIVISION 12 - FURNISHINGS**

- 12 2113            HORIZONTAL LOUVER BLINDS**
- 12 3530            RESIDENTIAL CASEWORK**

**DIVISION 22 – PLUMBING**

- 220517            SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**
- 220518            ESCUTCHEONS FOR PLUMBING PIPING**
- 220523.12        BALL VALVES FOR PLUMBING PIPING**
- 220529            HANGARS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPM**
- 220719            PLUMBING PIPING INSULATION**
- 221116            DOMESTIC WATER PIPING**
- 221119            DOMESTIC WATER PIPING SPECIALTIES**
- 221316            SANITARY WASTE AND VENT PIPING**
- 221319            SANITARY WASTE PIPING SPECIALTIES**
- 223300            ELECTRIC, DOMESTIC-WATER HEATERS**
- 224100            RESIDENTIAL PLUMBING FIXTURES**

**DIVISION 23 – MECHANICAL**

- 23 0517            SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**
- 23 0518            ESCUTCHEONS FOR HVAC PIPING**
- 23 0593            TESTING, ADJUSTING AND BALANCING FOR HVAC**
- 23 0713            DUCT INSULATION**
- 23 3113            METAL DUCTS**
- 23 3300            AIR DUCT ACCESSORIES**
- 23 3423            HVAC POWER VENTILATORS**
- 23 3713            DIFFUSERS, REGISTERS, AND GRILLES**
- 23 7313            AIR HANDLING UNITS**
- 23 7315            OUTDOOR UNIT SPLIT SYSTEM**
- 23 8126            SPLIT-SYSTEM AIR-CONDITIONERS**

**DIVISION 26 – ELECTRICAL**

- 26 0526            GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**
- 26 0553            IDENTIFICATION FOR ELECTRICAL SYSTEMS**
- 26 0573            OVERCURRENT PROTECTIVE DEVICE COORDINATION  
STUDY**
- 26 0574            LOW VOLTAGE ARCH FLASH HAZARD ANALYSIS**
- 26 0923            LIGHTING CONTROL DEVICES**
- 26 2416            PANELBOARDS**

<b>26 2417</b>	<b>METER CENTER GANGABLE</b>
<b>26 2713</b>	<b>ELECTRICITY METERING</b>
<b>26 2726</b>	<b>WIRING DEVICES</b>
<b>26 2816</b>	<b>ENCLOSED SWITCHES AND CIRCUIT BREAKERS</b>
<b>26 5100</b>	<b>INTERIOR LIGHTING</b>
<b>26 5600</b>	<b>EXTERIOR LIGHTING</b>

**DIVISION 31 - EARTHWORK**

<b>31 2113</b>	<b>RADON MITIGATION</b>
<b>31 3116</b>	<b>TERMITE CONTROL</b>

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

<b>32 1816.13</b>	<b>PLAYGROUND PROTECTIVE SURFACING</b>
<b>32 3113</b>	<b>CHAIN LINK FENCES AND GATES</b>
<b>32 3119</b>	<b>DECORATIVE METAL FENCES AND GATES</b>
<b>32 3300</b>	<b>SITE FURNISHINGS</b>
<b>32 3313</b>	<b>SITE BICYCLE RACKS</b>

This page intentionally left blank

**SECTION 00 0001  
PROJECT TITLE PAGE**

**PROJECT: OAK PARK TOWNHOMES**

**OWNER: OAK PARK TOWNHOMES, LP:**

**BY: \_\_\_\_\_ DATE: \_\_\_\_\_**

**ARCHITECT: ROSEMAN & ASSOCIATES, P.C.:**

**BY: \_\_\_\_\_ DATE: \_\_\_\_\_**

**CONTRACTOR:**

**BY: \_\_\_\_\_ DATE: \_\_\_\_\_**

**MISSOURI HOUSING DEVELOPMENT COMMISSION:**

**BY: \_\_\_\_\_ DATE: \_\_\_\_\_**

**END OF SECTION**

This page intentionally left blank

**SECTION 00 0005  
ARCHITECT'S CERTIFICATION**

**I, DAVID HENDRIKSE, HEREBY SPECIFY THAT THE DOCUMENTS OR INSTRUMENTS RELATING  
TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

**1.01 LIST OF DRAWINGS**

G-001	TITLE SHEET
G-002	GENERAL INFORMATION
G-003	PLAN GENERAL INFORMATION
G-004	GENERAL INFORMATION
G-005	GENERAL INFORMATION
G-100	CODE ANALYSIS
G-101	CODE ANALYSIS
G-102	ASSEMBLIES
G-200	UL ASSEMBLIES
G-201	UL ASSEMBLIES
G-202	UL ASSEMBLIES
G-203	UL ASSEMBLIES
G-300	ACCESSIBILITY STANDARDS
G-301	ACCESSIBILITY STANDARDS
AS-101	ARCHITECTURAL SITE AMENITIES
A-100	BUILDING SITE PLAN
A-101	BLDG #1-3 FLOOR & ROOF PLANS
A-102	BLDG #2 FLOOR & ROOF PLANS
A-103	BLDG #4 FLOOR & ROOF PLANS
A-104	BLDG #5 FLOOR & ROOF PLANS
A-201	BLDG #1-3 EXTERIOR ELEVATIONS
A-202	BLDG #2 EXTERIOR ELEVATIONS
A-203	BLDG #4 EXTERIOR ELEVATIONS
A-204	BLDG #5 EXTERIOR ELEVATIONS
A-300	WALL SECTIONS
A-303	UNIT STAIR SECTION AND DETAILS
A-400	25' 3-BEDROOM FLOOR PLANS
A-401	22' 3-BEDROOM FLOOR PLANS
A-402	25' 1-BEDROOM FLOOR PLANS
A-403	25' 1-BEDROOM FLOOR PLANS (TYPE 'A')
A-500	DETAILS
A-501	DETAILS
A-502	DETAILS
A-503	SITE DETAILS
A-600	WINDOW / DOOR / FINISH / SCHEDULES
A-601	WINDOW / DOOR DETAILS
A-700	INTERIOR ELEVATIONS

**1.02 SPECIFICATION SECTIONS**

DIVISION 00 - PROCUREMENTS AND CONTRACTING REQUIREMENTS	
SECTION 00 0000	TABLE OF CONTENTS
SECTION 00 0001	MHDC PROJECT TITLE PAGE
SECTION 00 0005	ARCHITECT'S CERTIFICATION PAGE
SECTION 00 0006	CIVIL CERTIFICATION PAGE
SECTION 00 0007	STRUCTURAL CERTIFICATION PAGE
SECTION 00 0008	MEP CERTIFICATION PAGE

SECTION 00 3100 INFORMATION AVAILABLE TO BIDDERS  
SECTION 00 3020 NGBS SCORING ANALYSIS  
SECTION 00 4000 MHDC AGREEMENT  
SECTION 00 4010 MDHC FORM 92442-CA  
SECTION 00 5000 CONDITIONS OF THE CONTRACT  
SECTION 00 5500 MHDC CONDITIONS  
SECTION 00 7000 GENERAL CONDITIONS  
SECTION 00 7010 AIA A201-2007 DRAFT  
SECTION 00 7300 SUPPLEMENTARY CONDITIONS  
SECTION 00 7310 HUD FORM 2554  
SECTION 00 7320 DAVIS BACON WAGE RATE, GENERAL DECISION  
SECTION 00 7330 HUD FORM 4010  
SECTION 00 9500 MBE/WBE REQUIREMENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01 1000 SUMMARY  
SECTION 01 2500 SUBSTITUTION PROCEDURES  
SECTION 01 2600 CONTRACT MODIFICATION PROCEDURES  
SECTION 01 2900 PAYMENT PROCEDURES  
SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS  
SECTION 01 3100 PROJECT MANAGEMENT AND COORDINATION  
SECTION 01 3200 CONSTRUCTION PROGRESS DOCUMENTATION  
SECTION 01 3300 SUBMITTAL PROCEDURES  
SECTION 01 4000 QUALITY REQUIREMENTS  
SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS  
SECTION 01 5850 PROJECT SIGNS  
SECTION 01 6000 PRODUCT REQUIREMENTS  
SECTION 01 7300 EXECUTION  
SECTION 01 7329 CUTTING AND PATCHING  
SECTION 01 7700 CLOSEOUT PROCEDURES  
SECTION 01 7820 OPERATION AND MAINTENANCE DATA  
SECTION 01 7839 PROJECT RECORD DOCUMENTS  
SECTION 01 7900 DEMONSTRATION AND TRAINING

DIVISION 03 - CONCRETE

SECTION 03 0516 UNDERSLAB VAPOR BARRIER  
SECTION 03 5400 GYPSUM CEMENT UNDERLAYMENT

DIVISION 04 - MASONRY

SECTION 04 2613 MASONRY VENEER  
SECTION 04 4313.16 ADHERED CAST STONE MASONRY VENEER

DIVISION 05 - STEEL (NOT USED)

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES

SECTION 06 2000 FINISH CARPENTRY  
SECTION 06 4550 SIMULATED WOOD TRIM AND PANELS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 0523 BUILDING ENVELOPE TESTING  
SECTION 07 2100 THERMAL INSULATION  
SECTION 07 2110 ACCOUSTIC INSULATION  
SECTION 07 2126 BLOWN INSULATION  
SECTION 07 2500 WEATHER BARRIERS  
SECTION 07 2600 VAPOR BARRIERS  
SECTION 07 3113 ASPHALT SHINGLES  
SECTION 07 4293 ALUMINUM SOFFIT PANELS  
SECTION 07 4626 FIBER-CEMENT SIDING



SECTION 07 5423 THERMOPLASTIC POLYOLEFIN ROOFING  
SECTION 07 6200 SHEET METAL FLASHING AND TRIM  
SECTION 07 7100 ROOF SPECIALTIES  
SECTION 07 7123 MANUFACTURED GUTTERS AND DOWNSPOUTS  
SECTION 07 8413 PENETRATION FIRESTOPPING  
SECTION 07 8413.11 FIRESTOP SCHEDULE  
SECTION 07 9200 JOINT SEALANTS

DIVISION 08 - OPENINGS

SECTION 08 1416 MOLDED PANEL WOOD DOORS  
SECTION 08 1613 FIBERGLASS DOORS  
SECTION 08 3100 ACCESS DOORS AND PANELS  
SECTION 08 3613 SECTIONAL DOORS  
SECTION 08 5313 VINYL WINDOWS  
SECTION 08 7111 DOOR HARDWARE  
SECTION 08 8000 GLAZING  
SECTION 08 8300 MIRRORS  
SECTION 08 9516 WALL AND ROOF VENTS

DIVISION 09 - FINISHES

SECTION 09 2900 GYPSUM BOARD  
SECTION 09 6519 RESILIENT PLANK FLOORING  
SECTION 09 6816 SHEET CARPETING  
SECTION 09 9113 EXTERIOR PAINTING  
SECTION 09 9123 INTERIOR PAINTING

DIVISION 10 - SPECIALTIES

SECTION 10 1400 SIGNAGE  
SECTION 10 1421 EXTERIOR SIGNAGE  
SECTION 10 2800 TOILET AND BATH ACCESSORIES  
SECTION 10 4416 FIRE EXTINGUISHERS  
SECTION 10 5050 POSTAL SPECIALTIES  
SECTION 10 5723 CLOSET AND UTILITY SHELVING

DIVISION 11 - EQUIPMENT

SECTION 11 3100 RESIDENTIAL APPLIANCES  
SECTION 11 6813 PLAYGROUND EQUIPMENT

DIVISION 12 - FURNISHINGS

SECTION 12 2113 HORIZONTAL LOUVER BLINDS  
SECTION 12 3530 RESIDENTIAL CASEWORK

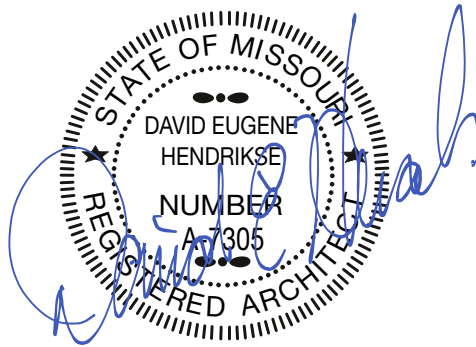
DIVISION 31 - EARTHWORK

SECTION 31 2113 RADON MITIGATION MHDC NEW CONSTRUCTION  
SECTION 31 3116 TERMITE CONTROL

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 1816.13 PLAYGROUND PROTECTIVE SURFACING  
SECTION 32 3113 CHAINLINK FENCES AND GATES  
SECTION 32 3119 DECORATIVE METAL FENCES AND GATES  
SECTION 32 3300 SITE FURNISHINGS  
SECTION 32 3313 SITE BICYCLE RACKS

**1.03 AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS, SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO OR INTENDED TO BE USED FOR ANY PART OR PARTS OF OAK PARK TOWNHOMES, KANSAS CITY, MISSOURI,**



**1.04 SEAL:**

**1.05 BY:** \_\_\_\_\_ **DATE:** 09/15/20

**END OF SECTION 000005**

**SECTION 00 0008  
CIVIL'S CERTIFICATION**

**I, EMMANUEL OBI, HEREBY SPECIFY THAT THE DOCUMENTS OR INSTRUMENTS RELATING TO  
BE AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

**1.01 LIST OF DRAWINGS**

**A. CIVIL TITLE SHEET**

1. C-100 TOPOGRAPHIC SITE SURVEY
2. C-101 DEMOLITION PLAN
3. C-102 GRADING PLAN
4. C-103 SITE PLAN LAYOUT
5. C-104 DIMENSIONAL PLAN
6. C-105 RETAINING WALL
7. C-106 SANITARY SEWER PLAN AND PROFILE
8. C-107 SANITARY SEWER PLAN AND PROFILE
9. C-108 6" WATERMAIN EXTENSION
10. C-109 6" WATERMAIN EXTENSION
11. C-110 STORM SEWER PLAN AND PROFILE
12. C-111 STORM WATER STORAGE DETAILS
13. C-112 STORM DRAINAGE MAP AND TABLE

**B. LAND DISTURBANCE TITLE SHEET**

1. LD-1 TITLE AND LOCATION MAP
2. LD-2 GENERAL NOTES
3. LD-3 EROSION CONTROL PLAN
4. LD-4 EROSION CONTROL DETAILS

**1.02 SPECIFICATION SECTIONS**

**A.**

1. **DIVISION-001**
2. SECTION - 01410 - REGULATORY REQUIREMENTS
3. SECTION 01567 - POLLUTION CONTROL
4. SECTION 01570 - TEMPORARY EROSION AND SEDIMENT CONTROL
5. **DIVISION-002**
6. SECTION 02220- DEMOLITION & DISPOSAL
7. SECTION 02315 – EXCAVATION
8. SECTION 02330 - EMBANKMENT
9. SECTION 02510 – WATER UTILITY FACILITIES
10. SECTION 02530 – SANITARY SEWERS
11. SECTION 02520 -WATER MAIN SHUT PROCEDURES
12. SECTION 02630 - STORM SEWERS
13. SECTION 02740 – FLEXIBLE PAVEMENT
14. SECTION 02745 – STREET CUT RESTORATION
15. SECTION 02760-PAVEMENT MARKING AND SYMBOLS
16. SECTION 02770- CURBS AND GUTTERS
17. SECTION 02775 – SIDEWALK AND ADA ACCESSIBLE RAMPS
18. SECTION 02931 – SODDINGSECTION
19. 005000 CONDITIONS OF THE CONTRACT

AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS,  
SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO  
OR INTENDED TO BE USED FOR ANY PART OR PARTS OF /OAK PARK TOWNHOMES,  
MISSOURI



1.03 SEAL:

1.04 BY: \_\_\_\_\_ EMMANUEL OBI \_\_\_\_\_ DATE: \_\_\_\_9/15/20\_\_\_\_

END OF SECTION 000008

**SECTION 00 0007  
STRUCTURAL CERTIFICATION**

**I, SCOTT M. ROSEMAN, HEREBY SPECIFY THAT THE DOCUMENTS OR INSTRUMENTS  
RELATING TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

**1.01 LIST OF DRAWINGS**

**A. STRUCTURAL**

S-001 STRUCTURAL GENERAL NOTES  
S-002 STRUCTURAL GENERAL NOTES  
S-003 SPECIAL INSPECTIONS  
S-100 SLAB DIMENSION PLANS  
S-101 BLDG #1-3 FOUNDATION AND FRAMING PLANS  
S-102 BLDG #2 FOUNDATION AND FRAMING PLANS  
S-103 BLDG #4 FOUNDATION AND FRAMING PLANS  
S-104 BLDG #5 FOUNDATION AND FRAMING PLANS  
S-500 STRUCTURAL DETAILS  
S-501 STRUCTURAL DETAILS  
S-502 STRUCTURAL DETAILS  
S-503 STRUCTURAL DETAILS

**1.02 SPECIFICATION SECTIONS**

A. 033000 CAST-IN-PLACE CONCRETE  
B. 061000 ROUGH CARPENTRY  
C. 061753 SHOP FABRICATED WOOD TRUSSES

**1.03 AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS,  
SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO  
OR INTENDED TO BE USED FOR ANY PART OR PARTS OF OAK PARK TOWNHOMES,  
KANSAS CITY, MISSOURI.**

**1.04 SEAL:**



**1.05 BY: \_\_\_\_\_ DATE: \_\_\_\_\_**

**END OF SECTION 00 0007**

**SECTION 000008  
PLUMBING CERTIFICATION**

**I, ANDREW J. DAILEY, HEREBY SPECIFY THAT THE DOCUMENTS OR INSTRUMENTS RELATING  
TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

**LIST OF DRAWINGS**

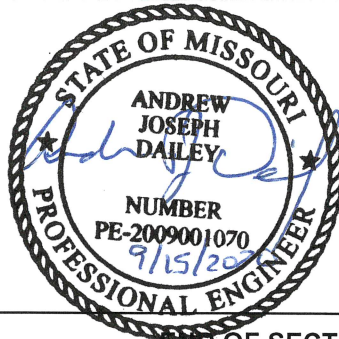
- P000** Plumbing Notes and Legend
- P101** Plumbing Building #1 and #3 Floor and Roof Plans
- P102** Plumbing Building #2 Floor and Roof Plans
- P103** Plumbing Building #4 Floor and Roof Plans
- P104** Plumbing Building #5 Floor and Roof Plans
- P301** Plumbing Riser Diagrams - 3-Bedroom
- P302** Plumbing Riser Diagrams – Community Room
- P303** Plumbing Riser Diagrams – 1 Bedroom
- P400** 25' 3-Bedroom Plumbing Plans
- P401** 22' 3-Bedroom and Community Room Plumbing Plans
- P402** 25'- 1-Bedroom Plumbing Plans
- P500** Plumbing Schedules
- P501** Plumbing Details

**SPECIFICATION SECTIONS**

- 220517** Sleeves and Sleeve Seals for Plumbing Piping
- 220518** Escutcheons for Plumbing Piping
- 220523.12** Ball Valves for Plumbing Piping
- 220529** Hangars and Supports for Plumbing Piping and Equipment
- 220719** Plumbing Piping Insulation
- 221116** Domestic Water Piping
- 221119** Domestic Water Piping Specialties
- 221316** Sanitary Waste and Vent Piping
- 221319** Sanitary Waste Piping Specialties
- 223300** Electric, Domestic-Water Heaters
- 224100** Residential Plumbing Fixtures

Firm Commitment  
September 15, 2020

AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS,  
SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR RELATING TO OR INTENDED TO  
BE USED FOR ANY PART OR PARTS OF OAK PARK TOWNHOMES, KANSAS CITY, MO.



SEAL:

BY: \_\_\_\_\_

DATE: 9/15/2020

END OF SECTION 000008

This page intentionally left blank



**SECTION 000008  
ELECTRICAL CERTIFICATION**

**I, CRAIG K. BREWSTER, HEREBY SPECIFY THAT THE DOCUMENTS OR INSTRUMENTS  
RELATING TO BE AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

**LIST OF DRAWINGS**

- E000** Electrical legend and general notes
- E100** Electrical site plan
- E101** Electrical combined buildings 1&3 first floor plan, second floor and roof plan
- E102** Electrical building 2 first floor plan, second floor and roof plan
- E103** Electrical building 4 first floor plan, second floor and roof plan
- E104** Electrical building 5 first floor plan, second floor and roof plan
- E400** 25' 3-bedroom townhome electrical power floor plans
- E401** 22' 3-bedroom townhome electrical power floor plans
- E402** One-bedroom units electrical power floor plans
- E500** 25' 3-bedroom townhome electrical lighting floor plans
- E501** 22' 3-bedroom townhome electrical lighting floor plans
- E502** One-bedroom units electrical lighting floor plans
- E600** Electrical one line diagram for combined buildings 1 and 3 and building 2
- E601** Electrical one line diagram for building 4 and building 5
- E602** Electrical panel schedules
- E603** Electrical panel schedules

**SPECIFICATION SECTIONS**

- 260526** Grounding and bonding for electrical system
- 260553** Identification for electrical systems
- 260573** Overcurrent protective devices coordination study
- 260574** Arc Flash analysis
- 260923** Lighting control devices
- 262416** Panelboards
- 262417** Gang able meter center
- 262713** Electricity metering
- 262726** Wiring devices
- 262816** Enclosed switch and circuit breakers
- 265100** Interior lighting
- 265600** Exterior lighting

AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS,  
SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR RELATING TO OR INTENDED TO  
BE USED FOR ANY PART OR PARTS OF OAK PARK TOWNHOMES, KANSAS CITY, MO.



SEAL:

BY: \_\_\_\_\_

DATE: \_\_\_\_\_

9-15-2020

END OF SECTION 000008

**SECTION 000008  
MECHANICAL CERTIFICATION**

**I, POLINA Y. LEVIN, HEREBY SPECIFY THAT THE DOCUMENTS RELATING TO BE  
AUTHENTICATED BY MY SEAL ARE LIMITED TO:**

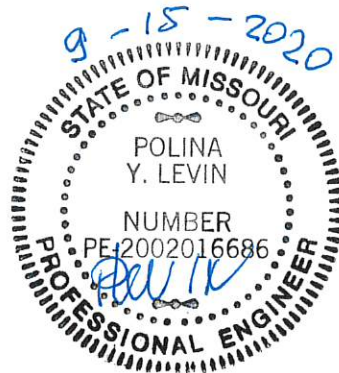
**LIST OF DRAWINGS**

- M000** Mechanical legend and general notes
- M002** Mechanical schedules
- M101** Mechanical combined buildings 1&3 first floor plan, second floor and roof plan
- M102** Mechanical building 2 first floor plan, second floor and roof plan
- M103** Mechanical building 4 first floor plan, second floor and roof plan
- M104** Mechanical building 5 first floor plan, second floor and roof plan
- M400** 25' 3-bedroom townhome mechanical floor plans
- M401** 22' 3-bedroom townhome mechanical power floor plans
- M402** One-bedroom units mechanical power floor plans
- M500** Mechanical details
- M501** Mechanical details

**SPECIFICATION SECTIONS**

- 230517** Sleeves and sleeve seals for HVAC piping
- 230518** Escutcheons for HVAC piping
- 230593** Testing, adjusting, and balancing for HVAC
- 230713** Duct Insulation
- 233113** Metal ducts
- 233300** Air duct accessories
- 233423** HVAC power ventilators
- 233713** Diffusers, registers, and grilles
- 237313** Air Handling Units
- 237315** Outdoor unit split system
- 238126** Split-System Air-Conditioners

AND I HEREBY DISCLAIM ANY RESPONSIBILITY FOR ALL OTHER PLANS,  
SPECIFICATIONS, REPORTS OR OTHER DOCUMENTS OR INSTRUMENTS RELATING TO  
OR INTENDED TO BE USED FOR ANY PART OR PARTS OF OAK PARK TOWNHOMES,  
KANSAS CITY, MO.



SEAL:

BY: \_\_\_\_\_

DATE: 9-15-2020

END OF SECTION 000008

**SECTION 00 3100  
AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:
- B. Geotechnical Report: TBD
  - 1. Original copy is available for inspection at General Contractor's office during normal business hours.
  - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
  - 3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
- C. NGBS (National Green Building Standard) Summary scorecard (Section 00 3110)

**1.02 PRELIMINARY DATA**

- A. Certain preliminary investigations and studies made by the Owner are available to the bidders but will not be part of Contract Documents.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**3.01 OBTAINMENT OF PERMITS**

- A. Contractor to obtain the following required permits, at no cost to Owner:
  - 1. Building Permit for all trades.

**END OF SECTION**



**SECTION 00 4000  
AGREEMENT**

**PART 1 GENERAL**

**1.01 FORM OF AGREEMENT**

- A. Capital Advance Construction Contract/Cost Plus - MHDC Form 92442-CA (Attached).

**PART 2 - PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

This page intentionally left blank



**CONSTRUCTION CONTRACT / COST PLUS**  
(MHDC Form 92442-CA)

**THIS CONSTRUCTION CONTRACT / COST PLUS CONTRACT ("CONTRACT")** made the \_\_\_\_\_, between \_\_\_\_\_, a Missouri \_\_\_\_\_, whose address is \_\_\_\_\_, Missouri \_\_\_\_\_ ("Contractor"), and \_\_\_\_\_, a Missouri \_\_\_\_\_, whose address is \_\_\_\_\_, Missouri \_\_\_\_\_ ("Owner").

**WHEREAS**, Mortgagor has applied to MHDC for a mortgage loan for the purpose of erecting a housing development to be located in \_\_\_\_\_, \_\_\_\_\_ **County**, Missouri, and identified as MHDC Development No. \_\_\_\_\_ - \_\_\_\_\_ and commonly called \_\_\_\_\_ ("Development").

**WITNESSETH**, that Contractor and Owner, for the consideration hereinafter set out, agree as follows:

**Article 1 -- Scope of Contract**

A. The Contract between the parties is set forth in the Contract Documents, which consist of this Contract, the drawings dated \_\_\_\_\_ and the specifications dated \_\_\_\_\_ ("collectively Drawings and Specifications"), which includes the current edition of AIA Document A201, General Conditions of the Contract for Construction and the MHDC approved Supplementary Conditions ("Supplementary Conditions"), if any. The provisions of this instrument and the said Supplementary Conditions, take precedence over all inconsistent provisions in the said AIA General Conditions. This Contract constitutes the entire agreement between the parties, and any previously existing contract concerning the work contemplated by the Contract Documents is hereby revoked.

B. The Contractor shall furnish all of the materials and perform all of the work (within the property lines) shown on, and in accordance with, the Drawings and Specifications as shown on **Exhibit "A"** attached hereto.

C. The Drawings, numbered as shown on **Exhibit "A"** attached, and the Specifications have been prepared by \_\_\_\_\_ ("Design Architect").

The architect administering the Contract is \_\_\_\_\_ ("Architect").

D. A master set of said Drawings and Specifications, identified by the parties hereto and by the Design Architect, the Architect, and the Contractor's Surety or Guarantor have been placed on file with **MISSOURI HOUSING DEVELOPMENT COMMISSION** ("MHDC"), and shall govern in all matters that arise with respect to such Drawings and Specifications.

E. Changes in the Drawings and Specifications, any terms of the Contract Documents, orders for extra work, changes by altering or adding to the work, or which will change the design concept, may be effected only with the prior written approval of the Owner and MHDC under such conditions as the MHDC may establish.

F. Notwithstanding any other provisions contained in the Contract Documents, the following is applicable to all construction contracts not competitively bid in accordance with MHDC's rules and regulations:

(i) The Contractor acknowledges that this Contract has resulted from sole-source negotiation rather than from competitive bid.

(ii) The Contractor has conducted a full and independent inspection of the site and acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost. The Contractor also acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work (such as test borings) done by or on behalf of the Contractor, as well as from the Drawings and Specifications made a part of this Contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work or for proceeding to successfully perform the work without additional expense to the Owner, or MHDC.

(iii) The Contractor warrants to the Owner and MHDC that the work, when completed, will comply fully with all MHDC's requirements, Drawings and Specifications and construction requirements imposed or enforced by any governmental agencies and in existence on the date of execution of this agreement.

(iv) The Contractor further agrees that it will not assert any claim against the MHDC because of changes in the Drawings and Specifications arising out of errors, omissions or deficiencies in the Drawings and Specifications.

## **Article 2 -- Time**

A. The work to be performed under this Contract shall be commenced within Ten (10) days as evidenced by a Notice to Proceed from the Owner and shall be completed by \_\_\_\_\_. Completion will be determined at the time in which all Development construction is completed as evidenced by the fully executed final certificate of substantial completion (AIA Document G704) has been received and approved by MHDC. This final certificate of substantial completion shall be the trigger for the start of the Development warranty period. The time by which the work shall be completed may be extended in accordance with the terms of the said AIA General Conditions only

with the prior written approval of the Owner and MHDC, such approval shall not be unreasonably withheld.

B. The Contractor shall correct any defects due to faulty materials or workmanship which appear within one year from the date of substantial completion.

C. If the work is not substantially completed in accordance with the Drawings and Specifications, including any authorized changes, by the date specified above, or by such date to which the contract time may be extended, the contract sum stated in Article 3A below shall be reduced by \$0.00 as liquidated damages, for each day of delay until the date of substantial completion.

D. The date of substantial completion shall be the date the Architect establishes that the Development is substantially completed as established by the AIA General Conditions provided that the date is subsequently endorsed by the Owner and MHDC or their designated representative(s).

E. By not more than 60 days after the date of substantial completion, the Contractor shall furnish final certificates of occupancy, if applicable and unconditional lien releases from all subcontractors and suppliers or provide adequate security bonding over any such claims as determined by the Owner. If the Contractor fails to fulfill its obligations hereunder, the Contractor agrees to pay liquidated damages of \$0.00 per day for each day until it has fulfilled such obligations. Owner may deduct liquidated damages in this subparagraph E and in subparagraph C from the final payment owed to the Contractor.

### **Article 3 -- Contract Sum and Payments**

A. (1) Subject to the provisions hereinafter set out, the Owner shall pay to the Contractor for the performance of this Contract the following items in cash:

(a) The actual cost of construction as defined in Article 9 below; plus

(b) A fee of \$\_\_\_\_\_.

(c) Subject to the terms and conditions of this Contract the total cash payable pursuant to this paragraph shall not exceed \$\_\_\_\_\_.

(d) In addition to any cash fee provided for in paragraph (1) Owner shall pay to the Contractor, the following: **NONE**

(2) If, upon completion, the Contractor shall have received cash payments in excess of (a) the actual cost of construction, plus (b) the cash fee specified in paragraph (1), plus the additional amount to be paid under the provisions of paragraph 1(d), all such excess shall be refunded to the Owner.

B. Each month after the commencement of work hereunder, the Contractor shall make a

monthly request on Form AIA G702 and G703 (or equivalent form approved by MHDC) for payment by the Owner for work done during the preceding month. Each request for payment shall be filed at least Seven (7) days before the date payment is desired. Subject to the approval of the MHDC, the Contractor shall be entitled to payment thereon in an amount equal to (1) the total value of classes of the work acceptably completed; plus (2) the value of materials and equipment incorporated in the work; less (3) 10 percent holdback **(or acceptable substitute security as required by RSMo. § 436.306-309)** and less prior payments. The "values" of (1) and (2) shall be computed in accordance with the amounts assigned to classes of work in the "Contractor's and/or Mortgagor's Cost Breakdown," attached hereto as Exhibit "B". The Contractor agrees that no materials or equipment required by the Specifications will be purchased under a conditional sale contract or with the use of any security agreement or other vendor's title or lien retention instrument. All payments under this Contract shall be disbursed pursuant to a Disbursing Agreement by and among the Owner, Contractor, Title Insurance Company, Architect(s) and MHDC.

C. The balance due the Contractor hereunder shall be payable upon the expiration of Thirty (30) days after the work hereunder is fully completed, provided the following have occurred:

- (1) All work hereunder requiring inspection by municipal or other governmental authorities having jurisdiction has been inspected and approved by such authorities and by the rating or inspection organization, bureau, association or office having jurisdiction; and
- (2) All certificates of occupancy, or other approvals, with respect to all units of the Development have been issued by State or local governmental authorities having jurisdiction; and
- (3) Architect has inspected the work and issues final Certificate of Payment as set forth in the AIA General Conditions; and
- (4) Contractor has submitted his cost certifications to MHDC as required by MHDC under Article 9; and
- (5) MHDC has allowed all costs as submitted in Contractor's Cost Certification.

D. With its final application for payment by the Owner, the Contractor shall disclose, on a form prescribed by the MHDC, all unpaid obligations contracted in connection with the work performed under this Contract.

The Contractor agrees that within Fifteen (15) days following receipt of final payment, it will pay such obligations in cash and furnish satisfactory evidence of such payment to the Owner.

#### **Article 4 -- Receipts and Releases of Liens**

The Owner and MHDC may require the Contractor to attach to each request for payment its acknowledgement of payment and waiver or release of lien and all subcontractors' and

materialmen's acknowledgements of payment and waiver or release of lien for work done and materials, equipment and fixtures furnished through the date covered by the previous payment. Concurrently with the final payment, the Owner and MHDC shall require the Contractor and subcontractor to execute a waiver or release of lien for all work performed and materials furnished hereunder.

## **Article 5 -- Requirements of Contractor**

A. The Contractor shall furnish, at its own expense, all building and other permits, licenses, tools, equipment and temporary structures necessary for the construction of the Development. The Contractor shall give all required notices and shall comply with all applicable codes, laws, ordinances, rules and regulations, and with the current regulations of the National Board of Fire Underwriters, wherever applicable. The Contractor further shall comply with the provisions of the Occupational Safety and Health Act of 1970. The Contractor shall immediately notify the MHDC of the delivery of all permits, licenses, certificates of inspection, certificates of occupancy, and any other such certificates and instruments required by law, regardless of to whom issued, and shall cause them to be displayed to the MHDC upon his request. Contractor shall also be responsible to comply with the provisions of those laws commonly known as CERCLA, RCRA, Clear Air Act, Clean Water Act and all other federal, state and local laws, ordinances, codes, rules and regulations pertaining to the protection of the environmental and of persons.

B. If the Contractor observes that the Drawings and Specifications are at variance with any applicable codes, laws, ordinances, rules or regulations, or protective covenants, it shall promptly notify the Architect(s) in writing, and any necessary changes shall be made as provided in this Contract for changes in the Drawings and Specifications. If the Contractor performs any work knowing it to be contrary to such codes, laws, ordinances, rules or regulations, or protective covenants, without giving such notice to the Architect(s), it shall bear all costs arising therefrom.

C. Upon completion of construction, the Contractor shall cooperate with the Owner in providing a survey showing the location on the site of all improvements constructed thereon, and showing the location of all water, sewer, gas and electric lines and mains, and of all existing utility easements. Such survey shall be prepared by a licensed surveyor who shall certify that the work is installed and erected entirely upon the land covered by the \_\_\_\_\_ deed of trust and security agreement on the Development and within any building restriction lines on said land, and does not overhang or otherwise encroach upon any easement or right-of-way of others. The Owner shall furnish copies of such survey required hereunder to MHDC.

D. The Contractor shall assume full responsibility for the maintenance of all landscaping which may be required by the Drawings and Specifications until such time as both parties to this Contract shall receive written notice from the Architect(s) that such landscaping has been finally completed. The Owner hereby agrees to make available to the Contractor, for such purpose, without cost to the latter, such facilities as water, hose and sprinkler.

E. The Contractor shall provide Owner with two (2) copies of the Development maintenance manual.

F. \_\_\_\_\_ If prevailing wage rates are applicable to this Development, the Contractor acknowledges that MHDC will monitor the Contractor's compliance with the prevailing wage requirements on a **monthly** basis. The Contractor must insert the wage provisions as determined by the Secretary of Labor for this Development in the construction contract so as to cover all laborers and mechanics employed in the development of the Development. In addition, the Contractor must post a notice at the job site that all laborers and mechanics are to be paid the prevailing wages in accordance with the prevailing wage determination applicable to the Development. The prevailing wage determination must also be posted at the job site. These postings must be placed so that all affected persons have clear access to the information. As part of the monitoring process, MHDC will make on-site inspections and conduct spot interviews of laborers and mechanics to verify that prevailing wages are being paid. In addition, the Contractor must submit weekly payroll forms to MHDC on a monthly basis. The payrolls will be on HUD forms WH-347 and WH-348. These forms must evidence payment of the prevailing wages. In addition, the contractor is responsible for obtaining these forms from their subcontractors and ensuring that the subcontractors comply with all prevailing requirements.

G. The contracting parties acknowledge and agree to be bound by the MHDC Workforce Eligibility Policy. If there is a violation of the MHDC Workforce Eligibility Policy the contracting parties may be sanctioned by MHDC. The imposition of sanctions will include, but is not limited to, the disqualification of the contracting parties from participation in future MHDC projects. MHDC may also elect to escrow funds which may be utilized in the event Undocumented Workers are determined to be working the project.

The contracting parties agree that in order to adhere to the MHDC Workforce Eligibility Policy each party to this agreement shall comply with the following:

- The contracting parties agree to provide MHDC with all bids collected which were solicited prior to entering into this contract. The contracting parties also agree to provide MHDC with all future bids which may be obtained by the contracting parties with respect to the scope of work contemplated herein;
- The contracting parties agree that prior to any individual performing any work on the project that individual must have properly completed the Form I-9 process with their employer [see Federal Form I-9 (Rev. 06/05/07) N];
- The contracting parties agree to use the Department of Homeland Security's E-Verify program for all employees working on the project except individual employees for which use of E-Verify is not possible due to the employee's existing employment status prior to the contracting party's registration and use of E-Verify. E-Verify is an Internet-based system operated by the Department of Homeland Security in partnership with the Social Security Administration that allows participating employers to electronically verify the employment

eligibility of their newly hired employees. The contracting parties agree to certify in writing that they are using and will continue to use the E-verify system.

- The contracting parties agree that a Form I-9 shall be kept on site for each individual who works on the project. The contracting parties also agree to provide E-Verify print-outs affirming the status of each of the individuals working on the project and attach the E-Verify printout to the corresponding Form I-9 which is stored on the project site (it is an acceptable practice to redact the social security number from the Form I-9 and E-Verify printout which is made available to MHDC for review);

- The contracting parties will cause a list of all individuals employed in the construction of this project to be retained on site;

- The contracting parties agree that a daily sign-in sheet for all individuals working on the project shall be maintained on site;

- The contracting parties will retain and provide MHDC monthly certified payroll records (every month during the construction of the project) for all employees and independent contractors working on the project;

- The contracting parties agree to allow MHDC to review the following documents during any MHDC on site Workforce Eligibility Policy inspections:

- Form I-9s
- E-Verify Print-out with corresponding I-9
- Comprehensive list of individuals who have worked on the project
- The daily sign in sheet for individuals who are working on the project
- Copies of all contracts executed in conjunction with the development

- MHDC shall be permitted to access the site to conduct random Workforce Eligibility Policy compliance reviews;

- The contracting parties agree that all contracts and subcontracts, and down the line contracts and subcontracts entered into as a part of this Development shall include this section verbatim; and,

- A copy of this entire agreement shall be made available to MHDC prior to beginning the scope of work contemplated herein.

All Capitalized terms in this section have the same meaning as defined in the MHDC Workforce Eligibility Policy.

H. If applicable, the Contractor and Owner shall ensure compliance with the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701(u)

(hereinafter "Section 3").

(1) The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted Developments covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

(2) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

(3) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

(4) The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.

(5) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected by before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

(6) Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

## **Article 6 -- Assurance of Completion**

The Contractor shall furnish to the Owner assurance of completion of the work in the form of:



100% Performance - Payment Bond (Dual Obligee) (MHDC Forms 2452 and 2452-A), in the amount of \$\_\_\_\_\_; or,

A Completion Assurance Agreement (MHDC Form 2450) in favor of MHDC in the amount of \$\_\_\_\_\_ (an unconditional, irrevocable, nondocumentary letter of credit in favor of MHDC, in the form approved by MHDC, or cash) to be held and disbursed in accordance with the MHDC Completion Assurance Agreement.

In the event the Contractor furnishes a Performance/Payment Bond as assurance of completion, the Contractor shall furnish to the Owner, latent defects insurance in the form of:

A Completion Assurance Agreement (Latent Defects) in favor of the MHDC in the amount of \$\_\_\_\_\_ (either cash or an unconditional, irrevocable, nondocumentary letter of credit in favor of MHDC, in a form approved by MHDC) to be held and disbursed by MHDC, as necessary.

Such assurance of completion shall run to the Owner and the MHDC as obligees and shall contain a provision whereby the surety agrees that any claim or right of action that either the Owner or the MHDC might have thereunder may be assigned to the MHDC.

#### **Article 7 -- Right of Entry and Interpretation**

A. The MHDC and its agents or assigns and the MHDC's agents shall, at all times during construction, have the right of entry and free access to the Development and the right to inspect all work done and materials, equipment and fixtures furnished, installed or stored in and about the Development. For such purposes, the Contractor shall furnish such enclosed working space as the MHDC or Agents may require and find acceptable as to location, size, accommodations and furnishings.

B. The MHDC shall also have the right to interpret the Contract Documents and to determine compliance therewith.

#### **Article 8 -- Assignments, Subcontracts and Termination**

A. This Contract shall not be assigned by either party without the prior written consent of the other party, and the MHDC, except that the Owner may assign the Contract, or any rights hereunder, to the MHDC.

B. The Contractor shall not subcontract all of the work to be performed hereunder without the prior written consent of the Owner and the MHDC.

C. Upon request by the Owner, or the MHDC, the Contractor shall disclose the names of all persons with whom it has contracted or will contract with respect to work to be done and materials

and equipment to be furnished hereunder. MHDC shall always be provided the monthly subcontractor list and copies of all subcontracts must be available for MHDC review.

D. The Contractor understands the work under this Contract is to be financed by a capital advance to be secured by a \_\_\_\_\_ deed of trust and security agreement and that the terms of said loan are set forth in a Capital Advance Agreement between the Owner and MHDC.

The Contractor further understands that said Capital Advance Agreement provides, among other things, that (i) costs of construction as defined therein will be advanced only to the extent that such charges have accrued thereunder; and (ii) in the event of a failure of the Owner to perform its obligations to the MHDC thereunder, the MHDC may, as attorney-in-fact for the Owner, undertake the completion of the Development in accordance with this Contract; and, in the event the MHDC elects not to undertake such completion, the Contractor's obligations under this Contract shall terminate.

#### **Article 9 -- Certification of Actual Cost**

A. The "actual cost of construction" as used in Article 3 above, **which is due Sixty (60) days after the date of substantial completion**, shall include all items of cost and expense incurred by the Contractor in the performance of this Contract, including costs and expenses of labor, materials for construction, equipment and fixtures, field engineering, sales taxes, workmen's compensation insurance, social security, public liability insurance, job overhead expenses, and all other expenses directly connected with construction; and including general overhead expenses, but excluding kickbacks, rebate and discounts received in connection with the construction of the Development; and excluding any return on or cost of the Contractor's working capital, such return on or cost of working capital being a part of or to be paid from the Contractor's fee or profit.

B. The Contractor shall keep accurate records of account of the said actual cost of construction, and shall, upon demand, make such records and invoices, receipts, subcontracts and other information pertaining to the construction of the Development available for inspection by the Owner and MHDC.

C. With its final application for payment, the Contractor shall furnish to the Owner a completed "Contractor's Certificate of Actual Cost," which shall be accompanied and supported by an independent public accountant's certificate as to actual cost (in form acceptable to MHDC).

D. In the event MHDC determines there is an identity of interest between the Owner or Contractor and any such subcontractor, equipment lessor or supplier, the Contractor shall include a provision in all subcontracts, equipment leases and purchase orders requiring the subcontractor, equipment lessor supplier to certify its costs incurred in connection with the Development.

## Article 10 -- Insurance

Contractor shall provide to Owner and MHDC at all times during the existence of the Contract Documents and the performance of the work contemplated thereby, Worker's Compensation and Employer's Liability Insurance, Public Liability Insurance and Vehicle Liability Insurance in the form and at least in the amount(s) required by MHDC Form 92329

## Article 11 -- Miscellaneous

A. Contractor agrees to furnish Owner and MHDC signed subcontracts from all subcontractor(s) who are to furnish or perform work, labor, services, or materials upon, to or for the work contemplated by the Contract Documents in support of the estimated costs contained on Exhibit "B".

B. Upon issuance of the Certificate of Substantial Completion of the Development by the Architect(s), , the Owner, Architect, and Contractor shall review and prepare a list of items to be completed and corrected ("Punchlist"). Should there be any item(s), on the Punchlist, the Owner and MHDC shall establish an estimated cost to complete each item and Owner will escrow from the amount due Contractor an amount equal to one and one-half (1-1/2) times the estimated cost necessary to complete said work. **All items on the punch list, if any, shall be completed within Two (2) weeks after the date of substantial completion.**

The amount of funds escrowed shall be paid within Thirty (30) days after the MHDC's representative has inspected said work and finds the work acceptable under the Contract Documents and the provisions of Article 3(C) fully performed.

C. The estimated costs to complete all items referred to in Article 2 paragraph B above shall not exceed the costs set forth in the Contractor's and/or Mortgagor's Cost Breakdown (Form FIN-115), attached as Exhibit "B", except as may be adjusted by approved Change Orders **as defined in the MHDC Capital Advance Agreement.**

D. After the final Certificate of occupancy and prior to the Cost Certification, the Owner will establish a date signifying the start of the Contractors 1 year warranty period for all parts, assembly and labor under which the entire development will be a part of. This will include all resident / commercial spaces regardless of their particular occupancy date.

**IN WITNESS WHEREOF**, the parties hereto have executed this Contract in Two (2) counterparts, each of which shall be deemed an original, in the day and year first above mentioned.

(SEAL)  
ATTEST/WITNESS:

**OWNER:**

\_\_\_\_\_, a Missouri \_\_\_\_\_

By: \_\_\_\_\_, its \_\_\_\_\_

By: \_\_\_\_\_

(SEAL)  
ATTEST/WITNESS:

**CONTRACTOR:**

\_\_\_\_\_, a Missouri \_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_  
\_\_\_\_\_, \_\_\_\_\_

**NOTICE TO OWNER. FAILURE OF THIS CONTRACTOR TO PAY THOSE PERSONS SUPPLYING MATERIAL OR SERVICES TO COMPLETE THIS CONTRACT CAN RESULT IN THE FILING OF A MECHANIC'S LIEN ON THE PROPERTY WHICH IS THE SUBJECT OF THE CONTRACT PURSUANT TO CHAPTER 429, RSMo. TO AVOID THIS RESULT, YOU MAY ASK THIS CONTRACTOR FOR "LIEN WAIVERS" FROM ALL PERSONS SUPPLYING MATERIAL OR SERVICES FOR THE WORK DESCRIBED IN THIS CONTRACT. FAILURE TO SECURE LIEN WAIVERS MAY RESULT IN YOUR PAYING FOR LABOR AND MATERIAL TWICE.**

MHDC 92442-CA

**SECTION 00 5000  
CONDITIONS OF THE CONTRACT**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. The work included under these Specifications consists of furnishing all items, materials, operations, or methods listed, mentioned, indicated, or scheduled on the Drawings and/or in these Specifications, including all labor, materials, equipment transportation temporary facilities, services, and incidentals necessary and required for construction completion of the project named in title page in accordance with Contract Documents.

**1.02 FORM OF SPECIFICATIONS**

- A. Conditions of the Contract, Supplementary General Conditions, and Division 1 apply to every Division of these Specifications.
- B. These Specifications are of abbreviated form and contain incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "shall be", "as noted on the Drawings", "according to the Drawings", "a", "the", and "all" are intentional. Omitted words and phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.
- C. All Specification instructions are directed to the Contractor, and inclusion of any work by mention, note, or itemization, however brief, implies Contractor shall provide same unless specifically directed otherwise.
- D. In specifying an item by manufacturer's name and/or catalog number, unless specifically stated otherwise, such item shall be provided with all standard devices and accessories indicated in latest edition of manufacturer's catalog or brochure published at date of date of Invitation to Bid: furnished such item complete with component parts necessary for obviously intended use and installation, whether or not description or catalog number contains all supplemental information and/or numbers of such components.

**1.03 UNIFORM FEDERAL ACCESSIBILITY STANDARDS**

- A. General Contractor shall complete all work in accordance with latest printed edition of the Fair Housing Act Guidelines, Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act and/or the Uniform Federal Accessibility Standards as applicable. Where work is required to comply with the standards and conflict exists with the architectural plans and/or specifications, notify Architect immediately of such conflict and request written clarification prior to proceeding with the work.

**1.04 AIA GENERAL CONDITIONS**

- A. AIA Document A201, "General Conditions of the Contract for Construction", 2017 Edition, 15 Articles, hereinafter referred to as "AIA General Conditions", is hereby made a part of this Specification. Contractor shall consult this Document and become intimately familiar with its contents. Refer to Section 007000, General Conditions.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 SUPPLEMENTS AND AMENDMENTS TO THE AIA GENERAL CONDITIONS**

- A. The AIA General Conditions are hereinafter supplemented and/or amended. All supplementary provisions shall be considered as added thereto. Where any Article is amended, deleted or superseded hereby, unaltered provisions of such Article shall remain in effect.

**3.02 GENERAL PROVISIONS**

- A. Supplement Subparagraph 1.2.1 as follows:
  - 1. Drawings, Specifications and Other Contract Documents are not intended as "Shop Drawings" or extensively detailed documents; they are intended to indicate general design concept of Project in sufficient detail that all work required is reasonable inferable there

from and Contractor shall provide all work thus indicated or reasonably inferred as necessary to produce intended results of complete, structurally sound, aesthetically desirable, durable, properly performing work of quality. Should conflict occur between Drawings and Specifications, Contractor shall obtain written decision of same from Architect prior to submitting Bid, Signing Agreement or proceeding with the work.

- B. Supplement Subparagraph 1.4.1, Interpretation, as follows:
1. When a word, "approval", "approved", "proper", "satisfactory", "equal", and "as directed" is used, it implies such reference as to the Architect's approval or direction.
  2. "Approve", "approval", or "approved" means the Architect will observe or review items or construction referred to him for such approval and that his review represents his opinion that such item or construction is acceptable for the circumstances and conditions of the project, based on his observations and/or information made available to him by Contractor. However, such review shall not represent that Architect checked item or construction in detail, nor that he thereby waives original requirements or assumes any responsibility for its correctness or performance.
  3. "Equal", "equivalent", means the item or construction possesses similar physical size and characteristics, similar performance qualities and characteristics and fulfills utilitarian functions required by Contract Documents without any decrease in quality, appearance or durability; responsibility for "equal" or equivalent" item of construction to fulfill the Architect's intent of Contract Documents (expressed or implied) rests with the Contractor.
  4. "Extent" means general checklist or outline of work included: not constructed as all inclusive nor limiting and not relieving Contractor from providing all similar or related work elsewhere indicated or inferable in Contract Documents.
  5. "Indicated" means as indicated on Contract Documents.
  6. "Provide" means furnish and install.

### **3.03 ARTICLE 3 CONTRACTOR**

- A. Supplement Subparagraph 3.7.1 as follows:
1. Contractor shall give notices to public or private utility companies and others required to make installations, in ample time for them to complete such installations and not delay the project, whether such installations are under contract or reasonable inferable necessary for completion of project. Contractor is responsible for staking or surveying as may be required to complete the installation of utilities either on or off site by any Utility Companies or by private contract.
- B. Supplement Subparagraph 3.12.5 as follows:
1. By submitting Shop Drawings and samples, Contractor thereby represents he has approved them (whether they bear his approval stamp or not) and he has determined and verified all field measurements, quantities, field construction criteria, materials, catalog numbers, and similar data, or will do so, and he has checked and coordinated Shop Drawings and sample with requirements of work and Contract Documents and with work of all other trades and Contractors on project.
- C. Supplement Subparagraph 3.12.8 as follows:
1. When material or equipment is specified by manufacturer's name or names, the intent is to establish quality required. Materials other than those specified will be considered after Contract has been executed provided they are submitted in writing by successful bidder with sufficient data to establish that their quality for the use intended is equivalent to the quality of materials specified.
  2. By making request for substitution, the Contractor represents that he has personally investigated the substitute product and determined that it is equal or superior to that specified, that he will provide the same warranty as for that specified, that he waives all claims for any additional cost related to the substitution, and that he will coordinate the installation of any accepted substitution making changes as may be required such that the work shall be completed in all respects.

3. Requests for substitutions shall be submitted in sufficient time to allow for proper consideration and so as to cause no delay in the work. All materials and equipment shall be applied, installed, connected, cleaned and placed in operation in accordance with manufacturer's directions.
4. When material or equipment is required to be installed by manufacturer's approved applicator, it shall be the contractor's responsibility to insure such approval.

#### **3.04 ARTICLE 4 ADMINISTRATION OF THE CONTRACT**

- A. Delete Second Sentence of Subparagraph 4.1.1 and Insert:
  1. The term Architect means Architect or his authorized representative (including his Consulting Engineer). The term Architect/Engineer means Architect and/or his Consulting Engineer.

#### **3.05 ARTICLE 8 TIME**

- A. Add the following Subparagraph:
  1. 8.1.5 As between the Owner and the Contractor: as to all acts of failures to act occurring prior to the relevant Date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such Date of Substantial Completion; as to all acts or failures to act occurring subsequent to the relevant Date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate of Payment.

#### **3.06 ARTICLE 11 INSURANCE AND BONDS**

- A. Supplement Paragraph 11.1 Contractor's liability Insurance, add the following:
  1. 11.1.4 Certificates of Insurance: General Contractor shall, before commencing work under this Contract, submit duplicate copies to Architect and Owner showing evidence that all Certificates of Insurance are in effect, covering Contractor and Owner as their interests may appear, and that these minimum insurance coverage will not be canceled or changed until 30 days after written notice is given to Owner and Architect. Coverage is as follows:
  2. Workmen's Compensation: Statutory for applicable states, except provided \$100,000.00 minimum coverage.
  3. Comprehensive General Liability including Contractor's Liability: Contingent Liability; Contractual Liability; Completed Operations and Products Liability all on occurrences with Bodily Injury Coverage and Broad from Property Damage. Remove the XCU exclusion relating to Explosion, Collapse and Underground Property Damage. Completed Operations Liability shall be kept in force for at least 2 years after date of final completion. Provides \$500,000.00 minimum coverage.
  4. Comprehensive Automobile Liability including no owner or hired care coverage as well as owned vehicles. Provide \$500,000.00 minimum coverage.
  5. Employer's Liability: Provide \$100,000.00 minimum coverage.
  6. Builder's Risk Insurance: Contractor will effect and maintain, Fire Insurance with extended coverage and vandalism and malicious mischief insurance upon the entire structure on which the work to be performed under this Contract is to be done to the extent of 100% of the insurable value thereof. Contractor will be responsible for any and all deductible.
  7. In addition to the above minimum coverage, Contractor shall provide \$1,000,000.00 umbrella coverage.
- B. Supplement Paragraph 11.4 Performance Bond and Payment Bond as follows:
  1. Performance Bond and Labor and Material Payment Bonds shall be furnished to the Owner, by General Contractor, in an amount equal to 100% of the contract sum as security for the faithful performance of the contract and the payment of all persons performing labor and furnishing material in connection with the contract.
  2. Surety: Bonds furnished shall be written by a Surety approved by the U.S. Treasury Department and licensed to do business in the State where project is to be constructed.

No work shall be commenced until bonds are in force. Power of Attorney for the Surety Company Agent must accompany each bond issued, and must be certified to include the date of the bonds.

3. Bid Proposal: Contractor shall include cost of bonds in contract price.

**END OF SECTION**



**SECTION 00 5500**  
**MHDC CONDITIONS OF THE CONTRACT**

**PART 1 - GENERAL**

**1.01 MHDC REQUIREMENTS**

- A. The work included under these specifications consists of requirements stipulated by Missouri Housing Development Commission (The "MHDC") pursuant to the current MHDC Design Constraints Compliance Guidelines.

**1.02 MHDC WORKFORCE ELIGIBILITY POLICY**

- A. MHDC has adopted and enacted the enforcement of its policy to support workforce eligibility requirements pursuant to its Commission, effective and made a part of these Specifications. The MHDC, effective the date of this Project, Workforce Eligibility Policy is made a part of this Project and shall be made a part of each General Contractor and each Subcontractors contract for the work to be performed for this Project. A copy of the MHDC Workforce Compliance Handbook is made a part of Work of this Section and available on the MHDC website.
- B. As stipulated by the MHDC Workforce Compliance Handbook, submission of various Forms and Lists are required to be submitted to MHDC offices and/or retained on-site for periodic review and inspection to ensure compliance with the Policy. A partial listing of those forms and lists is listed below. MHDC may add to or delete from this list as may be determined to be appropriate for the specific Project or as may be amended from time to time by the Commission.
  - 1. Designated Workforce Eligibility Contacts, MHDC Form - 2510
  - 2. Use of E-verify. Each General Contractor and subcontractors who have employees perform labor on site must utilize E-Verify and submit proof of registration to use E-verify.
  - 3. I-9 Forms and E-Verify for Employees
  - 4. Labor List, MHDC Form -2509
  - 5. Master Subcontractor List, MHDC Form -2502
  - 6. Certified Payroll, MHDC Form - 2504
  - 7. Daily Sign In Sheet, MHDC Form -2505
  - 8. Contractor Labor List, MHDC Form - 2503
  - 9. Subcontractor Bids: Must be submitted to MHDC at the time of Firm Submission and updated as new bids are collected.
  - 10. Documentation of Good Standing: Each incorporated General Contractor and Subcontractors must submit a certificate of good standing issued by the Missouri Secretary of State that is dated no earlier than six months prior to execution of their contract in connection with the Project.

**1.03 CONSTRUCTION DISBURSEMENT**

- A. General Contractor and all subcontractors shall comply with requirements set forth and made a part of the Specifications as set forth in the current MHDC Construction Disbursement Handbook, MHDC Form 2400.
- B. Applicable Forms:
  - 1. MHDC Form FIN 115, Mortgagor's and/or Contractors Schedule of Values shall be utilized to complete the AIA form of payment request. NO adjustments in the schedule of values may be made without MHDC approval.
  - 2. American Institute of Architects, AIA Document G702/G703 current edition, Application for Certificate of Payment must be completed and submitted with each application for payment.
  - 3. AIA Document G701 current edition, Change Orders
  - 4. Contractor's Prevailing Wage Certificate, MHDC Form -2450 (if applicable)
  - 5. MBE/WBE monthly reporting to MHDC, form together with sub-contractor list, Form 2502.
- C. Monthly Disbursements:
  - 1. All amounts requested must be approved by an MHDC designated inspector.

2. The Project must be in good standing with submission of the I-9 Compliance documentation.
3. The monthly amount requested for General Contractor's overhead and profit must not exceed the percentage of completion of the Project.
4. The monthly amount requested for General Contractor's profit must not exceed the percentage of completion of the Project.
5. MHDC shall maintain ten percent (10%) retainage on all work performed on the Project during the construction. No reduction of retainage will be considered nor approved by MHDC until the Project has achieved 90% completion and may be reduced to five percent (5%), subject to MHDC approval.
6. Any adjustments requested by the Contractor to the approved FIN 115 MUST be submitted and processed by MHDC on an AIA Change Order form.
7. Change Orders: Change Orders must be submitted in advance of or concurrent with a monthly application for payment and require signature of Owner, Contractor and Architect. MHDC may require the receipt of appropriate Consent of Surety to any increase/decrease to be submitted with the Change Order to MHDC.

#### **1.04 FIRM SUBMISSION REQUIRED DOCUMENTATION**

- A. At the time of submission of the Owner's application to MHDC, the following minimum items are required of the General Contractor.
  1. Contractor's Qualification Statement, AIA Document A305, current edition
  2. Financial Income/Balance Statement if required by MHDC
  3. Certificate of Insurance
  4. Certificate or evidence of Bonding
  5. Executed Mortgagor's and Contractors Cost Breakdown, MHDC Form -FIN 115
  6. Master Subcontractor List, MHDC Form -2502
  7. Subcontractor Bids
- B. Should MHDC determine that additional documentation is required, the General Contractor shall provide in a timely manner.

#### **1.05 OTHER MHDC REQUIRED DOCUMENTATION**

- A. During the performance of the work on the Project, General Contractor and all subcontractors shall maintain all required documentation and required Federal and State Notices at the Project Site as required. General Contractor shall post and maintain required MHDC Labor Lists, Master Lists, Sign-In sheets, I-9 documentation, Prevailing Wage notices (if applicable) at the Project site.
- B. General Contractor shall ensure all site field personnel are familiar with MHDC requirements, rules/regulations, and procedures to maintain effective communication with Owner, Architect and MHDC designated representative regarding the implementation of MHDC policies.
- C. General Contractor shall provide As-built survey and Surveyor's Report of the subject Project indicating all improvements at the site by a licensed land surveyor conforming to all requirements as stipulated and required by MHDC.
- D. General Contractor shall provide a Cost Certification performed by independent CPA pursuant to MHDC requirements, guidelines and requirements.

#### **1.06 FIRM COMMITMENT REQUIRED DOCUMENTATION**

- A. Executed Mortgagor's and Contractors Cost Breakdown, with the Schedule of Values shall be submitted in duplicate (2) copies with original signatures, MHDC Form FIN-115.
- B. When subcontractors work and material suppliers exceed \$10,000.00, their actual bids must be submitted.
- C. A list of all major subcontractors by work category.
- D. Contractors' Qualification Statement, AIA Form A305, current edition.

#### **PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION 005500**

This page intentionally left blank

**SECTION 00 7000  
GENERAL CONDITIONS**

**PART 1 GENERAL**

**1.01 FORM OF GENERAL CONDITIONS**

- A. AIA Document A201, General Conditions of the Contract for Construction, 2017 Edition, attached, is incorporated herein and made a part of The General Conditions Between The Owner And The Contractor.

**1.02 SUPPLEMENTARY CONDITIONS**

- A. Refer to Section 00 5000 and 00 7300 For Amendments And Supplementary Information To These General Conditions

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION 00 7000**

This page intentionally left blank

# AIA® Document A201® – 2017

## General Conditions of the Contract for Construction

### for the following PROJECT:

*(Name and location or address)*

Whittier Place II  
Emporia, Kansas

### THE OWNER:

*(Name, legal status and address)*

Whittier Place II, LP  
2851 Highway 60 West  
Suite 1  
Billings, Missouri 65610

### THE ARCHITECT:

*(Name, legal status and address)*

Rosemann & Associates, P.C., a Missouri professional corporation  
1526 Grand Boulevard  
Kansas City, Missouri 64108-1404

### TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

Init.

**AIA Document A201® – 2017.** Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A201," and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 10:37:38 CT on 08/19/2020 under Order No. 1648101243 which expires on 07/08/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail [copyright@aia.org](mailto:copyright@aia.org).

**User Notes:**

(3B9ADA3E)

## 15 CLAIMS AND DISPUTES



Init.

/

**AIA Document A201® – 2017.** Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. **The “American Institute of Architects,” “AIA,” the AIA Logo, “A201,” and “AIA Contract Documents” are registered trademarks and may not be used without permission.** This document was produced by AIA software at 10:37:38 CT on 08/19/2020 under Order No.1648101243 which expires on 07/08/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail [copyright@aia.org](mailto:copyright@aia.org).  
**User Notes:**

(3B9ADA3E)



## INDEX

(Topics and numbers in bold are Section headings.)

Acceptance of Nonconforming Work  
9.6.6, 9.9.3, 12.3  
Acceptance of Work  
9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3  
Access to Work  
3.16, 6.2.1, 12.1  
Accident Prevention  
10  
Acts and Omissions  
3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,  
10.2.8, 13.3.2, 14.1, 15.1.2, 15.2  
Addenda  
1.1.1  
Additional Costs, Claims for  
3.7.4, 3.7.5, 10.3.2, 15.1.5  
Additional Inspections and Testing  
9.4.2, 9.8.3, 12.2.1, 13.4  
Additional Time, Claims for  
3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, 15.1.6  
Administration of the Contract  
3.1.3, 4.2, 9.4, 9.5  
Advertisement or Invitation to Bid  
1.1.1  
Aesthetic Effect  
4.2.13  
Allowances  
3.8  
Applications for Payment  
4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10  
Approvals  
2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,  
3.12.10.1, 4.2.7, 9.3.2, 13.4.1  
Arbitration  
8.3.1, 15.3.2, 15.4  
**ARCHITECT**  
4  
Architect, Definition of  
4.1.1  
Architect, Extent of Authority  
2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,  
9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,  
13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1  
Architect, Limitations of Authority and  
Responsibility  
2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2,  
4.2.3, 4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4,  
9.4.2, 9.5.4, 9.6.4, 15.1.4, 15.2  
Architect's Additional Services and Expenses  
2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4  
Architect's Administration of the Contract  
3.1.3, 3.7.4, 15.2, 9.4.1, 9.5  
Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7  
Architect's Authority to Reject Work  
3.5, 4.2.6, 12.1.2, 12.2.1  
Architect's Copyright  
1.1.7, 1.5  
Architect's Decisions  
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,  
7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,  
13.4.2, 15.2  
Architect's Inspections  
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4  
Architect's Instructions  
3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2  
Architect's Interpretations  
4.2.11, 4.2.12  
Architect's Project Representative  
4.2.10  
Architect's Relationship with Contractor  
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,  
3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,  
3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,  
9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2  
Architect's Relationship with Subcontractors  
1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3  
Architect's Representations  
9.4.2, 9.5.1, 9.10.1  
Architect's Site Visits  
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4  
Asbestos  
10.3.1  
Attorneys' Fees  
3.18.1, 9.6.8, 9.10.2, 10.3.3  
Award of Separate Contracts  
6.1.1, 6.1.2  
Award of Subcontracts and Other Contracts for  
Portions of the Work  
5.2  
Basic Definitions  
1.1  
Bidding Requirements  
1.1.1  
Binding Dispute Resolution  
8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,  
15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1  
Bonds, Lien  
7.3.4.4, 9.6.8, 9.10.2, 9.10.3  
Bonds, Performance, and Payment  
7.3.4.4, 9.6.7, 9.10.3, 11.1.2, 11.1.3, 11.5  
Building Information Models Use and Reliance  
1.8  
Building Permit  
3.7.1  
Capitalization  
1.3  
Certificate of Substantial Completion  
9.8.3, 9.8.4, 9.8.5

Certificates for Payment  
 4.2.1, 4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7,  
 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4  
 Certificates of Inspection, Testing or Approval  
 13.4.4  
 Certificates of Insurance  
 9.10.2  
 Change Orders  
 1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,  
 7.1.2, 7.1.3, 7.2, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,  
 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2  
 Change Orders, Definition of  
 7.2.1  
 CHANGES IN THE WORK  
 2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,  
 11.5  
 Claims, Definition of  
 15.1.1  
 Claims, Notice of  
 1.6.2, 15.1.3  
 CLAIMS AND DISPUTES  
 3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, 15, 15.4  
 Claims and Timely Assertion of Claims  
 15.4.1  
 Claims for Additional Cost  
 3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, 15.1.5  
 Claims for Additional Time  
 3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, 15.1.6  
 Concealed or Unknown Conditions, Claims for  
 3.7.4  
 Claims for Damages  
 3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,  
 11.3.2, 14.2.4, 15.1.7  
 Claims Subject to Arbitration  
 15.4.1  
 Cleaning Up  
 3.15, 6.3  
 Commencement of the Work, Conditions Relating to  
 2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,  
 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, 15.1.5  
 Commencement of the Work, Definition of  
 8.1.2  
 Communications  
 3.9.1, 4.2.4  
 Completion, Conditions Relating to  
 3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,  
 9.10, 12.2, 14.1.2, 15.1.2  
 COMPLETION, PAYMENTS AND  
 9  
 Completion, Substantial  
 3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,  
 9.10.3, 12.2, 15.1.2  
 Compliance with Laws  
 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2,  
 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3,  
 15.2.8, 15.4.2, 15.4.3  
 Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3  
 Conditions of the Contract  
 1.1.1, 6.1.1, 6.1.4  
 Consent, Written  
 3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,  
 15.4.4.2  
 Consolidation or Joinder  
 15.4.4  
 CONSTRUCTION BY OWNER OR BY  
 SEPARATE CONTRACTORS  
 1.1.4, 6  
 Construction Change Directive, Definition of  
 7.3.1  
 Construction Change Directives  
 1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3,  
 7.3, 9.3.1.1  
 Construction Schedules, Contractor's  
 3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2  
 Contingent Assignment of Subcontracts  
 5.4, 14.2.2.2  
 Continuing Contract Performance  
 15.1.4  
 Contract, Definition of  
 1.1.2  
 CONTRACT, TERMINATION OR SUSPENSION  
 OF THE  
 5.4.1.1, 5.4.2, 11.5, 14  
 Contract Administration  
 3.1.3, 4, 9.4, 9.5  
 Contract Award and Execution, Conditions Relating  
 to  
 3.7.1, 3.10, 5.2, 6.1  
 Contract Documents, Copies Furnished and Use of  
 1.5.2, 2.3.6, 5.3  
 Contract Documents, Definition of  
 1.1.1  
 Contract Sum  
 2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,  
 9.1, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,  
 12.3, 14.2.4, 14.3.2, 15.1.4.2, 15.1.5, 15.2.5  
 Contract Sum, Definition of  
 9.1  
 Contract Time  
 1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,  
 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,  
 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,  
 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5  
 Contract Time, Definition of  
 8.1.1  
 CONTRACTOR  
 3  
**Contractor**, Definition of  
 3.1, 6.1.2  
 Contractor's Construction and Submittal Schedules  
 3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2  
 Contractor's Employees

2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6,  
10.2, 10.3, 11.3, 14.1, 14.2.1.1  
Contractor's Liability Insurance  
11.1  
Contractor's Relationship with Separate Contractors  
and Owner's Forces  
3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4  
Contractor's Relationship with Subcontractors  
1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2,  
9.6.7, 9.10.2, 11.2, 11.3, 11.4  
Contractor's Relationship with the Architect  
1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,  
3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2,  
6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6,  
10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1  
Contractor's Representations  
3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2  
Contractor's Responsibility for Those Performing the  
Work  
3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8  
Contractor's Review of Contract Documents  
3.2  
Contractor's Right to Stop the Work  
2.2.2, 9.7  
Contractor's Right to Terminate the Contract  
14.1  
Contractor's Submittals  
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2,  
9.8.3, 9.9.1, 9.10.2, 9.10.3  
Contractor's Superintendent  
3.9, 10.2.6  
Contractor's Supervision and Construction  
Procedures  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4,  
7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4  
Coordination and Correlation  
1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1  
Copies Furnished of Drawings and Specifications  
1.5, 2.3.6, 3.11  
Copyrights  
1.5, 3.17  
Correction of Work  
2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, 12.2, 12.3,  
15.1.3.1, 15.1.3.2, 15.2.1  
Correlation and Intent of the Contract Documents  
1.2  
Cost, Definition of  
7.3.4  
Costs  
2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3,  
7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6,  
11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14  
Cutting and Patching  
3.14, 6.2.5  
Damage to Construction of Owner or Separate  
Contractors  
3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work  
3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4  
Damages, Claims for  
3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2,  
11.3, 14.2.4, 15.1.7  
Damages for Delay  
6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2  
Date of Commencement of the Work, Definition of  
8.1.2  
Date of Substantial Completion, Definition of  
8.1.3  
Day, Definition of  
8.1.4  
Decisions of the Architect  
3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4,  
7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2,  
14.2.2, 14.2.4, 15.1, 15.2  
Decisions to Withhold Certification  
9.4.1, 9.5, 9.7, 14.1.1.3  
Defective or Nonconforming Work, Acceptance,  
Rejection and Correction of  
2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3,  
9.10.4, 12.2.1  
Definitions  
1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1,  
6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1  
Delays and Extensions of Time  
3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7,  
10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5  
Digital Data Use and Transmission  
1.7  
Disputes  
6.3, 7.3.9, 15.1, 15.2  
Documents and Samples at the Site  
3.11  
Drawings, Definition of  
1.1.5  
Drawings and Specifications, Use and Ownership of  
3.11  
Effective Date of Insurance  
8.2.2  
Emergencies  
10.4, 14.1.1.2, 15.1.5  
Employees, Contractor's  
3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,  
10.3.3, 11.3, 14.1, 14.2.1.1  
Equipment, Labor, or Materials  
1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3,  
9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2  
Execution and Progress of the Work  
1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1,  
3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1,  
9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4  
Extensions of Time  
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2,  
10.4, 14.3, 15.1.6, 15.2.5

Failure of Payment  
 9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2  
 Faulty Work  
 (See Defective or Nonconforming Work)  
 Final Completion and Final Payment  
 4.2.1, 4.2.9, 9.8.2, 9.10, 12.3, 14.2.4, 14.4.3  
 Financial Arrangements, Owner's  
 2.2.1, 13.2.2, 14.1.1.4  
**GENERAL PROVISIONS**  
 1  
 Governing Law  
 13.1  
 Guarantees (See Warranty)  
 Hazardous Materials and Substances  
 10.2.4, 10.3  
 Identification of Subcontractors and Suppliers  
 5.2.1  
 Indemnification  
 3.17, 3.18, 9.6.8, 9.10.2, 10.3.3, 11.3  
 Information and Services Required of the Owner  
 2.1.2, 2.2, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,  
 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,  
 14.1.1.4, 14.1.4, 15.1.4  
 Initial Decision  
 15.2  
 Initial Decision Maker, Definition of  
 1.1.8  
 Initial Decision Maker, Decisions  
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5  
 Initial Decision Maker, Extent of Authority  
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5  
 Injury or Damage to Person or Property  
 10.2.8, 10.4  
 Inspections  
 3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,  
 9.9.2, 9.10.1, 12.2.1, 13.4  
 Instructions to Bidders  
 1.1.1  
 Instructions to the Contractor  
 3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2  
 Instruments of Service, Definition of  
 1.1.7  
 Insurance  
 6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5,  
 11  
**Insurance, Notice of Cancellation or Expiration**  
**11.1.4, 11.2.3**  
 Insurance, Contractor's Liability  
 11.1  
 Insurance, Effective Date of  
 8.2.2, 14.4.2  
 Insurance, Owner's Liability  
 11.2  
 Insurance, Property  
 10.2.5, 11.2, 11.4, 11.5  
 Insurance, Stored Materials  
 9.3.2

**INSURANCE AND BONDS**  
 11  
 Insurance Companies, Consent to Partial Occupancy  
 9.9.1  
 Insured loss, Adjustment and Settlement of  
 11.5  
 Intent of the Contract Documents  
 1.2.1, 4.2.7, 4.2.12, 4.2.13  
 Interest  
 13.5  
 Interpretation  
 1.1.8, 1.2.3, 1.4, 4.1.1, 5.1, 6.1.2, 15.1.1  
 Interpretations, Written  
 4.2.11, 4.2.12  
 Judgment on Final Award  
 15.4.2  
 Labor and Materials, Equipment  
 1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,  
 10.2.4, 14.2.1.1, 14.2.1.2  
 Labor Disputes  
 8.3.1  
 Laws and Regulations  
 1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,  
 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,  
 15.4  
 Liens  
 2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8  
 Limitations, Statutes of  
 12.2.5, 15.1.2, 15.4.1.1  
 Limitations of Liability  
 3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,  
 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,  
 11.3, 12.2.5, 13.3.1  
 Limitations of Time  
 2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,  
 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,  
 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,  
 15.1.2, 15.1.3, 15.1.5  
 Materials, Hazardous  
 10.2.4, 10.3  
 Materials, Labor, Equipment and  
 1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,  
 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2  
 Means, Methods, Techniques, Sequences and  
 Procedures of Construction  
 3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2  
 Mechanic's Lien  
 2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8  
 Mediation  
 8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1,  
 15.4.1.1  
 Minor Changes in the Work  
 1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, 7.4  
**MISCELLANEOUS PROVISIONS**  
 13

Modifications, Definition of  
1.1.1  
Modifications to the Contract  
1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2  
Mutual Responsibility  
6.2  
Nonconforming Work, Acceptance of  
9.6.6, 9.9.3, 12.3  
Nonconforming Work, Rejection and Correction of  
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2  
Notice  
1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1  
Notice of Cancellation or Expiration of Insurance  
11.1.4, 11.2.3  
Notice of Claims  
1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, 15.1.3, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1  
Notice of Testing and Inspections  
13.4.1, 13.4.2  
Observations, Contractor's  
3.2, 3.7.4  
Occupancy  
2.3.1, 9.6.6, 9.8  
Orders, Written  
1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1  
OWNER  
2  
Owner, Definition of  
2.1.1  
Owner, Evidence of Financial Arrangements  
2.2, 13.2.2, 14.1.1.4  
Owner, Information and Services Required of the  
2.1.2, 2.2, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4  
Owner's Authority  
1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7  
Owner's Insurance  
11.2  
Owner's Relationship with Subcontractors  
1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2  
Owner's Right to Carry Out the Work  
2.5, 14.2.2  
Owner's Right to Clean Up  
6.3  
Owner's Right to Perform Construction and to Award

Separate Contracts  
6.1  
Owner's Right to Stop the Work  
2.4  
Owner's Right to Suspend the Work  
14.3  
Owner's Right to Terminate the Contract  
14.2, 14.4  
Ownership and Use of Drawings, Specifications and Other Instruments of Service  
1.1.1, 1.1.6, 1.1.7, 1.5, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3  
Partial Occupancy or Use  
9.6.6, 9.9  
Patching, Cutting and  
3.14, 6.2.5  
Patents  
3.17  
Payment, Applications for  
4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3  
Payment, Certificates for  
4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4  
Payment, Failure of  
9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2  
Payment, Final  
4.2.1, 4.2.9, 9.10, 12.3, 14.2.4, 14.4.3  
Payment Bond, Performance Bond and  
7.3.4.4, 9.6.7, 9.10.3, 11.1.2  
Payments, Progress  
9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4  
PAYMENTS AND COMPLETION  
9  
Payments to Subcontractors  
5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2  
PCB  
10.3.1  
Performance Bond and Payment Bond  
7.3.4.4, 9.6.7, 9.10.3, 11.1.2  
Permits, Fees, Notices and Compliance with Laws  
2.3.1, 3.7, 3.13, 7.3.4.4, 10.2.2  
PERSONS AND PROPERTY, PROTECTION OF  
10  
Polychlorinated Biphenyl  
10.3.1  
Product Data, Definition of  
3.12.2  
Product Data and Samples, Shop Drawings  
3.11, 3.12, 4.2.7  
Progress and Completion  
4.2.2, 8.2, 9.8, 9.9.1, 14.1.4, 15.1.4  
Progress Payments  
9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4  
Project, Definition of  
1.1.4  
Project Representatives



4.2.10  
 Property Insurance  
 10.2.5, 11.2  
 Proposal Requirements  
 1.1.1  
 PROTECTION OF PERSONS AND PROPERTY  
 10  
 Regulations and Laws  
 1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,  
 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8,  
 15.4  
 Rejection of Work  
 4.2.6, 12.2.1  
 Releases and Waivers of Liens  
 9.3.1, 9.10.2  
 Representations  
 3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1  
 Representatives  
 2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1  
 Responsibility for Those Performing the Work  
 3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10  
 Retainage  
 9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3  
 Review of Contract Documents and Field Conditions  
 by Contractor  
 3.2, 3.12.7, 6.1.3  
 Review of Contractor's Submittals by Owner and  
 Architect  
 3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2  
 Review of Shop Drawings, Product Data and  
 Samples by Contractor  
 3.12  
 Rights and Remedies  
 1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,  
 6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,  
 12.2.4, 13.3, 14, 15.4  
 Royalties, Patents and Copyrights  
 3.17  
 Rules and Notices for Arbitration  
 15.4.1  
 Safety of Persons and Property  
 10.2, 10.4  
 Safety Precautions and Programs  
 3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4  
 Samples, Definition of  
 3.12.3  
 Samples, Shop Drawings, Product Data and  
 3.11, 3.12, 4.2.7  
 Samples at the Site, Documents and  
 3.11  
 Schedule of Values  
 9.2, 9.3.1  
 Schedules, Construction  
 3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2  
 Separate Contracts and Contractors  
 1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2  
 Separate Contractors, Definition of

6.1.1  
 Shop Drawings, Definition of  
 3.12.1  
 Shop Drawings, Product Data and Samples  
 3.11, 3.12, 4.2.7  
 Site, Use of  
 3.13, 6.1.1, 6.2.1  
 Site Inspections  
 3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4  
 Site Visits, Architect's  
 3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4  
 Special Inspections and Testing  
 4.2.6, 12.2.1, 13.4  
 Specifications, Definition of  
 1.1.6  
 Specifications  
 1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14  
 Statute of Limitations  
 15.1.2, 15.4.1.1  
 Stopping the Work  
 2.2.2, 2.4, 9.7, 10.3, 14.1  
 Stored Materials  
 6.2.1, 9.3.2, 10.2.1.2, 10.2.4  
 Subcontractor, Definition of  
 5.1.1  
 SUBCONTRACTORS  
 5  
 Subcontractors, Work by  
 1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4,  
 9.3.1.2, 9.6.7  
 Subcontractual Relations  
 5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1  
 Submittals  
 3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3,  
 9.8, 9.9.1, 9.10.2, 9.10.3  
 Submittal Schedule  
 3.10.2, 3.12.5, 4.2.7  
 Subrogation, Waivers of  
 6.1.1, 11.3  
 Substances, Hazardous  
 10.3  
 Substantial Completion  
 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3,  
 12.2, 15.1.2  
 Substantial Completion, Definition of  
 9.8.1  
 Substitution of Subcontractors  
 5.2.3, 5.2.4  
 Substitution of Architect  
 2.3.3  
 Substitutions of Materials  
 3.4.2, 3.5, 7.3.8  
 Sub-subcontractor, Definition of  
 5.1.2  
 Subsurface Conditions  
 3.7.4  
 Successors and Assigns

13.2  
 Superintendent  
 3.9, 10.2.6  
 Supervision and Construction Procedures  
 1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4,  
 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4  
 Suppliers  
 1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6,  
 9.10.5, 14.2.1  
 Surety  
 5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2,  
 15.2.7  
 Surety, Consent of  
 9.8.5, 9.10.2, 9.10.3  
 Surveys  
 1.1.7, 2.3.4  
 Suspension by the Owner for Convenience  
 14.3  
 Suspension of the Work  
 3.7.5, 5.4.2, 14.3  
 Suspension or Termination of the Contract  
 5.4.1.1, 14  
 Taxes  
 3.6, 3.8.2.1, 7.3.4.4  
 Termination by the Contractor  
 14.1, 15.1.7  
 Termination by the Owner for Cause  
 5.4.1.1, 14.2, 15.1.7  
 Termination by the Owner for Convenience  
 14.4  
 Termination of the Architect  
 2.3.3  
 Termination of the Contractor Employment  
 14.2.2

## TERMINATION OR SUSPENSION OF THE CONTRACT

14  
 Tests and Inspections  
 3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,  
 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4  
 TIME  
 8  
 Time, Delays and Extensions of  
 3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7,  
 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5  
 Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2,  
 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,  
 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14,  
 15.1.2, 15.1.3, 15.4  
 Time Limits on Claims  
 3.7.4, 10.2.8, 15.1.2, 15.1.3  
 Title to Work  
 9.3.2, 9.3.3  
 UNCOVERING AND CORRECTION OF WORK  
 12  
 Uncovering of Work  
 12.1  
 Unforeseen Conditions, Concealed or Unknown  
 3.7.4, 8.3.1, 10.3  
 Unit Prices  
 7.3.3.2, 9.1.2  
 Use of Documents  
 1.1.1, 1.5, 2.3.6, 3.12.6, 5.3  
 Use of Site  
 3.13, 6.1.1, 6.2.1  
 Values, Schedule of  
 9.2, 9.3.1  
 Waiver of Claims by the Architect  
 13.3.2  
 Waiver of Claims by the Contractor  
 9.10.5, 13.3.2, 15.1.7  
 Waiver of Claims by the Owner  
 9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7  
 Waiver of Consequential Damages  
 14.2.4, 15.1.7  
 Waiver of Liens  
 9.3, 9.10.2, 9.10.4  
 Waivers of Subrogation  
 6.1.1, 11.3  
 Warranty  
 3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2,  
 15.1.2  
 Weather Delays  
 8.3, 15.1.6.2  
 Work, Definition of  
 1.1.3  
 Written Consent  
 1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3,  
 13.2, 13.3.2, 15.4.4.2  
 Written Interpretations  
 4.2.11, 4.2.12  
 Written Orders  
 1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

#### **§ 1.1.2 The Contract**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

#### **§ 1.1.3 The Work**

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

#### **§ 1.1.4 The Project**

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

#### **§ 1.1.5 The Drawings**

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

#### **§ 1.1.6 The Specifications**

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

#### **§ 1.1.7 Instruments of Service**

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent



consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

**§ 1.2.1.1** The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

**§ 1.2.2** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

**§ 1.2.3** Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### **§ 1.3 Capitalization**

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### **§ 1.4 Interpretation**

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### **§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service**

**§ 1.5.1** The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

**§ 1.5.2** The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### **§ 1.6 Notice**

**§ 1.6.1** Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

**§ 1.6.2** Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### **§ 1.7 Digital Data Use and Transmission**

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

## **§ 1.8 Building Information Models Use and Reliance**

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

**§ 2.1.2** The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

### **§ 2.2 Evidence of the Owner's Financial Arrangements**

**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

### **§ 2.3 Information and Services Required of the Owner**

**§ 2.3.1** Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements,

assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

**§ 2.3.2** The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

**§ 2.3.3** If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

**§ 2.3.4** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

**§ 2.3.5** The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

**§ 2.3.6** Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

#### **§ 2.4 Owner's Right to Stop the Work**

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

#### **§ 2.5 Owner's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

### **ARTICLE 3 CONTRACTOR**

#### **§ 3.1 General**

**§ 3.1.1** The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

**§ 3.1.2** The Contractor shall perform the Work in accordance with the Contract Documents.

**§ 3.1.3** The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

### **§ 3.2 Review of Contract Documents and Field Conditions by Contractor**

**§ 3.2.1** Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

**§ 3.2.3** The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

**§ 3.3.2** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

**§ 3.3.3** The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

### **§ 3.4 Labor and Materials**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.



**§ 3.4.2** Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

**§ 3.4.3** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### **§ 3.5 Warranty**

**§ 3.5.1** The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

**§ 3.5.2** All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

### **§ 3.6 Taxes**

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### **§ 3.7 Permits, Fees, Notices and Compliance with Laws**

**§ 3.7.1** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

**§ 3.7.2** The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

**§ 3.7.3** If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

### **§ 3.7.4 Concealed or Unknown Conditions**

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

**§ 3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### **§ 3.8 Allowances**

**§ 3.8.1** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

**§ 3.8.3** Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### **§ 3.9 Superintendent**

**§ 3.9.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 3.9.3** The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.2** The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the

Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### **§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

**§ 3.12.5** The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

**§ 3.12.6** By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

**§ 3.12.7** The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

**§ 3.12.8** The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

**§ 3.12.9** The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

**§ 3.12.10** The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

### **§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.



### **§ 3.16 Access to Work**

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the

Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

#### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

**§ 4.2.5** Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

**§ 4.2.6** The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

**§ 4.2.7** The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**§ 4.2.8** The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

**§ 4.2.9** The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

**§ 4.2.10** If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

**§ 4.2.11** The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

**§ 4.2.12** Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations

and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

**§ 4.2.13** The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

**§ 4.2.14** The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## **ARTICLE 5 SUBCONTRACTORS**

### **§ 5.1 Definitions**

**§ 5.1.1** A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

**§ 5.1.2** A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### **§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work**

**§ 5.2.1** Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

**§ 5.2.3** If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

**§ 5.2.4** The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

### **§ 5.3 Subcontractual Relations**

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor,

prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### **§ 5.4 Contingent Assignment of Subcontracts**

**§ 5.4.1** Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

**§ 5.4.2** Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

**§ 5.4.3** Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

### **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

#### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

**§ 6.1.1** The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

**§ 6.1.2** When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

**§ 6.1.3** The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

**§ 6.1.4** Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

#### **§ 6.2 Mutual Responsibility**

**§ 6.2.1** The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

**§ 6.2.2** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work,



promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

**§ 6.2.3** The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

**§ 6.2.4** The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

**§ 6.2.5** The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

### **§ 6.3 Owner's Right to Clean Up**

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## **ARTICLE 7 CHANGES IN THE WORK**

### **§ 7.1 General**

**§ 7.1.1** Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

**§ 7.1.2** A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

**§ 7.1.3** Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

### **§ 7.2 Change Orders**

**§ 7.2.1** A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

### **§ 7.3 Construction Change Directives**

**§ 7.3.1** A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

**§ 7.3.2** A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

**§ 7.3.3** If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

**§ 7.3.4** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

**§ 7.3.5** If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

**§ 7.3.6** Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

**§ 7.3.7** A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

**§ 7.3.8** The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

**§ 7.3.9** Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

**§ 7.3.10** When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

## **§ 7.4 Minor Changes in the Work**

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will

affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

## **ARTICLE 8 TIME**

### **§ 8.1 Definitions**

**§ 8.1.1** Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

**§ 8.1.2** The date of commencement of the Work is the date established in the Agreement.

**§ 8.1.3** The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

**§ 8.1.4** The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

### **§ 8.2 Progress and Completion**

**§ 8.2.1** Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

**§ 8.2.2** The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

**§ 8.2.3** The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

### **§ 8.3 Delays and Extensions of Time**

**§ 8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

**§ 8.3.2** Claims relating to time shall be made in accordance with applicable provisions of Article 15.

**§ 8.3.3** This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **§ 9.1 Contract Sum**

**§ 9.1.1** The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

**§ 9.1.2** If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### **§ 9.2 Schedule of Values**

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and

unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

### **§ 9.3 Applications for Payment**

**§ 9.3.1** At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

**§ 9.3.1.1** As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

**§ 9.3.1.2** Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

**§ 9.3.2** Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

**§ 9.3.3** The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

### **§ 9.4 Certificates for Payment**

**§ 9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

**§ 9.4.2** The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.



## **§ 9.5 Decisions to Withhold Certification**

**§ 9.5.1** The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

**§ 9.5.2** When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

**§ 9.5.3** When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

**§ 9.5.4** If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

## **§ 9.6 Progress Payments**

**§ 9.6.1** After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

**§ 9.6.2** The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

**§ 9.6.3** The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

**§ 9.6.4** The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

**§ 9.6.5** The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

**§ 9.6.6** A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

**§ 9.6.7** Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

**§ 9.6.8** Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

### **§ 9.7 Failure of Payment**

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

### **§ 9.8 Substantial Completion**

**§ 9.8.1** Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

**§ 9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**§ 9.8.3** Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

**§ 9.8.4** When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

**§ 9.8.5** The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

## **§ 9.9 Partial Occupancy or Use**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

**§ 9.9.2** Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

**§ 9.9.3** Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

## **§ 9.10 Final Completion and Final Payment**

**§ 9.10.1** Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

**§ 9.10.3** If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

**§ 9.10.4** The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

**§ 9.10.5** Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

### **§ 10.2 Safety of Persons and Property**

**§ 10.2.1** The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

**§ 10.2.2** The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

**§ 10.2.3** The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

**§ 10.2.4** When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

**§ 10.2.5** The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

**§ 10.2.6** The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

**§ 10.2.7** The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.



### **§ 10.2.8 Injury or Damage to Person or Property**

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

### **§ 10.3 Hazardous Materials and Substances**

**§ 10.3.1** The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

**§ 10.3.2** Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

**§ 10.3.3** To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

**§ 10.3.5** The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

**§ 10.3.6** If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

### **§ 10.4 Emergencies**

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

## ARTICLE 11 INSURANCE AND BONDS

### § 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

### § 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

### **§ 11.3 Waivers of Subrogation**

**§ 11.3.1** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

**§ 11.3.2** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

### **§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance**

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

### **§ 11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

## **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

### **§ 12.1 Uncovering of Work**

**§ 12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to

the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

## **§ 12.2 Correction of Work**

### **§ 12.2.1 Before Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

### **§ 12.2.2 After Substantial Completion**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

**§ 12.2.2.2** The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

**§ 12.2.2.3** The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

**§ 12.2.3** The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

**§ 12.2.4** The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

**§ 12.2.5** Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

## **§ 12.3 Acceptance of Nonconforming Work**

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## **ARTICLE 13 MISCELLANEOUS PROVISIONS**

### **§ 13.1 Governing Law**

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.



## **§ 13.2 Successors and Assigns**

**§ 13.2.1** The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

**§ 13.2.2** The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

## **§ 13.3 Rights and Remedies**

**§ 13.3.1** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

**§ 13.3.2** No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

## **§ 13.4 Tests and Inspections**

**§ 13.4.1** Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

**§ 13.4.2** If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

**§ 13.4.3** If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

**§ 13.4.4** Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

**§ 13.4.5** If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

**§ 13.4.6** Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

## **§ 13.5 Interest**

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

## ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### § 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

### § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance,

the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

#### **§ 14.3 Suspension by the Owner for Convenience**

**§ 14.3.1** The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

**§ 14.3.2** The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

#### **§ 14.4 Termination by the Owner for Convenience**

**§ 14.4.1** The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

**§ 14.4.2** Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

**§ 14.4.3** In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

### **ARTICLE 15 CLAIMS AND DISPUTES**

#### **§ 15.1 Claims**

##### **§ 15.1.1 Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

##### **§ 15.1.2 Time Limits on Claims**

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

##### **§ 15.1.3 Notice of Claims**

**§ 15.1.3.1** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

**§ 15.1.3.2** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

#### **§ 15.1.4 Continuing Contract Performance**

**§ 15.1.4.1** Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

**§ 15.1.4.2** The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

#### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

#### **§ 15.1.6 Claims for Additional Time**

**§ 15.1.6.1** If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

**§ 15.1.6.2** If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

#### **§ 15.1.7 Waiver of Claims for Consequential Damages**

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

#### **§ 15.2 Initial Decision**

**§ 15.2.1** Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

**§ 15.2.2** The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the



Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

**§ 15.2.4** If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

**§ 15.2.5** The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

**§ 15.2.6** Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

**§ 15.2.6.1** Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

**§ 15.2.7** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

**§ 15.2.8** If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### **§ 15.3 Mediation**

**§ 15.3.1** Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

**§ 15.3.2** The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

**§ 15.3.3** Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

**§ 15.3.4** The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

#### **§ 15.4 Arbitration**

**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

#### **§ 15.4.4 Consolidation or Joinder**

**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

**SECTION 00 7300  
SUPPLEMENTARY CONDITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. HUD Form 2554 Supplementary Conditions of the Contract for Construction, dated 12/20/2005 attached, is hereby incorporated herein and made a part of the General Conditions between the Owner and Contractor.
- B. See attached Prevailing Wage document from US Department of Housing and Urban Development (HUD) General Decision Number MO20200063, dated 07/24/2020. Modification Number 6.
- C. See Attached Federal Labor Standards Provision Form Hud-4010 Dated (06/2009)
- D. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

This page intentionally left blank



# Supplementary Conditions of the Contract for Construction

U.S. Department of Housing  
and Urban Development  
Office of Housing  
Federal Housing Commissioner

OMB Approval No. 2502-0470  
(Expires 5/31/2010)

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This information is required to obtain benefits and voluntary. HUD may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB control number.

This information collection is necessary to ensure that viable projects are developed. It is important to obtain information from applicants to assist HUD in determining if nonprofit organizations initially funded continue to have the financial and administrative capacity needed to develop a project and that the project design meets the needs of the residents. The Department will use this information to set forth the obligations of the contractor or subcontractor performing under the covered contract. This information is required in order to obtain benefits. This information is considered non-sensitive and no assurance of confidentiality is provided.

## Article 1 – Labor Standards

### Instructions

Whenever only FHA mortgage insurance is involved, use paragraph (A) and (C) of Article 1 – Labor Standards. Whenever any direct form of assistance (Section 8, Section 202/811 Capital Advance, grants etc.) is involved, use paragraphs (A) and (B) and (C) of Article 1 – Labor Standards.

### Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted or insured by the United States of America and the following Federal Labor Standards Provisions are included in this Contract or related instrument pursuant to the provisions applicable to such Federal assistance or insurance.

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR Part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification

requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs A.1.(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the

same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR Part 5.5(a)(3)(i) and that such information is correct and complete;

(2) That each laborer or mechanic (including each

helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph A.3.(ii)(b) of this section.

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph A.3.(i) of this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

**4. (i) Apprentices and Trainees. Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau

of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman's hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) **Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act Requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as HUD or its designee may be appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract the contractor certifies neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm

ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration . . . makes, utters or publishes any statement, knowing the same to be false . . . shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

**B. Contract Work Hours and Safety Standards Act.** As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

**2. Violation; liability for unpaid wages, liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

**3. Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C.** The Contractor will be required to execute FHA Form No. 2403-A, Contractor's Prevailing Wage Certificate, as a condition precedent to insurance by the Federal Housing Administration of that certain mortgage loan, or an advance thereof, made or to be made by the mortgagee in connection with the construction of the project.

## Article 2 – Equal Employment Opportunity

The applicant hereby agrees that it will incorporate or cause to be

incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

**A.** The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided setting forth the provisions of this nondiscrimination clause.

**B.** The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

**C.** The Contractor will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided advising the said labor union or workers representatives of the Contractor's commitments hereunder, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

**D.** The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965 and of the rules, regulations, and relevant orders of the Secretary of Labor.

**E.** The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

**F.** In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulations or order of the Secretary of Labor, or as otherwise provided by law.

**G.** The Contractor will include the portion of the sentence immediately preceding paragraph A and the provisions of paragraphs A through G in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance. *Provided, however,* that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Secretary of Housing and Urban Development or the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

**H.** The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work:

*Provided, That* if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

**I.** The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

**J.** The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

### **Article 3 – Equal Opportunity for Businesses and Lower Income Persons Located Within the Project Area**

(Applicable to Section 236 projects, where the estimated replacement cost of the project as determined by the Secretary of Housing and Urban Development exceeds \$500,000, and to all projects, including Section 236 regardless of estimated replacement cost, receiving rent supplement assistance under Title I, Section 101 of the Housing and Urban Development Act of 1965.)

**A.** The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible opportunities for training and employment be given lower income residents of the unit of local government or the metropolitan area (or nonmetropolitan county) as determined by the Secretary of Housing and Urban Development in which the projects located and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the same metropolitan area (or nonmetropolitan county) as the project.

### **Article 4 – Health and Safety**

**A.** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**B.** The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).

**C.** The Contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development of the Secretary of Labor shall direct as a means of enforcing such provisions.

"General Decision Number: MO20200063 07/24/2020

Superseded General Decision Number: MO20190063

State: Missouri

Construction Type: Residential

County: Jackson County in Missouri.

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Modification Number	Publication Date
0	01/03/2020
1	02/14/2020
2	04/03/2020
3	05/08/2020
4	05/15/2020
5	07/03/2020
6	07/24/2020

BRM00015-023 04/01/2019

	Rates	Fringes
BRICKLAYER.....	\$ 36.04	20.28

CARP0005-011 05/01/2019

	Rates	Fringes
CARPENTER.....	\$ 30.67	17.77

ELEC0124-001 08/26/2019

	Rates	Fringes
--	-------	---------

ELECTRICIAN.....	\$ 40.79	22.92
------------------	----------	-------

-----  
ENGI0101-031 04/01/2020

	Rates	Fringes
--	-------	---------

POWER EQUIPMENT OPERATOR:

Backhoe/Excavator.....	\$ 39.74	20.10
Roller.....	\$ 39.74	20.10

-----  
LAB00264-004 04/01/2020

	Rates	Fringes
--	-------	---------

LABORER

Mason Tender - Brick.....	\$ 30.00	15.70
---------------------------	----------	-------

-----  
PAIN0003-021 04/01/2017

	Rates	Fringes
--	-------	---------

PAINTER

Brush and Roller.....	\$ 29.34	16.96
-----------------------	----------	-------

-----  
\* PLUM0008-018 06/01/2020

	Rates	Fringes
--	-------	---------

PLUMBER.....	\$ 48.03	22.84
--------------	----------	-------

-----  
ROOF0020-009 06/01/2019

	Rates	Fringes
--	-------	---------

ROOFER.....	\$ 33.65	19.39
-------------	----------	-------

-----  
SFM00314-004 01/01/2017PORTION OF COUNTY WITHIN A 30 MILE RADIUS OF THE INTERSECTION  
OF PERSHING & BROADWAY IN KANSAS CITY, MO

	Rates	Fringes
--	-------	---------

SPRINKLER FITTER (Fire Sprinklers).....	\$ 36.74	19.92
--	----------	-------

-----  
SFM00669-005 04/02/2020

REMAINDER OF COUNTY

	Rates	Fringes
--	-------	---------

SPRINKLER FITTER (Fire Sprinklers).....	\$ 37.92	22.88
--	----------	-------

-----  
SHEE0002-028 07/01/2011

	Rates	Fringes
--	-------	---------

SHEET METAL WORKER (Including HVAC Duct and HVAC System).....	\$ 27.37	8.14
--	----------	------

-----  
SUM02011-007 08/11/2011

	Rates	Fringes
--	-------	---------

CEMENT MASON/CONCRETE FINISHER...	\$ 16.00	0.00
-----------------------------------	----------	------

LABORER: Common or General.....	\$ 11.00	0.00
---------------------------------	----------	------

-----

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at [www.dol.gov/whd/govcontracts](http://www.dol.gov/whd/govcontracts).

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

-----

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate

changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

---

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the



Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION"

This page intentionally left blank

## Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section I(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

**(ii) (a)** Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

**(1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and

**(2)** The classification is utilized in the area by the construction industry; and

**(3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

**(b)** If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

**(c)** In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**(d)** The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

**(iii)** Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

**(iv)** If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

**(ii) (a)** The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

**(b)** Each payroll submitted shall be accompanied by a Statement of Compliance, signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

**(1)** That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the Statement of Compliance required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **4. Apprentices and Trainees.**

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**(iii) Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(ii)** No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(iii)** The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., [Federal Housing Administration transactions] provides in part: [Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both.]

**11. Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B. Contract Work Hours and Safety Standards Act.** The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms [laborers] and [mechanics] include watchmen and guards.

**(1) Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

---

**(3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

**(4) Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

**(1)** No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

**(2)** The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

**(3)** The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

This page intentionally left blank



**SECTION 00 9500  
MBE/WBE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents
- B. Certification upon Completion of the Work.

**1.02 RELATED SECTIONS**

- A. Conditions of the Contract.
- B. Section 01300 - Submittal Procedures
- C. Section 01700 - Closeout procedures

**1.03 REQUIREMENTS OF CONTRACTOR AND SUBCONTRACTORS:**

- A. It is a condition of this Contract that the Contractor and any Subcontractor doing business under this Contract agrees to refrain from any unlawful employment practice as presently defined in Ordinances of the Columbia, Missouri, and that such person(s) will post at their employment office a notice setting forth the provisions of said City and that such person(s) agreed to abide by said provisions.
- B. The Contractor shall make good faith efforts to employ minorities and women in all trades throughout the workforce.
- C. Each person(s) shall be bound by the terms of Rules and Regulations promulgated for administration of said Sections; an such person(s) agree to execute the supportive documents for one of the following options:
  - 1. A proposed Affirmative Action Plan
  - 2. A certificate of compliance.

**1.04 MBE/WBE REQUIREMENTS**

- A. The Contractor must fully comply with the requirements, terms and conditions of the MBE/WBE Requirements, including the use of a goal oriented system for minority/women business participation contained herein and all other requirements, terms and conditions.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GOALS**

- A. Policy: Minority/Women's businesses shall have the maximum feasible opportunity to participate in the performance of this contract.
- B. Subcontract Award: The Contractor agrees to make every effort to carry out this MBE/WBE policy through award of subcontractors to minority/women's business enterprises to the fullest extent consistent with the efficient performance of this contract.
  - 1. It is the Owner's goal that a minimum of TEN PERCENT (10%) of the total contracted portion of work be awarded to MBE businesses; and
  - 2. It is the Owner's goal that a minimum of FIVE PERCENT (5%) of the total contracted portion of work be awarded to WBE businesses.

**3.02 DEFINITIONS**

- A. As used in this Contract the term "minority/women's businesses" means a business at least fifty-one percent (51%) of which is owned and controlled by minority group members or women and is certified such by a recognized agency as listed and approved by MHDC.
- B. Minority/Women's ownership must exercise actual day to day management.
- C. THE MBE/WBE MUST SERVE A USEFUL BUSINESS PURPOSE AND BE CAPABLE OF PERFORMING THE PARTICULAR SCOPE OF WORK INDEPENDENT OF THE CONTRACTOR.

- D. For the purpose of this definition, minority group members are Black Americans, Hispanic Americans, Asian Americans, American Indians, American Eskimos and American Aleuts.
- E. CONTRACTOR MUST MAKE REASONABLE EFFORTS TO INSURE THAT MBE/WBE SUBCONTRACTORS ARE CERTIFIED AS HAVING THE CAPABILITY OF PERFORMING THE INTENDED SUBCONTRACT SCOPE OF WORK PRIOR TO BEID OPENING. (I.E. THE MBE/WBE MUST BE CAPABLE OF PROVIDING THE NECESSARY EQUIPMENT AND LABOR FORCE INDEPENDENT OF THE Contractor, AND BE ABLE TO DEMONSTRATE SATISFACTORY PERFORMANCE ON CAPABLE TYPE AND SIZE OF PROJECT)
- F. For the purpose of this contract, the term "subcontract" includes all construction, modification and service work constructed for and by the Contractor in the execution of the Work under this contract.
- G. Although it is not made a requirement herein for approval of a contract that a Contractor in fact meets or exceeds these goals in their contracting, it is a requirement for contract approval that a Contractor objectively demonstrate every effort has been exerted to meet these goals.

### **3.03 ACCEPTABLE METHODS OF CONFORMANCE TO POLICY**

- A. Requirements for making every effort possible for minority/women owned subcontractor participation may be satisfied by the following methods; (Other equivalent methods proposed by a Contractor which are described in detail prior to award may also be approved).
  - 1. Negotiated Subcontract: The Contractor, will establish the scope of work in sufficient detail consistent with the capability of minority/women's firms. Upon establishment of the scope of work to be performed, negotiation of mutually acceptable price may proceed with one or more minority/women's firms. Most minority/women's contractors are small, with limited resources, experience, and bonding capacity and cannot be expected to compete with the more experienced and specialized non-minority/women's subcontractors.
  - 2. Joint Venture: The Contractor may utilize minority/women's firm(s) and bid jointly with such firm(s) for construction services required in the Plans and Specifications. If the joint venture method is utilized, credit toward the goal attainment will be determined on the basis of the percentage of the dollar amount of the work to be performed by the MBE/WBE (e.g., if a minority majority joint venture proposes to perform fifty percent (50%) of the project quoted at \$500,000.00 and fifty percent (50%) of the work is to be performed by the minority party in the joint venture, minority participation will be credited at twenty-five percent (25%) of the work or \$125,000.00).
  - 3. The Contractor may negotiate or form joint ventures with minority and women owned subcontractors which are not shown on the current certification list.
  - 4. All Contractors are required to secure Minority/Women's participation through either negotiated subcontractors or the formation of joint ventures.
  - 5. Records and Awards: The Contractors shall maintain records and shall submit an affidavit showing awards to minority/women's businesses, delineated by name, address, telephone number, employer identification number, area/scope of work, referencing contract document section and dollar amount of the contract award, giving a narrative or specific efforts to identify and award subcontractors to minority/women's businesses.

### **3.04 EVALUATION OF POSITIVE EFFORTS**

- A. The Contractor shall be deemed to be in compliance with the requirements, terms and conditions if the program goals expressed herein are met or exceeded.
  - 1. No Contractor shall be found to be in non-compliance solely on account of failure to meet the MBE/WBE goal. A Contractor unable to meet the percentage goal assigned to this contract shall be given the opportunity to objectively demonstrate that specific affirmative action steps specified have been instituted and that every effort has been made toward the attainment of the designated goals.

### **3.05 POST-BID COMPLIANCE**

- A. If any deficiency(ies) are correctable, the prospective Contractor will be advised what action must be taken to correct the deficiency(ies). The Owner will withhold approval of the proposed contract until satisfactory corrective action has been taken. FAILURE ON THE PART OF THE

CONTRACTOR TO TAKE THE REQUISIT CORRECTIVE ACTION OR TO EXPLAIN WHY THE CORRECTIVE ACTION CANNOT BE TAKEN MAY RESULT IN A FINDING THAT THE Contractor IS NON-RESPONSIVE AND MAY BE GROUNDS FOR REJECTION OF THE BID.

### **3.06 POST-CONTRACT AWARD COMPLIANCE**

- A. Contractors are required to execute and submit copies of all MBE/WBE's related sub-agreements within fifteen (15) days after contractor award and, from time to time report on the status of their compliance with appropriate requirements.

### **3.07 PROVISIONS FOR MBE/WBE SUBSTITUTION**

- A. Should it be discovered after bid opening that any one of the intended participant MBE/WBE'S declaration of minority/women's ownership is invalid, or after contract award should an MBE/WBE be unable to perform as originally intended, the general contractor (Contractor) must then make every reasonable attempt to replace the invalid MBE/WBE with a bona fide MBE/WBE from those who have furnished him bids prior to bid opening.
- B. In the event this substitution is necessary and no other MBE/WBE's have bid the General Contractor (Contractor) in this particular area of the contract, the General Contractor (Contractor) may, as an alternative to substitution, adjust the MBE/WBE involvement in another area of the total contract bid in order to meet minimum MBE/WBE participation requirements.

### **3.08 DEVIATION FROM CONTRACTOR'S PROPOSED MBE/WBE PARTICIPATION**

- A. Any deviation from the MBE/WBE utilization proposal as noted in the contractor's submission, whether before or after contract award and/or whether before or after commencement of work on the project, shall be immediately reported by the Contractor to the Owner.

### **3.09 SUBMITTAL OF REQUIRED DOCUMENTS**

- A. The Contractor shall submit as necessary the following completed MBE/WBE information:
  - 1. TO BE SUBMITTED WITH BID:
    - a. An Affirmative Action Plan or Certificate of Compliance or Letter of Intent.
    - b. Statement of Intended Utilization of Subcontractors.
  - 2. TO BE SUBMITTED W/BID IF APPLICABLE:
    - a. Joint Venture Disclosure
  - 3. TO BE SUBMITTED AFTER BID OPENING BY LOW CONTRACTOR:
    - a. Schedule for MBE/WBE Utilization

### **3.10 ACCESS TO INFORMATION**

- A. Every Contractor or subcontractor employed under this contract is hereby deemed to agree to permit the Owner or their duly authorized agents or employees, access at all reasonable times to all such persons, books, papers, as may be necessary to ascertain compliance with the Affirmative Action Program previously filed, and to furnish such further information as may be required, all within ten (10) days of the date of the written request.

**END OF SECTION**

This page intentionally left blank

## **SECTION 01 1000 SUMMARY**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
  - 2. Use of premises.
  - 3. Specification format and conventions.

#### **1.02 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Project Identification: OAK PARK TOWNHOMES
  - 1. Project Location: Kansas City, Kansas
- B. Architect:
  - Rosemann & Associates, P.C.;
  - 1526 Grand Boulevard.,
  - Kansas City, MO 64108.
  - Contact: Dave Hendrikse, 816.541.2930, dhendrikse@rosemann.com.
- C. Structural:
  - Rosemann & Associates, P.C.
  - 1526 Grand Boulevard
  - Kansas City, MO 64108
  - Contact: Scott Rosemann, 816.541.2930, srosemann@rosemann.com.
- D. Owner Consultants: The Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:
  - Civil Engineer:
    - OBI Consulting Engineers, Inc.
    - 1220 East 63rd Street, Suite 200
    - Kansas City, MO 64005
  - MEP Engineer:
    - Costum Engineering, LLC,
    - 12760 E US Highway 40
    - Independence, MO
  - 1. Contractor: TBD
- E. The Work consists of the following:
  - 1. The project consists of the development and construction of thirty-five (35) family apartment units located in four (4), slab-on-grade, two-story, wood-framed buildings. Each unit will be provided with a single car garage. Unit mix is comprised of six (6) 1-bedroom units and twenty-nine (29) 3-bedroom units. Two (2) 1-bedroom are Type A units, and one(1) is an HI-VI (Hearing Impaired-Visual Impaired) unit. The project will be located in Kansas City, Missouri.
  - 2. Site will include walks, dumpster enclosures, landscaping, site lighting and ground mounted signage
  - 3. Project is being developed and financed through the Missouri Housing Development Corporation (MHDC).

#### **1.03 TYPE OF CONTRACT**

- A. Project will be constructed under a single prime contract. Taxes shall be included in all bids.

#### **1.04 ACCESS TO SITE**

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

#### **1.05 WORK RESTRICTIONS**

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
  - 2. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

#### **1.06 OWNER'S OCCUPANCY REQUIREMENTS**

- A. Owner Occupancy of Completed Areas of Construction: Owner may take possession or occupy floors as they are completed.

#### **1.07 SPECIFICATION AND DRAWING CONVENTIONS**

- A. Specification Content: The Specifications are organized into Divisions and Sections using the 6-digit format numbering system. The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

#### **PART 2 PRODUCTS (NOT USED)**

#### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION 011000**

**SECTION 01 2500  
SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
    - a. Unavailability.
    - b. Regulatory changes.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
    - a. Substitution requests offering advantages solely to the Contractor will not be considered.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
    - a. Project Information:
    - b. Substitution Request Information:
      - 1) Indication of whether the substitution is for cause or convenience.
      - 2) Issue date.
      - 3) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
      - 4) Description of Substitution.
      - 5) Reason why the specified item cannot be provided.
      - 6) Differences between proposed substitution and specified item.
      - 7) Description of how proposed substitution affects other parts of work.
    - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
      - 1) Physical characteristics.
      - 2) In-service performance.
      - 3) Expected durability.
      - 4) Visual effect.
      - 5) Other salient features and requirements.

- d. Impact of Substitution:
  - 1) Savings to Owner for accepting substitution.
  - 2) Change to Contract Time due to accepting substitution.

D. Limit each request to a single proposed substitution item.

### **3.02 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- B. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
  - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  - 3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- C. Substitutions will not be considered under one or more of the following circumstances:
  - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  - 2. Without a separate written request.
  - 3. When acceptance will require revisions to Contract Documents.

### **3.03 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

### **3.04 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

**END OF SECTION**



**SECTION 01 2600  
CONTRACT MODIFICATION PROCEDURES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

**1.02 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

**1.03 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

**1.04 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION 012600**

**SECTION 01 2900  
PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703
  - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Change Orders (numbers) that affect value.
    - d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  - 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  - 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
  - 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  - 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  - 9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments

- or deposits, if any, and balance to be paid by Contractor.
10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
  11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

## **1.02 APPLICATIONS FOR PAYMENT**

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect by the 20th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  1. Submit draft copy of Application for Payment five days prior to due date for review by Architect.
- D. Application for Payment Forms: Use AIA forms approved by MHDC as form for Applications for Payment.
- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
  1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- G. Transmittal: Submit review copies of each Application for Payment to Architect Electronically. Submit three signed and notarized original copies of each Application for Payment to Architect

by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
  5. Products list (preliminary if not final).
  6. Schedule of unit prices.
  7. Submittal schedule (preliminary if not final).
  8. List of Contractor's staff assignments.
  9. List of Contractor's principal consultants.
  10. Copies of building permits.
  11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  12. Initial progress report.
  13. Report of preconstruction conference.
  14. Certificates of insurance and insurance policies.
  15. Performance and payment bonds.
  16. Data needed to acquire Owner's insurance.
- J. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  3. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

9. Final liquidated damages settlement statement.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION 012900**

**SECTION 01 3000  
ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Requests for Interpretation (RFI) procedures.
- H. Submittal procedures.

**1.02 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- B. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract, [ ] and .
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

**3.02 PROGRESS MEETINGS**

- A. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- B. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Maintenance of progress schedule.
  - 7. Corrective measures to regain projected schedules.
  - 8. Planned progress during succeeding work period.
  - 9. Maintenance of quality and work standards.
  - 10. Effect of proposed changes on progress schedule and coordination.
  - 11. Other business relating to work.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216**

- 1. Include written certification that major contractors have reviewed and accepted proposed schedule.

### **3.04 REQUESTS FOR INTERPRETATION (RFI)**

- A. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
- B. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.

### **3.05 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
  - 2. Shop drawings.
  - 3. Samples for selection.
  - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

### **3.06 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.



7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.08 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  1. After review, produce duplicates.
  2. Retained samples will not be returned to Contractor unless specifically so stated.

### **3.09 SUBMITTAL PROCEDURES**

- A. General Requirements:
  1. Use a separate transmittal for each item.
  2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  3. Transmit using approved form.
    - a. Use Contractor's form, subject to prior approval by Architect.
    - b. Use form generated by Electronic Document Submittal Service software.
  4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
  5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
- B. Product Data Procedures:
  1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
  1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

### **3.10 SUBMITTAL REVIEW**

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
  - 2. Not Authorizing fabrication, delivery, and installation:
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

**SECTION 01 3100  
PROJECT MANAGEMENT AND COORDINATION**

**PART 1 GENERAL**

**1.01 COORDINATION**

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
  - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's Construction Schedule.
  - 2. Preparation of the Schedule of Values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  - 9. Project closeout activities.

**1.02 SUBMITTALS**

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
  - 1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. Indicate required installation sequences.
    - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum

- clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
  3. Number of Copies: Submit 5 opaque copies of each submittal. Architect will return 2 copies.
    - a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.
  4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

### **1.03 ADMINISTRATIVE AND SUPERVISORY PERSONNEL**

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.
1. Include special personnel required for coordination of operations with other contractors.

### **1.04 PROJECT MEETINGS**

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Contractor shall schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.

- k. Preparation of Record Documents.
  - l. Use of the premises.
  - m. Work restrictions.
  - n. Owner's occupancy requirements.
  - o. Responsibility for temporary facilities and controls.
  - p. Construction waste management and recycling.
  - q. Parking availability.
  - r. Office, work, and storage areas.
  - s. Equipment deliveries and priorities.
  - t. First aid.
  - u. Security.
  - v. Progress cleaning.
  - w. Working hours.
3. Minutes: Contractor will record and distribute meeting minutes.
- C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. The Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.
  - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the

Work and reconvene the conference at earliest feasible date.

- D. Progress Meetings: Contractor shall conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) RFIs.
      - 16) Status of proposal requests.
      - 17) Pending changes.
      - 18) Status of Change Orders.
      - 19) Pending claims and disputes.
      - 20) Documentation of information for payment requests.
  3. Minutes: Contractor will record and distribute to Contractor the meeting minutes.
  4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
    - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Status of submittals.
    - 4) Deliveries.
    - 5) Off-site fabrication.
    - 6) Access.
    - 7) Site utilization.
    - 8) Temporary facilities and controls.
    - 9) Work hours.
    - 10) Hazards and risks.
    - 11) Progress cleaning.
    - 12) Quality and work standards.
    - 13) Change Orders.
3. Reporting: Contractor will record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

#### **1.05 REQUESTS FOR INTERPRETATION (RFIS)**

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
  1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
  2. RFI's must include Contractor's recommended solutions.
  3. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
  1. Project name.
  2. Date.
  3. Name of Contractor.
  4. Name of Architect.
  5. RFI number, numbered sequentially.
  6. Specification Section number and title and related paragraphs, as appropriate.
  7. Drawing number and detail references, as appropriate.
  8. Field dimensions and conditions, as appropriate.
  9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI. Cost and Time noted as TBD's will not be accepted.
  10. Contractor's signature.

11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
  - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
  1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
  1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
  1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or RFIs with numerous errors.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.
  1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were dropped and not submitted.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
  8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION 013100**



**SECTION 01 3200  
CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Photographic Documentation
  - 2. Contractor's Construction Schedule.
  - 3. Submittals Schedule.
  - 4. Daily construction reports.
  - 5. Field condition reports.

**1.02 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The measure of leeway in starting and completing an activity.
- E. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.

**1.03 SUBMITTALS**

- A. Submittals Schedule: Submit two copies of schedule to the Architect. Arrange the following information in a tabular format:
  - 1. Scheduled date for first submittal.
  - 2. Specification Section number and title.
  - 3. Submittal category (action or informational).
  - 4. Name of subcontractor.
  - 5. Description of the Work covered.
  - 6. Scheduled date for Architect's final release or approval.
- B. Preliminary Network Diagram: Submit two opaque copies, large enough to show entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
  - 1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit three copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Daily Construction Reports: Submit two copies at weekly intervals.
- F. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

#### **1.04 COORDINATION**

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from parties involved.
  2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### **PART 2 PRODUCTS**

#### **2.01 SUBMITTALS SCHEDULE**

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
  2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

#### **2.02 PHOTOGRAPHIC DOCUMENTATION**

- A. Extent: Document demolition and construction progress at weekly intervals, include pre-demolition photos for existing building and overall documentation of weekly progress in interval photos. Photo document areas under Green Communities requirements.
- B. Format: Electronic format, saved to disk for Owner's use monthly.

#### **2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents, and show how the sequence of the Work is affected.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

#### **2.04 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)**

- A. General: Prepare network diagrams using AON (activity-on-node) format.

- B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized time-scaled CPM network analysis diagram for the Work.
  - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  - 3. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing and commissioning.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
  - 1. Contractor or subcontractor and the Work or activity.
  - 2. Description of activity.
  - 3. Principal events of activity.
  - 4. Immediate preceding and succeeding activities.
  - 5. Early and late start dates.
  - 6. Early and late finish dates.
  - 7. Activity duration in workdays.
  - 8. Total float or slack time.
  - 9. Average size of workforce.

- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time.

## **2.05 REPORTS**

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. Equipment at Project site.
  3. Material deliveries.
  4. High and low temperatures and general weather conditions.
  5. Accidents.
  6. Stoppages, delays, shortages, and losses.
  7. Meter readings and similar recordings.
  8. Orders and requests of authorities having jurisdiction.
  9. Services connected and disconnected.
  10. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation on CSI Form 13.2A. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## **PART 3 EXECUTION**

### **3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 013200**

**SECTION 01 3300  
SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

**1.01 DEFINITIONS**

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

**1.02 SUBMITTAL PROCEDURES**

- A. General: Architect will provide electronic copies of CAD Drawings of the Contract Drawings for Contractor's use in preparing submittals if so requested. CAD files will be provided solely for the convenience of the Contractor and for informational purposes only. Architect's CAD files delivered to the Architect as submittals will not be accepted.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Provide overall schedule of submittals, listing Specification Section, Item, Manufacturer, and subcontractor, to Architect within 30 days of Notice to Proceed.
  - 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 3. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 working days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 15 working days for initial review of each submittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
  - 1. Include the following information on label for processing and recording action taken:
    - a. Revise list below to suit Project.
    - b. Project name.
    - c. Date.
    - d. Name and address of Architect.
    - e. Name and address of Contractor.
    - f. Name and address of subcontractor.
    - g. Name and address of supplier.
    - h. Name of manufacturer.
    - i. Number and title of appropriate Specification Section.
    - j. Drawing number and detail references, as appropriate.
    - k. Location(s) where product is to be installed, as appropriate.
    - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

- F. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- G. Format of submittals -
  - 1. Informational submittals - electronic copies only
  - 2. Shop drawings - electronic copies only
  - 3. Materials submittals - electronic copies plus materials samples where appropriate.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and authorities having jurisdiction, and others as necessary for performance of construction activities.
- K. Use for Construction: Use only final submittals marked "reviewed" by the Architect.

## **PART 2 PRODUCTS**

### **2.01 ACTION SUBMITTALS**

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. Mark each copy of each submittal to show which products and options are applicable.
  - 2. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operation and maintenance manuals.
    - k. Compliance with specified referenced standards.
    - l. Testing by recognized testing agency.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
  - 3. Submit Product Data before or concurrent with Samples.
  - 4. Number of Copies: Submit electronically unless material submittals. Architect will return electronic copy for contractor distribution to subcontractor, suppliers and vendors, and the Owner. Submit materials submittals in sample format where appropriate and enough copies so architect can retain a copy and send a copy to the Owner.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.

- d. Roughing-in and setting diagrams.
  - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
  - f. Shopwork manufacturing instructions.
  - g. Templates and patterns.
  - h. Schedules.
  - i. Design calculations.
  - j. Compliance with specified standards.
  - k. Notation of coordination requirements.
  - l. Notation of dimensions established by field measurement.
  - m. Relationship to adjoining construction clearly indicated.
  - n. Seal and signature of professional engineer if specified.
  - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Number of Copies: Same as for Product Data.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will retain sample and return submittal with options selected.
- E. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation" for Construction Manager's action.
- F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

## **2.02 INFORMATIONAL SUBMITTALS**

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
- 1. Number of Copies: Submit three copies of each submittal, unless otherwise indicated. Architect will not return copies.
  - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. An officer shall sign certificates and certifications or other individual authorized to sign documents on behalf of that entity.

3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
  - C. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
  - D. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  - E. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  - F. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
  - G. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
  - H. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
  - I. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
  - J. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
  - K. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
  - L. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
  - M. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

## **PART 3 EXECUTION**

### **3.01 CONTRACTOR'S REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. Submittals without evidence of Contractor's review will be returned without reviewing.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.



### **3.02 ARCHITECT'S ACTION**

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
  - 1. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- B. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

**END OF SECTION 013300**

This page intentionally left blank

**SECTION 01 4000  
QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
  - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  - 2. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
  - 3. Divisions 02 through 49 Sections for specific test and inspection requirements.

**1.02 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups will be judged by quality of work and standards of installation and will be retained on-site as quality standard of the project.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of three previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

### **1.03 CONFLICTING REQUIREMENTS**

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

### **1.04 SUBMITTALS**

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Complete test or inspection data.
  - 8. Test and inspection results and an interpretation of test results.
  - 9. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 11. Name and signature of laboratory inspector.
  - 12. Recommendations on retesting and reinspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

### **1.05 QUALITY ASSURANCE**

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- C. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. **Specialists:** Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
  - 2. **Testing Agency Responsibilities:** Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.

2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
  - a. Allow seven days for initial review and each re-review of each mockup.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

#### **1.06 QUALITY CONTROL**

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.

- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - 4. Facilities for storage and field curing of test samples.
  - 5. Delivery of samples to testing agencies.
  - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

### **1.07 SPECIAL TESTS AND INSPECTIONS**

- A. Special Tests and Inspections: Conducted by a qualified testing agency or special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  - 6. Retesting and reinspecting corrected work.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.01 TEST AND INSPECTION LOG**

- A. Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Architect.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

### **3.02 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
  - 2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION 014000**



## SECTION - 01410 - REGULATORY REQUIREMENTS

### PART 1 - GENERAL

1. As authorized and directed by City Code, the Director of Public Works has approved and adopted Standard Specifications and Drawings, the latest modification of which shall govern the construction Work. Many Kansas City standards and design criteria of the Metropolitan Chapter of the American Public Works Association have been adopted by the City, and others have been adopted with modifications. All current KCMO Standard Drawings and Supplements are available to download from <http://www.kcmo.org/pubworks.nsf/web/pwestandards>; however, the documents made available electronically do not form a part of the Contract.
2. All contract documents for construction bids are available through the Kansas City Plan Room on-line at <http://www.kcmoplanroom.org/>.
3. The City of Kansas City, Missouri, "Erosion and Sediment Control Specifications," City Standards and KCMO Supplements are available on the Internet at the above website address, or from the 5<sup>th</sup> Floor, City Hall, 816-513-2552.
4. The APWA *Standard Specifications and Design Criteria* of the Metropolitan Chapter of the American Public Works Association are available online at <http://www.kcapwa.net>, or from US Reprographics (above locations).



**SECTION 01 5000  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

**1.01 USE CHARGES**

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for sewer usage by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for sewer usage by all entities for construction operations.

**1.02 INFORMATIONAL SUBMITTALS**

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

**1.03 QUALITY ASSURANCE**

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

**1.04 PROJECT CONDITIONS**

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

**PART 2 PRODUCTS**

**2.01 TEMPORARY FACILITIES**

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

**2.02 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section

"Closeout Procedures."

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work. Locate facilities to limit site disturbance.
  - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

#### **3.02 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service underground, unless otherwise indicated.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
  - 1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Engineers' offices.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  - 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

#### **3.03 SUPPORT FACILITIES INSTALLATION**

- A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
  2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
- H. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- K. Temporary Elevator Use: Refer to Division 14 Sections for temporary use of new elevators.
- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

### **3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Division 31 Section "Site Clearing."
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Comply with requirements specified in Division 01 Section "Temporary Tree and Plant Protection."
- F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- G. Site Enclosure Fence: Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
  2. Protect air-handling equipment.
  3. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking in construction areas.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be

followed. Instruct personnel in methods and procedures. Post warnings and information.

### **3.05 MOISTURE AND MOLD CONTROL**

- A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Discard or replace water-damaged and wet material.
  - 4. Discard, replace or clean stored or installed material that begins to grow mold.
  - 5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  - 2. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

### **3.06 OPERATION, TERMINATION, AND REMOVAL**

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

**END OF SECTION**

This page intentionally left blank



**SECTION 01567 - POLLUTION CONTROL**

**PART 1 - GENERAL**

1. CONTRACTOR shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes will be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance will be permitted to enter sanitary sewers or any other drain or watercourse.
2. No open burning will be permitted.

**END OF SECTION**



## **SECTION 01570 - TEMPORARY EROSION AND SEDIMENT CONTROL**

### **PART 1 - GENERAL**

1. The CONTRACTOR shall provide erosion control for all areas disturbed during construction. The City has adopted a set of guidelines and procedures for controlling erosion entitled Erosion and Sediment Control Specifications (ESCS), dated March 18, 1994. These guidelines are available on the 18<sup>th</sup> Floor of City Hall at the permit Counter. The CONTRACTOR is to assume that the work is to be done under the City's General Permit. The CONTRACTOR does not need to make separate application with the Missouri Department of Natural Resources.
2. All the requirements of the Kansas City Metropolitan Chapter of the American Public Works Association (APWA), *Standard Specifications and Design Criteria* apply as amended and supplemented by the Department of Public Works of the City of Kansas City, Missouri (KCMO). Sections of said Specifications will be hereinafter referred to as "APWA-KCMO."

### **PART 2 - EROSION CONTROL PLAN**

1. The Contractor shall follow the erosion control plan that is shown in the Contract Drawings, unless otherwise directed by the Engineer. In the event that the overall disturbance of ground cover is less than one acre, an erosion control plan may not be included with the Contract Drawings.
2. If an erosion control plan is not provided in the Contract Drawings, this does not excuse the CONTRACTOR from making a constructive effort to prevent unrestrained erosion during his operations. Upon notification of a weather forecast with a reasonable likelihood of rain, or at the direction of the Engineer, the CONTRACTOR shall construct temporary berms and install enough erosion control fencing as necessary to control the erosion.
3. If the CONTRACTOR'S construction operations are complete to the point where sodding is the major item at hand before final acceptance can be made, and sodding is out-of-season or disallowed by the Engineer, the CONTRACTOR shall construct one of the following erosion control measures:
  - a. Incorporate the use of erosion control fencing immediately downstream of vulnerable areas that are susceptible to the formation of small streams. Maintain the erosion control devices until sodding season returns. Upon return of the sodding season, the area shall be re-graded to the lines and grades established in the Contract Drawings and sodded at the direction of the Engineer.
  - b. Terrace the ground with graded berms and incorporate the use of both temporary slope drains (as specified in ESCS Section 10.03.4.3) and erosion control fencing (as specified in this Section on pages 3-5). Maintain the erosion control devices until sodding season returns. Upon return of the sodding season, the area shall be re-graded to the lines and grades established in the Contract Drawings and sodded at the direction of the Engineer.
  - c. Fertilize, place sod, and irrigate as directed by APWA-KCMO 2400. Maintain the erosion control devices until sodding season returns. Upon return of the sodding season the

Oak Park Townhomes  
Project No.: 2020-02

CONTRACTOR shall re-establish the grade and replace all dead sod at the direction of the Engineer.

4. The construction and materials specifications for final seeding and sodding for the re-vegetation of disturbed ground surface areas shall be governed by APWA-KCMO 2400.

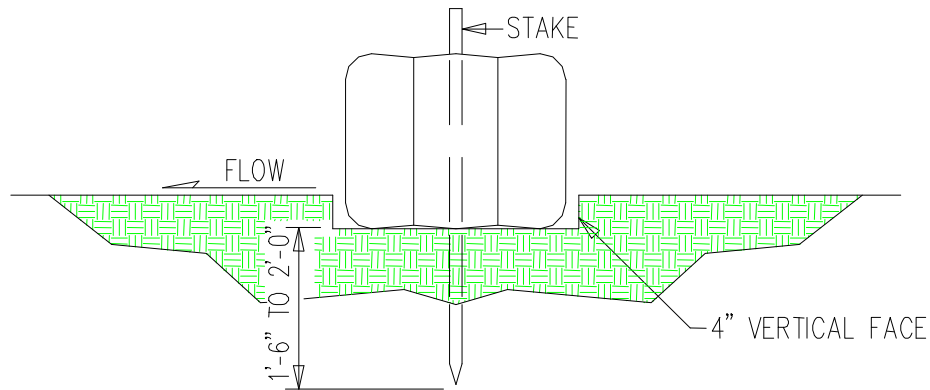
### **PART 3 - REFERENCE FIGURES**

See pages 01570-3 through 01570-5 of these specifications for details of the "Straw Bale Fence", "Silt Fence", and "Graded Berm".

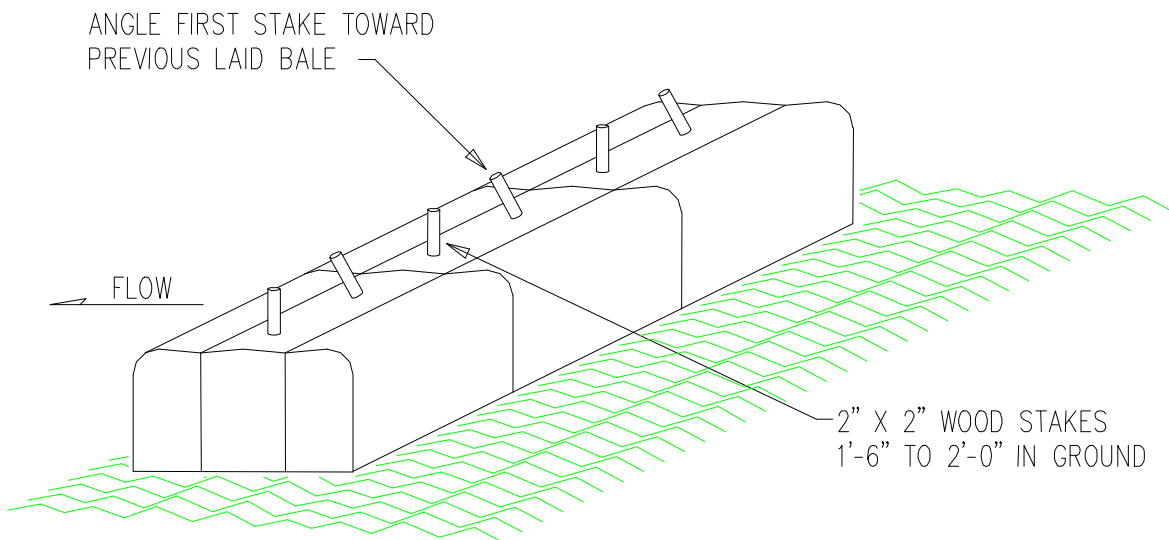
### **PART 4 -PAYMENT**

1. Such payments and prices constitute full compensation for all labor, materials, and equipment necessary to complete the items.
2. No payment shall be made for "Graded Berms" or "Temporary Slope Drains"; they are to be considered subsidiary to other items.

## **STRAW BALE FENCE DETAIL**



## **EMBEDDING DETAIL**

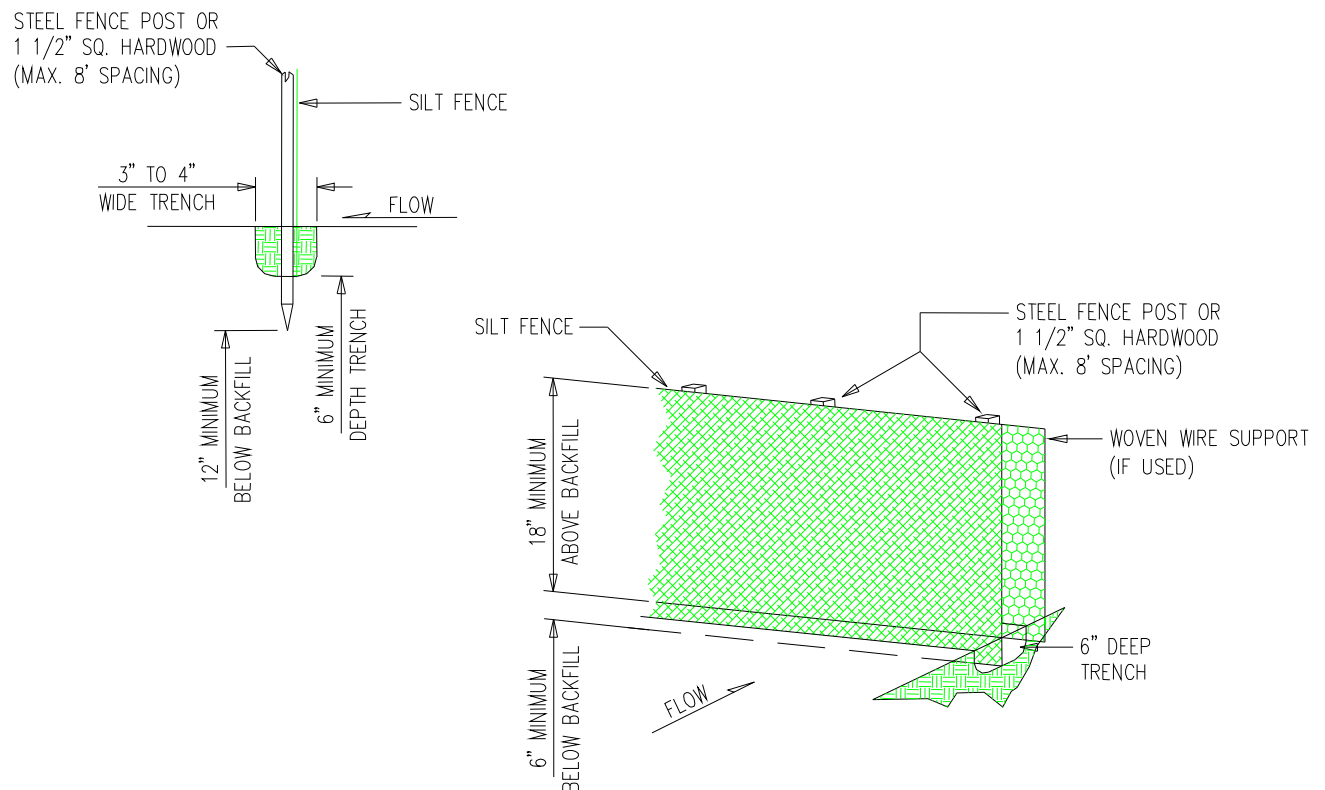


## **ANCHORING DETAIL**

1. Bales shall be placed in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4".
3. Bales shall be securely anchored in place by stakes driven through the bales. The first stake in each bale shall be angled towards previously laid bale to force bales together.
4. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
5. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the barrier.

6. The contractor shall remove bales when they have served their usefulness.
7. Sediment trapped by this practice shall be uniformly distributed on the source area prior to seeding or sodding.

## **SILT FENCE DETAIL**

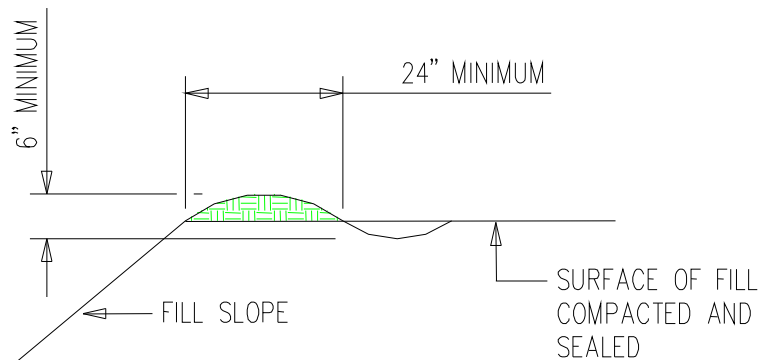


## **EMBEDDING DETAIL**

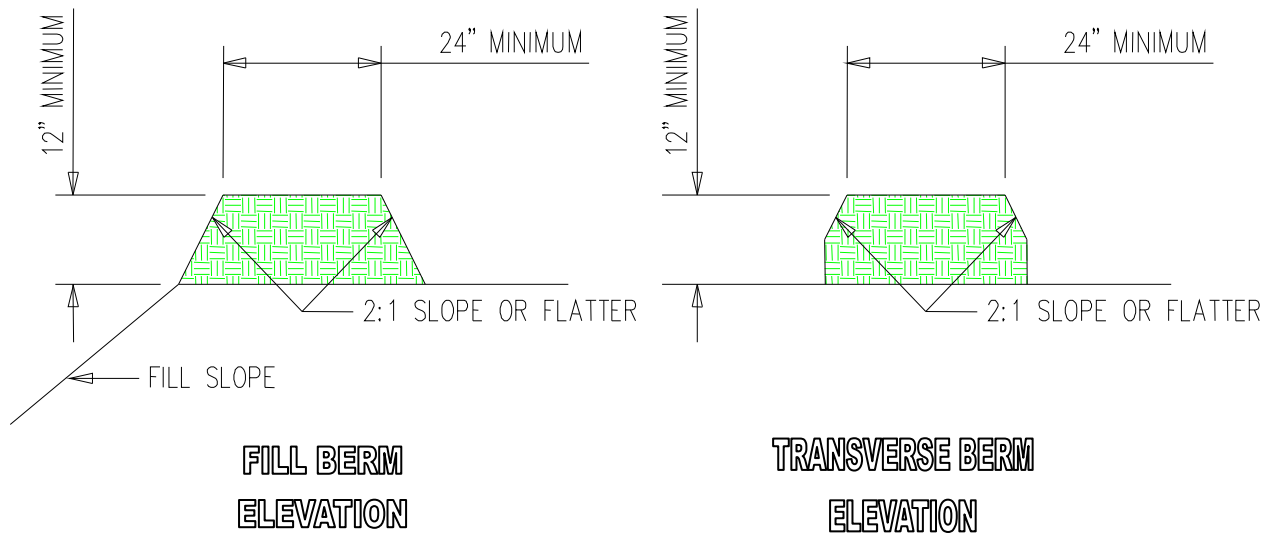
8. Posts which support the silt fence shall be installed on a slight angle towards the anticipated runoff source and placed at a maximum 8' apart or to silt fence manufacturer specifications, whichever is stricter.
9. Silt Fence shall be trenched in with a spade or mechanical trencher so that the down-slope face of the trench is flat and perpendicular to the line of flow.
10. The trench shall be a minimum of 6" deep and 3" to 4" wide to allow for the silt fence to be laid in the ground and back-filled.
11. Silt Fence shall be securely fastened to each support post or to woven wire, which is in turn attached to the fence posts.
12. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
13. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the barrier.
14. The contractor shall remove silt fences when they have served their usefulness.

15. Sediment trapped by this practice shall be uniformly distributed on the source area prior to seeding or sodding.
16. Silt Fence shall be Mirafi-100X Filter Fabric or approved equal.

### **BERM DETAIL**



**TYPE "A"**



**TYPE "B"**

17. Berms are required if the silt fence is not installed or properly maintained.
18. Type "A" Berms will be constructed at the end of each days operations on embankments.
19. Type "B" Berms will be constructed when embankment operations are shut down over the winter season or discontinued at the direction of or with the concurrence of the Engineer.
20. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
21. Remove sediment deposits as necessary to provide adequate storage volume for the next rain.

Oak Park Townhomes  
Project No.: 2020-02

22. The contractor shall remove berms when they have served their usefulness.
23. Sediment trapped by this practice shall be uniformly distributed on the source area prior to seeding or sodding.

**END OF SECTION**



**SECTION 01 5850  
PROJECT SIGNS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project identification sign during construction.

**1.02 QUALITY ASSURANCE**

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

**PART 2 PRODUCTS**

**2.01 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
- E. Lettering: Exterior quality paint, colors as needed.

**2.02 PROJECT IDENTIFICATION SIGN**

- A. One painted sign, 32 sq. ft area, and bottom 6 feet above ground.
- B. Content: Project sign content to be verified by the Architect. Sign to include but not limited to the following.
  - 1. MHDC Project number, title, logo and name of project.
  - 2. Names and titles of MHDC authorities.
  - 3. Names and titles of Rosemann & Associates, P.C. and Consultants.
  - 4. Graphic Design, Colors, Style of Lettering: Designated by Rosemann & Associates, P.C.
  - 5. Other requirements of local Housing Authority.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

**3.02 MAINTENANCE**

- A. Maintain signs and supports clean, repair deterioration and damage.

**3.03 REMOVAL**

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

**END OF SECTION 015850**

This page intentionally left blank

**SECTION 01 6000  
PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
  - 1. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
  - 2. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

**1.02 DEFINITIONS**

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

**1.03 SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - b. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - c. Samples, where applicable or requested.
    - d. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - e. Cost information, including a proposal of change, if any, in the Contract Sum.
    - f. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen days of receipt of request, or seven days after receipt of additional information or documentation, whichever is later.
  - a. Form of Acceptance: Indication of approval in writing from Architect.
  - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

#### **1.04 QUALITY ASSURANCE**

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

#### **1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  1. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  2. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
  1. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  2. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
  3. Store products to allow for inspection and measurement of quantity or counting of units.
  4. Store materials in a manner that will not endanger Project structure.
  5. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
  6. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  7. Protect stored products from damage and liquids from freezing.

#### **1.06 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

## **PART 2 PRODUCTS**

### **2.01 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
  6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
  7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

### **2.02 PRODUCT SUBSTITUTIONS**

- A. Timing: Architect will consider requests for substitution if received within 30 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect

for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
3. Requested substitution has received necessary approvals of authorities having jurisdiction.
4. Requested substitution is compatible with other portions of the Work.

### **2.03 COMPARABLE PRODUCTS**

- A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that the product is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

### **PART 3 EXECUTION (NOT USED)**

**END OF SECTION 016000**

## **SECTION 01 7300 EXECUTION**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout and land survey for controls.
  - 2. General installation of products, including Manufacturer's installation instructions.
  - 3. Progress Cleaning and Protection of Residents
  - 4. Protection of installed construction.
  - 5. Correction of the Work.
- B. Related Sections include the following:
  - 1. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
  - 2. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
  - 3. As excavation proceeds, verify any portion of the previous building on site that could interfere with new construction. Notify the Architect immediately.
  - 4. As interior demolition proceeds, verify any portion of the work that does not comply with layout for new construction. Notify the Architect immediately.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### **3.02 PREPARATION**

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the

Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

### **3.03 CONSTRUCTION LAYOUT**

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Interior Layout: Locate and lay out interior improvements as noted on the drawings.
- F. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### **3.04 FIELD ENGINEERING**

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.



- D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

### **3.05 INSTALLATION**

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 7'-6" in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
    - a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
    - b. Allow for building movement, including thermal expansion and contraction.
    - c. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- K. Obtain and maintain on-site Manufacturer's written recommendations and instructions for installation of products and equipment.

### **3.06 PROGRESS CLEANING AND RESIDENT PROTECTIONS**

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
  - 3. Site is an occupied site. Ensure that no materials remain exposed at any time that can be considered hazardous to the residents or staff.
- B. Separation: Separate residents and staff from construction at all times. Provide physical separation in order to prevent residents from entering construction areas. Provide physical separation necessary to protect residents from dusts and other construction chemicals.
- C. Site: Maintain Project site free of waste materials and debris.
- D. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
  - 3. Continuously monitor production of dust and control for resident and staff safety. Provide temporary enclosures or partitions in order to protect residents and staff from the health and comfort effects of dust and debris.
- E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure to building residents, staff, or construction personnel during the construction period.

### **3.07 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion. Provide complete protection of all installed finish flooring materials during entire duration of construction.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.
- C. Protect all existing construction, finishes, and materials to remain.

### **3.08 CORRECTION OF THE WORK**

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
  2. Note that flooring that is not adequately protected as specified herein will be replaced in total.
- B. Restore permanent facilities used during construction to their specified condition.
  - C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
  - D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
  - E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

### **3.09 STARTING AND ADJUSTING**

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

**END OF SECTION 017300**

This page intentionally left blank

**SECTION 01 7329  
CUTTING AND PATCHING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
  - 1. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

**1.02 DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

**1.03 SUBMITTALS**

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  - 3. Products: List products to be used and firms or entities that will perform the Work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
  - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
  - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

**1.04 QUALITY ASSURANCE**

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before

proceeding.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

### **3.03 PERFORMANCE**

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.

- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

**END OF SECTION 017329**

This page intentionally left blank



**SECTION 01 7700  
CLOSEOUT PROCEDURES**

**PART 1 GENERAL**

**1.01 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

**1.02 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

**1.03 MAINTENANCE MATERIAL SUBMITTALS**

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

**1.04 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the Owner. Label with manufacturer's name and model number where applicable.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section.
  - 5. Submit test/adjust/balance records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in

Section 017900 "Demonstration and Training."

6. Advise Owner of changeover in heat and other utilities.
  7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  8. Complete final cleaning requirements, including touchup painting.
  9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

**1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Page number.

**1.06 SUBMITTAL OF PROJECT WARRANTIES**

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

**PART 3 EXECUTION**

### 3.01 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and clean interior and exterior surfaces of glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
    - p. Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
    - q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    - r. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 017419 "Construction Waste Disposal."

### 3.02 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired.

Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
  - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

**END OF SECTION 017700**

**SECTION 01 7820  
OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Maintenance manuals for the care and maintenance of products, systems and equipment.
- B. Related Sections include the following:
  - 1. Divisions 2 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

**1.02 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

**1.03 SUBMITTALS**

- A. Submittal: Submit one copy of each manual 10 working days before final inspection to both the Architect and Owner. Architect and Owner will return copy with comments within 15 working days after final inspection.
  - 1. Correct or modify each manual to comply with Architect's and Owner's comments.

**1.04 COORDINATION**

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

**PART 2 PRODUCTS**

**2.01 MANUALS, GENERAL**

- A. Organization: Organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, a table of contents, followed by the manual contents.
- B. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder. Identify binders as "Operation", "Emergency" or "Maintenance".

**2.02 EMERGENCY MANUALS**

- A. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.

7. System, subsystem, or equipment failure.
8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

### **2.03 OPERATION MANUALS**

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  1. System, subsystem, and equipment descriptions.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  1. Product name and model number.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

### **2.04 MAINTENANCE MANUALS**

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard printed maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 EXECUTION**

### **3.01 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

**3.02 MANUAL SUBMITTAL**

- A. Submit review set of all manuals to the Owner for review prior to final submittal. Upon Owner's review, complete manuals per comments of review set and provide two final copies of all Operations and Maintenance Manuals to Owner.

**END OF SECTION 017820**



**SECTION 01 7839  
PROJECT RECORD DOCUMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.

**1.02 SUBMITTALS**

- A. Record Drawings: Submit one set of marked up prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

**PART 2 PRODUCTS**

**2.01 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of prints of the Contract Drawings and Shop Drawings.
  - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
  - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.

**2.02 RECORD SPECIFICATIONS**

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders and Record Drawings where applicable.

### **PART 3 EXECUTION**

#### **3.01 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

**END OF SECTION 017810**

**SECTION 01 7900  
DEMONSTRATION AND TRAINING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.

**1.02 CLOSEOUT SUBMITTALS**

- A. At completion of training, submit complete training manual(s) for Owner's use.

**1.03 COORDINATION**

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.

- c. Routine and normal operating instructions.
- d. Regulation and control procedures.
- e. Control sequences.
- f. Safety procedures.
- g. Instructions on stopping.
- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

### **3.02 INSTRUCTION**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times.
  - 1. Schedule training with Owner with at least seven days' advance notice.

**END OF SECTION**

## **SECTION - 02220 DEMOLITION & DISPOSAL**

### **PART 1 -GENERAL - Disposal of Demolition Debris**

All demolition debris shall be disposed of at a legal landfill or at a site where dumping of such materials is allowed under federal, state and local laws.

Demolition debris is defined as used building materials resulting from demolition, and waste materials from the construction of buildings or site clearing. Broken concrete, reinforcing steel, and asphalt are some of the many things considered to be demolition debris.

### **PART 2 - Approved Dumpsites**

In Kansas City, demolition debris dumpsites are permitted by the Board of Zoning Adjustment.

For further information on approved dumpsites contact: , City Development, 15th Floor, City Hall, 513-285101168  
.

### **PART 3. Earthen Landfills**

Soil, rock, and gravel are not considered to be demolition debris and can be placed at properly permitted locations. Obtain grading permits, erosion control permits, and floodplain certificates as applicable (from Codes Administration in KC). Broken concrete, with reinforcing closely trimmed and removed, may be placed in some earthen landfills, subject to approval by the landfill owner.

### **PART 4 Submittals**

At the pre-construction conference, CONTRACTOR shall submit the proposed sites for disposal of demolition debris and earthen material, in writing, to the OWNER. Once work starts, all substitute sites shall be submitted in writing to the OWNER. Submittals shall include a copy of the permit authorizing disposal at each site whether in or out of the City Limits.

Owner's Representative will confirm that the proposed sites, both within and out the City Limits, are properly authorized. Owners Representative will advise Contractor in writing if a disposal site is not properly authorized. Lack of a response to inquiry is sufficient cause to reject a disposal site.

### **PART 5 Remedy**

Failure to abide by these contract requirements to use only approved dumpsites, whether intentional or inadvertent, is deemed to be a major violation of the contract. In the event of such violation, the City shall have two special remedies, in addition to local ordinance penalties. It may, at its sole option:

Oak Park Townhomes  
Project No.: 2020-02

1. Direct that the materials which have been dumped at a site other than the approved one be moved to the approved location, and that the site where the unapproved dumping took place to be restored to its previous condition, or
2. Terminate the contract immediately by written notice to the CONTRACTOR, in which case the CONTRACTOR shall have no right to cure its default. The CONTRACTOR shall be entitled to be paid for the completed portion of his contract less the expense to remedy the unauthorized dumping. Such payment shall be made only after the work is complete and all costs are finally determined.

Before either of such remedies is invoked, the CONTRACTOR will be given five (5) Working Days written notice of the alleged violation. During the five (5) day period, the contractor may submit information for consideration by the OWNER. Due to the nature of illegal dumping, OWNER need not have proof positive; "alleged" is herewith adjudged sufficient evidence to terminate this contract.

#### **PART 6 PAYMENT**

No separate payment will be made for Demolition Disposal. All costs pertaining thereto shall be incidental to the other contract pay items.

**END OF SECTION**

## **SECTION 02315 - EXCAVATION**

### **PART 1 - GENERAL**

1. **APWA-KCMO.** All the requirements of the Kansas City Metropolitan Chapter of the American Public Works Association (APWA), *Standard Specifications and Design Criteria* apply as amended and supplemented by the Department of Public Works of the City of Kansas City, Missouri (KCMO). Sections of said Specifications will be hereinafter referred to as "APWA-KCMO."
2. **Excavation Classification.** All excavation is unclassified.
3. **Excavation.** Excavation shall conform to APWA-KCMO 2102.4 and 2602.3.A, except that no blasting will be allowed.
4. **Over excavation.** Additional depth excavation or over excavation, under grading, and backfill shall conform to APWA-KCMO 2102.5.

### **PART 2 - SUBSURFACE EXPLORATION**

1. **Subsurface exploration was performed at this project location.** The Geotechnical Report can be found in the Project Manual.

### **Part 3 - MEASUREMENT**

No measurements will be made for determining the volumes of trench excavation, over excavation, and backfill.

### **Part 4 - PAYMENT**

1. Payment will be made at the Contract Unit Price for Excavation which include Grading & Excavation. Payment shall constitute full compensation for labor, materials, and equipment necessary to complete the item.

**END OF SECTION**





## **SECTION 02330 - EMBANKMENT**

### **Part 1- GENERAL**

1. **Outline.** This section covers operations requiring earth fill greater than six (6) inches below finished grade, placed and compacted.
2. **APWA-KCMO.** All the requirements of the Kansas City Metropolitan Chapter of the American Public Works Association (APWA), *Standard Specifications and Design Criteria* apply as amended and supplemented by the Department of Public Works of the City of Kansas City, Missouri (KCMO). Sections of said Specifications will be hereinafter referred to as "APWA-KCMO."
3. **Embankment.** Embankment and compaction shall conform to APWA-KCMO 2102.

**END OF SECTION**



## **SECTION 02510 – WATER UTILITY FACILITIES**

### **PART 1 - GENERAL**

1. The Water Services Department Standards and Specifications for Water Main Extensions and relocations shall be used for the construction of the water mains except for the sections, which have been modified and included herein.
2. The Work to be performed under this section consists of furnishing all labor, materials (except those materials specifically listed under MATERIALS FURNISHED BY OWNER), equipment, tools, superintendence, and all services necessary to perform the Work complete with all appurtenances:
3. The contractor shall notify water services Department, Inspection and Construction Division at least 2 working days prior to starting work on water utility and facilities.
4. The Contractor shall provide a 3-year maintenance bond in accordance with the requirements of the water Department for all water line construction.

### **PART 2. CONTRACT SPECIFICATIONS**

1. The work shall conform to these Project Requirements and to the latest revision of the *Standards and Specifications for Water Main Extensions and Relocations* which is made a part hereof by reference.
2. The term “Engineer” as used in the aforesaid Standards and Specifications and in this section, Section 02510 of the Project Manual, only, shall mean the Engineering Services Division of the Water Services Department of the City, or any engineer or agent designated by the DIRECTOR of the Water Service Department in responsible charge of the water line Work.
3. The Standards and Specifications for Water Main Extensions and Relocations is available on the City website at <http://www.kcmo.org>. The hypertext path to click is as follows: Departments; Water Services; information link; Water Main Extension at Relocation Project; Standards and Specifications.

### **PART 3 MATERIALS FURNISHED BY THE OWNER**

1. The Owner will furnish, upon written request from the Contractor and without charge to the Contractor, the materials listed below. All other materials required to complete the Work in accordance with the Contract Documents shall be furnished and installed by and at the expense of the Contractor.
2. All material furnished by the Owner which is damaged, lost or stolen after its acceptance by the Contractor shall be replaced at the expense of the Contractor with like material purchased from the Owner.

3. The Contractor, or his authorized representative, shall sign a bill of receipt for all materials withdrawn from the Water Services Department Stores.
4. All materials withdrawn from the Water Services Department Stores that are not incorporated in the Work shall be returned to the Water Services Department Stores. All such material not returned shall be charged to the Contractor and deduction therefore shall be made from the final payment estimate.

#### **PART 4 CONNECTIONS TO EXISTING MAINS**

1. The Contractor shall furnish and install all fittings necessary for connections to the existing water mains at the locations shown on the Plans. No connections to existing mains shall be started without prior approval of the Director. Scheduling of water main shuts and connections to existing water main shall be discretion of Water Services.
2. It shall also be the responsibility of the Contractor to make any and all excavations and backfill as required, and furnish all labor, equipment, and material necessary to complete the connections as detailed on the Plans. The Contractor shall maintain, barricade, repair, restore, and protect all excavations and disturbed areas. All bends, tees, etc., shall be provided with adequate backing by the Contractor as required in Section 02669 – Thrust Restraints of the Standards and Specifications.

#### **3. Temporary Service**

- a. The Contractor shall notify all Water Services Department customers affected by the Work of making the connections as to the time of day and the span of time required to make said connections. When the closing of a valve to make the connections will terminate water service to a customer (S), the Contractor shall arrange to supply temporary service and schedule the time which is most convenient to the customer (S) for making the connection. No extra compensation will be allowed for providing temporary service or making the connection at a time other than normal working hours.
- b. When temporary water supply is not possible, valve shut duration shall be less than 4 hours.

#### **PART 5 BACKFILL**

All backfill in sidewalk and street areas shall be thoroughly compacted in conformance with APWA-KCMO Section 02602.3 “Construction Details.”

#### **PART 6 FACILITIES**

1. **Water.** The Owner will furnish without charge all necessary water for filling, flushing, and testing the completed line and other construction requirements. The Contractor shall make arrangements with the Owner for all water used. Use of City's water facilities shall be at the direction of the Water Services Department so that water service to customers served by the facilities is not impaired. Under any conditions, water shall not be wasted. Any water furnished by the Owner must be obtained from the Owner's existing main.

All material and service needed to obtain water for construction purposes shall be provided by the Contractor at his sole cost and expense.

- 2. Operation of Existing Valves.** The Contractor shall not operate any valves on the Water Services Department's system. The operation of all valves on the existing distribution system shall be performed by the Owner. If the Contractor desires the operation of any valves, he shall make a request to the Water Services Department for such operation, giving at least twenty-four (24) hours notice. The hydrant branch valves may be operated in the presence of a representative of the Water Services Department with no official advance notification.
- 3. Power.** All power for lighting, operation of the Contractor's plant or equipment, or for any other use which may be required for proper completion of the Work to be performed shall be provided by the Contractor at his sole cost and expense.

#### **PART 7 WATER SERVICE PERMITS AND FEES**

1. The Contractor will be required to obtain Water Service Permits as required in the Regulations of the Water Department, As Required. However, the Contractor will not be required to pay any permit fees for service permits or service taps.
2. The Contractor will be required to pay all permit fees of other City Departments, as identified in the General and Supplementary Conditions.

#### **PART 8 -POSITION, Line and Grade**

- A. A Registered Land Surveyor must set control points for the work. Horizontal and vertical control points shall be established using State Plane Coordinates, "Missouri Coordinate System of 1983, West Zone" and NAVD 88 Datum. The Contractor is responsible for hiring a Registered Land Surveyor for this work. All additional survey, layout, and measurement work shall be the responsibility of the Contractor.
- B. Contractor shall provide qualified and experienced staff, equipment and materials required to complete the survey, layout, and measurement work. Contractor shall also furnish necessary labor, equipment, and materials to establish or designate control points when required, establish construction easement boundaries, and check survey, layout, and measurement work. Offset stakes shall be provided at a minimum of 100 feet along the water line and at all appurtenances and fittings. Offset stakes will be at 50' intervals if curbs are not in place.
- C. Contractor shall coordinate survey work and shall inform Engineer and WSD in advance of the location and schedule of all survey work.
- D. Contractor shall provide to WSD complete survey cut sheets containing Water Main Stationing, State Plane Coordinates in U.S. Survey Feet (expressed in feet and decimals of a foot). These coordinates must conform to the "Missouri Coordinate System of 1983, West Zone". Cut notes must also include, Top of Pipe Elevations, Off-Set Hub distances with elevations of hub, Finish Grade at Hydrant Sets, Benchmark Elevations, Height of Instrument, and all main shots, in NAVD 88 datum. Stationing, coordinates, and elevations

must match drawings “approved for construction” by WSD, and shall be indicated for every fitting and every station at maximum distances of 50 feet along the water line. Water mains to be installed with deflections shall have coordinate points established at the beginning point of deflection and at the ending point of deflection.

- E. The cut sheets shall be sealed by a Registered Land Surveyor and must be submitted to WSD for approval a minimum of 2 working days prior to commencement of any Work included on the cut sheets. Saturdays, Sundays, or any Legal Holiday observed by the WSD are not to be included in the 2 working days period. Work shall not proceed if survey cut sheets are not approved by WSD.
- F. The Contractor shall maintain one set of approved cut sheets at the project site and shall keep them continually updated for record purposes.

## **PART 9 - DISINFECTION**

1. All disinfection work shall be in strict conformance with Section 02675 – Water Main Testing, Disinfection, and Dechlorination of the Standards and Specifications, with the following:
2. After the mains have been properly prepared, the Contractor will disinfect the mains, at no additional cost to the Water Services Department. The Contractor will furnish all necessary assistance for the operation of valves, etc.
3. After dechlorination and final flushing, and prior to putting the main into service, a passing Bac-T test shall be made on the main by the City. If the Bac-T test fails, the Contractor shall disinfect the main again. The Contractor shall do all the remaining work such as backfilling, paving, etc, which is necessary before the mains are put into service.

## **PART 10 - WATER SERVICES AND RECONNECTIONS**

1. All existing service lines connected to existing mains that are to be abandoned shall be disconnected from said mains and reconnected to the new mains. These reconnections shall be made by the Contractor.
2. The Contractor will perform only one water service transfer at a time. After the reconnection, the immediate area will be prepared for sod restoration before the Contractor is permitted to begin additional transfers.
3. If the Contractor chooses to use multiple crews for water service transfers, one crew may perform the transfer of the water services while another crew performs restoration. Cleanup must be completed on all water service transfers each day.
4. Installation of water service lines beneath streets and driveways shall be done by drilling or approved trench less methods unless rock or other site conditions require open cut excavations.
5. Contractor will replace all non-copper service connections with Type “K” copper (with like size, ¾” minimum) from the main to curb stop. Existing copper service connections can be spliced to

extend the existing service to the new main. If a shutoff does not exist within street right-of-way, a curb stop and box shall be installed at a location selected by Water Services Department.

4. The Contractor shall furnish all material, equipment, and labor for the complete installation in accordance with Rules & Regulations of the Water Department latest version. No service taps will be permitted until the new main is put in service. Existing water meters and tiles or curb stops that require relocation, either vertically or horizontally, because of construction, shall be relocated by the Contractor.
5. Meter and curb stop relocations include furnishing and installing new meter pit, new meter yoke, new curb stop, new curb box, new fittings, and all new appurtenances as required by the latest Rules & Regulation of the Water Services Department including any required upgrades to the existing service. Contractor shall coordinate with Water Services for removal and installation of new meter so as to minimize period when customer will be out of service. No additional payment to the contractor shall be allowed for any water services meter and curb stop relocations.
7. Service taps to the main shall be made in accordance with Rules & Regulations of the Water Department with the following exceptions:
8. Replace Section 4.02 (a) with “(a) Tapping shall be performed by the Contractor.”
9. Water meter and valve castings (curb stops or boxes) shall be relocated as necessary to match the new grades. The number of water meter or valve castings and water service line relocations are approximate only, and the actual quantities will be adjusted during construction.

## **PART 11 - WATER METER, VALVE AND CUT-OFF ADJUSTMENTS**

1. **Water Meter Adjustment.** Adjust water meters as necessary in conformance with the "Rules & Regulations of the Water Department" as published by the Water Department of Kansas City, Missouri. The completed work shall be subject to the approval of the Director of the Water Department.
2. **Water Valve and Cut-Off Adjustment.** Water valves and water service cut-offs which are affected by the work shall be adjusted as necessary to conform with the "Rules & Regulations of the Water Department" as published by the Water Department of Kansas City, Missouri. Once adjusted to finish grade, and following the installation of sod, each water valve box shall be blown clear of debris with compressed air. The Contractor shall be responsible for the protection of surrounding structures and/or vehicles which may be affected by this procedure. The completed work shall be subject to the approval of the Director of the Water Services Department.
3. **Covers and Stems.** Metal Water Meter, Valve Covers, and Stems shall be used in any walking or driving surface.

## **PART 12. CONSTRUCTION SEQUENCE**

No main will be considered substantially complete until the trenching, pipe laying, bedding, backfill, compaction and clean up are complete. In addition the main must be pressure/leakage tested and disinfected, flushed and services transferred. Service transfers, if any, are to be undertaken as soon as the main is accepted, and are to be completed before another main is started, unless multiple crews are working on the project simultaneously. Construction may not begin on subsequent mains until work on the first main is considered complete. If multiple crews are working on the project the pipe laying crews may not work more than one main ahead of the crews conducting service transfers. Where a main is constructed in established lawns, clean up must be performed before the next main is begun. (Lawn areas must be ready to accept sod.)

### **PART 13 - SETTING FIRE HYDRANTS**

1. Setting of the fire hydrants shall be in strict conformance with Section 02645 – Hydrants, Blowoff and Flushing Assemblies of the Standards and Specifications, with the following;
2. All new hydrant settings shall be as shown on the Plans and shall include all necessary excavation and backfill to make the installation complete. The area around each hydrant and hydrant valve cover shall be thoroughly compacted to prevent settlement of these areas.
3. The Contractor will locate the installation point of each hydrant as shown on the Plans, but not less than 2' from back of curb to face of hydrant. The Contractor shall furnish all labor and material necessary in laying out the Work. The Contractor shall be responsible for setting any offset stakes he may require. The Engineer shall approve the staked location of each hydrant before its installation.

### **PART 14 STREAM CROSSINGS**

Stream and drainage ditch crossings shall conform to the applicable Standards and Specifications and details shown on the Plans.

1. The trench width shall be as required for proper pipe installation and the trench depth shall be as required to give minimum cover shown on the Plans. Pipe encasement, where required, shall be in accordance with the Standards and Specifications and placed as indicated on the Plans.
2. The construction of riprap for erosion prevention of ditch slopes will be required at locations shown on the Plans.
3. The rock used for riprap shall be hard durable stone, not less than fifteen (15) inches thick, and shall be placed in mortar to provide a neat, uniform surface.
4. The Contractor shall furnish all labor, equipment, and materials, and perform all work necessary to construct water main stream crossings as required. No extra payment will be allowed for shoring, forming, dewatering, trenching, backfilling, rip-rap, concrete or steel, or any other items necessary to complete stream or ditch crossings.

### **PART 15 SUBMITTALS**

1. **Schedule of Values**



Before submission of the first Application for Payment, Contractor shall prepare and submit to Engineer for review a Schedule of Values. The submittal of the Schedule of Values, showing the estimated quantity and value of each kind of work, shall be acceptable before the Application for Payment is prepared.

## **2. Shop Drawings and Engineering Data**

- a. Shop Drawings and engineering data covering all equipment, fabrications, and building materials which will become a permanent part of the work under this Contract shall be submitted to Engineer for review, at the Engineer's address given in the Agreement. The data shall include drawings and descriptive information in sufficient detail to show the kind, size, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.
- b. All submittals, regardless of origin shall be stamped with the approval of Contractor and identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each submittal shall indicate the intended use of the item in the work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
- c. Contractor's stamp of approval is a representation to Owner and Engineer that Contractor accepts full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and that he has reviewed and coordinated each submittal with the requirements of the work and the Contract Documents.
- d. Contractor shall accept full responsibility for the completeness of each submission. When an item consists of components from several sources, Contractor shall submit a complete initial submittal including all components.
- e. All Deviations from the Contract Documents shall be identified on each submittal and shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.
- f. Six (6) copies of each drawing and necessary data shall be submitted to the Engineer. Engineer will return two marked copies to Contractor. Facsimile (fax) copies will not be acceptable. Engineer will not accept submittals from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

## **PART 16 PAYMENT**

No separate payment will be made for this item. All costs pertaining thereto shall be included in the Contract Unit Prices for other items as listed in Section 00412, Bid Form-Unit. Such payment shall be considered as full compensation for all labor, equipment, and materials required to complete the

following Work in accordance with the Contract Drawings and Specifications regardless of scope changes or differing site conditions:

**1. Water Main Relocation and Water Service Line Relocation – Main To Curb Box.** Payment will be made for “All Water Main Relocation Work” at the lump sum price listed in the Bid Form – Unit Prices. Such payment shall be considered as full compensation for all labor, equipment, and materials required to complete the following work in accordance with the Contract Drawings and Specifications regardless of scope changes or differing site conditions.

- a. All water mains, including all pipe, valves, fittings, hardware, polyethylene encasement, and all traffic control.
- b. All hydrant sets, including all pipe, valves, fittings, hardware, and polyethylene encasement.
- c. All water service connections, including all costs for locating the service line, trenching, pipe, curb stop valves and boxes, and all fittings resulting in an operable water service conforming to the Plumbing Code.
- d. All Pavement restoration, PCC driveway restoration, sidewalk, and curb ramp restoration Work associated with the water main or water service line relocation that is required to complete the water main or water service line relocation Work from the main to the curb box.

**2. Water Service Relocation - Curb Box to Building.**

Payment will be made as a lump sum bid item for “All Water Main Relocation Work” at the Contract Unit Price as listed in the Bid Form – Unit Prices. Such payment shall be considered as full compensation for all labor, equipment, and materials required to complete the following Work in accordance with the Contract Drawings and Specifications regardless of scope changes or differing site conditions:

All water service line relocation work, including connections, trenching, pipe, and all fittings from the curb box to the building shall result in operable water service lines conforming to the Plumbing Code and the Contract Drawings.

**3. Water Meter or Valve Box Adjustment.**

Payment for each adjustment to water service curb box castings for meters or valves or cut-offs will be made as a lump sum bid item for “All Water Main Relocation Work” at the Contract Unit Price as listed in the Bid Form. Such payment shall be considered as full compensation for all labor, equipment, materials, earthwork, and installation required to complete the following Work in accordance with the Contract Drawings and Specifications regardless of scope changes or differing site conditions:

- A. Contractor shall maintain in a safe place at the project site one continually updated record copy of all Drawings, Standards and Specifications, Addenda, Shop Drawings, Written Amendments, Change Orders, Work Change Directives, written interpretations or clarifications of the contract documents, survey information (including approved cut sheets), and all other documents relevant to the Work. All such documents shall be kept in good condition and order, and shall be continuously updated to indicate all changes made during construction. No work shall be allowed in the absence of these record documents.
- B. Upon completion of the work at the project site, the Contractor shall submit to the WSD all Record Documents. Record drawing submittals, that are a part of the Record Documents, shall include one paper copy, one reproducible copy (on Mylar or vellum), and one electronic copy on computer disc of the updated drawings in the latest version of Microstation® or AutoCAD®. The disc shall include all information necessary to edit and plot the drawings, and shall be labeled with the Project Name, WSD Project Number, WSD Work Order Number, WSD Drawing Number, and date of publication. All measurements on the Record Drawings must be updated to indicate the true location of the work as it was actually constructed in the field. The Record Drawings for water mains must include references for all beginning and ending points, bends, hydrants, valves, tees, fittings, and beginning and ending points of deflection of water mains indicated in State Plane Coordinates in U.S. feet (expressed in feet and decimals of a foot). The coordinates must conform to the "Missouri Coordinate System of 1983, West Zone". State wide Missouri Geographical Reference System monuments, Kansas City Metro Control Project monuments, Certified Land corners used as references to determine State Plane coordinates, and all control monuments used in the survey work must be listed with reference ties shown on the Record Drawings. The Record Drawings must indicate the elevations of the finished grade or improvements and the top of the water main at every fitting and Station at maximum spacing of 50' along the water main. All elevations shall be indicated in NAVD 88 Datum (in feet and decimals of a foot). Every sheet of the Record Drawings must be reviewed and **sealed by a Registered Land Surveyor, licensed in the state of Missouri** and must include the following statement on the title block inside the box marked "for WSD use" and in close proximity to the Registered Land Surveyor's seal::

"Each sheet of these Record Drawings and attached Survey Cut Sheets for the Work have been reviewed and approved by the Registered Land Surveyor whose seal is affixed to this Record. The horizontal control, coordinates, and elevations shown on these Records are accurate and are based on the Missouri Coordinate System of 1983, West Zone and NAVD88 datum. These Records have been revised, as required in Section 01000, 1.20 of the Standards and Specifications for Water Main Extensions and Relocations, under my personal supervision to show the true and accurate measurements of the work as it was actually constructed."

The Contractor must also sign each sheet of the documents with the following certification:

"I hereby certify that this Record correctly depicts the Work constructed as to size, horizontal and vertical location, and grade as shown on the approved construction drawings or their revision. The Work was done in accordance with

Oak Park Townhomes  
Project No.: 2020-02

these Records and the current version of the Standards and Specifications for Water Main Extensions and Relocations.”

Contractor: \_\_\_\_\_ Date: \_\_\_\_\_  
Name (print): \_\_\_\_\_ Title: \_\_\_\_\_  
Signature: \_\_\_\_\_

- C. The WSD will review the submitted Record Documents and determine their adequacy prior to final acceptance of the Work. Record Documents determined to be inadequate will be returned to the Contractor for required revisions or additions. The Contractor will correct all inadequacies and make all additions required to make the Record Documents acceptable to the WSD. The Record documents shall be an integral part of the work guaranteed by the Contractor’s Performance and Maintenance Bond. If during the three year maintenance period WSD determines that further revisions or corrections are necessary to make the Record Documents accurate, the Contractor, at no cost to WSD will make or cause the revisions or corrections to be made.

**END OF SECTION**

## **SECTION 02520 WATER MAIN SHUT PROCEDURES**

### **PART 1      Purpose:**

- 1.1 To provide consistent specific guidance to Contractors and WSD personnel responsible for temporarily shutting off water mains including both test shuts and main shuts, and to minimize customer service disruptions.

### **PART 2      Scope:**

- 2.1 This procedure applies to both scheduled/planned shutting of water mains for the purposes of making tie-ins, extensions, relocations, service line kills, and valve replacements, and to unscheduled/unplanned shuts for leak repairs.
- 2.2 This would apply to WSD Engineering staff administering contracts, or other City improvements requiring water line relocations, and to WSD Pipeline Division.
- 2.3 This procedure does not apply to disinfection, flushing and sampling/testing of new main extensions.

### **PART 3      Responsibilities:**

- 3.1 WSD Engineering staff is responsible for coordinating scheduled/planned tie-ins or extensions which may require temporary loss of water/pressure (including Test Shuts).
- 3.2 WSD Pipeline Division is responsible for valving down water mains on a scheduled basis; for service line kills, making valve repairs or valve replacements, certain fire hydrants valves or hydrant replacements (including Test Shuts). However, a majority of the time they make unscheduled shuts for leak repairs.

### **PART 4      Procedure:**

#### **4.1      Underlying Philosophy**

- 4.1.1 Assuming that an “unscheduled/unplanned shut”, i.e. main break repair, may last approximately 4 hours, a “scheduled” shut should inconvenience customers to no greater degree, if at all.

#### **4.2      Scheduled/Planned Shuts – Service Level Goals**

- 4.2.1 The overall service level goal is to eliminate or reduce the impact on customers when water systems shuts must be made.
- 4.2.2 The circumstances surrounding each shut are unique. Each planned shut should be evaluated for the optimum choice of methods to reduce or eliminate the loss of water supply during the shut period. Factors to be considered in evaluating means to achieve the goals include the following data:
  - i Number of customers affected by loss of water service

- ii Nature of customers affected by loss of water service, that is, residences, commercial businesses, industrial businesses, research facilities, hospitals, home-care individuals, 24/7 businesses, heavy water user (bottler, commercial laundry, etc.) and so on.
- iii Location of main shut, that is, downtown (congested with utilities), residential street, highway, green space, and so on.
- iv Time of year (seasonal demands) and proximity of holidays
- v Practicality of providing temporary water service and cost thereof.

4.2.3 Shuts being made for contractor main extensions or tie-ins shall, generally speaking, use temporary supply measures or night time work, at contractor's discretion. However, due to special circumstances (as mentioned in 4.2.2 above), the WSD may choose which approach is to be utilized.

4.2.4 To minimize the number of customers affected, the use of a nighttime or after hours shut must be considered. Typical examples would be:

- Use of a nighttime shut, for residential areas and some businesses, typically beginning after 11 p.m. and ending before 5 a.m.
- An after-hours shut, when some businesses or industries are closed or processes are shut down. WSD will work with the business affected to coordinate the shut to eliminate or minimize impact on the business operations.

4.2.5 To reduce the impact of an outage during a shut, typical examples of methods to follow are:

- Hydrant to hydrant jumpers
- Temporary above ground piping/manifolding. Manifolding to individual premises is typically considered when outage is expected to exceed 12 hours.

4.2.6 The use of valve insertions to minimize the impact area should be considered also.

4.2.7 Should temporary water supply during a shut be impractical or not feasible, any outage, whether day or night, should be limited to 4 hours.

4.2.8 Due to the many variables involved in planning for a given shut, "common sense" should always be applied to minimize the potential negative impact of an outage on the customer.

#### 4.3 **Scheduled Shuts - Procedures:**

4.3.1 All shuts shall be pre-approved. All Shuts, whether Engineering – activity related or Pipeline Division related, shall be preliminarily approved by the Department.

4.3.2 **Water Quality-**

Each shut, including test shuts, shall include field chlorine testing (consistent with AWWA Standards) following proper, thorough flushing. Bac-T samples should be taken if chlorine levels are found to be less than 1.5 mg/l total chlorine. (see 4.4.1.5)

4.3.3 **Notification-**

4.3.3.1 Door hangers shall be used to notify customers in advance of any scheduled shut.

4.3.3.2 Notice to the following WSD staff shall be made in advance of all shuts:

4.3.3.3 Notice to the above shall include shut start time and expected duration, approximate number of customers affected, (residential/commercial) and any special customers affected.

Notice at the end of the shut shall be given to WSD Dispatch (if less than 16 inch main South, 12 inch North) and to WSD Dispatch and SCADA (if greater than 16 inch main South, 12 inch North).

4.4 **Scheduled and Unscheduled Shuts - Procedure**

4.4.1 **Use of Chlorine Test Kits-**

4.4.1.1 Chlorine test kits shall be initially issued by the WSD Laboratory to Engineers, Engineering Technicians / Inspectors, Pipeline crews and Meter Field Service Staff. WSD Laboratory shall train this staff in the proper use thereof. Necessary replenishment of test reagents shall be purchased by each user group, i.e. Engineering, Pipeline, or Meter Field Services.

4.4.1.2 A chlorine test shall be performed after each scheduled test shut, scheduled shut or each unscheduled shut (leak repair). The chlorine test shall follow proper flushing, of the pipeline that has been repaired. A useful field estimate is to flush for about 2-minutes for each 100 ft of pipeline to achieve the desired 2.5 feet/second water velocity. **(See attachment No. 1)**

4.4.1.3 For each unscheduled shut, affecting various sized areas, one chlorine test shall be made for each 30-50 customers shut off, or 1200 feet of main, approximately.

4.4.1.4 Should Cl<sub>2</sub> level be found less than 1.5 mg/l, a second test shall be performed. Should a second test be less than 1.8 mg/l, a Bac-T sampling shall be made. Lab must be notified as soon as possible

of such need and they will perform this test. CI2 test records shall be kept and initialed by the appropriate Supervisor in charge.

4.4.2 **Back-up Resources – Scheduled/Planned Shuts**

When the Pipeline Division is needed for valving or excavation resources, every attempt should be made to schedule the shut on Tuesday, Wednesday, Thursday of the week, when maximum Pipeline staff are available.

4.4.3 **Weekly List of Scheduled/Planned Shuts**

4.4.3.1 This list of Shuts shall be created and kept up to date by Engineering. Pipeline Division shall provide weekly their list of planned shuts to be included in this Weekly list.

4.4.3.2 The Weekly List of Scheduled/Planned Shuts shall be completed by Friday of the preceding week. The list shall be distributed to the Department Heads.

**End of Section**



## **SECTION 02530 – SANITARY SEWERS**

### **PART 1 - GENERAL**

1. This section includes sewer lines, manholes, service lines and all other appurtenances necessary to complete construction of the sanitary sewer lines as part of this project.
2. The Contractor shall perform acceptance testing for all “Manholes”, “Sewer Pipe”, and all “Appurtenances” in accordance with Section 2500 of the “APWA Standard Specification and Design Criteria”, Division II, and the Kansas City Missouri Supplement to Section 2500 (latest version).

### **PART 2 -PRODUCTS**

1. Materials are as called out on the plans and specified in the references or in this section of the project manual.
2. Unless specified otherwise, Vitrified Clay Pipe (VCP) may be substituted for Polyvinyl Chloride Pipe (PVC), except for service lines, which shall be 4” PVC unless noted.

### **PART 3 - EXECUTION**

1. Outside drops shall conform to Standard Plan MH-OD, Manhole-Outside Drop.
2. Pipe encasement and collars shall conform to P-EN.
3. Tees, Wyes, and Building Service Lines: Tees (T’s), Wyes (Y’s), and building services lines shall be installed as shown on the plans or specified herein.
  - a. Tees, Wyes, and Saddles shall be installed at forty-five (45) degrees with pipe springline for pipe sizes 8 through 16-inch diameter. Tees, Wyes, and Saddles shall not be installed in pipe sizes greater than or equal to eighteen- (18) inch diameter.
  - b. Building Service Lines shall be installed with a straight alignment and at a uniform grade not less than two (2) percent unless otherwise specified and shall be embedded with Class B embedment. When a Building Service Line grade exceeds twenty (20) percent, pipeline anchors shall be installed as required under Section 2506.2.11, with the first anchor not more than twelve (12) feet nor less than seven (7) feet upstream of the tee or wye.
  - c. The Contractor shall maintain an accurate record for submittal to the Engineer of the location, size and direction of each tee, wye, saddle and/or location, size and length of each building service line. Locations shall use the pipeline stationing as shown on the Plans or the distance from the first downstream manhole. In the event such records are not kept or are lost before final acceptance of the work, the required information shall be re-determined by the Contractor at no additional cost to the Owner.
  - d. Service Line locations are approximate. The Contractor and the Property Owner with approval of the Engineer shall establish the locations in the field. Service Lines shall be terminated and capped a minimum of five (5) feet outside the back of curb area or one (1) foot on the public side of the right-of-way line or easement boundary. A 2” x 4” stake shall be placed at the end of each

Service Line and a metallic tape saying "Buried Sewer Below" shall be attached to the end of the pipe and extend two (2) feet above grade. Contractor shall avoid disturbance of existing drive

#### **PART 4 - PAYMENT**

Payment "Sewer Lines", "Manholes", and "Service Lines" will be made at the contract unit price. Payment shall constitute full compensation for labor, materials, and equipment necessary to complete tie items.

**END OF SECTION**

## **SECTION 02630 - STORM SEWERS**

### **PART 1. -GENERAL**

1. Storm sewer pipe structures and appurtenances shall be installed and constructed at the locations shown on the Drawings. Materials and construction shall be in compliance with Section 2600 of the "Standard Specifications and Design Criteria".
2. Prior to constructing the new sewers, the CONTRACTOR shall physically locate all unforeseen utility service lines within ten (10) feet of the proposed sewers. If there is a utility conflict with the proposed sewers, the CONTRACTOR shall notify the ENGINEER so that the existing service top elevation and horizontal coordinates can be obtained by the project surveyor. Certified as-built redlines and the utility investigation surveying are the sole responsibility of the CONTRACTOR.)
3. Existing sewer mains and sewer & water service lines that require new construction, relocation or adjustment, in the vertical or horizontal alignments shall be performed by the Contractor. Repairs to damages caused by the CONTRACTOR shall be responsibility of the CONTRACTOR.
4. The CONTRACTOR shall perform acceptance testing for all "Manholes", "Sewer Pipe", and all "Appurtenances" in accordance with APWA-KCMO and Water Services Department Standards & Requirements.
5. Storm Sewer Construction and/or Relocation shall be conducted in accordance with KCMO-APWA Standard Specifications and Design Criteria, Section 02600, except as herein amended.

### **1.2. ADDITIONAL SPECIFIC REQUIREMENTS**

1. Service Line locations, as shown or indicated on the plans are all assumed. The CONTRACTOR (prior to construction of the new sewer systems) with approval of the Engineer shall be responsible to perform dye tests, digging potholes and establish the exact numbers and the actual surveyed horizontal and vertical location of all existing services within 10' of the proposed storm sewer. The Contractor subsequently shall be responsible to determine the actual conflicted crossings at the proposed storm sewer and submit his service-relocation shop drawings and/or certified sketches for the Engineer's review and approval. (Contractor also shall be responsible to provide field electronic data such as the location coordinates and service line spot elevations for the Engineer use.) It shall be the responsibility of the Contractor to obtain necessary field information for aiding him in determining the required

minimum length of the existing sanitary or any other services necessary to clear for the construction of proposed sewers.

### 1.3. MATERIALS

1. **Storm Sewer Pipe.** All reinforced concrete pipe (RCP) as called out on the Contract Drawings and shall be of standard manufacture in accordance with the applicable sections of the Standard Specifications. Pipe materials shall meet or exceed APWA-KCMO 2600 standards for HDPE pipe.
2. **Flowable Fill.** CLSM (flowable fill) shall be used to backfill all storm sewer structures and storm sewers located within all pavements within street right of way, as specified in APWA-KCMO 2602.3.C.
3. **Curb Inlets.** New curb inlets shall conform to the KCMO Standard Drawings "CI-1, Curb Inlet Type 1" or "CI-2, Curb Inlet Type 2" with steel frame throat. The structure(s) shall be constructed to the size and type listed in the Bid Form-Unit Prices; the throat height(s) shall be as shown on the standard drawings unless otherwise specified on the plans and in the Bid Form-Unit Prices. Precast top slabs shall be formed with the steel frame in place. Until it is poured in place with the concrete gutter throat, the steel framework shall not be used to lift or to support the weight of the top slab. The curb inlet top slab shall have a type RC4C shallow ring & cover (without cam locks).
4. **Field Inlets & Grate Inlets.** Field inlets and grate inlets shall conform to APWA-KCMO Drawing "FI-1" and GI-1, respectively. Field inlet openings shall be as specified in the Contract Drawings.
5. **Manholes and Junction Boxes.** Manholes and Junction Boxes shall conform to KCMO Standard Drawings, MH-1 and JB-1, respectively. Sizes shall be as shown in the Contract Drawings. Shrink wrap shall be used to seal the manhole joints between the precast cone barrel and the manhole ring casting wherever storm sewer manholes are located adjacent to or within driveway or street pavements.
6. **Manhole Ring and Covers.** Inlet manhole ring and covers shall be "MH-RC4C" without cam locks. Storm sewer manhole ring and covers shall be "MH-RC3". Cam locks are only required where specifically called out on field inlet tops in residential areas, curb inlet tops in non-sump areas, all areas subject to flooding – such as in a floodplain or within a creek channel, and whenever bolt down rings are specified. Manhole rings are only required to be bolted-down on 'pressure' piped sewers. Vented covers will not be used in new construction. Covers shall be marked "STORM".

### 1.4. Execution

- 2. Connection To Existing System.** Where a storm sewer pipe is being connected to an existing drainage structure, the work shall be constructed by sawing and chipping a hole through its sidewall to allow a minimum of three-inches of new concrete around the pipe. The invert shall be chipped away and replaced to shape a new doghouse collar and invert. The interior concrete surfaces shall be grouted smooth with non-shrink grout. Depending on the method and extent of the sidewall demolition, reinforcing bars may need to be doweled into the existing structure at the direction of the Owner's Representative.

**Pipe Trimming.** Pipes connecting to structures shall be cut parallel with the inside face of structures with plane walls. Pipes connecting to other pipes shall be cut parallel with the spring line of the pipe. Projection of the pipe beyond the inside face shall not exceed one inch. Voids shall be grouted with non-shrink grout.

- 3. Connection Of Existing Pipes to New Pipes.** Connection to and/or extension of an existing pipe shall be accomplished by construction of a concrete collar between the old and new pipes. The collar shall be a minimum of 6" thick and 3' long using MCIB Mix No. A558-1-2 and shall encircle the pipe. The connection shall be properly supported to prevent settlement. All work shall be performed to the satisfaction of the OWNER'S Representative.
- 4. Inlet and Pipe Removal.** This Section consists of removing an inlet and associated pipe. Backfill shall be in accordance with Figure 1 APWA-KCMO 2602.3.C. The existing pipe removed shall be plugged with concrete plugs. Any abandoned pipes left in place shall be filled with Fly Ash Slurry.
- 5. Tunneling.** Storm sewer pipes within the drip line of a tree marked "Save" shall be installed by tunneling under the roots. Drip line is defined as the diameter of the tree in inches x 10 = drip line diameter in feet. One joint of RCP may be pushed with the excavator bucket. Boring and jacking shall be accomplished in accordance with APWA 2603.3; steel casing is not required. There will be no separate payment for tunneling operations of 30' or less.

## **1.5. EXFILTRATION AND OUTFLOW TESTING OF SEWER LINE**

Where required for gasketed storm sewers located in close proximity to water lines, exfiltration tests shall be performed by the CONTRACTOR in accordance with APWA-KCMO 2509.4.2. The CONTRACTOR shall furnish all labor, equipment, materials, and reports for the required acceptance tests. Pipelines that do not conform to the requirements shall be repaired and/or replaced and shall be retested until the pipeline meets the project requirements. Testing shall be recorded by the CONTRACTOR and a copy shall be submitted to the Engineer. No testing shall be performed before backfill and compaction operation has been completed.

## **1.6. PAYMENT**

- 1. Storm Sewer Pipe.** HDPE pipe will be measured per linear foot along the horizontal geometric centerline of the pipe to the inside walls of the structures at each end, be the structure a PCC inlet, manhole, box culvert, concrete open channel liner, or headwall. No separate payment will be made for pressure testing of the sewer line. Such payment and price shall constitute full compensation for all labor, material, and equipment necessary to complete the items.
- 2. Curb Inlets, Field Inlets, Grate Inlets, Manholes and Junction Boxes.** Costs shall include fabrication, delivery, earthwork, installation, and all other items necessary to construct the structures. Such payment and price shall constitute full compensation for all labor, material, and equipment necessary to complete the items.
- 3. Connection Of Existing Pipes to New Pipes.** Such payment and price shall constitute full compensation for all labor, material, and equipment necessary to complete the items. If the item is not listed in the Bid Form-Unit Prices, no payment will be made for this work and all costs associated therewith shall be included in other items.
- 4. Inlet and Pipe Removal.** Such payment and price shall constitute full compensation for all labor, material, and equipment necessary to complete the items. If the item is not listed in the Bid Form-Unit Prices, no payment will be made for this work and all costs associated therewith shall be included in other items.

END OF SECTION 02620

## **SECTION 02740 – FLEXIBLE PAVEMENT**

### **PART 1. GENERAL**

1. This section governs all the work and materials necessary for the construction of asphaltic concrete pavements.
2. All the requirements of the Kansas City Metropolitan Chapter of the American Public Works Association (APWA), *Standard Specifications and Design Criteria* apply as amended and supplemented by the Department of Public Works of the City of Kansas City, Missouri (KCMO). Sections of said Specifications will be hereinafter referred to as "APWA-KCMO."
3. All work included in this Section shall conform to APWA-KCMO 2600.
4. Asphaltic concrete mixes shall conform to APWA-KCMO 2205. Base course shall be Type 1-01; surface course and wedging shall be Type 3-01.
5. Surface course and wedging shall be virgin asphalt.
6. Recycled asphalt may be used for the base course.

### **PART 2. MEASUREMENT**

1. The "Asphaltic Concrete Base" or "Asphaltic Concrete Surface" shall be measured in square yards. In those areas where additional pavement is being replaced the length and width of the work will be measured to the nearest foot and converted to the nearest 0.1 square yard for payment

### **PART 3 PAYMENT**

1. "Asphaltic Concrete Base" or "Asphaltic Concrete Surface" will be by the square yard. Such payment and price shall constitute full compensation for all labor, materials, and equipment necessary to complete the item.

**END OF SECTION**





## **SECTION 02745 – STREET CUT RESTORATION**

### **A. GENERAL**

1. This section covers all work associated with street cut restoration as indicated on the Contract Documents.
2. All the requirements of the Kansas City Metropolitan Chapter of the American Public Works Association (APWA), *Standard Specifications and Design Criteria* apply as amended and supplemented by the Department of Public Works of the City of Kansas City, Missouri (KCMO). Sections of said Specifications will be hereinafter referred to as "APWA-KCMO."
3. All work associated with the pavement shall conform to APWA-KCMO 2200.
4. All street surfaces removed by this construction shall be replaced in accordance with the current "Street Cut Restoration," APWA-KCMO Drawing "SR-1," except as modified by APWA-KCMO 2602.3.C and the trench backfill note on the plans.

### **B. MEASUREMENT**

1. The restored street pavement above the sewer pipe will be measured to the nearest tenth of a foot, horizontally, along the geometric centerline of the pipe to the edges of the full depth restored pavement.
2. No measurement will be made for street cut restoration work associated with utility relocations.

### **C. PAYMENT**

1. No separate payment will be made for Street Cut Restoration. All costs pertaining thereto shall be included in the Contract Unit Prices for other items as listed in Section 00412, Bid Form-Unit Prices.

**END OF SECTION**



## SECTION 02760 PAVEMENT MARKING AND SYMBOLS

**A. Summary:** This work consists of furnishing material for and installation of standard traffic paint.

**B. Specifications:**

Paint for Pavement marking shall conform to MoDOT Section 620.50.

Paint for pavement marking shall be a VOC compliant solvent borne acrylic paint suitable for satisfactory application on asphaltic or concrete surfaces. Apply a 15 mil thickness.

Arrangement and dimensions of pavement markings and symbols shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD). Where conflicts occur between the plans and the MUTCD, MUTCD shall govern.

**C. Construction:**

Surface Preparation. Surface, on which thermoplastic material is to be placed, shall be clean and dry. Existing pavement markings which will prevent proper bonding or distract drivers, will be removed by methods approved by the Engineer.

Finished markings shall have clean straight edges and square ends.

Glass beads are not required on this project.

**D. Payment:** Payment for "Pavement Marking" and "Symbols" shall be by the lump sum and shall constitute full compensation for materials and work necessary to complete the item.



## SECTION 02770 CURBS AND GUTTERS

### PART 1. GENERAL

1. This section covers the construction of concrete PCC Curb or Curb and Gutter as indicated in the Contract Documents.
2. Concrete Curb or Curb and Gutter construction shall conform to APWA-KCMO 2209 and Standard Drawing "C", Type CG-1 or C-1 curb
3. Where existing pavement is damaged during curb replacement construction work, pavement will be sawed parallel to the gutter and replaced in accordance with Section 02745, Street Cut Restoration

### PART 2 MEASUREMENT

All curb and gutters will be measured to the nearest foot along the curb face. Measurement shall be carried through inlet transitions but not through drive aprons unless complete separation of curb and gutter is carried continuously across the apron. Concrete curb inlet throats shall be measured as curb.

### PART 3 PAYMENT

1. Payment will be made at the Contract Unit Price per lineal foot. Such payment and price shall constitute full compensation for all labor, materials, and equipment for the performance of all the work necessary to complete the item.

**END OF SECTION**



## **Section 02775 – SIDEWALK AND ADA ACCESSIBLE RAMPS**

### **Part 1 - GENERAL**

#### **1.1 SIDEWALKS**

1. Portland cement concrete (PCC) sidewalks shall conform to APWA-KCMO 2208, 2209, 2301 and Standard Drawings “SW-1”, “SW Notes”, SW ADA”, “SW-205”, “SW-305”, and “SW-405.”
2. The CONTRACTOR shall protect the newly placed sidewalk until the concrete has reached a compressive strength of 3,000 psi as evidenced by the breaking of laboratory test cylinders.
3. During construction, care shall be taken to ensure public safety along the sidewalk.
4. PCC sidewalk shall be a minimum of eight (8) inches thick reinforced concrete for the ten (10) linear feet of “SW-1, Type A”, ADA accessible ramps constructed at each street corner. Reinforcing shall be 6 x 6 – W2.9 x W2.9 welded steel wire fabric placed with a three inch clearance from the ground.
5. All non-ADA accessible ramp PCC sidewalk shall be (4) inches thick. The CONTRACTOR shall be responsible for the cost of providing fill material consisting of untreated compacted aggregate within the top six (6) inches of sub-grade.
6. All curb boxes, manholes, tile covers, and meter-pit covers shall be adjusted to grade and movable portions shall be left free and clean.
7. All sidewalks and driveways reconstructed along streets under the jurisdiction of the Parks and Recreation Department shall be done in accordance with their plans and specifications. Reinforcing shall be 6 x 6 – W2.9 x W2.9 welded steel wire fabric. Work on Parks and Recreation Department streets shall also require a separate permit from that Department.

#### **B. ADA ACCESSIBLE RAMPS WITH DETECTABLE WARNING**

1. Detectable warnings are required standardized surface features built-in or applied to walking surfaces on sidewalks or ramps to warn visually impaired people of hazards on circulation path. ADA accessible ramps shall conform to the details as shown on the following pages in this Section. The CONTRACTOR shall be responsible for the cost of providing fill material consisting of untreated compacted aggregate within the top six (6) inches of subgrade.
2. Contractor shall submit shop drawings in accordance with Section 01330, “Shop Drawings and Material Submittals”, which clearly defines the method and materials used for detectable warning. Rolled or stamped detectable warning will not be permitted.
3. Detectable warnings shall consist of raised truncated domes with a 0.9 inch nominal diameter, a nominal 0.2 inch height, and a nominal center to center spacing of 2.35 inches. They shall extend across the full walking surface of the walk or ramp, and shall be 2 feet long in the direction of pedestrian travel.

Oak Park Townhomes

Project No.: 2020-02

4. Detectable warnings shall contrast visually with adjoining surfaces, either light-on-dark or dark-on-light. The material used to provide contrast should contrast by at least 40%. Contrast in percent is determined by:

Contrast =  $[(B1-B2)/B1] \times 100$ , where:

B1 = light reflectance value (LRV) of the lighter area

B2 = light reflectance value (LRV) of the darker area

Light Reflectance Value shall be determined by ASTM D2805 for painted surfaces or by visual comparison to paint chips with LRVs determined by ASTM D2805 for non-painted surfaces. The material used to provide contrast shall be an integral part of the walking surface.

## **G. PAYMENT**

1. PCC Sidewalks: This is a field measure item. Payment will be by the square foot. Such payment and price shall constitute full compensation for all labor, materials, and equipment necessary to complete the item.
2. Detectable Warning: No separate payment will be made for this item unless otherwise specified.

**END OF SECTION**



## SECTION 02931 – SODDING

### PART 1 - GENERAL

1.1. SCOPE. This section shall cover the work consisting of furnishing and planting viable sod in accordance with these specifications and in reasonable conformity with the areas and locations shown on the plans or established by the Engineer. The Contractor shall provide all materials, labor, and equipment to complete the sodding work in accordance with these specifications.

1.2. PERSONNEL AND EQUIPMENT. All sodding work shall be performed by a contractor having demonstrated experience in sodding on projects of similar size. The work shall be prepared by experienced personnel who are familiar with the required work and who are under the supervision of a qualified foreman at all times when the work is in progress.

### PART 2 - MATERIALS.

2.01. Sod. The sod to be used as source material shall be a thick stand of Kentucky Blue Grass, Turf Type Tall Fescue, Bermuda Grass, Zoysia Grass or other grasses as shown on the plans. The sod shall contain a growth of not more than 1 percent of other grasses and clovers, shall be free from all prohibited and noxious weeds.

The Turf Type Tall Fescue sod shall be composed of an equal mix of three or four compatible species of 100 percent Turf Type Tall Fescue. The mixture shall not include any varieties of the slower growing Turf Type Tall Fescue “Dwarf”. The species shall be one of the following:

Apache	Arid	Austin
Bonanza	Carefree	Chieftan
Cimmaron	Cochise	Falcon
Guardian	Hounddog	Jaguar II
Maverick II	Mustang	Olympic
Phoenix	Rebel II	Rebel 3D
Safari	Shenandoah	Thoroughbred
Titan	Tribute	Vegas

Kentucky Blue Grass and Turf Type Tall Fescue sod shall be cut in strips of uniform thickness, the range of acceptable thickness shall be 1 1/2 to 2 inches; each strip containing at least one square yard. Sod shall be cut in strips not less than 12 inches wide.

Bermuda Grass or Zoysia Grass sods shall be cut into strips of uniform thickness, the range of acceptable thickness shall be 1 1/2 to 2 inches; each strip being not less than 12 inches wide and 24 inches long. Strips that crumble will not be acceptable.

Broken pads and torn or uneven ends will not be acceptable. Standard size sections shall be strong enough to support their own weight and should retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section. Sod shall not be harvested or transplanted with moisture content (excessively dry or wet) that will adversely affect its survival.

Sod shall be relatively free of thatch, up to 1/2 inch allowable (uncompressed). Sod shall be reasonably free of diseases, nematodes, and soil-borne insects. State nursery and/or plant materials laws require that all sod entering inter-state commerce be inspected and approved for sale. The same applies to sod being

shipped intra-state. The inspections and approval must be made by the state agricultural department, office of the state entomologist.

Sod for golf courses and other areas as deemed necessary shall be of the Kentucky Blue Grass and Turf Type Tall Fescue Grass as specified above. Bermuda Grass and Zoysia Grass sod will not be acceptable for these areas.

2.02. Fertilizer. Fertilizer shall be inorganic 12.12.12 or 13.13.13 grade, uniform in composition, free flowing and suitable for application with approved equipment, delivered to the site in convenient containers, each fully labeled, conforming to applicable state fertilizer laws, bearing the name, trade name, or trade mark and warranty of the producer.

### PART 3 - CONSTRUCTION.

3.01. Time and Conditions. The work shall not be started until substantially all earthwork has been completed. Backfills and fills shall be allowed to settle and the topsoil spread and finish grading completed immediately before the work is started.

3.02. Preparation of Area. Preparation of areas to be sodded shall include filling, reshaping or eroded areas, cleaning ditches and refinishing slopes to the established grade section. The area shall be cleared of stumps, stones larger than 3 inches, roots, cable, wire, and other materials that might hinder the work or subsequent maintenance. **The surface shall not be compacted and must be loose before placement of top soil, which may require preliminary tilling. A minimum of 4" of topsoil must be in place either from reclaimed topsoil from clearing or new brought in the meet the 4".**

3.03. Application of Fertilizer. Before **final** tilling operations, fertilizer shall be spread uniformly at the rate of 300 pounds per acre. Fertilizing rate is equivalent to 3.5 pounds per 500 square feet.

3.04. Preparation of Sod Bed. After fertilizer has been applied, the areas to be sodded shall be tilled to a depth of at least 2 inches by disking, plowing, harrowing, or other accepted methods until the soil is well pulverized and smoothed with a weighted spike-tooth harrow, railroad chains, or bridge timber float drag. When a chisel plow is used, the chisels shall be set not more than 10 inches apart and the areas shall be cross- or double-tilled. All areas shall be left smooth for ease of mowing. All operations shall be done in a direction parallel to the contour lines on the slope and not uphill or downhill.

3.05. Application of Sod. Kentucky Blue Grass and Turf Type Fescue sod shall not be placed during a drought not during the period from June 1 to September 1, unless authorized by the Engineer, and shall not be placed on frozen ground. Bermuda and Zoysia sods shall only be placed during the period from May 1 to October 15. The Engineer reserves the right to delay the sodding of all types of sod or to vary the permissible sodding seasons, due to weather, soil conditions, or for other causes.

Sod shall be moist when it is placed. Sod strips shall be laid along contour lines, commencing at the lowest point of the area and working upward. The transverse joints of sod strips shall be staggered and the sod carefully placed to produce tight joints. If necessary to walk excessively on newly laid sod, walking boards should be laid for this purpose. The sod shall be firm and watered immediately after it is placed. The "firming" shall be accomplished by application of a roller weighing not less than 60 nor more than 90 pounds per linear foot of roller or other approved method.

3.06. Anchoring Sod. On 2:1 slopes, or steeper, the sod shall be anchored with 1/2 inch square by 8 inch long wooden pegs. The wooden pegs shall be driven into the ground 3 pegs to the square yard or other approved methods. Pegging shall be done immediately after sod is firmed.

3.07. Cleanup. Within reasonable time after completion of the construction operations, the entire area shall be cleared of excess soil and waste material, including, but not limited to, stones, stumps, roots, brush, wire, grade stakes, and all objects that might be a hindrance to maintenance operations or affect the visual appearance of the site. All roads over which hauling operations have been conducted, regardless of the type of surfacing, shall be kept clean, and soil clods and debris left on the surface shall be removed. The wheels of vehicles shall be cleaned to avoid leaving soil upon the surface of roads, walks, and other surfaced areas.

#### PART 4. - WATER SUPPLY.

4.01. Water Usage. Water used in this work shall be furnished by the Contractor and will be suitable for irrigation and free from ingredients harmful to plant life. All watering equipment required for the work shall be furnished by the Contractor. Water from adjacent fire hydrants or public water lines shall be metered. Written approval from the property owner shall be obtained prior to the use of suitable water from ponds or creeks. Water from private owners shall also be metered.

#### Part 5.- MAINTENANCE.

The Contractor shall be responsible for maintaining the installed grass sod until all areas are complete and accepted by the Engineer. Grass areas in excess of one square foot that are dead or in poor condition regarding color and quality shall be replaced at the Contractor's expense prior to final acceptance.

The Contractor shall maintain the grass area for a period of approximately 30 days or until the grass reaches a mowing height of 2 1/2 inches. The Contractor shall notify the Engineer that the installed grass is ready to be mowed, and upon approval, the Contractor shall cut and "bag" grass clippings to a height of 1 1/2 inches. Completion of the mowing and replanting of all dead or dying grass by the Contractor shall be required prior to final acceptance.

End of Section.



**SECTION 03 0516  
UNDERSLAB VAPOR BARRIER**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet vapor barrier under concrete slabs on grade.

**1.02 REFERENCE STANDARDS**

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Samples: Submit samples of underslab vapor barrier to be used.
- D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Underslab Vapor Barrier:
  - 1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
  - 2. Complying with ASTM E1745 Class A.
  - 3. Thickness: 15 mils.
  - 4. Basis of Design:
    - a. Stego Industries LLC; Stego Wrap Vapor Barrier (15-mil):  
[www.stegoindustries.com/#sle](http://www.stegoindustries.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

**3.02 INSTALLATION**

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches.
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Repair damaged vapor retarder before covering with other materials.

**END OF SECTION**

This page intentionally left blank

**SECTION 03 3000  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting 2010.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- J. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- K. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2020.
- N. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2015a.
- O. ASTM C150/C150M - Standard Specification for Portland Cement 2020.
- P. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.
- Q. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- U. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2015.
- W. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.
- X. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- Y. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a.
- Z. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers 2014.

- AA. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.

## **1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
  - 2. For chemical-resistant waterstops, provide data on ASTM D471 test results.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

## **1.03 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

## **PART 2 PRODUCTS**

### **2.01 FORMWORK**

- A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
  - 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
  - 3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

### **2.02 REINFORCEMENT MATERIALS**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
  - 1. Type: Deformed billet-steel bars.
  - 2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
- C. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
  - 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

### **2.04 ADMIXTURES**



- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Water Reducing Admixture: ASTM C494/C494M Type A.

## **2.05 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder:
  - 1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. Epoxy Bonding System:
  - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- B. Waterstops: PVC, complying with COE CRD-C 572.
- C. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Material: Closed-cell, non-absorbent, compressible polymer foam in sheet form.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
  - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
  - 2. Height: To suit slab thickness.

## **2.07 CURING MATERIALS**

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- C. Curing and Sealing Compound, Moisture Emission-Reducing, Membrane-Forming: Liquid, membrane-forming, clear sealer, for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
  - 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
  - 2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
  - 3. VOC Content: Less than 100 g/L.
  - 4. Solids Content: 25 percent, minimum.
- D. Moisture-Retaining Sheet: ASTM C171.
  - 1. Curing paper, regular.
  - 2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
- E. Water: Potable, not detrimental to concrete.

## **2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,500 pounds per square inch.
  - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
  - 3. Water-Cement Ratio: Maximum 0.50 percent by weight.
  - 4. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  - 5. Maximum Slump: 4 inches.
  - 6. Maximum Aggregate Size: 3/4 inch.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

#### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
  - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
- E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

#### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

#### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing

laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

- F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### 3.05 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

### 3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Correct the slab surface if tolerances are less than specified.
- B. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
  - 1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
  - 2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
  - 3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
  - 4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.
- C. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- D. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### 3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
  - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
  - 3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
  - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
  - 3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to

be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.

### **3.08 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
  - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
  - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
  - 3. Final Curing: Begin after initial curing but before surface is dry.

### **3.09 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

### **3.10 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### **3.11 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

**SECTION 03 5400  
CAST UNDERLAYMENT**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes gypsum-cement-based, self-leveling underlayment for application below interior floor coverings.
  - 1. Liquid-applied self-leveling floor underlayment.
    - a. Use gypsum-based type at UL floor assembly systems listed.
- B. Section includes acoustical mat for application below gypsum cement underlayment.

**1.02 REFERENCE STANDARDS**

- A. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete 2020.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.
- C. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions. Include any control or cold joint locations and details.
- D. Manufacturer's Instructions.

**1.04 QUALITY ASSURANCE**

- A. Hold a Pre-Installation conference meeting one-week prior to installation proceeding. Inform Architect two-days prior for coordination.
- B. Applicator Qualifications: Company specializing in performing the work of this section, and approved by manufacturer.
- C. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.
- D. Fire-Resistance Ratings: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- E. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- F. Sound Transmission Characteristics: Where indicated, provide gypsum-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

**1.06 FIELD CONDITIONS**

- A. Do not install underlayment until floor penetrations and peripheral work are complete.

- B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.
  - 1. Place gypsum-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.
- C. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
- D. During the curing process, ventilate spaces to remove excess moisture.

#### **1.07 COORDINATION**

- A. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.

### **PART 2 PRODUCTS**

#### **2.01 GYPSUM-CEMENT-BASED UNDERLAYMENTS**

- A. General: Gypsum-cement-based, self-leveling product that can be applied in minimum uniform thickness of 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

#### **2.02 MANUFACTURERS**

- A. Gypsum Underlayment: Per UL assembly listed manufacturer's
  - 1. ARDEX Engineered Cements; ARDEX K 22 F with ARDEX P51 Primer: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  - 2. Hacker Industries, Inc; Firm-Fill 2010+: [www.hackerindustries.com/#sle](http://www.hackerindustries.com/#sle).
  - 3. Maxxon Corporation; Gyp-Crete 2000/3.2K: [www.maxxon.com/#sle](http://www.maxxon.com/#sle).
  - 4. USG; Levelrock® Series 2500 Floor Underlayment: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 5. Substitutions: See Section 01 6000 - Product Requirements
- B. Sound Control Mat:
  - 1. Hacker Industries, Inc; Firm-Fill SCM 125: [www.hackerindustries.com/#sle](http://www.hackerindustries.com/#sle).
  - 2. Maxxon Corporation; Acousti-Mat 1/4: [www.maxxon.com/#sle](http://www.maxxon.com/#sle).
  - 3. USG; Levelrock® SAM-N12 Sound Attenuation Mat: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.03 MATERIALS**

- A. Cast Underlayments, General:
  - 1. Comply with applicable code for combustibility or flame spread requirements.
- B. Gypsum-Based Underlayment: Gypsum based mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment with the following properties:
  - 1. Compressive Strength: Minimum 2500 pounds per square inch, tested per ASTM C472.
  - 2. Density: Maximum 115 pounds per cubic foot.
  - 3. Final Set Time: 1 to 2 hours, maximum.
  - 4. Thickness: 3/4 inch to maximum 1 1/2 inch.
  - 5. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/0 in accordance with ASTM E84.
  - 6. Cement Binder: Gypsum or blended gypsum cement as defined by ASTM C 219.
  - 7. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- C. Water: ASTM C1602/C1602M; clean, potable, at a temperature of not more than 70 deg F, and not detrimental to underlayment mix materials.
- D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- E. Primer shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D.

- F. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch; or coarse sand as recommended by underlayment manufacturer.
  - 1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- G. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- H. Corrosion-Resistant Coating: Recommended in writing by underlayment manufacturer for metal substrates.
  - 1. Coating shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D.
- I. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.
- J. Sound Control Mat: Sheet material, perimeter isolation strip, and tape; as recommended by the underlayment manufacture, to provide a minimum of 50 STC and 50 IIC in fire rated assembly.

## **2.04 MIXING**

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to self-leveling consistency without over-watering.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

### **3.02 PREPARATION**

- A. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- B. Vacuum clean surfaces.
- C. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- D. Close floor openings.
- E. Wood Substrates: Mechanically fasten loose boards and panels to eliminate substrate movement and squeaks. Sand to remove coatings that might impair underlayment bond and remove sanding dust.
  - 1. Install underlayment reinforcement recommended in writing by manufacturer.
- F. Install sound control mat in accordance with manufacturer's instructions.
- G. Provide control joints at any firewalls and/or planned cold joints

### **3.03 APPLICATION**

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Install Acousti-Mat following manufacturer's recommendations and specifications.
- C. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- D. Apply underlayment to produce uniform, level surface.
  - 1. Apply a final layer without aggregate to product surface.
  - 2. Feather edges to match adjacent floor elevations.
  - 3. Feather edges to match exterior door thresholds, 1/4" per foot maximum.
- E. Pump or pour material onto substrate. Do not retemper or add water.
  - 1. Pump, move, and screed while the material is still highly flowable.
  - 2. Be careful not to create cold joints.
  - 3. Wear spiked shoes while working in the wet material to avoid leaving marks.
- F. Place to indicated thickness, with top surface level to 1/8 inch in 10 ft.
- G. For final thickness over 1-1/2 inches, place underlayment in layers. Allow initial layer to harden to the point where the material has lost its evaporative moisture. Immediately prime and begin

application of the subsequent layer within 24 hours.

- H. Place after Unit demising and internal partition installation.
- I. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

#### **3.04 CURING**

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

#### **3.05 PROTECTION**

- A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.
- B. Do not permit traffic over unprotected floor underlayment surfaces per manufacturer's recommendation.
- C. Protect underlayment from any concentrated and rolling loads for remainder of construction period.

**END OF SECTION**



**SECTION 04 2000  
UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- F. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- G. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units 2017.
- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- I. ASTM C150/C150M - Standard Specification for Portland Cement 2020.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- K. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- M. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- N. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- O. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.
- P. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.

**1.04 QUALITY ASSURANCE**

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of Contract Documents.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

**PART 2 PRODUCTS**

## **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
  - 2. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block.
    - b. Lightweight.

## **2.02 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
  - 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.

## **2.03 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
  - 2. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
  - 3. WIRE-BOND [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Truss or ladder.
  - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
  - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- E. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
- G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
  - 3. Vertical adjustment: Not less than 3-1/2 inches.

## **2.04 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
- D. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- E. Weeps:
  - 1. Type: Polyester mesh.
  - 2. Manufacturers:
    - a. Advanced Building Products, Inc: [www.advancedbuildingproducts.com/#sle](http://www.advancedbuildingproducts.com/#sle).
    - b. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## **2.05 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Exterior, non-loadbearing masonry: Type N.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

### **3.06 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches on center horizontally below shelf angles and lintels and near top of walls.

### **3.07 CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

### **3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

- A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

### **3.10 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
- C. Extend metal flashings through exterior face of masonry and terminate in an angled drip with hemmed edge. Install joint sealer below drip edge to prevent moisture migration under flashing.

### **3.11 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

### **3.12 TOLERANCES**

- A. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- B. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- C. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

**3.13 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.

**3.14 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

This page intentionally left blank

**SECTION 04 2613  
MASONRY VENEER**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Clay face KING brick.
  - 2. Colored Mortar.
  - 3. Ties and anchors.
  - 4. Embedded flashing.
  - 5. Weather Resistant Barrier
  - 6. Control joints
  - 7. Miscellaneous masonry accessories.

**1.02 PRE-INSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at Project site.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
  - 1. Clay face brick, in the form of straps of five or more bricks.
  - 2. Colored mortar.
  - 3. Weep holes/vents.
- D. Samples for Verification: For each type and color of the following:
  - 1. Clay face brick, in the form of straps of five or more bricks.
  - 2. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
  - 3. Weep holes and vents.
  - 4. Accessories embedded in masonry.

**1.04 INFORMATIONAL SUBMITTALS**

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type and size of the following:
  - 1. Masonry units.
    - a. Include data on material properties.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C 67.
  - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
  - 3. Mortar admixtures.
  - 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 5. Anchors, ties, and metal accessories.
- C. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  1. Build mockup of typical wall area as shown on Drawings facing south.
  2. Build mockups for typical exterior wall full height by full thickness, including face and backup wythes and accessories.
    - a. Include a sealant-filled joint at least 16 inches (400 mm) long in each mockup.
    - b. Include lower corner of window opening, at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.
    - c. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).
    - d. Include metal studs, sheathing, water-resistive barrier [sheathing joint-and-penetration treatment, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
  3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
  4. Protect accepted mockups from the elements with weather-resistant membrane.
  5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### **1.07 FIELD CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of veneer, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches (600 mm) down face of veneer, and hold cover securely in place.



- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### **2.02 UNIT MASONRY, GENERAL**

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

### **2.03 BRICK**

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  - 3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  - 4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Clay Face KING Brick: Facing brick complying with ASTM C 216.
  - 1. Grade: MW.
  - 2. Type: FBS.

3. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Size (Actual Dimensions): King Size Brick are 9 5/8" L x 2 5/8" H x 2 3/4" thru the wall, for a nominal face dimension of 10" x 3" with a standard 3/8" mortar joint. Conform to ASTM C652
6. Color and Texture: TBD

## **2.04 MORTAR MATERIALS**

- A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C 144.
  1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
  3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- F. Water: Potable.

## **2.05 TIES AND ANCHORS**

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
  2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
  3. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304.
  4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
- C. Corrugated-Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication.
- D. Adjustable Masonry-Veneer Anchors:
  1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).
  2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- (1.90-mm-) thick steel sheet, galvanized after fabrication.
  3. Fabricate wire ties from 0.25-inch- (6.35-mm-) diameter, [hot-dip galvanized-steel] [stainless-steel] wire unless otherwise indicated.

4. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.

## **2.06 EMBEDDED FLASHING MATERIALS**

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual and as follows:
  1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
  2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
  3. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  4. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 1/4 inch (6 mm) to form a stop for retaining sealant backer rod.
  5. Solder metal items at corners.

## **2.07 MISCELLANEOUS MASONRY ACCESSORIES**

- A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Weep/Vent Products: Use one of the following unless otherwise indicated:
  1. Vinyl Weep Hole/Vent: Units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect.
- C. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  1. Configuration: Provide one of the following:
    - a. Sheets or strips not less than 1 inch (25 mm) thick and installed to full height of cavity with additional strips 4 inches (100 mm) high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.
- D. Weather Resistant Backing:
  1. Provide Two-ply JumboTex weather-resistive barrier by Fortifiber Building Systems.

## **2.08 MASONRY CLEANERS**

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

## **2.09 MORTAR MIXES**

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime mortar unless otherwise indicated.
  3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Use Type N unless another type is indicated.
  1. For masonry below grade or in contact with earth, use Type S.
  2. Pigments shall not exceed 10 percent of portland cement by weight.
  3. Application: Use pigmented mortar for exposed mortar joints.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION, GENERAL**

- A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

### **3.03 TOLERANCES**

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
  - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
  - 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.
- C. Joints:
  - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
  - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). [Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).]
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

### **3.04 LAYING MASONRY WALLS**

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated on Drawings; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

### **3.05 MORTAR BEDDING AND JOINTING**

- A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### **3.06 ANCHORED MASONRY VENEERS**

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with [ seismic] masonry-veneer anchors to comply with the following requirements:
  1. Fasten screw-attached and seismic anchors through sheathing to wall framing and [to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  2. Embed tie sections connector sections and continuous wire in masonry joints.
  3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
  5. Revise spacing to suit coursing, comply with requirements of authorities having jurisdiction, or comply with structural requirements imposed by wind or seismic forces..
- B. Provide not less than 1 inch (25 mm) of airspace between back of masonry veneer and face of sheathing.
  1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

### **3.07 EXPANSION/CONTROL JOINTS**

- A. General: Install expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement. Vertical expansion joints in Brick Veneer: For brickwork without openings, space

no more than 25 ft. o.c. For Brickwork with multiple openings, consider symmetrical placement of expansion joints and reduced spacing of no more than 20 ft o.c., per Brick Industry Association.

- B. Form control joints as follows:
  - 1. Build in compressible joint fillers where indicated.
  - 2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
- C. Provide vertical and horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).
  - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry. Review joint locations with Architect prior to commencing
  - 2. Locate vertical, pressure-relieving joints at door or window openings no greater than 20' oc. Review joint locations with Architect prior to commencing

### **3.08 LINTELS**

- A. Install steel lintels where indicated and at horizontal relief angle control/expansion joints (no more than 20' o.c)
- B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

### **3.09 FLASHING, WEEP HOLES, AND VENTS**

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. Extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under water-resistive barrier, lapping at least 4 inches
  - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
  - 4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  - 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
  - 7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
  - 8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

- D. Install weep holes in veneers in head joints of first course of masonry immediately above embedded flashing.
  - 1. Use specified weep/vent products to form weep holes.
  - 2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
  - 3. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
  - 4. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
  - 5. Trim wicking material flush with outside face of wall after mortar has set.
- E. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
  - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
- C. Testing Prior to Construction: One set of tests.
- D. Clay Masonry Unit Test: For each type of unit provided, according to ASTM C 67 for compressive strength.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

### **3.11 REPAIRING, POINTING, AND CLEANING**

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking

- tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
  7. Clean stone trim to comply with stone supplier's written instructions.
  8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

### **3.12 MASONRY WASTE DISPOSAL**

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
  2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
  3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 042613**



**SECTION 04 4313.16**  
**ADHERED STONE MASONRY VENEER**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Stone masonry adhered to unit masonry backup.
  - 2. Stone masonry adhered to wood framing and sheathing.
  - 3. Watertable sill at masonry veneer wainstcot
  - 4. Patio wall caps

**1.02 PREINSTALLATION MEETINGS**

- A. Pre-installation Conference: Conduct conference at project job site.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Samples for Initial Selection: For colored mortar and other items involving color selection.
- C. Samples for Verification:
  - 1. For each stone type indicated. Include at least 5' of wall on each. Samples in each set and show the full range of color and other visual characteristics in completed Work.
  - 2. For each color of mortar required, fully laid in each segment.
  - 3. Assume mockups of stone required.
- D. Test Reports: Certified test reports showing compliance with specified performance requirements and physical properties.
- E. Manufacturer's Instructions: Provide manufacturers installation instructions.
- F. Warranty: Provide product and installation warranties.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Build mockups for in sizes approximately 5' long by 3' high by full thickness, including face and backup wythes and accessories.
    - a. Include stone coping at top of mockup.
    - b. Include a sealant-filled joint at least 16 inches long in mockup.
    - c. Include through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit stone masonry above half of flashing).
    - d. Include studs, sheathing, flashing, and weep holes in exterior masonry-veneer wall mockup.
  - 3. Protect accepted mockups from the elements with weather-resistant membrane.
  - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- C. Pre-Installation Conference:
  - 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
  - 2. Attendance:
    - a. General Contractor

- b. Architect/Owner's Representative
- c. Environmental StoneWorks Representative

D. Warranty: Single Source Warranty.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, in a dry location, or in covered weatherproof dispensing silos.

#### **1.06 FIELD CONDITIONS**

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining stone masonry face.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

#### **1.07 COORDINATION**

- A. Advise installers of other work about specific requirements for placement of flashing and similar items to be built into stone masonry.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Basis of Design: Stone Mountain Manufacturing; (913)345-8888  
<https://www.stonemountainkc.com/>
- B. Cultured Stone® by Boral®, which is located at: 200 Mansell Court E. Suite 305; Roswell, GA 30076; Toll Free Tel: 800-255-1727; Tel: 866-557-8663; Email: [boralstoneanswers@boral.com](mailto:boralstoneanswers@boral.com); Web: [www.culturedstone.com](http://www.culturedstone.com)
- C. CastleStone, 11668 Lilburn Park Road, St Louis, MO 63146; Tel: 314.997.1600; Email: [Tom@CastleStoneProducts.com](mailto:Tom@CastleStoneProducts.com); Web: [www.CastleStoneProducts.com](http://www.CastleStoneProducts.com).
- D. Midwest Cast Stone, 1610 State Ave.; Kansas City, KS 66102 ; Tel: 913-371-3300 ; Fax: 888-830-1954; Email: [requestinfo@midwestcaststone.com](mailto:requestinfo@midwestcaststone.com); Web: [www.midwestcaststone.com](http://www.midwestcaststone.com)

- E. Caliber Cast Stone, #2 Cool Springs Court, O'Fallon, MO 63366; Tel: 636.978.4000; Email request info mseidel@calibercaststone.com; Web: www.calibercaststone.com.
- F. Environmental StoneWorks 6300 East Stapleton Drive South, Denver CO 80216 with resources to provide materials of consistent quality in appearance and physical properties.
- G. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.
- H. Substitutions: Per Division 01 requirements.
- I. Manufactured Stone & Brick Veneer Properties:
  - 1. Stone Thickness: 1-1/8-2-1/2 inches
    - a. Basis of Design to be:
      - 1) Category: TBD
      - 2) Style: TBD
      - 3) Color: TBD
      - 4) Available final specifications to include manufacturers full line of products.
      - 5) Owner to make final decision of style from on site mock ups.
      - 6) Please make provisions for dry stack joints if required by Ownership. Please Bid as included in the quote, and provide a deduct for going with traditional mortar joints.
  - 2. Weight: maximum of 15 lbs./SF
  - 3. Density to be determined under ASTM C 567
  - 4. Compressive Strength: Minimum of 1,800 PSI when tested in accordance with ATSM C 192
  - 5. Water absorption: less than 18% when tested in accordance with ASTM C-140 or UBC standard 15-5
  - 6. Freeze-thaw: less than 3% mass loss when tested in accordance with ASTM C 67
  - 7. Shear Bond Strength: minimum of 50 PSI when conducted in accordance with ASTM C 482
  - 8. Thermal Resistance:  $R = .865$  when tested at a thickness of 1.0 inch (25.4 mm) in accordance with ASTM C 518
  - 9. Smoke and fuel contribution: UL listed 0/0
  - 10. Flexural strength: tested in accordance with ASTM C 348, Section 4.4
  - 11. Tensile strength: tested in accordance with ASTM C 190, Section 4.5
  - 12. Weather resistance: Mix design proven by test results to be resistant to degradation by weather.
- J. Architectural Trim:
  - 1. Products: Single source from one manufacturer.
  - 2. Wall Capstones:
    - a. Texture: As selected by Architect from manufacturer's full range.
    - b. Color: As selected by Architect from manufacturer's full range.
    - c. Size: As indicated on the drawings.
  - 3. Pier Capstones:
    - a. Texture: Chiseled
    - b. Color: As selected by Architect from manufacturer's full range.
    - c. Size: As indicated on the drawings.
  - 4. Watertable/sill:
    - a. Color: As selected by Architect from manufacturer's full range.
    - b. Size: As indicated on the drawings
    - c. Provide sloped top surface and drip edge.
  - 5. Light Fixture Stones:
    - a. Color: As selected by Architect from manufacturer's full range.
    - b. Size: As necessary for light fixture indicated.

- c. UL approved metal extension box may be provided.
- 6. Receptacle Stones:
  - a. Color: As selected by Architect from manufacturer's full range.
  - b. Size: As necessary for light electrical outlet.
  - c. UL approved metal extension box may be provided.
- K. Weather Resistant Barrier: ASTM D 226, 2 layers of No. 15 non-perforated asphalt-saturated organic felt paper or 1 layer and a house-wrap product supported by a current evaluation report showing equivalency to Grade D building paper, in addition to the WRB as required by other specification sections. Install weather resistive barrier (per manufacturer's instructions) over all exterior surfaces designated to receive stone veneer and require waterproofing. WRB shall be applied horizontally with the upper layer lapped over the lower layer at not less than 2 inches. Lap weather-resistive barrier not less than 6 inches at the vertical joints. In the case of applications with two layers, start with two horizontal layers at the bottom of exterior wall or structure.
- L. Reinforcing (Lath): Corrosion resistant minimum 2.5 lbs. per square yard expanded metal lath that complies with ASTM C 847, or, corrosion resistant minimum 18 gauge woven wire mesh that complies with ASTM C 1032. For open studs and non-solid sheathing (e.g. rigid insulation board) use corrosion resistant minimum 3.4 lbs. per square yard, 3/8" paper backed lath (paper backing shall meet the requirements of ASTM D226 to be considered a substitute for Weather Resistive Barrier). Any alternative lath material shall carry an evaluation report that rates the lath as an acceptable substitute to the above listed materials. Lap lath not less than 2 inches all around vertically and horizontally. Terminate lath a minimum of 2 inches on the foundation and/or flange of the weep screed or as directed by project specifications and or local building codes. Metal lath can be installed with the small cups pointing upward to better capture mortar scratch coat.
- M. Fasteners: Galvanized steel fasteners (nails, staples or screws), for wood stud applications (open, rigid sheathing, rigid foam insulation) should penetrate the stud a minimum of 3/4 inch. Spacing of these fasteners should be a maximum of 6" vertical and should be 16" horizontal (on the studs). These fasteners should be a minimum of 1 1/2 inches long, 11 gage nails having a 7/16 inch head or 7/8 inch long, 16 gage staples. Corrosion resistant screws should have a 7/16 inch head and should penetrate the metal stud a minimum of 3/8 inch. Refer to governing building code for information on specific fastener penetration depth.
  - 1. In the case of rigid sheathing, care should be taken to avoid excessive fasteners applied between wall framing. In the case of exterior gypsum sheathing (e.g. DensGlass), fasteners should only be applied into wall framing unless additional fasteners are approved by the design professional.
- N. Weep Screed: Foundation Weep Screed shall be corrosion resistant and a minimum 0.019-inch (No. 26 galvanized sheet gauge, fabricated plastic or vinyl material) with a minimum vertical attachment of 3 1/2 inches. Weep screed should have holes with a minimum diameter of 3/16 inch spaced at a maximum of 33 inches on center. Install Foundation Weep Screed per manufacturer's instructions and integrate with WRB and metal lath. Weep screed shall have a minimum of 3 1/2 inches attachment flange at or below the foundation plate line on exterior walls in accordance with ASTM C926. The exterior lath shall cover and terminate on the attachment flange of the weep screed. Weep holes should not be covered during installation.
- O. Clearances: Weep Screed and/or stone should be held a minimum of 4 inches above finished grade or per local code and building practices. Weep screed and/or stone shall be held at a clearance above hard surfaces a minimum of 2 inches or as per local code and building practices. Weep screed terminations that meet concrete surfaces that are supported by a footing shall be held at a clearance above the concrete a minimum of 1/2 inch. Installer and GC to coordinate with finished grades per Civil plan and landscape details to comply with weep screed starting points.
- P. Mortar: To be mixed with potable water clean and free from injurious amounts of oils, acids, alkalis, salts, organic minerals or other deleterious substances. Per Manufacturers

recommendations.

## **2.02 MORTAR MATERIALS**

- A. Regional Materials: Aggregate for mortar and grout shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- B. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
  - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Mortar Cement: ASTM C 1329.
- F. Masonry Cement: ASTM C 91.
- G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in stone masonry mortar.
- H. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.
- I. Aggregate: ASTM C 144 and as follows:
  - 1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
  - 2. White Aggregates: Natural white sand or ground white stone.
  - 3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- J. Latex Additive: water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.
- K. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- L. Water: Potable.

## **2.03 STONE TRIM ANCHORS**

- A. Stone Trim Anchors: Units fabricated with tabs or dowels designed to engage kerfs or holes in stone trim units and holes for fasteners or post installed anchor bolts for fastening to substrates or framing as indicated.
- B. Materials: Fabricate anchors from stainless steel, ASTM A 240/A 240M or ASTM A 666,. Fabricate dowels from stainless steel, ASTM A 276,.
- C. Fasteners for Stone Trim Anchors: Annealed stainless-steel bolts, nuts, and washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- D. Post installed Anchor Bolts for Fastening Stone Trim Anchors: made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or Type 316, for anchors.

## **2.04 EMBEDDED FLASHING MATERIALS**

- A. Metal Flashing: Provide metal flashing complying with Spec Section 07 6200 and as follows:
  - 1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.

2. Copper: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet, 10-oz./sq. ft. weight or 0.0135 inch thick for fully concealed flashing; 16-oz./sq. ft. weight or 0.0216 inch thick elsewhere.
  3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  4. Fabricate through-wall metal flashing embedded in masonry from , with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
  5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  6. Fabricate through-wall flashing with drip edge indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.
  7. Fabricate through-wall flashing with sealant stop indicated. Fabricate by bending metal back on itself 3/4 inch at exterior wall face and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
  8. Fabricate metal for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
  9. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees.
  10. Metal Sealant Stops: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior wall face. At exterior wall face, bend metal back on itself for 3/4 inch and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
  11. Metal Expansion-Joint Strips: Fabricate from to shapes indicated.
- B. Flexible Flashing: For flashing unexposed to the exterior, use the following unless otherwise indicated:
1. Copper-Laminated Flashing: copper sheet bonded with asphalt between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  2. Asphalt-Coated Copper Flashing: copper sheet coated with flexible asphalt. Use only where flashing is fully concealed in masonry.
  3. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive, rubberized-asphalt compound, bonded to a high-density, cross-laminated, polyethylene film to produce an overall thickness of not less than
  4. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:
    - a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
    - b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of rubberized-asphalt adhesive.
    - c. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch-thick coating of rubberized-asphalt adhesive. Where flashing extends to masonry face, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
      - 1) Color: tbd .
    - d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
  5. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D 4637, 0.040 inch thick.
- C. Application: Unless otherwise indicated, use the following:
1. Where flashing is indicated to receive counterflashing, use metal flashing.
  2. Where flashing is indicated to be turned down at or beyond wall face, use metal flashing.
  3. Where flashing is partly exposed and is indicated to terminate at wall face, use metal flashing
  4. Where flashing is fully concealed, use

- D. Solder and Sealants for Sheet Metal Flashings:
  - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
  - 3. Elastomeric Sealant: ASTM C 920, chemically curing sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Adhesives, Primers, and Seam Tapes for Flexible Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

## **2.05 MISCELLANEOUS MASONRY ACCESSORIES**

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from
- B. Cementitious Dampproofing: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- C. Weep Products: Use the following unless otherwise indicated:
  - 1. Wicking Material: Absorbent rope, made from , 1/4 to 3/8 inch in diameter.
  - 2. Mesh Weep Holes: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches high by thickness of stone masonry; in color selected from manufacturer's standard.
- D. Expanded Metal Lath: 3.4 lb/sq. yd., self-furring, diamond-mesh lath complying with ASTM C 847. Fabricate from structural-quality, zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G60.
- E. Woven-Wire Lath: ASTM C 1032, fabricated into 1-1/2-inch hexagonal-shaped mesh with minimum 0.0510-inch-diameter, galvanized-steel wire.
- F. Welded-Wire Lath: ASTM C 933, fabricated into 2-by-2-inch mesh with minimum 0.0625-inch-diameter, galvanized-steel wire.
- G. Lath Attachment Devices: Material and type required by ASTM C 1063 for installations indicated.
- H. Weather Resistant Backing:
  - 1. Provide Two-ply JumboTex weather-resistive barrier by Fortifiber Building Systems over commercial self-draining weather barrier.

## **2.06 MASONRY CLEANERS**

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

### 3.03 SETTING STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
  - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
  - 2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
  - 3. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in range ashlar pattern with course heights as indicated, lengths, and uniform joint widths, with offset between vertical joints as indicated.
- D. Arrange stones in broken-range ashlar pattern with uniform course heights, random lengths, and uniform joint widths.
- E. Arrange stones in three-course, random-range ashlar pattern with random course heights, random lengths (interrupted coursed), and uniform joint widths.
- F. Arrange stones in polygonal (mosaic) pattern with uniform joint widths.
- G. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- H. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- I. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than     at narrowest points or more than     at widest points.
- J. Provide sealant joints of widths and at locations indicated.
  - 1. Keep sealant joints free of mortar and other rigid materials.
  - 2. Sealing joints is specified in Section 079200 "Joint Sealants."
- K. Install metal expansion strips in sealant joints at locations indicated. Build flanges of expansion strips into masonry by embedding in mortar between stone masonry and backup wythe. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
- L. Install embedded flashing at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  - 1. At stud-framed walls, extend flashing through stone masonry, up sheathing face at least 8", and behind weather barrier.
  - 2. At multi-wythe masonry walls, extend flashing through stone masonry, turned up a minimum of 6 inches, and extend into or through inner wythe to comply with requirements in Section 042000 "Unit Masonry."
  - 3. At concrete backing, extend flashing through stone masonry, turned up a minimum of     , and insert in reglet.
  - 4. At lintels and shelf angles, extend flashing full length of angles but not less than 6 inches into masonry at each end.
  - 5. At sills, extend flashing not less than 4 inches at ends.
  - 6. At ends of head and sill flashing, turn up not less than 2 inches to form end dams.
  - 7. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.



8. Install metal with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  9. Extend sheet metal flashing 1/2 inch beyond masonry face at exterior, and turn flashing down to form a drip.
  10. Install metal drip edges beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face and adhere flexible flashing to top of metal drip edge.
  11. Install metal flashing termination beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face and adhere flexible flashing to top of metal flashing termination.
  12. Cut flexible flashing flush with wall face after completing masonry wall construction.
- M. Place weep holes in joints where moisture may accumulate, including above shelf angles and at flashing.
1. Use wicking material to form weep holes above flashing in stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
  2. Space weep holes o.c.
  3. Trim wicking material used in weep holes flush with exterior wall face after mortar has set.

### **3.04 CONSTRUCTION TOLERANCES**

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
- D. Measure variation from level, plumb, and position shown in plan as a variation of the average plane of each stone face from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

### **3.05 INSTALLATION OF ADHERED STONE MASONRY VENEER**

- A. Install flashing over sheathing and behind weather-resistant sheathing paper by fastening through sheathing into framing.
- B. Install lath over weather-resistant sheathing paper by fastening through sheathing into framing to comply with ASTM C 1063.
- C. Install lath over unit masonry and concrete to comply with ASTM C 1063.
- D. Install scratch coat over metal lath 3/8 inch thick to comply with ASTM C 926.
- E. Coat backs of stone units and face of with cement-paste bond coat, then butter both surfaces with setting mortar. Use sufficient setting mortar so a slight excess will be forced out the edges of stone units as they are set. Tap units into place, completely filling space between units and
- F. Rake out joints for pointing with mortar to depth of not less than before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

### **3.06 POINTING**

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: Per approved mock up.

### **3.07 ADJUSTING AND CLEANING**

- A. Remove and replace stone masonry of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective joints.
  - 3. Stone masonry not matching approved samples and mockups.
  - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Per Manufacturer's instructions.

### **3.08 EXCESS MATERIALS AND WASTE**

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches in greatest dimension.
  - 2. Mix masonry waste with at least 2 parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
  - 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

**END OF SECTION 044313.16**

**SECTION 06 1000  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- D. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- G. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2015.
- H. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.
- I. PS 1 - Structural Plywood 2009.
- J. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
- K. PS 20 - American Softwood Lumber Standard 2020.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.
- D. Samples: For rough carpentry members that will be exposed to view, submit two samples, 6by12 inch in size illustrating wood grain, color, and general appearance.
- E. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- F. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- G. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- H. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.
- I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.03 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.

2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

#### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

#### **1.05 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
  3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

#### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Stud Framing (2 by 2 through 2 by 6 ):
  1. Species: Douglas Fir-Larch.
  2. Grade: No. 2.
- D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 ):
  1. Species and Grades: As indicated on drawings for various locations.
- E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

#### **2.03 EXPOSED TIMBERS**

- A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
- B. Moisture Content: Kiln-dry (20 percent maximum).
- C. Surfacing: S4S.
- D. Species: Redwood.
- E. Grade: Clear Heart Structural.

#### **2.04 STRUCTURAL COMPOSITE LUMBER**

- A. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
  1. Beams: Use laminated veneer lumber, laminated strand lumber, or parallel strand lumber with manufacturer's published E (modulus of elasticity): 1,800,000 psi, minimum.

#### **2.05 CONSTRUCTION PANELS**

- A. Subfloor/Underlayment Combination: Any PS 2 type, rated Single Floor.

1. Bond Classification: Exterior.
  2. Span Rating: 48.
  3. Performance Category: 1-1/8 PERF CAT.
  4. Edges: Tongue and groove.
- B. Subfloor/Underlayment Combination: Oriented strand board wood structural panel; PS 2, rated Single Floor.
1. Bond Classification: Exterior.
  2. Performance Category: 3/4 PERF CAT.
  3. Edges: Tongue and groove.
  4. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 200 days.
  5. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches, 19.2 inches and 24 inches on center, respectively.
  6. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
- C. Roof Sheathing: Oriented strand board wood structural panel; PS 2.
1. Grade: Structural 1 Sheathing.
  2. Bond Classification: Exposure 1.
  3. Performance Category: 5/8 PERF CAT.
  4. Span Rating: 40/20.
  5. Edges: Square.
  6. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
  7. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches and 24 inches on center, respectively.
  8. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
- D. Wall Sheathing: Any PS 2 type.
1. Bond Classification: Exterior.
  2. Grade: Structural I Sheathing.
  3. Span Rating: 24.
  4. Performance Category: 7/16 PERF CAT.
  5. Edge Profile: Square edge.
- E. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- F. Other Applications:
1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
  3. Other Locations: PS 1, C-D Plugged or better.

## **2.06 ACCESSORIES**

- A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.

1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.
- D. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- E. Subfloor Adhesives: Waterproof, air cure type, cartridge dispensed; adhesives designed for subfloor applications and complying with either ASTM C557 or ASTM D3498.
- F. Water-Resistive Barrier: As specified in Section 07 2500.

## **2.07 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
  1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat exposed exterior rough carpentry items, including stairways, balconies, and covered walkways
    - c. Do not use treated wood in direct contact with the ground.
  2. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with roofing, flashing, or waterproofing.
    - d. Treat lumber in contact with masonry or concrete.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.

- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.03 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- G. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
- H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

### **3.04 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Joints of rigid wall coverings that occur between studs.

### **3.05 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.06 INSTALLATION OF CONSTRUCTION PANELS**

- A. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.

- B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. At long edges use sheathing clips where joints occur between roof framing members.
  - 2. Nail panels to framing; staples are not permitted.
- C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
  - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
- D. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.
  - 4. Size and Location: As indicated on drawings.

### **3.07 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.08 CLEANING**

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**



**SECTION 06 1753**  
**SHOP-FABRICATED WOOD TRUSSES**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Installation requirements for miscellaneous framing.

**1.02 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. AWPA U1 - Use Category System: User Specification for Treated Wood 2018.
- C. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction 2014.
- D. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses 2018.
- E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses 1989.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.
- C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
  - 1. Include identification of engineering software used for design.
  - 2. Provide shop drawings stamped or sealed by design engineer.
  - 3. Submit design calculations.
- D. Designer's Qualification Statement.
- E. Fabricator's Qualification Statement.

**1.04 QUALITY ASSURANCE**

- A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Handle and erect trusses in accordance with TPI BCSI 1.
- B. Store trusses in vertical position resting on bearing ends.
- C. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

**PART 2 PRODUCTS**

**2.01 TRUSSES**

- A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
  - 1. Connectors: Steel plate.
  - 2. Structural Design: Comply with applicable code for structural loading criteria.
  - 3. Floor Deflection: 1/360, maximum.
  - 4. Roof Deflection: 1/240, maximum.
  - 5. Fire Retardance: Comply with applicable code(s); provide factory pressure treated wood.

## **2.02 MATERIALS**

- A. Lumber:
  - 1. Moisture Content: Between 7 and 9 percent.
  - 2. Lumber fabricated from old growth timber is not permitted.
- B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

## **2.03 ACCESSORIES**

- A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.
- B. Fasteners: Electrogalvanized steel, type to suit application.
- C. Bearing Plates: Electrogalvanized steel.

## **2.04 WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that supports and openings are ready to receive trusses.

### **3.02 PREPARATION**

- A. Coordinate placement of bearing items.

### **3.03 ERECTION**

- A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.
- B. Set members level and plumb, in correct position.
- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Do not field cut or alter structural members without approval of Architect.
- E. Install permanent bridging and bracing.
- F. Install headers and supports to frame openings required.
- G. Frame openings between trusses with lumber in accordance with Section 06 1000.
- H. Coordinate placement of decking with work of this section.
- I. After erection, touch-up primed surfaces with primer consistent with shop coat.

### **3.04 SITE APPLIED WOOD TREATMENT**

- A. Treat all site-sawn cuts of pressure-treated wood using same type of treatment (i.e. preservative or fire-retardant).
- B. Apply treatment in accordance with manufacturer's instructions.

### **3.05 TOLERANCES**

- A. Framing Members: 1/2 inch maximum, from true position.

## **END OF SECTION**

**SECTION 06 2000  
FINISH CARPENTRY AND MILLWORK**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Furnish all materials, labor and equipment necessary to complete the standing and running trim, door and window casings and sills, wall base board, wood blocking, shims, hanging strips and similar work as shown and detailed on drawings and as specified including:
  - 1. Interior painted wood or hardboard standing and running trim.
  - 2. Interior painted wood door trim
    - a. Primed pine or MDF casing square molding at apartment wood doors throughout project.
  - 3. Interior painted wood or hardboard base boards
    - a. 5 1/4" MDF or pine casing square molding at interior apartment base board
  - 4. Interior painted open staircase wood handrail, guardrail, newels and balusters
    - a. Unfinished red oak at Residential open stairways and two-story spaces
  - 5. 6" Window sills
  - 6. Exterior Trim (trim not specified as fiber-cement trim)

**1.02 SUBMITTALS**

- A. Shop Drawings: Include location of each item, plans and elevations, large-scale details, attachment devices, and other components.

**1.03 QUALITY ASSURANCE**

- A. Except as otherwise shown or specified, comply with specified provisions of the Architectural Woodwork Institute (AWI) for premium quality work.
- B. All lumber shall be sound stock, thoroughly seasoned and kiln dried. "Green" or unseasoned lumber will not be acceptable for use in millwork.

**1.04 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Job Measurements - Field verify measurements before beginning finished carpentry and millwork to insure perfect fitting

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Wood for Opaque Finish: Any closed-grain hardwood.
- B. Door trim
  - 1. Pine Alexandria moulding 1 1/16" x 2 1/4" finger jointed casing from Home Depot or equal at all interior door openings.
  - 2. Hollow Metal resident HVAC closet doors receive casing a Unit side only.
- C. Apartment Base Trim.
  - 1. Pine Alexandria moulding 9/16" x 5-1/4" x 96" long finger jointed base molding.
  - 2. Provide at all apartment interior rooms.
- D. Apartment stairway handrails, baluster and newels; by STAIRPARTS.COM or equal.
  - 1. Unfinished Standard, (no plow) square red oak hand/guard rail with associated wall brackets
  - 2. Primed Craftsman Series Box newel, 4" square x 54" tall with associated anchors
  - 3. Primed Craftsman wood baluster, 1.25" square, 36" tall

- E. Window Sill/Stools - Composite 3/8" x 6" with integral rolled front edge, Palight trim Board or equal.
- F. Exterior Trim: (Not Fiber-Cement Trim)
  - 1. Quarter round, brick mould, etc. shall be clear fir or pine, painted

## **2.02 FABRICATION**

- A. Primed trim prior to installation.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Condition woodwork to average prevailing humidity conditions in installation areas. Remove packing materials and back prime before installation.
- B. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in this Section for type of woodwork involved.
- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

**END OF SECTION 062000**

**SECTION 06 4550  
SIMULATED WOOD PRODUCTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Simulated Wood Gable Attic PVC Vents

**1.02 REFERENCES**

- A. ASTM D 792 – Density and Specific Gravity of Plastics by Displacement.
- B. ASTM D 570 – Water Absorption of Plastics.
- C. ASTM D 638 – Tensile Property of Plastics.
- D. ASTM D 790 – Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- E. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
- F. ASTM D 5420 – Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by means of a Striker Impacted by Falling Weight.
- G. ASTM D 256 – Determining the Pendulum Impact Resistance of Plastics.
- H. ASTM D 696 – Coefficient of Linear Thermal Expansion of Plastics Between -30 deg C and 30 deg C with a Vitreous Silica Dilatometer.
- I. ASTM D 635 - Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- J. ASTM E 84 – Surface Burning Characteristics of Building Materials
- K. ASTM D 648 – Deflection Temperature of Plastics Under Flexural Load in Edgewise Position.
- L. ASTM 3679 – Standard Specification for Rigid Poly Vinyl Chloride (PVC) Siding.

**1.03 SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Installation methods, including nailing patterns.
- C. Verification Samples: For each finish profile specified, two samples, minimum size 6 inches (150 mm) long, representing actual product and patterns finish.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: A minimum of 3 years in the installation of PVC products.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.

**1.06 PROJECT CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

**1.07 WARRANTY**

- A. Warranted to the original Owner under normal and proper use to be free of manufacturing defects for a period of 25 years.

**1.08 COORDINATION**

- A. Coordinate Work with other operations and installation of trim to avoid damage to installed materials.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Gable Faux Vents and products: Acceptable Manufacturer:
  - 1. Ekena Millworks
  - 2. Fypon Building Products,
  - 3. Nu-Wood by Jasper Plasticcs
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

### **2.02 SIMULATED WOOD PRODUCTS**

- A. General:
  - 1. Provide simulated wood elements to the following profiles and to the configurations indicated on the Drawings.
- B. Architectural Exterior Trim, Attic Faux Vents as indicated on the drawings
  - 1. Finish: Smooth Natural White.

### **2.03 ACCESSORIES**

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges
- B. Fasteners:
  - 1. Use fasteners designed for wood trim and siding (thinner shank, blunt point, full round head).
  - 2. Use a highly durable fastener such as stainless steel or hot dipped galvanized steel.
  - 3. Staples, small brads and wire nails must not be used as fastening members.
  - 4. Fasteners should be long enough to penetrate a solid wood substrate a minimum of 1-1/2 inch (38 mm).
  - 5. The use of standard nail guns is acceptable.
  - 6. Use two fasteners per every framing member for trimboard applications. Use additional fasteners for trimboards 12 inches (305 mm) or wider, as well as sheets.
  - 7. Install fasteners no more than 2 inches (51 mm) from the end of the board.
  - 8. Fasten trim into a flat, solid substrate. Fastening trim into hollow or uneven areas must be avoided.
  - 9. Pre-drilling is typically not required unless a large fastener is used or product is being installed in low temperatures.
- C. Joint Compound: As recommended by molded unit manufacturer, provide spackle joint compound, ready-mixed, vinyl type
- D. Adhesives:
  - 1. Glue all trim joints (scarf or miter) with a cellular PVC cement/adhesive such as TrimTight or Extreme PVC TrimWelder.
  - 2. Glue joints should be secured with a fastener and/or fastened on each side of the joint to allow adequate bonding time.
  - 3. Surfaces to be glued should be smooth, clean and in complete contact with each other.
  - 4. Various adhesives may be used. Consult adhesive manufacturer to determine suitability.
- E. Sealants:
  - 1. Use urethane, polyurethane or acrylic based sealants without silicone as specified in Section 07910.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. Prior to installation, verify governing dimensions of and condition of substrate.

- C. If substrate preparation is the responsibility of another installer, notify Contractor of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Examine, clean, and repair as necessary any substrate conditions that would be detrimental to proper installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
  - 1. Comply with all terms necessary to maintain warranty coverage.
  - 2. Use trim details indicated on Drawings.
  - 3. Touch up all field cut edges before installing.
- B. Cutting:
  - 1. Use carbide tipped blades designed to cut wood. Do not use fine-tooth metal-cutting blades or plywood blades.
  - 2. Avoid rough edges from cutting caused by: excessive friction, poor board support, worn saw blades or badly aligned tools.
- C. Drilling:
  - 1. Drill with standard woodworking drill bits.
  - 2. Do not use bits made for rigid PVC.
  - 3. Avoid frictional heat build-up and remove shavings from the drill hole frequently.
- D. Nail Location:
  - 1. Refer to fastening schedule and diagrams in the most current version of the manufacturer's installation manual for recommended fastener spacing.
  - 2. Install fasteners no more than 3/4 inches (19 mm) from the end of each board.
- E. Thermal Expansion and Contraction:
  - 1. Expansion and contraction will occur with changes in temperature.
  - 2. When properly fastened, allow 1/4 inch (6 mm) per 18 foot (5.49 m) for expansion and contraction.
  - 3. Joints between pieces should be glued to eliminate joint separation. When gaps are glued on a long run, allow for expansion and contraction at the end of the runs.
- F. Finishing.
  - 1. Correct dents and gouges before applying final coating.
  - 2. Prepare surfaces and paint materials as recommended by the molding manufacturer. Paint as specified in Section 09900.
  - 3. If moldings get dirty during installation, clean with a soft bristle brush and a bucket of soapy water. For stubborn stains, mold or mildew, use a cleaner suitable for PVC products.

### **3.04 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### **END OF SECTION**

This page intentionally left blank



**SECTION 07 0523  
BUILDING ENVELOPE TESTING**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. This Section includes testing building envelope systems.

**1.02 DEFINITIONS**

- A. Acceptance Criteria: The measured value(s) or range(s) that determine if the results of the test pass or fail.
- B. Accuracy: The capability of an instrument to indicate the true value of a measured quantity.
- C. ACH75: The ratio of the air leakage rate at 75 Pa (0.3 in. H<sub>2</sub>O), corrected for a standard air density, to the volume of the test zone (1/h).
- D. AHJ: The local governing Authority Having Jurisdiction over the installation.
- E. Air Barrier System: A system in the building construction that is designed and installed to reduce air leakage either into or through the building envelope.
- F. Air Change Rate: The calculated number of times the total air volume of a defined space is replaced in a given unit of time. This is ordinarily computed by dividing the total volume of the room supply or exhaust air in cubic meters (cubic feet), per unit of time, by the total volume of the subject space. It is normally expressed as air changes per hour, ACH.
- G. Air Exfiltration: Air leakage out of the building.
- H. Air Infiltration: Air leakage into the building.
- I. Airflow Rate: The volume of airflow through the fan or blower door per unit of time (m<sup>3</sup>/s or ft<sup>3</sup>/min, cfm).
- J. Air Leakage Area: The effective leakage area (AL) at the test pressure.
- K. Air Leakage Change Rate: Air leakage rate in volume units/h divided by the building space volume with identical volume units, normally expressed as air changes per hour, ACH.
- L. Air Leakage Graph: A graphic representation that shows the relationship of measured airflow rates to the corresponding measured pressure differences, usually plotted on a log-log scale.
- M. Air Leakage Rate: The total volume of air passing through the test zone or building envelope per unit of time (ft<sup>3</sup>/min [cfm] or m<sup>3</sup>/s).
  - 1. Discussion: This movement includes flow through joints, cracks, and porous surfaces, or a combination thereof. The driving force for such an air leakage, in service can be mechanical pressurization and de-pressurization, natural wind pressures, or air temperature differentials between the building interior and the outdoors, or a combination thereof.
- N. Air Leakage Site: A location on the building envelope or air barrier system where air can move between the building interior and the outdoors.
- O. Air Tightness: The degree to which a test zone or building envelope resists the flow of air.
  - 1. Discussion: Air leakage rate, effective leakage area and the rating term such as ACH50 are examples of measures of building tightness.
- P. Anomalous Thermal Image: An observed thermal pattern of a structure that is not in accordance with the expected thermal pattern.
- Q. Baseline Building Pressure: The natural building pressure difference measured when there is no flow through the blower door. This is also referred to as the Bias Pressure.
- R. Blower Door: A fan pressurization device incorporating a controllable fan and instruments for airflow measurement and building pressure difference measurement that mounts securely in a door or other opening.

- S. Building Envelope: The boundary or barrier separating the interior volume of a building from the outside environment.
  - 1. Discussion: For the purpose of this test procedural standards, the interior volume is the deliberately conditioned space within a building, generally not including attics, basements, and attached structures, for example, garages, unless such spaces are connected to the heating and air conditioning system, such as a crawl space plenum.
- T. Building Pressure Difference: The pressure differential across the test zone or building envelope.
- U. Calibrate: The act of comparing an instrument of unknown accuracy with a standard of known accuracy to detect, correlate, report, or eliminate by adjustment any variation in the accuracy of the tested instrument.
- V. Certificate of Compliance (Conformance): A written statement, signed by a qualified party, attesting that the items or services are in accordance with specified requirements, and accompanied by additional information to substantiate the statement.
- W. Certification: The process of validation required to obtain a certificate of compliance.
- X. CFM75: The airflow leakage value in cubic feet per minute at a test pressure of 75 Pascals (Pa). The subscript value defines the test pressure.
- Y. Closed: The condition of a building used to test the air barrier in an unoccupied building to test the air barrier with intentional openings sealed.
- Z. Differential Pressure (DP): The difference between two pressures measured between a sample point and reference point.
  - 1. Discussion: This movement includes flow through joints, cracks, and porous surfaces, or a combination thereof. The driving force for such an air leakage, in service can be wind pressures, or air temperature differentials between the building interior and the outdoors, or a combination thereof.
- AA. Deficiency: Any circumstance or operation that affects the measurement results as compared to the design criteria required by the contract documents.
- BB. Effective Leakage Area: In order to take values generated by fan pressurization and to use them in determining natural air exchange, the effective leakage area of a building must be calculated. Each gap and crack in the building envelope contributes a certain amount of area to the total leakage area of the building. The Effective Leakage Area assumes that all of the individual leakage areas in the building are combined into a single idealized orifice or hole. The ELA will change depending on the reference pressure used to calculate it.
- CC. Envelope: The construction, taken as a whole or in part, that separates the indoors of a building from the outdoors.
- DD. Equivalent Leakage Area: EqLA, usually taken at 10Pa using 0.61 discharge coefficient, but for the purposes of this Specification, it is taken at 75 Pa.
- EE. Field-of-View (FOV): The total angular dimensions, expressed in degrees or radians, within which objects can be imaged, displayed, and recorded by a stationary imaging device.
- FF. Framing Spacing: Distance between the centerlines of joists, studs, or rafters.
- GG. Function: Function in this standard refers to the specific type of data measurement specified in Section 4, Standards for Instrumentation and Calibration.
- HH. Infrared Imaging System: An instrument that converts the spatial variations in infrared radiance from a surface into a two-dimensional image of that surface, in which variations in radiance are displayed as a range of colors or tones.
- II. Infrared Thermography: The process of generating thermal images that represent temperature and emittance variations over the surfaces of objects.
- JJ. Instantaneous Field of View (IFOV): The smallest angle, in milliradians, that can be instantaneously resolved by a particular infrared imaging system.

- KK. Intentional Opening: Openings within the envelope that are designed to remain open to atmosphere during the building's operation. Intentional openings include building components such as air intake, exhaust louvers, pressure relief dampers or louvers, dryer and exhaust vents, combustion flues and any other leakage site that is designed to remain open during the building's normal operation. Windows, doors, conduits, mechanical piping, sleeves and structural steel are not intentional openings.
- LL. M<sup>3</sup>/S75: The airflow leakage value in cubic meters per second at a test pressure of 75 Pascals (Pa). The subscript value defines the test pressure.
- MM. Masonry Veneer: Frame construction with a non-load bearing exterior masonry surface.
- NN. May: Used to indicate a course of action that is permissible as determined by the NEBB Certified BET Firm.
- OO. Minimum Resolvable Temperature Difference (MRTD): A measure of the ability of the operators of an infrared imaging system to discern temperature differences with that system. The MRTD is the minimum temperature difference between a four-slot test pattern of defined shape and size and its blackbody background at which an average observer can discriminate the pattern with that infrared imaging system at a defined distance.
- PP. N/A: Not Available, Not Applicable, or Not Accessible. The simple notation "N/A" without definition is not allowed.
- QQ. NEBB Certified BET Firm: A NEBB Certified BET Firm is a firm that has met and maintains all the requirements of the National Environmental Balancing Bureau for firm certification in Building Envelope Testing and is currently certified by NEBB. A NEBB Certified BET Firm shall employ at least one NEBB Certified BET Professional in a full-time management position.
- RR. NEBB Certified BET Report: The data presented in a NEBB Certified BET Report accurately represents system measurements obtained in accordance with the current edition of the NEBB Procedural Standards for Building Envelope Testing. A NEBB Certified BET Report does not necessarily guarantee that systems measured conform to the design requirements or stated guidelines. The report is an accurate representation of the measured results only.
- SS. NEBB Certified BET Professional: A NEBB Certified BET Professional is a full-time employee of the firm in a management position who has successfully passed the professional level written and practical qualification examinations and maintains the professional re-qualification requirements of NEBB.
- TT. Nominal Airflow Rate: The flow rate indicated by the blower door using the manufacturer's calibration coefficients (m<sup>3</sup>/s or ft<sup>3</sup>/min, CFM).
- UU. Orifice Blower Door: A blower door in which airflow rate is determined by means of the pressure drop across an orifice or nozzle.
- VV. Open: The condition of a building used to test the ventilation rate in a occupied building with intentional openings unsealed.
- WW. Precision: The ability of an instrument to produce repeatable readings of the same quantity under the same conditions. The precision of an instrument refers to its ability to produce a tightly grouped set of values around the mean value of the measured quantity.
- XX. Precision Index of the Average: The sample standard deviation divided by the square root of the number of samples.
- YY. Pressure Station: A specified induced change in the building pressure difference from the initial zero-flow building pressure difference (Pa, in. w.c.).
- ZZ. PPM: Parts per million
- AAA. Procedure: The approach to and execution of a sequence of work operations to yield a repeatable and defined result.
- BBB. Range: The upper and lower limits of an instrument's ability to measure the value of a quantity for which the instrument is calibrated.
- CCC. Resolution: The smallest change in a measured variable that an instrument can detect.

- DDD. Shall: The term is used to indicate mandatory requirements that must be followed in order for the project to become a NEBB certified project. Work must conform to these standards and procedures and no deviation is permitted: In the event unique circumstances prevent a required action from being fulfilled, a notation shall be included in the BET report explaining the reason that the requirement was not completed. For example, such notation could be one of the following: Not Available, Not Applicable, or Not Accessible. The simple notation "N/A" without definition is not allowed.
- EEE. Should: The term is used to indicate that a certain course of action is preferred but not necessarily required.
- FFF. Single Zone: A space in which the pressure differences between any two places, differ by no more than 5% of the inside to outside pressure difference.
1. Discussion: A multi-room space that is interconnected within itself with door- sized openings through any partitions or floors is likely to satisfy this criterion if the fan airflow rate is less than 3 m<sup>3</sup>/s (6357 ft<sup>3</sup>/min).
- GGG. Specified Test Pressure: The required induced differential static air pressure across the specimen.
- HHH. Standard: A required qualification, action, or result for BET work.
- III. Standard Operating Procedure: An internal policy prepared by each BET firm and / or prepared by the Owner/Buyer. Procedures are written to provide guidance, direction,
- JJJ. and step-by-step details relating to issues such as safety, testing protocols, acceptance criteria, etc. NEBB BET Firm SOP's shall be utilized in an absence of SOP's prepared by the Owner.
- KKK. Test Pressure Difference or Differential: The measured pressure difference across the building envelope, expressed in Pascals (Pa) or in inches of water column (in. w.c.).
- LLL. Test Zone: A building or a portion of a building that is configured as a single zone for the purpose of this standard. For detached dwellings, the test zone envelope normally comprises the thermal envelope.
- MMM. Test Zone Envelope: The barrier or series of barriers between a test zone and the outdoors and internal spaces not included in the test zone.
- NNN. Testing: The use of specialized and calibrated instruments to measure fluid quantities, temperatures, pressures, rotational speeds, electrical characteristics, velocities, and sound and vibration levels,
- OOO. Testing, Adjusting, and Balancing (TAB): A systematic process or service applied to heating, ventilating and air-conditioning (HVAC) systems and other environmental systems to achieve and document air and hydronic flow rates. The standards and procedures for providing these services are addressed in the current edition of the NEBB "PROCEDURAL STANDARDS FOR THE TESTING, ADJUSTING AND BALANCING OF ENVIRONMENTAL SYSTEMS".
- PPP. Thermal Pattern: A representation of colors or tones that indicate surface temperature and emittance variation.
- QQQ. Thermogram: A recorded image that maps the apparent temperature pattern of an object or scene into a corresponding contrast or color pattern.
- RRR. Total air flow: The volume of air flowing per unit of time through the test zone inclusive of the air flowing through the test zone under differential test pressure conditions converted to standard conditions for temperature and density.
- SSS. Unit of Length: The sum of all perimeters of operable ventilators, sash, or doors that are contained in the test specimen based on overall dimensions of such parts. Where two such operable parts meet two adjacent lengths of perimeter shall be counted as only one length.
- TTT. Zone: A volume of building served by a single ventilation system. For buildings with natural ventilation only, the whole building shall be considered a zone.

### 1.03 BET FIRM QUALIFICATIONS

- A. The BET Firm shall be NEBB Certified in Building Envelope Testing. Building envelope testing shall be conducted by the NEBB Certified BET Professional or by technicians directly under the supervision of the NEBB Certified BET Professional.

#### **1.04 BET FIRM SUBMITTALS**

- A. Qualification Data: When requested, submit 2 copies of evidence that BET firm and this Project's BET team members meet the qualifications specified in Sub-section 1.3 BET Firm Qualifications.
- B. BET Agenda: When requested, submit 2 copies of the BET Agenda. Include a complete set of report forms intended for use on this Project.
- C. Certified BET Reports: Submit a final BET report in accordance with the current edition of the NEBB Procedural Standards for Building Envelope Testing.

#### **1.05 QUALITY ASSURANCE**

- A. The NEBB Certified BET Firm shall submit a copy of the firm's NEBB BET Certification.
- B. When requested, the NEBB Certified BET Firm shall provide the NEBB Certificate of Conformance Certification.
- C. BET Report Forms: Prepare report forms in accordance with the requirements from the current edition of the NEBB Procedural Standards for Building Envelope Testing.
- D. Instrumentation Calibration: Calibration of instruments shall be in accordance with the current edition of the NEBB Procedural Standards for Building Envelope Testing.

#### **1.06 CONSTRUCTION TEAM RESPONSIBILITY TO BET AGENCY**

- A. Provide the NEBB Certified BET Firm with a conformed set of contract documents that pertain to the air barrier (drawings, specifications, and approved submittals), including all current approved change orders and contract modifications.
- B. Develop a project schedule with the input of the NEBB Certified BET Firm that coordinates the work of other disciplines and provides adequate time in the construction process to allow successful completion of the building envelope testing and remedial work.
- C. Notify the NEBB Certified BET Firm of all schedule changes.
- D. Ensure that the building enclosure is complete, including but not limited to, all structural components, the air barrier and vapor barrier complete, windows and doors installed, door hardware complete, door sweeps and weather stripping complete, floor and ceilings complete. Ensure that the building enclosure and components are complete and operational such that the performance of the building envelope tests would not be adversely affected.
- E. Provide all project preparation and setup for the BET tests, this may include but is not limited to temporary sealing of intentional openings, removing ceiling tile, opening access doors, opening interior doors and affixing them so they cannot close during the tests. This may include preparation of adjoining spaces. This would also include staging the building so no people will be opening doors or windows during the BET tests.
- F. Provide temporary or permanent power for BET tests.
- G. For building pressure test method using the Building Air Moving Equipment systems:
  - 1. Ensure that all necessary building systems are complete and are operating in a safe manner.
  - 2. Complete the installation of permanent electrical power systems serving the building systems. Such electrical systems shall be properly installed in accordance with all applicable codes to ensure the safety of all construction personnel.
  - 3. Perform startup of all building systems in accordance with manufacturers' recommendations.
  - 4. Complete the installation, programming, calibration and startup of all building control systems.

#### **PART 2 - PRODUCTS (NOT APPLICABLE)**

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper BET of systems and equipment. Contract Documents are defined in the General and Supplementary Conditions of Contract. Report deficiencies discovered.

### **3.02 PRELIMINARY PROCEDURES FOR BUILDING ENVELOPE TESTING**

- A. Conduct the Preliminary Procedures in accordance with procedures contained in the current edition of the NEBB Procedural Building Envelope Testing and this section. This includes that the Design Professionals and/or the Owner are responsible to define the objectives and the acceptance criteria for the testing. Additionally, they are responsible to define which air leakage test(s) are to be performed by the NEBB Certified BET Firm.

### **3.03 INSTRUMENTS AND EQUIPMENT**

- A. Instruments and equipment necessary to perform Building Envelope Testing shall meet the requirements of the current edition of the NEBB Procedural Building Envelope Testing and this section.

### **3.04 COMMON TEST PROCEDURES FOR BUILDING ENVELOPE TESTING**

- A. Perform Building Envelope Testing on all systems to be tested according to the procedures contained in the current edition of the NEBB Procedural Building Envelope Testing and this section. As stated in Section 3.1 above, the test method shall be defined by the Design Professionals and /or the Owner. The procedures listed below apply to both test methods and shall be followed when performing either the Blower Door Test Method or the Building Air Moving Equipment System Test method.
- B. Establish the exterior test zone envelope. This is accomplished by defining the test zone envelope and ensuring it is appropriate for the goals of the test.
- C. Select the appropriate test envelope condition; open or closed. For the closed condition, close all operable openings and seal other intentional openings to evaluate envelope air tightness. For the open condition, leave all operable openings in the normal operating condition of the building's occupancy to assess the envelope's effect on natural air change rates. The closed condition shall be the default option if no compelling reason exists to utilize the open condition.
- D. Adjust all building components in accordance with Table 1 below and/or per the specification. For testing a building in the closed condition, close all operable openings and seal other intentional openings to evaluate envelope air tightness. For occupied condition, leave all operable openings in the normal operating condition of the building's occupancy.
- E. Prior to conducting the test, perform the preliminary procedures identified in Section 3.1. If the performance of these preliminary procedures is the responsibility of others, survey the site and building to insure that all preliminary procedures have been properly completed.
- F. Establish the interior test zone. This is accomplished by opening all interior building doors including fire doors, corridor doors, pass-throughs, in the test zone so that a uniform inside pressure is created within the zone. If there are hard ceilings with access doors, all access doors are to be open.
- G. Measure and record the wind velocity and direction on the windward side of the building at a distance 30 to 50 feet away from the buildings. Preferred test conditions are wind velocity of 0 to 2 m/s (0 to 4 mph). If the surrounding building induced winds or the wind is gusting more than 4 mph above the steady state wind then the test should not be performed due to accuracy limits.
- H. Measure and record the outside temperature. Preferred test conditions are outside temperatures from 2°C to 35°C (35°F to 95°F). If test is performed below 2°C (35°F) there is a possibility of freezing pipes. If the test is performed above 35°C (95°F) damaging finished materials, building finishes or worker safety becomes a concern.

- I. Measure and record the indoor and outdoor temperatures at the beginning of the test so that their average values can be calculated.
- J. Determine the height & temperature factor. The factor is the product of the absolute value of the indoor/outdoor air temperature difference multiplied by the building height. If the factor is less than 200 m°C (1,180 ft°F), perform the test. If the factor is greater than 200 m°C (1,180 ft°F), the stack effect may influence the building envelope pressure difference and will reduce the accuracy of the result. When the factor is greater than the above stated values, the entire test shall be performed both under a pressurization and depressurization modes utilizing ASTM E 1827 Blower Door Test Method and the minimum induced test pressure shall be 25 Pa (0.10 in.w.c.).
- K. TABLE 1: Recommended Pre-Test Building Preparations

	<b>Closed</b>	<b>Open</b>
Exhaust fans with back draft dampers	Sealed	No preparation
Supply fans with back draft dampers	Sealed	No preparation
Furnace room door for furnace outside test zone	Closed	Closed
Combustion air intake damper for boilers	Closed	Closed
Outside air intake damper for Air Handling Unit inside test zone	Sealed	Closed
Outside air intake for Air Handling Unit inside test zone without damper	Sealed	No preparation
Exhaust, Air Handling Units, Make-up Air Units, Energy Recovery Units, Supply fans, Furnaces, Fan Coil Units, Boilers, Gas Hot Water Heaters, All equipment requiring combustion air (including kitchen equipment, HVAC, etc.)	Off	Off
Fan inlet grilles with motorized damper	Closed	Closed
Fan inlet grills without motorized damper	Sealed	No preparation
Ventilators designed for continuous use	Sealed	Sealed
Supply and exhaust ventilator dampers	Sealed	Held closed
Clothes dryer	Off	Off
If clothes dryer is connected to the dryer vent	No preparation	No preparation
Vented combustion appliance	Off	Off
Ventilation to other zones	Sealed	Sealed
Windows	Closed and Latched	Closed and Latched
exterior doors	Closed and Latched	Closed and Latched
Window air conditioners	Sealed	No preparation
Through the wall air conditioners outside air vent	Sealed	No preparation
Openings leading to outside the test zone	Closed	Closed
All HVAC ducts going from inside the test zone to outside the test zone and back into the test zone	Sealed	Sealed
All electrical conduits going from inside the test zone to outside the test zone and back into the test zone	Sealed	Sealed

Openings within the test zone	Open	Open
Floor drains and plumbing traps	Filled	Filled
Elevator pressure relief openings	Closed	Closed
Elevator Doors	Closed	Closed
Elevator Door Frame spacing between the elevator door and frame if the elevator connects an area outside the air barrier	Sealed	Open
Elevator Door Frame spacing between the elevator door and frame if the elevator connects an area within the air barrier	Open	Open
Rooms with Exterior, non-ducted louvers (interior doors)	Closed	Closed
Loading Dock Doors (interior doors)	Closed	Closed

- L. Open all doors, windows, and other openings that connect portions of the building outside the test zone envelope with the outdoors. For example, if the building is a combination of office and warehouse, and only the office portion of the building is to be tested then open the warehouse doors. If the entire office and warehouse is to be tested, then all office and warehouse doors are to be closed to the outside but the doors between the office and warehouse are to be open.
- M. Remove sufficient ceiling tiles for lay-in ceilings, or open sufficient access panels for hard ceilings, were the pressure between the ceiling cavity and the room is equalized to within +/-10% of the building envelope test pressure.
- N. Record the condition of the building's components including windows, exterior doors, interior doors, stairwell doors, elevator doors, walls, access doors, roof and floor (i.e. sealed or unsealed, open or closed, etc.).

### 3.05 BLOWER DOOR TEST METHOD PROCEDURES

- A. Install the blower door in an entry door, window or vent opening. The openings must be sealed or taped to avoid leakage at these points. Orient the blower door appropriately for depressurization or pressurization as required. The installation should have minimal obstructions of airflow into and out of the building.
- B. Install the pressure measuring instrument across the building envelope. It is good practice to use more than one location across the building envelope for pressure measurement. Preferred locations for exterior pressure measurement locations should be those that avoid extremes of exterior pressures. A good location avoids exterior corners and complex architectural features and should be close to the middle of the exterior wall.
- C. In addition, buildings more than 4 floors or 12.2 m (48.0 ft) in height, shall have pressures measured at a minimum of 2 locations or every 4 floors, whichever is greater.
- D. Average 10 baseline pressures points of 10 seconds per point, where the variation between any point and the mean must be no greater than 1 Pascal.
- E. Zero the pressure sensor by connecting the differential ports together. Note: Some blower doors may perform this or an equivalent step automatically. Follow the manufacturer's instructions accordingly.
- F. Before beginning the test, measure and record the baseline building differential pressure across the airflow measurement device with the blower off. If a damper is used to control airflow, it should be in a fully closed position for the baseline building pressure measurements. If the air moving equipment employs a blank-off plate, it should be fully closed for the baseline building tests.



- G. Start the blower door fans and pressurize / depressurize the building to the highest specified induced pressure differential. Measure and record the building envelope differential pressure.
- H. Pressure readings are to be taken to produce an accurate average building pressure. Fluctuations in pressure due to wind require pressure measurements to be taken on both the windward and leeward side of the building and averaged. If the buildings height or building configuration causes internal building pressure fluctuations, then interior pressure shall be taken and averaged.
- I. Perform a minimum of 10 building envelope pressure differentials and their corresponding airflow measurements for both the pressurization mode and the depressurization mode (a total of 20 measurements). The measurements shall be taken over a minimum of 10 seconds. The range of the building envelope pressure differences should be from a minimum of 25 Pa (0.10 in. w.c.) to maximum of 75 Pa (0.30 in. w.c.). Use increments of 5 Pa (0.02 in. w.c.) for the full range of building envelope pressure differences. (i.e. 25, 35, 40, 45, 50, 55, 60, 65, 70, 75 Pa) or (0.10, 0.14, 0.16, 0.18, 0.20, 0.22, 0.24, 0.26, 0.28, and 0.30 in. w.c.).
- J. Conduct tests at each building envelope pressure differential. Allow the fan and instrumentation to stabilize prior to taking any measurements. At each pressure differential, measure the airflow rate and the pressure differences across the envelope over at least a 10 second time interval. Average the airflow and pressure differentials over this time interval. For each building envelope pressure differential test, collect data for both pressurization and de- pressurization.
- K. After conducting the pressure tests, measure and record the baseline building differential pressure across the airflow measurement device with the fan off and sealed.
- L. Report the building envelope pressure differential, and the airflow for each test and the beginning and ending baseline building differential pressure.
- M. Subtract the average baseline differential pressure from the building envelope differential pressure and report this value for both pressurization and depressurization.
  - 1. NOTE: Some equipment may perform this step, or an equivalent step, automatically follow the manufacturer's instructions accordingly.
- N. Measure and record the indoor and outdoor temperatures at the end of the test so that their average values can be calculated.
- O. Repeat steps 8.2.3.9 through 8.2.3.14 for the alternate pressurization.

### **3.06 BUILDING AIR MOVING EQUIPMENT SYSTEM TEST METHOD PROCEDURES**

- A. This test method can be utilized for pressurization or depressurization testing of the building envelope; however, the test is not as accurate as the ASTM 779 that is the blower door tests. This test should not be considered an equal to those tests. This is due to several reasons; none of which pertain to the abilities of the NEBB Certified BET Firm or the capabilities of the required instrumentation and equipment to perform the Building Air Moving Equipment Test Method. The major features that could affect the ability to perform the test and the accuracy of this test relate to the following:
  - 1. The ability of the installed HVAC equipment and systems to mechanically bring in sufficient amounts of outside air for pressurization and / or mechanically exhaust sufficient amounts of building air for depressurization.
  - 2. The ability of the installed mechanical equipment and systems to generate the required airflows and associated static pressures to properly conduct the test
  - 3. The configuration of the equipment installed in the system to accurately measure airflow and static pressures. The most accurate method to measure airflow in the field is by performing a duct traverse using a Pitot tube and digital manometer. To accurately perform a traverse measurement requires an adequate length of straight duct downstream from any equipment, fittings or obstructions to provide an ideal duct traverse plane in which to obtain an accurate duct traverse.
  - 4. The ability of the most building air moving equipment systems to be manipulated in order to produce meaningful building pressure gradients

- B. When using the Building Air Moving Equipment System Method Test, the NEBB Certified BET Firm shall follow NEBB TAB procedures to measure the airflow. The preferred method to measure the airflow is by the traverse method that complies with NEBB procedures. If airflow monitoring stations are used, it is the NEBB firm's responsibility to verify the accuracy of the airflow monitor.
- C. If neither the traverse method nor the use of airflow monitoring stations is available, then three (3) alternate methods of measuring airflow per the NEBB TAB procedures shall be used. The three different methods should correlate flow to each other within 10%.
- D. The Building Air Moving Equipment Test Method consists of taking two sets of data at two different building pressures. The first set of data, identified as P1, is taken the higher differential pressure value. The second set of data identified as P2, is taken the lower differential pressure value. The criteria limits for values of P1 and P2 values shall be as follows:
  - 1. P1 value shall be between 75 and 35 Pa (0.30 in.w.c. and 0.14 in.w.c).
  - 2. P2 value shall be 1/3 of the P1 value and shall be between 25 and 10 Pa (0.10 in.w.c. and 0.04 in.w.c).
    - a. If the above criteria cannot be achieved, then the Blower Door Test Method SHALL be performed utilizing both the pressurization and the depressurization modes.
    - b. A minimum of five replicate measurements of building envelope differential pressure and the corresponding airflow shall be taken at each value of P1 and P2. Thus, a total of 10 pressures measurements and 10 airflow measurements are required.
- E. Install the pressure measuring instrument across the building envelope. It is good practice to use more than one location across the building envelope for pressure measurement. Preferred locations for exterior pressure measurement locations should be those that avoid extremes of exterior pressures. A good location avoids exterior corners and complex architectural features and should be close to the middle of the exterior wall.
- F. In addition, buildings more than 4 floors or 12.2 m (48.0 ft) in height shall have pressures measured at a minimum of 2 locations or every 4 floors, whichever is greater.
- G. The pressures from each location should be averaged, typically using a manifold. Average the pressures over at least a 10 second time period.
- H. Zero the pressure sensor
- I. Measure and record the baseline building differential pressure by closing the dampers or otherwise seal off the fan(s) that will be creating the test flows.
- J. Conduct five (5) tests at the P1 building envelope pressure differential. Allow the fan and instrumentation to stabilize prior to taking any measurements. Measure the airflow and the building pressure differential simultaneously. Repeat until all 5 airflow measurements and 5 envelope pressure differential measurements have been taken. Each of the flow and corresponding pressure differentials measurements must occur within 5 minutes of each other.
- K. Repeat the entire procedure at P2 and conduct five (5) tests at the P2 building envelope pressure differential. Allow the fan and instrumentation to stabilize prior to taking any measurements. Measure the airflow and then measure the building pressure differential. Repeat until all 5 airflow measurements and 5 envelope pressure differential measurements have been taken. Each of the flow and corresponding pressure differentials measurements must occur within 5 minutes of each other.
- L. Average the 5 airflow measurements to each other and average the 5 pressure differentials to each other for the data obtained at P1.
- M. Average the 5 airflow measurements to each other and average the 5 pressure differentials to each other for the data obtained at P2.
- N. Measure and record Baseline Building Pressure Differential at the end of the test.
- O. Measure and record the indoor and outdoor temperatures at the end of the test so that their average values can be calculated.
  - 1. NOTE: It is advisable to check that the condition of the building envelope has not changed after each pressure reading, for example, that sealed openings have not become

unsealed or that doors, windows, or dampers have not been forced open by the building envelope pressure testing.

### **3.07 DATA ANALYSIS AND CALCULATIONS FOR BOTH THE BLOWER DOOR TEST METHOD AND THE BUILDING AIR MOVING EQUIPMENT SYSTEM TEST METHOD**

- A. If the airflow measuring instrumentation being utilized does not provide the volumetric airflow at the temperature and pressure of the air flowing through the flowmeter during the test, the airflow values must be corrected for density.
- B. When correcting the readings of the airflow measurements for density, the preferred method is to use the temperature and the actual barometric pressure. A method to correct for density using temperature and elevation is available but does not account for weather impact. In the pressurization mode this will be the outside air temperature and barometric pressure. For depressurization test this will be the inside air temperature and barometric pressure.
- C. Average the baseline building envelope pressures measured before and after the flow measurements. Subtract the average from the measured envelope differential pressures readings to determine the corrected induced envelope pressures.
- D. Plot the measured airflow against the corrected induced pressure differences on a log-log plot to complete the air leakage graph for both pressurization and de-pressurization (for an example, see Appendix C, Section C.10 of the current edition of the NEBB Procedural Building Envelope Testing).
- E. Use the data to determine the air leakage coefficient.
- F. Correct the air leakage coefficient (C) to standard conditions. Use the data to determine the pressure exponent separately for pressurization and depressurization.
- G. If the pressure exponent (n) is less than 0.45 or greater than 0.8, then the test is invalid and shall be repeated.
- H. Use a log-linearized linear regression technique and the associated equation in Appendix C, Section C.5.5 of the current edition of the NEBB Procedural Building Envelope Testing, where Q is the airflow rate, in m<sup>3</sup>/s (cfm), and DP is the differential pressure in Pa (in.w.c.). In determining the fit of the above equation, the confidence intervals of the derived air leakage coefficient (C) and pressure exponent (n) should be calculated.
- I. The effective leakage area, AL, can be calculated from the corrected air leakage coefficient and the pressure exponent using a reference pressure (DPr). Calculate the leakage areas separately for pressurization and depressurization.
- J. To obtain a single value for flow coefficient, pressure exponent and leakage area for use in other calculations, the average of these values from the pressurization and depressurization envelope flows and pressure differences, with their offsets removed, may be combined together. This combined data set then is used in the same way as each individual data set to obtain C, n, and AL for the combined data. If the flow at a specified pressure difference, such as 50 Pa, is desired, it should be determined using the derived C and n and the specified reference pressure.
- K. Determine the upper confidence limits for the derived values which shall not exceed the leakage rate per square footage of air barrier.

### **3.08 ACCEPTANCE**

- A. The acceptance criteria should be as specified in the contract documents or as agreed to between the Owner / Buyer and the NEBB Certified BET Firm.

### **3.09 FINAL REPORT**

- A. The final report shall be in accordance with the requirements of the current edition of the NEBB Procedural Standards for the Building Envelope Testing.

### **END OF SECTION**

This page intentionally left blank

**SECTION 07 2100  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. 2012 IECC per the table on G-series drawings

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Perimeter insulation at slabs-on-grade.
  - 2. Concealed building insulation.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Fire-Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 PRODUCTS**

**2.01 CELLULAR-GLASS INSULATION**

- A. Manufacturer: Johns Manville.
- B. Cellular-Glass Insulation:
  - 1. R-48 unfaced at attic or equivalent blown-in insulation.
  - 2. R-20 kraft faced at exterior walls - install with kraft face to interior of building.

**2.02 FOAM-PLASTIC BOARD INSULATION**

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
  - 1. Type VI, 1.80 lb/cu. ft., R-5 per inch.
  - 2. At foundation and slab perimeter as indicated on drawings

**2.03 AUXILIARY INSULATING MATERIALS**

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

- B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

### **3.03 INSTALLATION, GENERAL**

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

### **3.04 INSTALLATION OF SLAB EDGE INSULATION**

- A. Install vertically inside formwork as indicated in the drawings. Stagger end joints and tightly abut insulation units.
- B. Protect insulation from damage during concrete work.

### **3.05 INSTALLATION OF CAVITY-WALL INSULATION**

- A. Install units of cellular-glass insulation with closely fitting joints using method indicated by manufacturer.

### **3.06 PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION 072100**

**SECTION 07 2110  
ACOUSTIC INSULATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Glass fiber acoustical insulation for interior partitions.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.03 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

**PART 2 PRODUCTS**

**2.01 SOUND ATTENUATION BATTS**

- A. Type: Unfaced glass fiber acoustical insulation complying with ASTM C 665, Type I.
- B. Size: as indicated on the drawings or largest practical size x width of partition stud.
- C. Surface Burning Characteristics, when tested in accordance with ASTM E 84:
  - 1. Maximum flame spread: 10
  - 2. Maximum smoke developed: 10
- D. Combustion Characteristics - passes ASTM E 136.
- E. Fire Resistance Ratings: passes ASTM E 119 as part of a complete fire tested wall assembly.
- F. Sound Transmission Class: STC 45
- G. Dimensional Stability: Linear Shrinkage less than 0.1%

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

**3.02 INSTALLATION, GENERAL**

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

**3.03 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION**

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use

mechanical anchorage to provide permanent placement and support of units.

- B. Glass-Fiber Blanket Acoustical Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
  - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

#### **3.04 PROTECTION**

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION 072100**



**SECTION 07 2126  
BLOWN INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Ceiling and Attic: Blown insulation pneumatically placed into joist spaces through access holes.

**1.02 REFERENCE STANDARDS**

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation 2017.
- C. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation 2019.
- D. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation 2017.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate procedure for preparation and installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Blown Insulation:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. GreenFiber: [www.greenfiber.com/#sle](http://www.greenfiber.com/#sle).
  - 3. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 4. Thermafiber, Inc: [www.thermafiber.com/#sle](http://www.thermafiber.com/#sle).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 MATERIALS**

- A. Applications: Provide blown insulation in attic as indicated on drawings.
- B. Thermal Resistance [R-value]: Provided minimum values in accordance with applicable edition of ASHRAE Std 90.1 I-P for envelope requirements of building location and climate zone.
- C. Blown Insulation: ASTM C739, cellulosic fiber type, nodulated for pour and bulk for pneumatic placement.
  - 1. Thermal Resistance (R-value): 11.0 sq ft hr deg F/BTU inch, minimum.

**2.03 ACCESSORIES**

- A. Roof Ventilation Baffles: Prefabricated ventilation channels for placement under roof sheathing with baffles to prevent wind-washing.
  - 1. Material: Polyvinyl chloride (PVC).
  - 2. Roof Joist/Truss Spacing: 16 inch on center, nominal.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that substrate and adjacent materials are dry and ready to receive insulation.
- B. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
- C. Verify spaces are unobstructed to allow for proper placement of insulation.

**3.02 INSTALLATION**

- A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.
- B. Place insulation pneumatically to completely fill rafter spaces.
- C. Completely fill intended spaces leaving no gaps or voids.

**3.03 CLEANING**

- A. Remove loose insulation residue.

**3.04 SCHEDULES**

- A. Attic Spaces: Pour insulation between ceiling joists to achieve an R-value of 38.

**END OF SECTION**

**SECTION 07 2500  
WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Building wrap as water-resistive barrier, and air barrier.
  - 2. Flexible flashing.
  - 3. Two layers of felt under brick veneer and adhered stone finish products.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For water-resistive barrier, from ICC-ES.

**PART 2 PRODUCTS**

**2.01 MISCELLANEOUS MATERIALS WATER-RESISTIVE BARRIER**

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
    - b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap D. Self-draining
    - c. Ludlow Coated Products; Barricade Building Wrap.
    - d. Pactiv, Inc.; GreenGuard Ultra Wrap.
    - e. Raven Industries Inc.; Fortress Pro Weather Protective Barrier.
  - 2. Water-Vapor Permeance: Not less than 20 perms (1150 ng/Pa x s x sq. m) per ASTM E 96/E 96M, Desiccant Method (Procedure A).
  - 3. Air Permeance: Not more than 0.0072 cfm/sq. ft. infiltration and 0.0023 cfm/ sq. ft. exfiltration at a pressure differential of 1.57 psf when tested according to ASTM E 2178.
  - 4. Allowable UV Exposure Time: Not less than three months.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

**2.02 ACCESSORIES**

- A. Per manufacturer's recommendation for substrate.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.
    - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Butyl Self Adhered Flashing.
    - c. Protecto Wrap Company; BT-25 XL.
    - d. Raven Industries Inc.; Fortress Flashshield.
    - e. Advanced Building Products Inc.; Wind-o-wrap.
    - f. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
    - g. Fiberweb, Clark Hammerbeam Corp.; Aquaflash 500.

- h. MFM Building Products Corp.; Window Wrap.
  - i. Polyguard Products, Inc.;
  - j. Sandell Manufacturing Co., Inc.; Presto-Seal.
- C. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- D. Nails and Staples: ASTM F 1667.

### **PART 3 EXECUTION**

#### **3.01 WATER-RESISTIVE BARRIER INSTALLATION**

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
  - 1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
  - 2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap unless otherwise indicated.
- C. Building Paper: Apply horizontally with a 2-inch (50-mm) overlap and a 6-inch (150-mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
- D. Building Wrap: Comply with manufacturer's written instructions.
  - 1. Seal seams, edges, fasteners, and penetrations with tape.
  - 2. Extend into jambs of openings and seal corners with tape.

#### **3.02 FLEXIBLE FLASHING INSTALLATION**

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
  - 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches (100 mm) except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  - 4. Lap water-resistive barrier over flashing at heads of openings.
  - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

**END OF SECTION 072500**

**SECTION 07 2600  
VAPOR RETARDERS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Polyethylene vapor retarders.
  - 2. Reinforced-polyethylene vapor retarders.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

**PART 2 PRODUCTS**

**2.01 POLYETHYLENE VAPOR RETARDERS**

- A. Vapor barrier shall have all of the following qualities:
  - 1. Maintain permeance of less than 0.01 Perms as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
  - 2. Other performance criteria:
    - a. Strength: ASTM E1745 Class A.
    - b. Thickness: 15 mils minimum
    - c. Manufacturers: Subject to compliance with requirements, provide products by the following:
      - 1) Stego Industries, 877.464.7834, stegoindustries.com.
      - 2) Substitutions: See Section 01 6000 - Product Requirements.

**2.02 ACCESSORIES**

- A. Seams:
  - 1. Stego Tape by Stego Industries.
  - 2. Sealing Penetrations of Vapor barrier:
    - a. Stego Mastic by Stego Industries
    - b. Stego Tape by Stego Industries.
  - 3. Perimeter/edge seal:
  - 4. Stego Crete Claw by Stego Industries.
    - a. 2. Stego Term Bar by Stego
    - b. 3. StegoTack Tape (double-sided sealant tape)
  - 5. Penetration Prevention:
    - a. Beast Foot by Stego.
  - 6. Vapor Barrier-Safe Screed System
    - a. Beast Screed by Stego

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

**3.02 INSTALLATION OF VAPOR RETARDERS ON FRAMING**

- A. Place vapor retarders on side of construction indicated on Drawings.
- B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

### **3.03 PROTECTION**

- A. Protect vapor retarders from damage until concealed by permanent construction.

**END OF SECTION 072600**

**SECTION 07 3113  
ASPHALT SHINGLES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Asphalt shingle roofing. Provide matching ridge vents from same manufacturer.
- B. Flexible sheet membranes for eave protection, underlayment, and valley protection.
- C. Associated metal flashings and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2019.
- B. ASTM D3161/D3161M - Standard Test Method for Wind-Resistance of Steep Slope Roofing Products (Fan-Induced Method) 2020.
- C. ASTM D3462/D3462M - Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules 2019.
- D. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings 2020a.
- E. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples 2018a.
- F. NRCA (RM) - The NRCA Roofing Manual 2019.
- G. UL (DIR) - Online Certifications Directory Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating material characteristics.
- C. Samples: Submit two samples of each shingle color indicating color range and finish texture/pattern ; for color selection.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Shingles: 100 sq ft of each type and color.

**1.04 QUALITY ASSURANCE**

- A. Products are Required to Comply with Fire Resistance Criteria: UL (DIR) listed and labeled.

**1.05 FIELD CONDITIONS**

- A. Do not install shingles or eave protection membrane when surface temperatures are below 45 degrees F.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Asphalt Shingles: architectural profile
  - 1. Atlas Roofing Corporation: [www.atlasroofing.com/#sle](http://www.atlasroofing.com/#sle).
  - 2. GAF; Timberline HD Reflector Series: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  - 3. IKO Industries Inc; Armourshake: [www.iko.com/#sle](http://www.iko.com/#sle).
  - 4. Owens Corning Corp: [www.owenscorning.com/#sle](http://www.owenscorning.com/#sle).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 ASPHALT SHINGLES**

- A. Asphalt Shingles: Asphalt-coated glass felt, mineral granule surfaced, complying with ASTM D3462.
  - 1. Fire Resistance: Class A, complying with ASTM E108.
  - 2. Wind Resistance: Class A, when tested in accordance with ASTM D3161.
  - 3. Style: Square.
  - 4. Color: As selected by Architect.

## **2.03 SHEET MATERIALS**

- A. Eave Protection Membrane:
  - 1. Eave Protection Membrane: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.
- B. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
  - 1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
  - 2. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
  - 3. Fasteners: As recommended by manufacturer or building code qualification report or approval.
- C. Flexible Flashing: Self-adhering polymer-modified asphalt sheet complying with ASTM D1970/D1970M; 40 mil total thickness; with strippable treated release paper and polyethylene sheet top surface.

## **2.04 ACCESSORIES**

- A. Roofing Nails: Standard round wire shingle type, galvanized steel, stainless steel, aluminum roofing nails, or copper roofing nails, minimum 3/8 inch head diameter, 12 gauge, 0.109 inch nail shank diameter, 1-1/2 inch long and complying with ASTM F1667.
- B. Plastic Ridge Vents: Extruded plastic with vent openings that do not permit direct water or weather entry; flanged to receive shingles.

## **2.05 METAL FLASHINGS**

- A. Metal Flashings: Provide sheet metal eave edge, gable edge, ridge, ridge vents, open valley flashing, and other flashing indicated.
  - 1. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.
  - 2. Hem exposed edges of flashings minimum 1/4 inch on underside.
  - 3. Coat concealed surfaces of flashings with bituminous paint.
- B. Steel Sheet Metal: Prefinished and galvanized steel sheet, 26 gage, 0.0179 inch minimum thickness, G90/Z275 hot-dipped galvanized; PVC coated, color as selected.
- C. Sheet Metal: Galvanized steel, as specified in Section 07 6200.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.
- B. Verify that roof deck is of sufficient thickness to accept fasteners.
- C. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.
- D. Verify roof openings are correctly framed.
- E. Verify deck surfaces are dry, free of ridges, warps, or voids.

### **3.02 PREPARATION**

- A. Seal roof deck joints wider than 1/16 inch as recommended by shingle manufacturer.
- B. At areas where eave protection membrane is to be adhered to substrate, fill knot holes and surface cracks with latex filler.
- C. Broom clean deck surfaces before installing underlayment or eave protection.



- D. Install eave edge flashings tight with fascia boards, weather lap joints 2 inches and seal with plastic cement, and secure flange.

### **3.03 INSTALLATION - EAVE PROTECTION MEMBRANE**

- A. Install eave protection membrane from eave edge to minimum 4 ft up-slope beyond interior face of exterior wall.
- B. Install eave protection membrane in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

### **3.04 INSTALLATION - UNDERLAYMENT**

- A. Underlayment At Roof Slopes Up to 4:12: Install two layers of underlayment over area not protected by eave protection, with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer, and nail in place.
- B. Underlayment At Roof Slopes Greater Than 4:12: Install underlayment perpendicular to slope of roof, with ends and edges weather lapped minimum 4 inches, stagger end laps of each consecutive layer, nail in place, and weather lap minimum 4 inches over eave protection.
- C. Weather lap and seal watertight with plastic cement any items projecting through or mounted on roof.

### **3.05 INSTALLATION - VALLEY PROTECTION**

- A. Install flexible flashing in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Weather lap joints minimum 2 inches.
- C. At Exposed Valleys: Install minimum 36 inches wide roll roofing with mineral surface side up over first layer of protection, and centered, apply 4 inch wide band of lap cement along each edge of first layer, press roll roofing into cement, nail in place minimum 18 inches on center and 1 inch from edges.

### **3.06 INSTALLATION - METAL FLASHING AND ACCESSORIES**

- A. Install flashings in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Weather lap joints minimum 2 inches and seal weather tight with plastic cement.
- C. Items Projecting Through or Mounted on Roofing: Flash and seal weather tight with plastic cement.

### **3.07 INSTALLATION - SHINGLES**

- A. Install shingles in accordance with manufacturer's instructions manufacturer's instructions and NRCA (RM) applicable requirements.
  - 1. Fasten individual shingles using two nails per shingle, or as required by manufacturer and local building code, whichever is greater.
  - 2. Fasten strip shingles using four nails per strip, or as required by manufacturer and local building code, whichever is greater.
- B. Place shingles in straight coursing pattern with 5 inch weather exposure to produce double thickness over full roof area, and provide double course of shingles at eaves.
- C. Project first course of shingles 3/4 inch beyond fascia boards.
- D. Extend shingles 1/2 inch beyond face of gable edge fascia boards.
- E. Extend shingles on one slope across valley and fasten, trim shingles from other slope 2 inches from valley center line to achieve closed cut valley, and concealing valley protection.
- F. Cap hips with individual shingles, maintaining 5 inch weather exposure, and place to avoid exposed nails.
- G. Coordinate installation of roof mounted components or work projecting through roof with weather tight placement of counterflashings.

H. Complete installation to provide weather tight service.

**3.08 PROTECTION**

A. Do not permit traffic over finished roof surface.

**END OF SECTION**

**SECTION 07 4293  
ALUMINUM SOFFIT PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum soffit for exterior patios.
- B. Trim, flashings, accessories, and fasteners for aluminum siding.

**1.02 REFERENCE STANDARDS**

- A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Soffit materials, underlayment, flashings, fasteners and accessories.
  - 2. Dimensions, physical properties, and typical details.
  - 3. Storage and handling requirements and recommendations.
  - 4. Installation instructions and recommendations.
- C. Shop Drawings: Indicate layout, methods of attachment and support clips, provisions for movement, flashing, trim, edge and field conditions, interface with adjacent materials, locations of cutouts or special shapes, anchorage systems, and details.
- D. Samples: For each finish product specified, provide two complete sets of color chips representing manufacturer's full range of available colors and patterns, including the following:
  - 1. Soffit: Two of each type; full panel width by 12 inches long.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.04 QUALITY ASSURANCE**

- A. Preinstallation Conference: Conduct conference at site.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store products in manufacturer's unopened packaging bearing brand name and manufacturer's identification until ready for installation.
- B. Verify quantities and condition immediately upon receipt; remove damaged materials from site, and coordinate with manufacturer to replace with new materials meeting specified requirements.
- C. Store products off the ground, within manufacturer's temperature and environmental limits, away from moisture, protected from traffic and construction activities, and minimize on-site storage prior to installation.
- D. Retain strippable protective covering on metal panels during installation.

## **1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a two year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Aluminum Soffit Panels:
  - 1. Gentek Building Products, Inc: [www.gentekinc.com/#sle](http://www.gentekinc.com/#sle).
  - 2. Kaycan Ltd: [www.kaycan.com/#sle](http://www.kaycan.com/#sle).
  - 3. Knotwood, a brand of OmniMax International: [www.knotwood.com/#sle](http://www.knotwood.com/#sle).
  - 4. Ply Gem: [www.plygem.com/#sle](http://www.plygem.com/#sle).
  - 5. Revere Building Products, Inc: [www.reverebuildingproducts.com/#sle](http://www.reverebuildingproducts.com/#sle).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 ALUMINUM PANELS**

- A. Aluminum Soffit:
  - 1. Material: Precoated aluminum sheet, 0.016 inch, minimum base metal thickness.
  - 2. Flush Profile: Board Style, Single 6-Inch; 6 inches wide, center panel vented; 6 inch exposure.
  - 3. Dimensions: 16 inches wide by 12 feet long.
  - 4. Ventilation: Provide manufacturer's standard of net free area.
  - 5. Soffit Accessories: Provide coordinating accessories made of same material as required for complete and proper installation.
    - a. F-Channel trim.
    - b. J-Channel trim.
    - c. Wide face J-Channel trim.
    - d. Roof drip edge, quick start.
    - e. Mitered molding.
    - f. Fascia corner.

### **2.03 MATERIALS**

- A. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating, and with manufacturer's standard panel back coating.
- B. Exterior Finish: Two-coat fluoropolymer
- C. Color: As selected by Architect from manufacturer's full range.

### **2.04 ACCESSORIES**

- A. Fasteners: Aluminum; non-staining, of size and strength to securely and rigidly retain this work; prefinished to match siding finish.
- B. Finish: Shop precoated with manufacturer's standard SMP (silicone-modified polyester) coating system.
  - 1. Color: As selected by Architect from manufacturer's full range of available colors.
  - 2. Texture: Smooth.
- C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  - 1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim

with same finish system as adjacent metal panels.

- E. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
  - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## **2.05 FABRICATION**

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

## **2.06 FINISHES**

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrate conditions before beginning installation.
- B. Verify dimensions and acceptable substrate condition.
- C. Verify weather resistant barrier (WRB) has been properly installed over substrate; refer to Section 07 2500 for requirements.
- D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.
- E. Do not proceed with installation until unacceptable conditions have been corrected.

### **3.02 PREPARATION**

- A. Surface Preparation: Prepare surfaces as recommended by manufacturer.
- B. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
  - 1. Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

- C. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

### **3.03 INSTALLATION**

- A. Install aluminum soffit, trim, and accessories in accordance with manufacturer's written instructions.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.
- C. Provide concealed fasteners except where approved on shop drawings.
- D. Exterior Soffit Vents: Install according to manufacturer's written instructions; provide vent area shown on drawings.
- E. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- F. Install joint sealants as specified in Section 07 9200 for a watertight installation.
- G. Watertight Installation:
  - 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
  - 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
  - 3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.
- H. Where dissimilar materials are in contact, prevent galvanic action as recommended by manufacturer.

### **3.04 CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant. Remove grease and oil films, excess joint sealer, handling marks, and other installation debris from aluminum panels, leaving panels clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to material finishes.
- C. Upon completion of installation, thoroughly clean prefinished aluminum surfaces in accordance with AAMA 609 & 610.
- D. Remove excess materials and debris from project site.

### **3.05 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

### **END OF SECTION**

**SECTION 07 4646  
FIBER-CEMENT SIDING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes primed fiber-cement lap siding and trim.
- B. Section includes primed fiber-cement vented soffits.

**1.02 COORDINATION**

- A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples for Initial Selection: For fiber-cement siding including related accessories. (12 inch minimum)

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals. Provide 2% extra materials of each color for Owner's attic stock.

**1.05 QUALITY ASSURANCE**

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
  - 1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store packaged materials in original containers with labels intact until time of use.
- B. Store materials on elevated platforms, under cover, and in a dry location.

**1.07 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of product, including related accessories, to include in maintenance manuals.

**1.08 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish full lengths of fiber-cement siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

**1.09 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including cracking and deforming.
    - b. Deterioration of materials beyond normal weathering.
    - c. Deterioration of manufacturer's finish beyond normal weathering.
- B. Warranty Period: 20 years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Source Limitations: Obtain products, including related accessories, from single source from single manufacturer.

## **2.02 FIBER-CEMENT SIDING**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product noted below or comparable product by another manufacturer:
  - 1. James Hardie Building Products, Inc.
  - 2. Allura, a division of Plycem USA, Inc
  - 3. Fiberon; Composite Cladding
  - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
- C. Labeling: Provide fiber-cement siding that is tested and labeled according to ASTM C 1186 by a qualified testing agency acceptable to authorities having jurisdiction.
- D. Nominal Thickness: Not less than 5/16 inch.
- E. Horizontal Siding Pattern: Boards in sizes as shown on elevations in plain lap siding. Width as indicated on the drawings.
  - 1. Texture: Smooth.
  - 2. Hardie Trim Board: sizes as shown on elevations in plain style.
- F. Horizontal Ceiling Panel Texture: 48-inch- wide sheets with smooth texture and Hardie reveal trim.
- G. Manufacturer Climate Zone: HZ5

## **2.03 FIBER-CEMENT SOFFIT**

- A. General: ASTM C 1186, Type A, Grade II, fiber-cement board, noncombustible when tested according to ASTM E 136; with a flame-spread index of 25 or less when tested according to ASTM E 84.
- B. Nominal Thickness: Not less than 5/16 inch (8 mm).
- C. Pattern: width as shown on details, smooth texture.
- D. Ventilation: Provide perforated soffit - install with insert screen.

## **2.04 ACCESSORIES**

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
  - 1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.
- B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:
  - 1. Door and window casings.
  - 2. Moldings and trim.
  - 3. Angled support blocks for signage, light fixtures and exterior electrical outlets, etc.
- C. Flashing: Provide aluminum flashing complying with Section 076200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
- D. Fasteners:
  - 1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch into substrate.
  - 2. For fastening fiber cement, use hot-dip galvanized fasteners.
  - 3. For rain screen application of Hardie panels, follow manufacturers recommendations for treated wood shim application.
- E. Insect Screening for Soffit Vents: manufacturer's standard aluminum mesh.



## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and related accessories. Including but not limited to self-draining weather barrier.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean substrates of projections and substances detrimental to application.

### **3.03 INSTALLATION**

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
  - 1. Do not install damaged components.
  - 2. Install fasteners no more than 24 inches o.c.
- B. Install joint sealants to produce a weathertight installation.

### **3.04 ADJUSTING AND CLEANING**

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

**END OF SECTION 074646**

This page intentionally left blank

**SECTION 07 5423  
THERMOPLASTIC POLYOLEFIN ROOFING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Adhered thermoplastic polyolefin (TPO) roofing system at Unit balconies

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
  - 1. Base flashings and membrane terminations.
- C. Samples for Verification: For the following products:
  - 1. Sheet roofing, of color required.

**1.03 PRE-INSTALLATION MEETINGS**

- A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site
- B. Pre-installation Roofing Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  - 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  - 5. Review structural loading limitations of roof deck during and after roofing.
  - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
  - 7. Review governing regulations and requirements for insurance and certificates if applicable.
  - 8. Review temporary protection requirements for roofing system during and after installation.
  - 9. Review roof observation and repair procedures after roofing installation.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and manufacturer.

**1.05 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For roofing system to include in maintenance manuals.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid

material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

#### **1.08 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### **1.09 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  1. Special warranty includes roofing, base flashings, roof insulation, fasteners, and other components of roofing system.
  2. Warranty Period: 20 years from date of Substantial Completion.
    - a. Basis of Design: Provide Firestone 20 Year Red Shield Platinum Warranty.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
  1. Carlisle SynTec Incorporated.
  2. Firestone Building Products.
  3. GAF Materials Corporation.
  4. Johns Manville.
- B. Source Limitations: Obtain components including roof insulation and fasteners for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

#### **2.02 PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

#### **2.03 TPO ROOFING**

- A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.
  1. Thickness: 60 mils (1.5 mm), nominal. Basis of Design: Firestone UltraPly TPO Membrane
  2. Exposed Face Color: White or Tan- confirm with Architect/Owner

#### **2.04 AUXILIARY ROOFING MATERIALS**

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.

- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 50 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Bonding Adhesive: Manufacturer's standard, water based.
- D. Slip Sheet: Manufacturer's standard, of thickness required for application.
- E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), pre-punched.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

## **2.05 COVER BOARDS**

- A. Basis of Design: Georgia-Pacific DensDeck Prime. Provide coverboard on all TPO roofing
- B. Provide coverboard surrounding any roof-top equipment in ballasted areas.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

### **3.03 ROOFING INSTALLATION, GENERAL**

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weather tightness of transition and to not void warranty for existing roofing system.

### **3.04 ADHERED ROOFING INSTALLATION**

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

### **3.05 BASE FLASHING INSTALLATION**

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### **3.06 PROTECTING AND CLEANING**

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION**

**SECTION 07 6200**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Formed roof-drainage sheet metal fabrications.
  - 2. Formed wall sheet metal fabrications.
  - 3. Formed equipment support flashing.

**1.02 COORDINATION**

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
  - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.
  - 4. Include details for forming, including profiles, shapes, seams, and dimensions.
  - 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 6. Include details of termination points and assemblies.
  - 7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
  - 8. Include details of roof-penetration flashing.
  - 9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  - 10. Include details of special conditions.
  - 11. Include details of connections to adjoining work.
  - 12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish.
  - 1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
  - 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
  - 3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
  - 4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

#### **1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

#### **1.07 WARRANTY**

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification Class 1-120. Identify materials with name of fabricator and design approved by FM Approvals.
- D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
  - 1. Design Pressure: as published for building location.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

#### **2.02 SHEET METALS**

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.



1. Exposed Coil-Coated Finish:
  - a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color: As selected by Architect from manufacturer's full range
3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

### **2.03 UNDERLAYMENT MATERIALS**

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F (111 deg C); and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Atlas Roofing Corporation; Summit.
    - b. Engineered Coated Products; Nova-Seal II.
    - c. Kirsch Building Products, LLC; Sharkskin Ultra.
    - d. SDP Advanced Polymer Products Inc; Palisade.
- C. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
    - e. Metal-Fab Manufacturing, LLC; MetShield.
    - f. Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
    - g. Polyguard Products, Inc.; Deck Guard HT.
    - h. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
    - i. SDP Advanced Polymer Products Inc; Palisade SA-HT.
  2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.
  3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.
- D. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

### **2.04 MISCELLANEOUS MATERIALS**

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

- a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
  - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
  - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- I. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cheney Flashing Company.
    - b. Fry Reglet Corporation.
    - c. Heckmann Building Products, Inc.
    - d. Hickman, W. P. Company.
    - e. Hohmann & Barnard, Inc.
    - f. Keystone Flashing Company, Inc.
    - g. National Sheet Metal Systems, Inc.
    - h. Sandell Manufacturing.
  - 2. Material: Aluminum, 0.024 inch (0.61 mm) thick.
  - 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
  - 4. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
  - 5. Accessories:
    - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
  - 6. Finish: With manufacturer's standard color coating.

## **2.05 FABRICATION, GENERAL**

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  2. Obtain field measurements for accurate fit before shop fabrication.
  3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
  2. Use lapped expansion joints only where indicated on Drawings.
- E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- J. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.
- K. Do not use graphite pencils to mark metal surfaces.

## **2.06 WALL SHEET METAL FABRICATIONS**

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings; and form with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
1. Zinc: [0.032 inch (0.80 mm)]

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
  2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
- C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.
- D. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

### 3.03 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners[, solder], protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  - 5. Torch cutting of sheet metal flashing and trim is not permitted.
  - 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
  - 1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m)] [Insert dimension] with no joints within 24 inches (600 mm) of corner or intersection.
  - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
  - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

### **3.04 ROOF FLASHING INSTALLATION**

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- D. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
  1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch (600-mm) centers.
  2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch (600-mm) centers.
- E. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.
- F. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- G. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner.
- H. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with [elastomeric] [butyl] sealant and clamp flashing to pipes that penetrate roof.

### **3.05 WALL FLASHING INSTALLATION**

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

### **3.06 MISCELLANEOUS FLASHING INSTALLATION**

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

### **3.07 ERECTION TOLERANCES**

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

### **3.08 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 076200**

**SECTION 07 7100  
ROOF SPECIALTIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Copings.
  - 2. Roof-edge specialties.
  - 3. Roof-edge scupper drainage systems.
  - 4. Reglets and counter-flashings.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof specialties.
  - 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
  - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
  - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
  - 4. Detail termination points and assemblies, including fixed points.
  - 5. Include details of special conditions.
- C. Samples: For each type of roof specialty and for each color and texture specified.
- D. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.
- E. Samples for Verification:
  - 1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
  - 2. Include copings, roof-edge specialties, roof-edge drainage systems, reglets and counter-flashings made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

**1.03 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are and SPRI ES-1 tested to specified design pressure- 120 mph wind exposure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
  - 1. Build mockup of typical roof edge as shown on Drawings.
  - 2. Build mockup of typical roof edge as part of Integrated Exterior Mockup specified in Section 014000 "Quality Requirements"
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

#### **1.06 FIELD CONDITIONS**

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

#### **1.07 WARRANTY**

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; material surfaces.

#### **2.02 COPINGS**

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps. Refer to roof plan for coping schedule color and locations
  - 1. Metallic-Coated Steel Sheet Coping Caps: Zinc-coated (galvanized) steel, nominal 0.028-inch thickness
    - a. Surface: Smooth, flat finish.
    - b. Finish: Two-coat fluoropolymer
    - c. Color: Match Architect's sample

#### **2.03 ROOF-EDGE SPECIALTIES**

- A. Canted Roof-Edge Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized-steel sheet cant, 0.028 inch thick, minimum, with extended vertical leg terminating in a drip-edge cleat. Provide matching corner units.
  - 1. Metallic-Coated Steel Sheet Fascia Covers: Zinc-coated (galvanized) steel, nominal 0.028-inch thickness
    - a. Surface: Smooth
    - b. Finish: Flat
    - c. Color: As selected by Architect from manufacturer's full range



## **2.04 ROOF-EDGE DRAINAGE SYSTEMS**

- A. Parapet Scuppers: Manufactured with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof
  - 1. Zinc-Coated Steel: Nominal 0.028-inch > thickness.
  - 2. Formed Aluminum: 0.032 inch thick.
- B. Conductor Heads: Manufactured conductor heads, each with flanged back and stiffened top edge, and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout, exterior flange trim, and built-in overflow.
  - 1. Zinc-Coated Steel: Nominal 0.028-inch thickness.
- C. Accessories:
  - 1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
  - 2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

## **2.05 MATERIALS**

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- C. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
- D. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.
- E. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.

## **2.06 UNDERLAYMENT MATERIALS**

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
  - 1. Thermal Stability: ASTM D 1970/D 1970M; stable after testing at 240 deg F.
  - 2. Low-Temperature Flexibility: ASTM D 1970/D 1970M; passes after testing at minus 20 deg F.
- B. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. minimum.

## **2.07 MISCELLANEOUS MATERIALS**

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
  - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
  - 2. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
  - 3. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
  - 4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
  - 5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- B. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

## **2.08 FINISHES**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Galvanized-Steel Sheet Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A 755/A 755M and coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 UNDERLAYMENT INSTALLATION**

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
  - 1. Apply continuously under roof-edge specialties and counterflashings
  - 2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.
- B. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- C. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

### **3.03 INSTALLATION, GENERAL**

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, under-layments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  - 4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  1. Coat concealed side of roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
  2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
  2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

### **3.04 COPING INSTALLATION**

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
  1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements
  2. Interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's required spacing that meets performance requirements

### **3.05 ROOF-EDGE SPECIALTIES INSTALLATION**

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

### **3.06 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION**

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
  1. Provide elbows at base of downspouts at grade to direct water away from building

2. Connect downspouts to underground drainage system. Coordinate with respective Civil Drawings and provide if not shown on Civil Drawings.
3. Coordinate downspout connections to Canales as indicated on drawings
- C. Splash Pans: Install where downspouts discharge on low-slope roofs set in elastomeric sealant.
- D. Parapet Scuppers: Install scuppers through parapet where indicated. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
  1. Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.
  2. Loosely lock front edge of scupper with conductor head.
  3. Seal or solder exterior wall scupper flanges into back of conductor head.
- E. Conductor Heads: Anchor securely to wall with elevation of conductor top edge 1 inch below scupper discharge.

### **3.07 REGLET AND COUNTERFLASHING INSTALLATION**

- A. General: Coordinate installation of reglets and counter-flashings with installation of base flashings.
- B. Counter-flashings: Insert counter-flashings into reglets or other indicated receivers; ensure that counter-lashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with butyl sealant. Fit counter-flashings tightly to base flashings.

### **3.08 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

### **END OF SECTION**

**SECTION 07 7123  
MANUFACTURED GUTTERS AND DOWNSPOUTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pre-finished aluminum gutters and downspouts.
- B. Precast concrete splash pads.

**1.02 REFERENCE STANDARDS**

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- C. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.
- C. Maintain one copy of each document on site.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- D. Samples: Submit two samples, 6 inch long illustrating component design, finish, color, and configuration.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Gutters and Downspouts:
  - 1. ATAS International, Inc; Water Control System: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Cheney Flashing Company: [www.cheneyflashing.com/#sle](http://www.cheneyflashing.com/#sle).
  - 3. Drexel Metals Inc; 7 Inch Box Gutter: [www.drexmet.com/#sle](http://www.drexmet.com/#sle).
  - 4. OMG Roofing Products: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).
  - 5. SAF Perimeter Systems, a division of Southern Aluminum Finishing Company, Inc: [www.saf.com/persys/#sle](http://www.saf.com/persys/#sle).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 MATERIALS**

- A. Pre-Finished Aluminum Sheet: ASTM B209 (ASTM B209M); 0.032 inch thick.
  - 1. Finish: Plain, shop pre-coated with modified silicone coating.
  - 2. Color: As selected from manufacturer's standard colors.
- B. Protective Backing Paint: Zinc molybdate alkyd.

**2.03 COMPONENTS**

- A. Gutters: CDA rectangular style profile. 5"

- B. Downspouts: CDA Rectangular profile, 5"
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
  - 1. Anchoring Devices: In accordance with CDA requirements.
  - 2. Gutter Supports: Brackets.
  - 3. Downspout Supports: Brackets.
- D. Fasteners: Galvanized steel , with soft neoprene washers.

#### **2.04 ACCESSORIES**

- A. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

#### **2.05 FABRICATION**

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

#### **3.02 PREPARATION**

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

#### **3.03 INSTALLATION**

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Set splash pans under downspouts.

**END OF SECTION**

**SECTION 07 8413  
PENETRATION FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Penetrations in fire-resistance-rated walls.
  - 2. Penetrations in horizontal assemblies.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.03 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

**1.04 COORDINATION**

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

**PART 2 PRODUCTS**

**2.01 PENETRATION FIRESTOPPING**

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-wool-fiber or rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.

## **2.02 FILL MATERIALS**

- A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- B. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- C. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- D. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- E. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

## **2.03 MIXING**

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

### **3.03 INSTALLATION**

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.



- C. Install fill materials for firestopping by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

#### **3.04 CLEANING AND PROTECTION**

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

**END OF SECTION 078413**

This page intentionally left blank

WOOD FLOORS			GYPSUM WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, <b>F-C-1168*</b> , F-C-1142	METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1095, W-L-1506, W-L-1380, W-L-1410, W-L-1164
	2	F-C-1009, F-C-1059, <b>F-C-1168*</b>		2	W-L-1054, W-L-1058, W-L-1164, W-L-1506, W-L-1380, W-L-1410
NON-METALLIC PIPE OR CONDUIT	1	<b>F-C-2232*</b> , <b>F-C-2030*</b> , <b>F-C-2160*</b> , <b>F-C-2389*</b> , <b>F-C-2432</b> , <b>F-C-2081*</b> , F-C-2142, <b>F-C-2203*</b> , F-C-2204, <b>F-C-2310*</b> , <b>F-C-2334*</b> , <b>F-C-2404</b>	NON-METALLIC PIPE OR CONDUIT	1	W-L-2078, W-L-2075, W-L-2128, W-L-2340, W-L-2467, W-L-2482
	2	<b>F-C-2029*</b> , <b>F-C-2030*</b> , <b>F-C-2128*</b> , <b>F-C-2160*</b> , <b>F-C-2081*</b>		2	W-L-2078, W-L-2075, W-L-2128, W-L-2605, W-L-2340, W-L-2467, W-L-2482
SINGLE OR CABLE BUNDLES	1	<b>F-C-3012*</b> , <b>F-C-3110*</b> , <b>F-C-3044*</b> , <b>F-C-3094*</b> , <b>F-C-3071*</b>	SINGLE OR BUNDLED CABLES	1 & 2	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396, W-L-3447, W-L-3310, W-L-3415
	2	F-C-3012, <b>F-C-3110*</b>	INSULATED PIPES	1 & 2	W-L-5028, W-L-5029, W-L-5047
INSULATED PIPES	1 & 2	<b>F-C-5004*</b> , <b>F-C-5037*</b>	Miscilanious Mechanical and Ductwork	1 & 2	W-L-7042
			MIXED PENETRANTS	1	W-L-1095, W-L-8013
Miscilanious Mechanical and Ductwork	1	F-C-7013, F-C-7042		2	W-L-1095, W-L-8013
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**			
	2	<b>F-C-7036*</b>			
MIXED PENETRANTS	1	<b>F-C-8009*</b> , F-C-8014, <b>F-C-8026*</b> , F-C-8044			

**\*Bold text indicates a T-rating equal to the F-rating for floor svstems**  
\*\*CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-6000

- NOTES:
- Jobsite conditions of each through-penetration firestop system must meet ALL details of the UL-Classified System selected.
  - If jobsite conditions do not match any UL-classified systems in the schedules above, contact Hilti for alternative systems or Engineer Judgment Drawings - 800-879-8000
  - Where more than one applicable UL-Classified System is listed in the schedules, choose the UL System which is most economical for each. through-penetration firestop system.
  - Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.
  - For 8" and 10" pipe (metallic and non-metallic) through 3hr concrete podium, contact Hilti to provide Engineering Judgement

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
BLANK OPENINGS	2	<b>F-A-0006*</b> , C-AJ-0090	CIRCULAR BLANK OPENINGS	2	C-AJ-0055, C-AJ-0090
	3	<b>F-A-0006*</b> ,		3	C-AJ-0055, C-AJ-0086
SINGLE METAL PIPES OR CONDUIT	2	C-AJ-1226, F-A-1016, F-A-1017, F-A-1023, F-A-1037, <b>F-A-1108*</b>	SINGLE METAL PIPES OR CONDUIT	2	C-AJ-1226, W-J-1248
	3	C-AJ-1226, F-A-1017		3	C-AJ-1226
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	2	F-A-2053, <b>C-AJ-2109*</b> , <b>C-AJ-2098*</b> , C-AJ-2167, C-AJ-2342, <b>C-AJ-2371*</b> , F-B-2061	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	2	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342, W-J-2267
	3	<b>F-A-2054*</b> , <b>C-AJ-2109*</b> , <b>C-AJ-2098*</b> , C-AJ-2371, C-AJ-2342		3	C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342
SINGLE/CABLE BUNDLES	2 & 3	F-A-3007,C-AJ-3095	SINGLE/CABLE BUNDLES	2	C-AJ-3180, W-J-3060, W-J-3167
				3	C-AJ-3180, W-J-3167
SINGLE INSULATED PIPES	2	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091	CABLE TRAY	2 & 3	C-AJ-4034, C-AJ-4035
	3	F-A 5016, C-AJ-5090			
MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	2 & 3	C-AJ-7046, C-AJ-7051	SINGLE INSULATED PIPES	2 & 3	C-AJ-5090, C-AJ-5061
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	2	<b>C-AJ-7095*</b>	MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	2 & 3	C-AJ-7046, C-AJ-7051
MIXED PENETRANTS	2 & 3	C-AJ-8099, C-AJ-8207			
WOOD FLOORS			MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	2	W-J-7091, W-J-7112, W-J-7124
TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	MIXED PENETRANTS	2 & 3	C-AJ-8099, C-AJ-8207
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, <b>F-C-1168*</b> , F-C-1142	GYPSUM WALLS		
	2	F-C-1009, F-C-1059, <b>F-C-1168*</b>	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
NON-METALLIC PIPE OR CONDUIT	1	<b>F-C-2232*</b> , <b>F-C-2030*</b> , <b>F-C-2160*</b> , <b>F-C-2389*</b> , <b>F-C-2432</b> , <b>F-C-2081*</b> , F-C-2142, <b>F-C-2203*</b> , F-C-2204, <b>F-C-2310*</b> , <b>F-C-2334*</b> , <b>F-C-2404</b>	METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1095, W-L-1506, W-L-1380, W-L-1410, W-L-1164
	2	<b>F-C-2029*</b> , <b>F-C-2030*</b> , <b>F-C-2128*</b> , <b>F-C-2160*</b> , <b>F-C-2081*</b>		2	W-L-1054, W-L-1058, W-L-1164, W-L-1506, W-L-1380, W-L-1410
SINGLE OR CABLE BUNDLES	1	<b>F-C-3012*</b> , <b>F-C-3110*</b> , <b>F-C-3044*</b> , <b>F-C-3094*</b> , <b>F-C-3071*</b>	NON-METALLIC PIPE OR CONDUIT	1	W-L-2078, W-L-2075, W-L-2128, W-L-2340, W-L-2467, W-L-2482
	2	F-C-3012, <b>F-C-3110*</b>		2	W-L-2078, W-L-2075, W-L-2128, W-L-2605, W-L-2340, W-L-2467, W-L-2482
INSULATED PIPES	1	<b>F-C-5004*</b> , <b>F-C-5037*</b> , <b>F-C-5036*</b>	SINGLE OR BUNDLED CABLES	1 & 2	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3396, W-L-3447, W-L-3310, W-L-3415
	2	F-C-5004, F-C-5037	INSULATED PIPES	1 & 2	W-L-5028, W-L-5029, W-L-5047
Miscilanious Mechanical and Ductwork	1	F-C-7013, F-C-7042	Miscilanious Mechanical and Ductwork	1 & 2	W-L-7042
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**	MIXED PENETRANTS	1	W-L-1095, W-L-8013
	2	<b>F-C-7036*</b>		2	W-L-1095, W-L-8013
MIXED PENETRANTS	1	<b>F-C-8009*</b> , F-C-8014, <b>F-C-8026*</b> , F-C-8044			

\***Bold text indicates a T-rating equal to the F-rating for floor systems**

\*\*CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-6000

NOTES:

- Jobsite conditions of each through-penetration firestop system must meet ALL details of the UL-Classified System selected.
- If jobsite conditions do not match any UL-classified systems in the schedules above, contact Hilti for alternative systems or Engineer Judgment Drawings - 800-879-8000
- Where more than one applicable UL-Classified System is listed in the schedules, choose the UL System which is most economical for each. through-penetration firestop system.
- Coordinate work with other trades to assure that penetration opening sizes are appropriate for penetrant locations, and vice versa.
- For 8" and 10" pipe (metallic and non-metallic) through 3hr concrete podium, contact Hilti to provide Engineering Judgement

Schedule of joint firestop systems. Basis of Design: Hilti, Inc.

JOINT TYPE	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
		JOINT WIDTH LESS THAN OR EQUAL TO 2"
Gypsum Wall to Wood Floor/Ceiling Assembly	1	HW-S-0090
CONCRETE OR BLOCK WALL TO FLAT CONCRETE FLOOR ( <b>TOP-OF-WALL</b> )	1	N/A**
	2	HW-D-0825, HW-D-0097 <sup>1</sup>
	3	HW-D-1008 <sup>1</sup> , HW-D 0268
GYPSUM WALL TO FLAT CONCRETE FLOOR ( <b>TOP-OF-WALL</b> )	1 & 2	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119
GYPSUM SHAFT WALL TO <b>TOP-OF-WALL</b>	2	HW-D-0824, HW-D-0342
GYPSUM SHAFT WALL TO CONCRETE FLOOR ( <b>BOTTOM-OF-WALL</b> )	1 & 2	BW-S-0023
GYPSUM WALL TO CONCRETE FLOOR ( <b>BOTTOM-OF-WALL</b> )	1 & 2	BW-S-0001, BW-S-0002, BW-S-0039
CONCRETE ( <b>WALL TO WALL</b> )	2	WW-D-0017, WW-D-0082, WW-D-0220
	3	WW-D-1011 <sup>1</sup> , WW-D-0032
GYPSUM TO CONCRETE ( <b>WALL TO WALL</b> )	1 & 2	WW-D-0040

\* SEE NOTE 3

\*\* CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-8000

NOTES:

1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (\*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.
4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.

This page intentionally left blank

## **SECTION 07 9200 JOINT SEALANTS**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Latex joint sealants.
  - 3. Acoustical joint sealants.

#### **1.02 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### **1.03 PROJECT CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
  - 1. Suitability for Immersion in Liquids: Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

#### **2.02 SILICONE JOINT SEALANTS**

- A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
- B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
- C. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
- D. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

## **2.03 LATEX JOINT SEALANTS**

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

## **2.04 ACOUSTICAL JOINT SEALANTS**

- A. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

## **2.05 JOINT SEALANT BACKING**

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## **2.06 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

# **PART 3 EXECUTION**

## **3.01 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## **3.02 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint



- sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
  3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
  2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
  4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
  5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at

perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

### **3.04 CLEANING**

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### **3.05 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### **3.06 JOINT-SEALANT SCHEDULE**

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
  - 1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
  - 2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.
    - b. Control and expansion joints in unit masonry.
    - c. Joints in dimension stone cladding.
    - d. Joints between different materials listed above.
    - e. Perimeter joints between materials listed above and frames of doors, windows and louvers.
  - 2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
  - 1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
    - b. Control and expansion joints in stone flooring.
    - c. Control and expansion joints in tile flooring.
  - 2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Tile control and expansion joints.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
  - 2. Joint Sealant: Latex.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
  - 2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Location:
    - a. Acoustical joints where indicated.
    - b. Other joints as indicated.
  2. Joint Sealant: Acoustical.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

**END OF SECTION 079200**

This page intentionally left blank

**SECTION 08 1416  
MOLDED PANEL WOOD DOORS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Hollow-core pre-hung doors with wood-veneer hardboard or MDF faces.
  - 2. Shop priming flush wood doors.
  - 3. Factory fitting pre-hung wood doors to wood frames and factory machining for hardware.
- B. Related Sections:
  - 1. Division 06 "Finish Carpentry" for door trim.
  - 2. 09 Sections "Painting" for field finishing doors.
  - 3. Division 08 Section "Hardware" for preparation for hardware.

**1.02 SUBMITTALS**

- A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  - 1. Indicate dimensions and locations of mortises and holes for hardware.
  - 2. Indicate dimensions and locations of cutouts.

**1.03 QUALITY ASSURANCE**

- A. Source Limitations: Obtain wood doors and frames from single manufacturer.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

**1.06 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Hollow-Core Interior Doors: One year(s) from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Ampco, Inc.
  - 3. Buell Door Company Inc.
  - 4. Chappell Door Co.
  - 5. Eagle Plywood & Door Manufacturing, Inc.
  - 6. Eggers Industries.
  - 7. Graham; an Assa Abloy Group company.
  - 8. Haley Brothers, Inc.
  - 9. Ideal Architectural Doors & Plywood.
  - 10. Ipik Door Company.
  - 11. Lambton Doors.
  - 12. Marlite.
  - 13. Masonite
  - 14. Marshfield Door Systems, Inc.
  - 15. Oshkosh Architectural Door Company.
  - 16. Poncraft Door Company.
  - 17. VT Industries Inc.

## **2.02 DOOR CONSTRUCTION, GENERAL**

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. Wood Doors for Opaque Finish:
  - 1. Grade: Premium
  - 2. Faces: Any closed-grain hardwood of mill option
- C. Interior Hardboard-Faced HC Doors
  - 1. Core: Institutional Hollow Core
  - 2. Construction: Hardboard faces glued directly to core
  - 3. Blocking: Provide wood blocking with minimum dimensions as follows:
    - a. 10-inch bottom-rail blocking
    - b. 5-by-18-inch lock blocks
    - c. 2-1/2-inch midrail blocking
  - 4. Provide doors pre-hung in wood frames. Manufacturer to provide door butts

## **2.03 FABRICATION**

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with requirements in NFPA 80 for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

## **2.04 SHOP PRIMING**

- A. Doors for Opaque Finish: Shop prime doors with one coat of wood primer specified in Division 09 Section "Painting". Seal all four edges, edges of cutouts, and mortises with primer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine doors and installed door frames before hanging doors.
  - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors.  
Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
    - a. Comply with NFPA 80 for fire-rated doors.
  2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

### **3.03 ADJUSTING**

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION 081416**

This page intentionally left blank



**SECTION 08 1613  
FIBERGLASS DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fiberglass entry doors and patio doors
- B. Fiberglass door frames.
- C. Fiberglass borrowed lite frames at entry and patios
- D. Refer to drawing door schedule for paneling

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.
- B. Section 09 9113 - Exterior Painting: Field painting.

**1.03 REFERENCE STANDARDS**

- A. AAMA 1304 - Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems 2018.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- D. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2018.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- I. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard details, installation instructions, hardware and anchor recommendations.
- C. Shop Drawings: Indicate layout and profiles; include assembly methods.
  - 1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.
  - 2. Indicate wall conditions, door and frame elevations, sections, materials, gauges, finishes, location of door hardware by dimension, and details of openings; use same reference numbers indicated on drawings to identify details and openings.
- D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.

- E. Installer's Qualification Statement.
- F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Doors: Two from same production run as products installed.
  - 3. Package products with protective coverings and identify with descriptive labels.

#### **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Mark doors with location of installation, door type, color, and weight.
- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Deliver pre-assembled doors and frames with braces, spreaders, and packaging as required to prevent damage.
- D. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
  - 1. Store at temperature and humidity conditions recommended by manufacturer.
  - 2. Do not use non-vented plastic or canvas shelters.
  - 3. Immediately remove wet wrappers.
- E. Store in position recommended by manufacturer, elevated minimum 4 inches above grade, with minimum 1/4 inch space between doors.

#### **1.08 FIELD CONDITIONS**

- A. Do not install doors until structure is enclosed.
- B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

#### **1.09 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty covering materials and workmanship , including degradation or failure due to chemical contact.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Molded Fiberglass Doors:
  - 1. Pella Windows and Doors
  - 2. ProVia
  - 3. Jeld-Wen Windows and Doors FiberLast.
  - 4. Therma-Tru
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 DOOR AND FRAME ASSEMBLIES**

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
  - 1. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
  - 2. Screw-Holding Capacity: Tested to 890 pounds, minimum.
  - 3. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
  - 4. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
  - 5. Sizes: As indicated on drawings.

6. Clearance Between Door and Frame: 1/8 inch, maximum.
7. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.
8. Provide frame anchors that allow for variation in rough opening size; field cutting of doors or frames to fit is not permitted.

## **2.03 COMPONENTS**

- A. Doors: Fiberglass construction with reinforced core.
  1. Thickness: 1-3/4 inch, nominal.
  2. Core Material: Manufacturer's standard core material for application indicated.
  3. Construction:
    - a. Molded in one piece including through color gel coating on each side; manufacturer's standard subframe, core and faces fused during curing; hardware reinforcements.
  4. Face Sheet Texture: Smooth.
  5. Door Panel: As indicated on drawings.
  6. Subframe and Reinforcements: Manufacturer's standard materials.
  7. Waterproof Integrity: Provide factory fabricated edges, cut-outs, and hardware preparations of fiberglass reinforced plastic (FRP); provide cut-outs with joints sealed independently of glazing, louver inserts, or trim.
  8. Hardware Preparations: Factory reinforce, machine, and prepare for door hardware including field installed items; provide solid blocking for each item; field cutting, drilling or tapping is not permitted; obtain manufacturer's hardware templates for preparation as necessary.
  9. Bottom Rail: Provide height necessary to allow up to 1-1/4 inch field cut off bottom of door without impairing door strength or durability. Provide at least 10" high bottom rail to meet code.
- B. Door and Borrowed Lite Frames: Provide type in compliance with performance requirements specified for doors.
  1. Type: Factory assembled with chemically welded joints.
  2. Profiles: 5-3/4 inches deep, 2 inches wide at jambs, and 2 inches wide at headers.
  3. Non-Fire-Rated:
    - a. Fiberglass pultrusions with gel-coating matching doors.
  4. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant; field assemble knock-down type frames as required.
  5. Hardware Cut-outs: Provide continuous backing or mortar guards of same material as frame, with watertight seal.
  6. Frame Anchors: Stainless steel, Type 304; provide three anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
  7. Reinforcing: Provide manufacturer's standard reinforcing at hinge, strike, and closer locations.

## **2.04 PERFORMANCE REQUIREMENTS**

- A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.
- B. Forced Entry Resistance: Pass in accordance with AAMA 1304 test method.
- C. Water Leakage: No uncontrolled leakage on interior face when tested in accordance with ASTM E331 at differential pressure of 7.5 psf.
- D. Air Leakage: Maximum of 0.1 cfm per square foot at 6.27 psf differential pressure, when tested in accordance with ASTM E283.
- E. Thermal Transmittance, Exterior Doors: AAMA 1503, U-value of 0.35, maximum, measured on exterior door in size required for this project.
- F. Acoustical Performance: Sound Transmission Class (STC) of 25, minimum, when tested in accordance with ASTM E90.

## **2.05 FINISHES**

- A. Gel Coating: Ultraviolet (UV) stabilized polyester finish.
  - 1. Thickness: Minimum 15 mils, 0.015 inch wet thickness, plus/minus 3 mils, 0.003 inch.
  - 2. Color: As selected by Architect from manufacturer's standard line of colors.

## **2.06 ACCESSORIES**

- A. Stops for Glazing and Louver: Fiberglass, unless otherwise indicated or required by fire rating; provided by door manufacturer to fit factory made openings, with color and texture to match door; fasteners shall maintain waterproof integrity.
  - 1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
  - 2. Glazed Openings: Provide removable stops on interior side.
  - 3. Opening Sizes and Shapes: As indicated on drawings.
- B. Glazing: See Section 08 8000.
- C. Door Hardware: See Section 08 7100.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- B. Clean and prepare substrate in accordance with manufacturer's directions.
- C. Protect adjacent work and finish surfaces from damage during installation.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.
- B. Install exterior doors in accordance with ASTM E2112.
- C. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.
- D. Set thresholds in continuous bed of sealant.
- E. In stud walls, install frames prior to building walls; anchor frames to studs using concealed anchors.
- F. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
- G. Repair or replace damaged installed products.

### **3.04 ADJUSTING**

- A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.
- B. Adjust hardware for smooth and quiet operation.
- C. Adjust doors to fit snugly and close without sticking or binding.

### **3.05 CLEANING**

- A. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance.

**3.06 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

This page intentionally left blank

**SECTION 08 3100  
ACCESS DOORS AND PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall and ceiling mounted access units.

**1.02 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- B. FM (AG) - FM Approval Guide current edition.
- C. ITS (DIR) - Directory of Listed Products current edition.
- D. UL (FRD) - Fire Resistance Directory Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Project Record Documents: Record actual locations of each access unit.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

**PART 2 PRODUCTS**

**2.01 ACCESS DOORS AND PANELS ASSEMBLIES**

- A. Wall-Mounted Units:
  - 1. Location: As coordinated with associated subcontractor's needs.
  - 2. Panel Material: Aluminum extrusions with gypsum board inlay.
  - 3. Location and Size: 12 by 12 inches, minimum, coordinate with affected trade for actual access requirement sizes and locations
  - 4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  - 5. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
  - 6. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
- B. Fire-Rated Wall-Mounted Units:
  - 1. Wall Fire-Rating: As indicated on drawings.
  - 2. Size: 12 by 12 inches.
- C. Fire-Rated Ceiling (Attic)-Mounted Units:
  - 1. Location: As indicated on drawings.
  - 2. Ceiling Fire-Rating: As indicated on drawings.
  - 3. Panel Material: Steel.
  - 4. Size: 24 by 24 inches.

**2.02 WALL AND CEILING MOUNTED ACCESS UNITS**

- A. Manufacturers:
  - 1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
    - a. Insulated Fire-Rated Access Panel: Activar/JL Industries FD.
  - 2. ACUDOR Products Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
    - a. Fire-Rated Ceiling-Mounted Units - 2 Hours or Less: ACUDOR FWC-5015.

3. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  4. Bauco Access Panel Solutions Inc: [www.accesspanelsolutions.com/#sle](http://www.accesspanelsolutions.com/#sle).
  5. Best Access Doors: [www.bestaccessdoors.com/#sle](http://www.bestaccessdoors.com/#sle).
    - a. Fire-Rated Insulated Access Panel for Drywall: Best Access Doors; Series BA-FRI.
  6. Cendrex, Inc: [www.cendrex.com/#sle](http://www.cendrex.com/#sle).
    - a. Fire-Rated Ceiling-Mounted Units: Cendrex PFI series, downward opening.
  7. FF Systems, Inc: [www.ffaystemsinc.com/#sle](http://www.ffaystemsinc.com/#sle).
  8. Milcor, Inc: [www.milcorinc.com/#sle](http://www.milcorinc.com/#sle).
  9. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  10. Studco Building Systems; EZConcept AccessDor : [www.studcosystems.com/#sle](http://www.studcosystems.com/#sle).
  11. Substitutions: See Section 01 6000 - Product Requirements.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
1. Style: Exposed frame with door surface flush with frame surface.
  2. Door Style: Single thickness with rolled or turned in edges.
  3. Frames: 16 gauge, 0.0598 inch, minimum thickness.
  4. Heavy Duty Frames: 14 gauge, 0.0747 inch, minimum thickness.
  5. Single Steel Sheet Door Panels: 1/16 inch, minimum thickness.
  6. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
    - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
  7. Steel Finish: Primed.
  8. Hardware:
    - a. Hardware for Fire-Rated Units: As required for listing.
    - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    - c. Latch/Lock: Screw driver slot for quarter turn cam latch.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

### **3.03 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

### **END OF SECTION**



**SECTION 08 3613  
SECTIONAL DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

**1.02 REFERENCE STANDARDS**

- A. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors 2011.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- E. Installer's Qualification Statement.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.
- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- B. Comply with applicable code for motor and motor control requirements.

**1.05 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Sectional Doors:
  - 1. C.H.I. Overhead Doors; Model 3295 Aluminum Full-View Doors: [www.chiohd.com/#sle](http://www.chiohd.com/#sle).
  - 2. Clopay Building Products; Model 3720: [www.clopaydoor.com/#sle](http://www.clopaydoor.com/#sle).
  - 3. Entrematic; Amarr 3552 Aluminum Full View Door: [www.amarr.com/commercial/#sle](http://www.amarr.com/commercial/#sle).
  - 4. Fimbel Architectural Door Specialties: [www.fimbelads.com/#sle](http://www.fimbelads.com/#sle).
  - 5. Raynor Garage Doors: [www.raynor.com/#sle](http://www.raynor.com/#sle).
  - 6. Wayne-Dalton, a Division of Overhead Door Corporation: [www.wayne-dalton.com/#sle](http://www.wayne-dalton.com/#sle).
  - 7. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 ALUMINUM DOORS**

- A. Aluminum Doors: Stile and rail aluminum with solid panels; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
  - 1. Door Nominal Thickness: 2 inches thick.
  - 2. Finish: Factory finished with acrylic baked enamel; TBD color.
  - 3. Electric Operation: Electric control station.
- B. Door Panels: Paneled aluminum construction; extruded aluminum stiles and rails; 0.05 inch thick infill panels of sheet aluminum; stile and rail joints welded; rabbeted weather joints at

meeting rails.

## **2.03 COMPONENTS**

- A. Track: Rolled galvanized steel, 0.090 inch minimum thickness; 2 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.
- B. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- C. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- D. Head Weatherstripping: EPDM rubber seal, one piece full length.
- E. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- F. Lock: Inside center mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

### **3.02 PREPARATION**

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
- B. Apply primer to wood frame.

### **3.03 INSTALLATION**

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.

### **3.04 TOLERANCES**

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

### **3.05 ADJUSTING**

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

### **3.06 CLEANING**

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

### **3.07 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

**END OF SECTION**

**SECTION 08 5313  
VINYL WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Vinyl-framed, factory-glazed windows.
- B. Operating hardware.
- C. Insect screens.

**1.02 REFERENCE STANDARDS**

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2017.
- B. AAMA 701/702 - Combined Voluntary Specifications for Pile Weatherstrip and Replaceable Fenestration Weatherseals 2011.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2017.
- F. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2019c.
- G. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact 2017.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing of type specified and with at least three years documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

**1.06 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of sealants.

**1.07 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for degradation of color finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Vinyl Windows:
  - 1. Alliance Window System; Windgate:
  - 2. Columbia Windows and Doors; Series 820
  - 3. Jeld-Wen; Builder's Vinyl Series
  - 4. Milgard; Style Line Series
  - 5. Pella Corporation; Thermastar: [www.pellacommercial.com/#sle](http://www.pellacommercial.com/#sle).
  - 6. Silver Line by Andersen: [www.silverlinewindows.com/#sle](http://www.silverlinewindows.com/#sle).
  - 7. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 DESCRIPTION**

- A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
  - 1. Configuration: As indicated on drawings.
    - a. Product Type: C - Casement window, FW - Fixed window, and H - Hung window, vertically sliding in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
  - 2. Color: Color as selected.
  - 3. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
  - 4. Operable Units: Double weatherstripped.
  - 5. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
  - 6. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
  - 7. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
  - 8. Mounting Flange: Integral to frame assembly, providing weather stop at entire perimeter of frame.
  - 9. Insect Screens: Tight fitting for operating sash location.

### **2.03 PERFORMANCE REQUIREMENTS**

- A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
  - 1. Performance Class (PC): R.
- B. Design Pressure: In accordance with applicable codes.
- C. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, tested by independent agency and passed in accordance with ASTM E1996 for Wind Zone 1 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
- D. Condensation Resistance Factor: CRF of 50, minimum, the lower value of the glass and frame window components and determined in accordance with AAMA 1503.
- E. Fenestration Assembly Thermal Transmittance (U-value): Comply with ASHRAE Std 90.1 I-P for building envelope requirements for applicable climate zone.
- F. Forced Entry Resistance (FER): Tested to comply with ASTM F588 requirements having at least Grade 10 performance for each required window assembly.

### **2.04 COMPONENTS**

- A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.
  - 1. Glass Stops: Snap-on PVC glazing bead with color to match sash and frame.
  - 2. Glazing Tape: Closed cell foam type with double sided adhesive.

3. Setting Blocks: Manufacturer's standard.
  4. Secondary Glass Panel: Annealed glass, 1/8 inch thick.
- B. Frame Depth: 2-11/16 inches.
- C. Divided Lite Grid: Installed between panes of insulating glass, 5/8 inch wide flat metal bars, color to match frame and sash.
1. Pattern: Manufacturer's standard layout.
- D. Insect Screens: Aluminum, extruded or roll-formed frame with mitered and reinforced corners; apply screen mesh taut to frame; secure to window with hardware to allow easy removal.
1. Hardware: Manufacturer's standard; quantity as required per screen.
  2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's 18 x 16 mesh.
  3. Frame Finish: Manufacturer's standard, color to match window frame and sash color.
- E. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to maintain weather seal in accordance with AAMA 701/702.
- F. Bedroom window units shall meet minimum egress requirements of 5.0 sq. ft. total opening and 20" min. width x 24" min. height. Contractor shall provide Architect with proof of compliance from window manufacturer.
- G. Accessories: Provide related flashings, anchorage and attachment devices as necessary for full assembly.

## **2.05 HARDWARE**

- A. Vertical Sliding Sash: Metal and nylon spiral friction slide cylinder, provide two for each sash and jamb.
- B. Sash lock: Lever handle and keeper with cam lock, provide at least one for each operating sash.
- C. Finish of Exposed Hardware: Baked enamel, match interior sash and frame color.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive this work.

### **3.02 INSTALLATION**

- A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.
- B. Install windows in accordance with ASTM E2112.
- C. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.
- D. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.
- E. Set sill members and sill flashing in continuous bead of sealant.

### **3.03 TOLERANCES**

- A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

### **3.05 ADJUSTING**

- A. Adjust hardware for smooth operation and secure weathertight closure.

### **3.06 CLEANING**

- A. Remove protective material from pre-finished surfaces.

- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

**END OF SECTION**

## SECTION 08 71 00 – DOOR HARDWARE

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

A. Section includes:

- 1. Mechanical and electrified door hardware for:
  - a. Swinging doors.
  - b. Sliding doors.
- 2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- 3. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

- 1. Windows
- 2. Cabinets (casework), including locks in cabinets
- 3. Signage
- 4. Toilet accessories
- 5. Overhead doors

C. Related Sections:

- 1. Division 01 Section "Alternates" for alternates affecting this section.
- 2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
- 3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
- 4. Division 26 sections for connections to electrical power system and for low-voltage wiring.
- 5. Division 28 sections for coordination with other components of electronic safety and security systems.

### 1.03 REFERENCES

#### A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

#### B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

#### C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

### 1.04 SUBMITTALS

#### A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

#### B. Action Submittals:

1. Product Data: Technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
  - a. Wiring Diagrams: For power, signal, and control wiring and including:
    - 1) Details of interface of electrified door hardware and building safety and security systems.
    - 2) Schematic diagram of systems that interface with electrified door hardware.
    - 3) Point-to-point wiring.
    - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated, and tagged with full description for coordination with schedule.
  - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.



4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
  - a. Door Index; include door number, heading number, and Architects hardware set number.
  - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
  - c. Quantity, type, style, function, size, and finish of each hardware item.
  - d. Name and manufacturer of each item.
  - e. Fastenings and other pertinent information.
  - f. Location of each hardware set cross-referenced to indications on Drawings.
  - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
  - h. Mounting locations for hardware.
  - i. Door and frame sizes and materials.
  - j. Name and phone number for local manufacturer's representative for each product.
  - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
    - 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.
5. Key Schedule:
  - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
  - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
  - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
  - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
  - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
    - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
  - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier, Installer and Architectural Hardware Consultant.
2. Product data for electrified door hardware:

- a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
  3. Warranty: Special warranty specified in this Section.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Factory order acknowledgement numbers (for warranty and service)
    - d. Name, address, and phone number of local representative for each manufacturer.
    - e. Parts list for each product.
    - f. Final approved hardware schedule, edited to reflect conditions as-installed.
    - g. Final keying schedule
    - h. Copies of floor plans with keying nomenclature
    - i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
    - j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

#### 1.05 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
1. Warehousing Facilities: In Project's vicinity.
  2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
  4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
    - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC) or Door Hardware Technician (DHT).
  2. Can provide installation and technical data to Architect and other related subcontractors.
  3. Can inspect and verify components are in working order upon completion of installation.
  4. Capable of producing wiring diagrams.
  5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

- C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
- F. Keying Conference
  - 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
    - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
    - b. Preliminary key system schematic diagram.
    - c. Requirements for key control system.
    - d. Requirements for access control.
    - e. Address for delivery of keys.
- G. Pre-installation Conference
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Inspect and discuss preparatory work performed by other trades.
  - 3. Inspect and discuss electrical roughing-in for electrified door hardware.
  - 4. Review sequence of operation for each type of electrified door hardware.
  - 5. Review required testing, inspecting, and certifying procedures.
- H. Coordination Conferences:
  - 1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
  - 2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
  - 1. Deliver each article of hardware in manufacturer's original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys and permanent cores to Owner's Representative by registered mail or overnight package service.

## 1.07 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

## 1.08 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
    - a. Closers:
      - 1) Mechanical: 10 year
      - 2) Electrified: 2 years.
    - b. Locksets:
      - 1) Mechanical: 10 year.
      - 2) Electrified: 1 year.

- c. Key Blanks: Lifetime
- 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

## 1.09 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
  - 1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

### 2.02 MATERIALS

- A. Fasteners
  - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
  - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
  - 3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
  - 4. Install hardware with fasteners provided by hardware manufacturer.

- B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.
  - 1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
  - 2. Use materials which match materials of adjacent modified areas.
  - 3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.
- C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
  - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

## 2.03 HINGES

- A. Manufacturers and Products:
  - 1. Scheduled Manufacturer and Product: Ives 5BB series.
  - 2. Acceptable Manufacturers and Products: Hager BB series, McKinney TA/T4A series, Stanley FBB Series.
- B. Requirements:
  - 1. Provide hinges conforming to ANSI/BHMA A156.1.
  - 2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
    - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
    - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
  - 3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
    - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  - 4. 2 inches or thicker doors:
    - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
    - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
  - 5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
  - 6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
  - 7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
    - a. Steel Hinges: Steel pins
    - b. Non-Ferrous Hinges: Stainless steel pins
    - c. Out-Swinging Exterior Doors: Non-removable pins
    - d. Out-Swinging Interior Lockable Doors: Non-removable pins
    - e. Interior Non-lockable Doors: Non-rising pins

8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
10. Provide mortar guard for each electrified hinge specified.
11. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.
  - a. pattern.

## 2.04 FLUSH BOLTS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

### B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

## 2.05 TUBULAR LOCKS – GRADE 3 AT UNITS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Schlage J series.
2. Acceptable Manufacturers and Products: Hager 3300 series, PDQ Industries SM series.

### B. Requirements:

1. Provide tubular locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 3, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide locks with standard 2-3/8 inches (60 mm) adjustable to 2-3/4 inches (70 mm) backset with 1/2 inch (13 mm) latch throw. Provide 2-3/4 inch (70 mm) backset, unless 2-3/8 inches (60 mm) is required by door or frame detail, or noted otherwise.
4. Provide locksets that fit standard 2-1/8 inches (54 mm) diameter bore without the use of thru-bolts.
5. Locksets adjustable to fit in 1-3/8 inches (35 mm) or 1-3/4 inches (44 mm) door thickness.
6. Provide standard T-strikes unless extended lip strikes are necessary to protect trim.
7. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
  - a. Lever Design: Schlage Solstice

## 2.06 ROLLER LATCHES

### A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

### B. Requirements:

1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

## 2.07 CYLINDERS

### A. Manufacturers:

1. Scheduled Manufacturer: Schlage
2. Acceptable Manufacturers: Best, Corbin-Russwin, Falcon

### B. Requirements:

1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
  - a. Cylinder/Core Type at common areas: Large Format Interchangeable Core (LFIC).
  - b. Cylinder/Core Type at units: Key-in-lever.
  - c. Keyway/Security Type: Standard open.
3. Nickel silver bottom pins.
4. Temporary Construction Cylinder Keying at units.
  - a. Provide construction cores that permit voiding construction keys without cylinder removal, furnished in accordance with the following requirements.
    - 1) Split Key Construction Keying System.
    - 2) 3 "split" construction control keys and extractor tool.
    - 3) 12 construction change (day) keys.
  - b. Owner's Representative will void operation of temporary construction keys.
5. Replaceable Construction Cores.
  - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
    - 1) 2 construction control keys.
    - 2) 12 construction change (day) keys.



- b. Owner's Representative will replace construction cores.

## 2.08 KEYING

- A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Requirements:
  - 1. Provide keying system capable of multiplex masterkeying.
  - 2. Permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - a. Keying system as directed by the Owner.
    - b. Grand Master Key System: Cylinders/cores operated by change (day) keys and subsequent masters (including grand/great grand) keys.
  - 3. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  - 4. Provide keys with the following features:
    - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm).
  - 5. Identification:
    - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
    - b. Identification stamping provisions must be approved by the Architect and Owner.
    - c. Stamp keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE".
    - d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.
    - e. Permanent cylinders/cores and/or keys are to be shipped directly to Owner's Representative.
  - 6. Quantity: Furnish in the following quantities.
    - a. Change (Day) Keys: 3 per cylinder/core.
    - b. Permanent Control Keys: 3
    - c. Master Keys: 6 per master.
    - d. Unused balance of key blanks shall be furnished to Owner with the cut keys.

## 2.09 KEY CONTROL SYSTEM

- A. Manufacturers:
  - 1. Scheduled Manufacturer: Telkee.
  - 2. Acceptable Manufacturers: HPC, Lund.
- B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
  - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
  - b. Provide hinged-panel type cabinet for wall mounting.

## 2.10 DOOR CLOSERS (HIGH TRAFFIC AREAS)

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Falcon SC70A series.
2. Acceptable Manufacturers and Products: LCN 4050 series, Norton 7500 series, Sargent 351 series.

### B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
3. Closer Body: 1-1/2 inch (38 mm) diameter with 5/8 inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## 2.11 PROTECTION PLATES

### A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Hiawatha.

### B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
  - a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

- b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
- c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

## 2.12 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

### A. Manufacturers:

- 1. Scheduled Manufacturers: Glynn-Johnson.
- 2. Acceptable Manufacturers: Rixson, Sargent.

### B. Requirements:

- 1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
- 2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
- 3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
- 4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

## 2.13 DOOR STOPS AND HOLDERS

### A. Manufacturers:

- 1. Scheduled Manufacturer: Ives.
- 2. Acceptable Manufacturers: Burns, Hiawatha.

### B. Provide door stops at each door leaf:

- 1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
- 2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
- 3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

## 2.14 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

### A. Manufacturers:

- 1. Scheduled Manufacturer: Zero International.
- 2. Acceptable Manufacturers: National Guard, Reese.

### B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
  - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
  - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

## 2.15 SILENCERS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

### B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

## 2.16 DOOR VIEWERS

### A. Manufacturers:

1. Scheduled Manufacturer: Ives.
2. Acceptable Manufacturers: Burns, Rockwood.

### B. Provide appropriate door viewer for door type and rating with minimum of 180-degree view area.

## 2.17 FINISHES

### A. As specified in hardware sets.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- #### A.
- Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

- B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
  - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
  - 1. Replace construction cores with permanent cores as indicated in keying section.
  - 2. Furnish permanent cores to Owner Representative for installation.
- I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- K. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

- L. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- M. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- N. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

### 3.03 FIELD QUALITY CONTROL

- A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.
  - 1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

### 3.04 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
  - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
  - 3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, Installer's Architectural Hardware Consultant must examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

### 3.05 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.06 DOOR HARDWARE SCHEDULE

- A. Hardware items are referenced in the following hardware. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

B. Hardware Sets:

**Hardware Group No. 01**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	ND80RD LAT	626	SCH
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	SC71 RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	GASKETING	429AA-S	AA	ZER
			MOUNT PRIOR TO INSTALLING CLOSER		
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	655A-36" (914MM)	A	ZER

OPERATIONAL DESCRIPTION: STOREROOM FUNCTION: DEADLOCKING LATCH BOLT BY LEVER  
OUTSIDE OR KEY INSIDE. INSIDE LEVER IS LOCKED. OUTSIDE LEVER ALWAYS FREE

**Hardware Group No. 02**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	1011 3.5 X 3.5	646	IVE
1	EA	PRIVACY LOCK	J40 SOL	619	SCH
1	EA	DOOR STOP	060	619	IVE

OPERATIONAL DESCRIPTION: PUSH-BUTTON LOCKING. CAN BE OPENED FROM OUTSIDE WITH  
SMALL CIRCULAR TOOL. TURNING INSIDE KNOB/LEVER RELEASES BUTTON.

NOTE: REPLACE BASEBOARD STOP (IVES 060) WITH HINGE PIN STOP (IVES 69) WHERE  
REQUIRED

**Hardware Group No. 03**

For use on Door #(s):

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	1011 3.5 X 3.5	646	IVE
2	EA	BALL CATCH	347	619	IVE
2	EA	SINGLE DUMMY TRIM	J170 SOL	619	SCH
2	EA	DOOR STOP	70	A15	IVE

OPERATIONAL DESCRIPTION: PUSH/PULL WITH A BALL CATCH

NOTE: REPLACE HINGE PIN STOP (IVES 69) WITH BASEBOARD STOP (IVES 060) WHERE  
REQUIRED

**Hardware Group No. 04**

For use on Door #(s):

Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	1011 3.5 X 3.5	646	IVE
1	EA	MANUAL FLUSH BOLT	FB458	619	IVE
1	EA	SGL CYL DEADBOLT	B60J	619	SCH
1	EA	FSIC CORE	23-030	626	SCH
2	EA	DOOR STOP	70	A15	IVE

OPERATIONAL DESCRIPTION: DEADBOLT THROWN OR RETRACTED BY KEY FROM OUTSIDE OR BY INSIDE TURN UNIT. BOLT AUTOMATICALLY DEADLOCKS WHEN FULLY THROWN.

NOTE: REPLACE BASEBOARD STOP (IVES 060) WITH HINGE PIN STOP (IVES 69) WHERE REQUIRED

NOTE: REPLACE HINGE PIN STOP (IVES 69) WITH BASEBOARD STOP (IVES 060) WHERE REQUIRED

**Hardware Group No. 05**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	1011 3.5 X 3.5	646	IVE
1	EA	PASSAGE SET	J10 SOL	619	SCH
1	EA	DOOR STOP	060	619	IVE

OPERATIONAL DESCRIPTION: PASSAGE FUNCTION: LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE AT ALL TIMES. INSIDE LEVER IS ALWAYS FREE FOR IMMEDIATE EGRESS.

NOTE: REPLACE BASEBOARD STOP (IVES 060) WITH HINGE PIN STOP (IVES 69) WHERE REQUIRED

Passage Function (F01): Latchbolt retracted by lever from either side at all times. Inside lever is always free for immediate egress.

**Hardware Group No. 06**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	SPRING HINGE	3SP1 4.5 X 4.5	652	IVE
1	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	W101S LAT	619	FAL
1	EA	SGL CYL DEADBOLT	B560JF	619	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	KICK PLATE	8400 6" X 2" LDW B-CS	619	IVE
1	EA	DOOR STOP	060	619	IVE
1	EA	GASKETING	8144SBK 7FT PSA	BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	63A-36" (914MM)	A	ZER

OPERATIONAL DESCRIPTION: BOTH LEVERS ALWAYS UNLOCKED. DEADBOLT PROJECTED BY KEY OUTSIDE AND THUMBTURN FROM INSIDE.

NOTES: (2) VIEWERS ARE REQUIRED AT ACCESSIBLE UNITS. CONSULT WITH ARCHITECT REGARDING LOCATION AND HEIGHT.



**Hardware Group No. 07**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	W101S LAT	619	FAL
1	EA	SGL CYL DEADBOLT	B560JF	619	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	KICK PLATE	8400 6" X 2" LDW B-CS	619	IVE
1	EA	DOOR STOP	060	619	IVE
1	EA	GASKETING	8144SBK 7FT PSA	BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	63A-36" (914MM)	A	ZER

OPERATIONAL DESCRIPTION: BOTH LEVERS ALWAYS UNLOCKED. DEADBOLT PROJECTED BY KEY OUTSIDE AND THUMBTURN FROM INSIDE.

NOTES: (2) VIEWERS ARE REQUIRED AT ACCESSIBLE UNITS. CONSULT WITH ARCHITECT REGARDING LOCATION AND HEIGHT.

**Hardware Group No. 08**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	1011 3.5 X 3.5	646	IVE
1	EA	PASSAGE SET	J10 SOL	619	SCH
1	EA	SGL CYL DEADBOLT	B560J	619	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	DOOR STOP	060	619	IVE
1	EA	GASKETING	8144SBK 7FT PSA	BK	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
			(UNLESS FURNISHED BY PRE-HUNG DOOR MFR)		
1	EA	THRESHOLD	63A-36" (914MM)	A	ZER

OPERATIONAL DESCRIPTION: BOTH LEVERS ALWAYS UNLOCKED. DEADBOLT THROWN OR RETRACTED BY KEY FROM OUTSIDE OR BY INSIDE TURN UNIT. BOLT AUTOMATICALLY DEADLOCKS WHEN FULLY THROWN.

NOTE: REPLACE BASEBOARD STOP (IVES 060) WITH HINGE PIN STOP (IVES 69) WHERE REQUIRED

Both levers always unlocked. Deadbolt thrown or retracted by key from outside or by inside turn unit. Bolt automatically deadlocks when fully thrown.

**Hardware Group No. 09**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	1011 3.5 X 3.5	646	IVE
1	EA	SGL CYL DEADBOLT	B60J	619	SCH
1	EA	FSIC CORE	23-030	626	SCH
1	EA	DOOR STOP	060	619	IVE

OPERATIONAL DESCRIPTION: DEADBOLT THROWN OR RETRACTED BY KEY FROM OUTSIDE OR BY INSIDE TURN UNIT. BOLT AUTOMATICALLY DEADLOCKS WHEN FULLY THROWN.

NOTE: REPLACE BASEBOARD STOP (IVES 060) WITH HINGE PIN STOP (IVES 69) WHERE REQUIRED

**Hardware Group No. 10**

For use on Door #(s):

Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
BY DOOR MFR.					

**DOOR INDEX**

**1 BED A**

Door Numbers	Hardware Set#
000	06
001.1	03
001.2	09
003.1	05
004	02
004.1	05
005	02
006	05

**1 BED A EXTERIOR**

Door Numbers	Hardware Set#
001	07
001.1	08
100	10
201	07
1000	01

Oak Park Townhomes  
Project No. 20031

1 BED B

Door Numbers	Hardware Set#
001.1	03
002.2	03
004	02
005	02
005.1	05

1 BED B 2ND

Door Numbers	Hardware Set#
202.1	05
202.2	09
205.1	05
206	02
206.1	03
207	02

1 BED B EXTERIOR

Door Numbers	Hardware Set#
001	07
001.1	07
100	10
201	07
1000	01

22' 3 BED

Door Numbers	Hardware Set#
000	06
001.1	05
005	02
010	05
010.1	04
011	02
011.1	02
011.2	05
012	02
012.1	03
013	02
013.1	03
014	02

Oak Park Townhomes  
Project No. 20031

22' 3 BED EXTERIOR

Door Numbers	Hardware Set#
001	07
001.1	07
100	10
201	07
1000	01

25' 3 BED

Door Numbers	Hardware Set#
000	06
003.1	05
006	02
010.1	05
010.2	04
011	02
011.1	02
011.2	05
012	02
012.2	03
013	02
013.1	03
014	02

25' 3 BED EXTERIOR

Door Numbers	Hardware Set#
001	07
001.1	07
100	10
201	07
1000	01

END OF SECTION

**SECTION 08 8000  
GLAZING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes glazing performance criteria for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. In-Swing Patio and Entry Doors with sidelites per elevations
  - 2. Vinyl Windows.
  - 3. Refer to 2012 IECC table within the 'G' Series of the Construction Documents

**1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- D. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- F. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- I. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.
- J. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).
- K. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.

**1.03 PERFORMANCE REQUIREMENTS**

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
  - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each glass product and glazing material indicated, including erection plan indicating tempered glass locations.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings. List or indicate those units which require tempered glazing.

### **1.05 QUALITY ASSURANCE**

- A. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- B. Safety Glazing Labeling: Where safety glazing labeling is required, permanently mark glazing with certification label of a certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

### **1.07 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing when ambient temperature is less than 40 degrees F.
  - 2. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

### **1.08 WARRANTY**

- A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 GLASS PRODUCTS, GENERAL**

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
  - 1. Minimum Glass Thickness for Exterior Lites: As required by Code.
  - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is required per the current building code, provide Kind FT heat-treated float glass.
- C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for local wind zone when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on

the Project and shall be installed in same manner as glazing indicated for use on the Project.

1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.
  2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.
  3. Large-Missile Test: For all glazing, regardless of height above grade.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites.
  2. For laminated-glass lites, properties are based on products of construction indicated.
  3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
  5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
- E. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
1. In conjunction with vapor retarder and joint sealer materials described in other sections.

## 2.02 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036,
1. Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
  5. Thermal Transmittance (U-Value), Summer - Center of Glass, Visible Light Transmittance (VLT) and Solar Heat Gain Coefficient (SHGC); Refer to 2012 IECC table within the 'G' Series of the Construction Documents

## 2.03 INSULATING GLASS

- A. Insulating-Glass General: Factory-assembled vision glass double glazed units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
  2. Spacer: Manufacturer's standard spacer material and construction.
  3. Desiccant: Molecular sieve or silica gel, or blend of both.
  4. Refer to 2012 IECC table within the 'G' Series of the Construction Documents
- B. Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with air.
  3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
  4. Tint: Clear.
  5. Coating: Low-E (passive type), on #2 surface.
  6. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
  7. Tint: Clear.
  8. Total Thickness: 1 inch.

## 2.04 GLAZING GASKETS

- A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from[ one of] the following:
1. Neoprene complying with ASTM C 864.
  2. EPDM complying with ASTM C 864.
  3. Silicone complying with ASTM C 1115.

4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
- B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
  1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.
- C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

## **2.05 GLAZING SEALANTS**

- A. General:
  1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
  6. Provide manufacturer's recommended glazing sealant for each application.

## **2.06 GLAZING TAPES**

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## **2.07 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.



- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
- G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

## **2.08 FABRICATION OF GLAZING UNITS**

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

### **3.03 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### **3.04 TAPE GLAZING**

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### **3.05 GASKET GLAZING (DRY)**

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight

seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### **3.06 CLEANING AND PROTECTION**

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

**END OF SECTION 088000**

This page intentionally left blank

**SECTION 08 8300  
MIRRORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass mirrors.
  - 1. Annealed float glass.

**1.02 REFERENCE STANDARDS**

- A. ASTM C1036 - Standard Specification for Flat Glass 2016.
- B. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- C. GANA (GM) - GANA Glazing Manual 2008.
- D. GANA (SM) - GANA Sealant Manual 2008.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Mirror Types: Submit structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Manufacturer's Certificate: Certify that mirrors, meets or exceeds specified requirements.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.
- B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with manufacturer's recommendations.

**1.05 FIELD CONDITIONS**

- A. Do not install mirrors when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Mirror Design Criteria: Select materials and/or provide supports as required to limit mirror material deflection to 1/200, or to the flexure limit of glass, with full recovery of glazing materials, whichever is less.
- B. Mirror Glass: Clear, annealed float glass; ASTM C1036, with copper and silver coatings, and protective overcoating.
  - 1. Thickness: 1/4 inch.
  - 2. Edges: Arrised.
  - 3. Size: As indicated on drawings.

**2.02 ACCESSORIES**

- A. Channel Frame: One piece, channel frame, stainless steel, Type 430, satin finish, 1/2 inch by 1/2 inch by 3/8 inch deep with 90 degree mitered corners.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surfaces of mirror frames or recesses are clean, free of obstructions, and ready for installation of mirrors.

**3.02 PREPARATION**

- A. Clean contact surfaces with solvent and wipe dry.

**3.03 INSTALLATION**

- A. Install mirrors in accordance with manufacturer's recommendations.
- B. Set mirrors plumb and level, and free of optical distortion.
- C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

**3.04 CLEANING**

- A. Remove labels after work is complete.
- B. Clean mirrors and adjacent surfaces.

**END OF SECTION**

**SECTION 08 9516  
WALL AND ROOF VENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Shingle-over linear vents
  - 2. Ridge Vents
  - 3. Gravity Air vents
  - 4. Refer to Roof plans for types, locations and sizes

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For each type of metal finish required.

**1.03 WARRANTY**

- A. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Source Limitations: Obtain vents from single source from single manufacturer.

**2.02 ROOF VENTS**

- A. Roof Gravity Vents:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Greenheck Fan Corporation, Gravity box vents.
    - b. Ruskin Company, Gravity Vent
    - c. Cor-a-Vent, In-vent, Ridge and Eave, Roof-to-wall vent
  - 2. UL listed: rated to withstand wind pressures of over 50 PSF, which is equivalent to wind speeds exceeding 200 mph
  - 3. Box Vent Operation: Wind enters the unit through a set of low vents or openings producing the necessary vacuum to extract excess moisture through a second set of high openings. Wind driven rain and or snow cannot penetrate these gravity ventilators because they have three rows of louvers. Inner louvers prevent insects from entering. Vent comes with an inner louver design which has 1/8th inch openings, allowing for vigorous air movement and eliminating back pressure.
  - 4. Finish: Mill.

**2.03 MATERIALS**

- A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Aluminum Castings: ASTM B 26/B 26M, Alloy 319.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

**2.04 ALUMINUM FINISHES**

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install according to manufacturer's written instructions.
- B. Locate and place vents level, plumb, and at indicated alignment with adjacent work.
- C. Attach vents securely in place using fasteners supplied or approved by manufacturer.

- D. Protect unpainted surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

**3.02 ADJUSTING AND CLEANING**

- A. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- B. Restore vents damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

**END OF SECTION 08 9516**



**SECTION 09 2900  
GYPSUM BOARD**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Interior gypsum board.
  - 2. Bath/shower backing panels
  - 3. Moisture resistant gypsum board
  - 4. Furring, sound attenuation and associated accessories

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.03 QUALITY ASSURANCE**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Owner will review gypsum board finish quality prior to installation of paint finishes and reserves right to require reworking of areas that do not meet quality standards.

**1.04 STORAGE AND HANDLING**

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

**2.02 INTERIOR GYPSUM BOARD**

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
- B. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- C. Regular Type:
  - 1. Thickness: 1/2 inch (12.7 mm).
  - 2. Long Edges: Tapered.
- D. Fire Resistant Type X:
  - 1. Thickness: 5/8 inch (15.9 mm) and 1/2 inch (12.7 mm).
  - 2. Long Edges: Tapered.
- E. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
  - 1. Core: 5/8 inch (15.9 mm), Type X.
  - 2. Long Edges: Tapered.
  - 3. Use in all damp locations like bath rooms and kitchen sink locations.
  - 4. Do not use behind shower or tub surrounds. Use shower and tub backing panels.

### **2.03 TRIM ACCESSORIES**

- A. Trim: ASTM C 1047, galvanized or aluminum-coated steel sheet or rolled zinc at interior applications and hot dip galvanized steel sheet or rolled zinc at exterior locations. Provide the following shapes, unless otherwise indicated:
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. Expansion (Control) Joint: Use where indicated.

### **2.04 JOINT TREATMENT MATERIALS**

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
  - 1. Interior Gypsum Wallboard: Paper.
  - 2. Water Resistant Gypsum Board: As recommended by panel manufacturer.
  - 3. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
  - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
  - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
- D. Joint Compound for Tile Backing Panels:
  - 1. Cementitious Backer Units: As recommended by backer unit manufacturer.

### **2.05 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

- D. Resilient Sound Isolation Clips: Steel resilient clips with molded rubber isolators, attaches to framing; improves noise isolation for areas between gypsum board assemblies and adjacent sources of noise.

## **2.06 TRIM ACCESSORIES**

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
  - 2. Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Expansion (control) joint.
    - g. Curved-Edge Cornerbead: With notched or flexible flanges.
    - h. 7/8" steel furring channels or hat channels.

## **2.07 TILE AND SHOWER/TUB BACKING PANELS**

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges. Use behind all shower and tub/shower surrounds.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. C-Cure; C-Cure Board 990.
    - b. CertainTeed Corp.; FiberCement BackerBoard.
    - c. Custom Building Products; Wonderboard or EasyBoard.
    - d. FinPan, Inc.; [Util-A-Crete Concrete Backer Board] [EZ Backer] [ProTEC].
    - e. James Hardie Building Products, Inc.; Hardiebacker.
    - f. National Gypsum Company, Permabase Cement Board.
    - g. USG Corporation; DUROCK Cement Board.
  - 2. Thickness: 1/2 inch (12.7 mm).
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  - 4. DO NOT USE IN RATED ASSEMBLIES - Use Dens Glass Gold gypsum sheathing in place of gypsum board in rated assemblies.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PANEL PRODUCT INSTALLATION**

- A. Gypsum Board: Comply with ASTM C 840 and GA-216.
  - 1. Space screws a maximum of 12 inches o.c. for vertical applications, unless closer spacing required by Code.
  - 2. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    - b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

4. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
5. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.

### **3.03 FINISHING**

- A. Installing Trim Accessories: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Coordinate location of push-in concealed spaces vent with the architect.
- C. Finishing Gypsum Board and cementitious panels: Treat panel joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare board surfaces for decoration.
  1. Prefill open joints and damaged surface areas.
  2. Apply joint tape over board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
  1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
  2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at all panel surfaces that will be exposed to view.

**END OF SECTION 092900**

**SECTION 09 6519  
RESILIENT PLANK FLOORING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Resilient Vinyl plank flooring (LVT) for areas noted.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated to meet test and technical requirements.
- B. Shop Drawings: For each type of flooring. Include floor plank layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- C. Samples: In manufacturer's standard size, but not less than 18-by-6-inch sections of each different color and pattern of flooring required.
- D. Qualification Data: For qualified Installer.
- E. Maintenance data.
- F. Warranty.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation. Installation procedures should be in strict accordance with manufacturer's published technical documentation.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.
- B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
  - 2. Smoke Density: ASTM E662 and NFPA 258 nonflaming - DM Corrected <450.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 81 deg F (27 deg C) and 50% relative humidity. Store floor tiles on flat surfaces.

**1.05 PROJECT CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive floor coverings.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.
- F. Comply with ASTM F1869 testing procedures for determining rate of moisture vapor emitted from on-grade concrete floors.

**1.06 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

**PART 2 PRODUCTS**

**2.01 RESILIENT VINYL PLANK FLOORING - LVT GLUED APPLIED**

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following.
  - 1. Raskin Industries, Formations Luxury Vinyl Tile, 'Alpine Plank' collection, <http://www.raskinind.com/ formations/>.
    - a. Style: Vinyl Plank
    - b. 12 mil wear layer, 7.25" wide x 48" long planks, fiberglass reinforced core, Nano Ceramic enhanced coating, meets or exceeds requirements of ASTM F1700-04 Class III, Type B, ASTM F970-07 static load limit. Class 1 radiant flux ASTM E364 material.
    - c. Slip Resistance: ADA Compliant
    - d. Warranty - 8 year commercial and 20 year residential limited wear warranty for residential installation.
    - e. Meets FloorScore certification.
    - f. Installation: Direct Glue
    - g. COLOR: Two color/wood species range as selected by Architect from manufacturer's full standard color range.
  - 2. Products meeting these requirements may be available from other manufacturers.

## **2.02 INSTALLATION MATERIALS**

- A. Verify with manufacturer's recommendations.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- C. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.
  - 1. Use adhesives that have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
  - 4. Moisture Testing: Perform tests recommended by manufacture. Proceed with installation only after substrates pass most stringent testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings and acoustic underlayment until they are same temperature as space where they are to be installed.
  - 1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

### **3.02 FLOOR COVERING AND UNDERLAYMENT INSTALLATION**

- A. Comply with manufacturer's written instructions for installing floor coverings and underlayment. Verify flooring manufacturer's acceptance of underlayment product reference warranty

covering.

- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out floor coverings as follows:
  - 1. Maintain uniformity of floor covering direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
  - 3. Match edges of floor coverings for color shading at seams.
  - 4. Avoid cross seams.
- D. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

### **3.03 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protection of floor covering.
- B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor covering before applying liquid floor polish.
  - 1. Apply two coat(s) or as many as recommended by manufacturer for initial wear period.
- C. Protect and Cover floor coverings until Substantial Completion.

**END OF SECTION 096519**

This page intentionally left blank



**SECTION 09 6816  
SHEET CARPETING**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. Carpet placed with glue down method at Type-A (Accessible) Units
- B. Carpet placed over pad and perimeter edge strips at Type-B Units.
- C. Accessories as needed for complete installation as required by Manufacturer

**1.02 REFERENCES**

- A. ASTM D2859 - Test Method for Flammability of Finished Textile Floor Covering Materials.
- B. ASTM E84 - Surface Burning Characteristics of Building Materials.
- C. ASTM E648 - Critical Radiant Flux of Floor Covering Systems Using A Radiant Heat Energy Source.
- D. NFPA 253 - Test for Critical Radiant Flux of Floor Covering Systems.

**1.03 SUBMITTALS**

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Samples: Submit two samples 12" x 12" in size illustrating color and pattern for each carpet material specified. Color shall contrast with adjacent finishes per Universal Design requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
- D. Provide seaming diagram with seam locations, types and methods

**1.04 QUALIFICATIONS**

- A. Installer: Company specializing in installing carpet with minimum three years documented experience (qualified/certified to install brand specified).

**1.05 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for flame/smoke rating requirements.

**1.06 STORAGE AND HANDLING**

- A. Store materials for 3 days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 70 degrees F ambient temperature 1 day prior to, during and 24 hours after installation.
- C. Comply with CRI 104 for temperature, humidity and ventilation limitations as a minimum.

**PART 2 - PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURES**

- A. Blue Ridge
- B. Mowhawk
- C. Shaw
- D. StainMaster
- E. Or Approved Equal

**2.02 MATERIALS**

- A. Carpet - conforming to the following criteria:
  - 1. Pile Yarn Content: 100% nylon Construction: Pattern loop
  - 2. Fiber Treatment: Soil/Stain Protection Yarn Weight: 34 oz / sq yd

3. Gauge: 1/10"
  4. Pile Height: .16 inches Width: 12'-0"
  5. Density Factor: 2,400 (min.)
  6. Dye Method: 100% solution dyed Primary Backing: Synthetic Secondary Backing: EcoWorx
  7. Static (AATCC 134): Less than 3.5KV — permanent conductive filament Warranty: Lifetime commercial limited
  8. Color: As selected by Architect from manufacturer's full color range
  9. All carpeting shall be from the same manufacturer's dye lot.
  10. Installation: Install over 3/8" fiber (poly bonded foam) pad (6 pounds per cubic foot density) minimum at all Type-B units. NOTE: Direct glue product in all accessible units (Type-A).
- B. All carpeting shall be back-stamped in accordance with requirements of UM Bulletin No. 44D. Certification of compliance to be given to Owner at project completion.
- C. All carpeting shall be per the following: Pass the DOC FF-1-70 "pill test", be Class II, 0.22 watts/cm' per ASTM E 648-86; and have a smoke density less than 450 per ASTM E84-84.

### **2.03 ACCESSORIES**

- A. Low VOC Adhesive: Compatible with carpet material and as recommended by carpet manufacturer.
- B. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.
- C. Edge Strips: Homogeneous composition of polyvinyl chloride (PVC), high quality additives, and colorants. All transitional strips shall comply with the applicable accessibility codes requirements. Standard formulation exceeds ASTM E648 Class 1 Flammability requirements. Transitional strips shall be designed for interior applications only. Type, finish, and color as selected by Owner from manufacturer's standard products (applicable to flooring material transition) and color selection(s).
- D. Seam Accessories: 60% latex adhesive for seam tipping, double bond seaming tape (for direct glue down installation), foil faced seaming tape (for conventional installation), water based seam sealing adhesive. All products used shall be compatible with the carpet system being installed and be approved by manufacturer for use with the product. Butt cut edges at backing to form secure seams and to prevent pile loss at seams.
- E. Tackless Carpet Stripping: Water-resistant plywood, in strips as required to match cushion thickness and comply with CRI, Section 12.2.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft. (6 mm in 3m), and are ready to receive work.
1. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting. Comply with ASTM F 710.
  2. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Comply with CRI 104, Section 7.3 "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

### 3.03 INSTALLATION

- A. Installation shall be by experienced carpet layers with at least three years documented experience in accordance with carpet manufacturer's instructions. Carpet seams shall be consistent with the run of the carpet and unnoticeable to the casual observer.
- B. In all Type-A Units with no padding to be installed. Carpet shall be installed by glue down method, Class 1 and/or in accordance with manufacturer's written instructions.
- C. Apply carpet and adhesive in accordance with manufacturers' instructions.
- D. Verify carpet match before cutting to ensure minimal variation between dye lots.
- E. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true, and cleanly between the rows of carpet tufts — DO NOT cut tufts that may unravel later. Edge carpet seams. Locate seams in area of least traffic.
- F. Form and join seams straight, not overlapped or peaked, and free of gaps. Use method of carpet seaming that includes: seam tipping with 60% latex, carpet seaming tape or seam sealing adhesive or as recommended by manufacturer for proper installation.
- G. Lay carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance. Provide monolithic color, pattern, and texture match within any one area.
- H. Extend carpet into toe spaces, door reveals, closets, open-bottom obstructions, removable flanges, alcoves and similar openings.
- I. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- J. Cut and fit carpet around interruptions.
- K. Fit carpet tight to intersection with vertical surfaces without gaps.
- L. Where wall bases are scheduled, cut carpet tight to walls. Fit carpet tight to vertical interruptions, leaving no gaps.
- M. The installation of transitional strips shall not begin until the work of all other trades has been completed, especially overhead trades. Areas to receive transitional strips shall be clean, fully enclosed, weathertight, and maintained at a uniform temperature of at least 65 degrees F for 24 hours before, during, and after the installation is completed. The transitional strips and adhesives shall be conditioned in the same manner. The floor surface shall be smooth, flat, level, permanently dry, clean and free of all foreign material, such as dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt, and old adhesive residue. Transitional Strips shall be securely adhered to the floor utilizing the manufacturer's recommended adhesive.
- N. Flat landing surfaces and changes in floor finish material shall not be greater than 1/4" (vertical transition) or 1/8" (2:1 beveled transition).
- O. Perform the following operations immediately after carpet installation:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Provide clean edge at wall bases, free of cut loops, etc.
  - 4. Vacuum carpet using commercial machine with face-beater element.

### 3.04 CLEANING

- A. Upon completion of installation, provide and install temporary surface protection over carpet material in areas where other construction activities or construction foot traffic are still present and/or where exterior elements (snow, rain, mud, dirt, etc.) may be tracked into area from the outside.
- B. After all construction activities are complete and further construction foot traffic is not required or permitted - carpet shall be cleaned of all dirt, debris, stains and residues in accordance with manufacturer's written instructions.

- C. Carpet surface shall be vacuumed after completion of cleaning process. Vacuum cleaner shall be absent of any dust, dirt or debris and shall have installed a new and clean dust collection bag and filters. Collection bag and filters shall be replaced as necessary to allow proper dust and dirt collection.
- D. Maintain cleanliness of carpet surface until area of work is accepted by Owner.

**END OF SECTION**

**SECTION 09 9113  
EXTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on exterior substrates, including fiber cement siding, panels and trim.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

**1.04 FIELD CONDITIONS**

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material, finish and color applied.

**PART 2 PRODUCTS**

**2.01 PAINT, GENERAL**

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range

**2.02 METAL PRIMERS**

- A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.
- B. Primer, Galvanized, Water Based: MPI #134.

**2.03 SOLVENT-BASED PAINTS**

- A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.
- B. Alkyd, Exterior Gloss (Gloss Level 6): MPI #9.

**PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### **3.02 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

### **3.03 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Paint entire exposed surface of window frames and sashes.
  - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### **3.04 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.05 EXTERIOR PAINTING SCHEDULE**

- A. Steel Substrates:
  - 1. Water-Based Light Industrial Coating System:
    - a. Prime Coat: Shop primer specified in Division 05 Section where substrate is specified.
    - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
    - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss, MPI #163.
    - d. Topcoat: Light industrial coating, exterior, water based, gloss, MPI #164.
  - 2. Alkyd System:
    - a. Prime Coat: Shop primer specified in Division 05 Section where substrate is specified.
    - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
    - c. Topcoat: Alkyd, exterior, semi-gloss, MPI #94.
    - d. Topcoat: Alkyd, exterior, gloss, MPI #9.
- B. Galvanized-Metal Substrates:
  - 1. Latex System:
    - a. Prime Coat: Primer, galvanized, water based, MPI #134.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior semi-gloss, MPI #11.
    - d. Topcoat: Latex, exterior gloss, MPI #119.
  - 2. Alkyd System:
    - a. Prime Coat: Primer, galvanized metal
    - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
    - c. Topcoat: Alkyd, exterior, semi-gloss, MPI #94.
    - d. Topcoat: Alkyd, exterior, gloss, MPI #9.
- C. Opaque Finish Wood Substrates: Including wood trim, architectural woodwork, wood-based panel products, exposed joists and beams.
  - 1. Latex System:
    - a. Prime Coat: Primer, latex for exterior wood, MPI #6.
    - b. Intermediate Coat: Latex, exterior, matching topcoat.
    - c. Topcoat: Latex, exterior, low sheen (Gloss Level 3-4), MPI #15.

**END OF SECTION 099113**

This page intentionally left blank



**SECTION 09 9123  
INTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes surface preparation and the application of paint systems on interior substrates.

**1.02 RELATED REQUIREMENTS:**

- A. Section 099113 "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
1. Submit Samples on rigid backing, 8 inches square.
  2. Step coats on Samples to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .
1. Maintain containers in clean condition, free of foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

**1.05 FIELD CONDITIONS**

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

**1.06 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

**PART 2 PRODUCTS**

**2.01 PAINT, GENERAL**

- A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."
- B. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Flat Paints and Coatings: 50 g/L.
  2. Nonflat Paints and Coatings: 150 g/L.
  3. Primers, Sealers, and Undercoaters: 200 g/L.
  4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
  5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.

- D. Colors: As selected by Architect from manufacturer's full range. Note that apartments receive single flat color for both walls and ceilings. Public areas receive three colors - one on walls and one on ceilings plus one accent color at selected areas.

## **2.02 PRIMERS/SEALERS**

- A. Primer Sealer, Latex, Interior: MPI #50.
- B. Primer, Latex, for Interior Wood: MPI #39.

## **2.03 METAL PRIMERS**

- A. Primer, Rust-Inhibitive, Water Based: MPI #107.
- B. Primer, Galvanized, Water Based: MPI #134.

## **2.04 WATER-BASED PAINTS**

- A. Latex, Interior: MPI #52.
- B. Latex, Interior, Flat, (Gloss Level 1): MPI #53 (flat) for ceilings
- C. Latex, Interior, (Gloss Level 3): MPI #52 (eggshell) for walls not noted otherwise.
- D. Latex, Interior, (Gloss Level 4): MPI #43 (satin) for hollow metal doors
- E. Latex, Interior, Semi-Gloss, (Gloss Level 5): MPI #54 (semi-gloss) for hollow metal frames.

## **2.05 SOLVENT-BASED PAINTS**

- A. Alkyd, Interior: MPI #51.
- B. Alkyd, Interior, Semi-Gloss: MPI #47.

# **PART 3 EXECUTION**

## **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Wood: 15 percent.
  - 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

## **3.02 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### **3.03 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### **3.04 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces, fixtures or equipment.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.05 INTERIOR PAINTING SCHEDULE**

- A. Steel Substrates:
  - 1. Alkyd System:
    - a. Prime Coat: Primer, alkyd, quick dry, for metal.
    - b. Intermediate Coat: Alkyd, interior, matching topcoat.
    - c. Topcoat: Alkyd, interior, semigloss.

- B. Galvanized-Metal Substrates:
  - 1. Latex over Waterborne Primer System:
    - a. Prime Coat: Primer, galvanized, water based.
    - b. Intermediate Coat: Alkyd, interior, matching topcoat.
    - c. Topcoat: Alkyd, interior, semigloss.
- C. Opaque Finish Wood Substrates: Including wood trim, architectural woodwork, and wood-based panel products
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss.
- D. Gypsum Board Substrates:
  - 1. Latex System:
    - a. Prime Coat: Primer sealer, latex, interior.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, flat, (Ceilings).
    - d. Topcoat: Latex, interior, eggshell (Walls).

**END OF SECTION 099123**

## **SECTION 10 1400 SIGNAGE**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Unit or entry door signs.
- B. Fire Riser room.
- C. FDC identification.
- D. Building identification signs.

#### **1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

#### **1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
  - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule. Coordinate with Owner to numbering sequence prior to shop drawing submittal.
  - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
  - 3. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

#### **1.06 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Unit Flat Signs:
  - 1. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
  - 2. Cosco Industries (ADA signs); ADA Series 1: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 3. FASTSIGNS: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
  - 4. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
  - 5. Seton Identification Products: [www.seton.com/aec/#sle](http://www.seton.com/aec/#sle).
  - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Building Dimensional Letter Signs:
  - 1. Cosco Industries; Cast Aluminum: [www.coscoarchitecturalsigns.com/#sle](http://www.coscoarchitecturalsigns.com/#sle).
  - 2. FASTSIGNS: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- C. Other Signs - Monument Sign, refer to Section 10 1421, EXTERIOR SIGNS:

## **2.02 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and/or Door Signs: Provide a sign for every exterior doorway.
  - 1. Sign Type: Flat signs with engraved panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1-1/2 inch.
  - 4. Sign Height: 3 inches, unless otherwise indicated.
  - 5. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
- C. Building Identification Signs:
  - 1. Use individual metal dimensional letters.
  - 2. Mount on outside wall in location indicated on drawings. Coordinate with Architect prior to final installation. Coordinate with Local AHJ and Fire Department for other specific requirements.

## **2.03 UNIT SIGN TYPES**

- A. Flat Signs: Signage media without frame.
  - 1. Edges: Square.
  - 2. Corners: Square.
  - 3. Wall Mounting of One-Sided Signs: Tape adhesive.
- B. Color and Font: Unless otherwise indicated:
  - 1. Character Font: Helvetica, Arial, or other sans serif font.
  - 2. Character Case: Upper case only.
  - 3. Background Color: Clear.
  - 4. Character Color: Contrasting color.

## **2.04 TACTILE SIGNAGE MEDIA**

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
  - 1. Total Thickness: 1/8 inch.

## **2.05 BUILDING DIMENSIONAL LETTERS**

- A. Metal Letters:
  - 1. Metal: Aluminum casting.
  - 2. Metal Thickness: 1/8 inch minimum.
  - 3. Letter Height: 10 inches.
  - 4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper case only.

- 5. Finish: Brushed, satin.
- 6. Mounting: Concealed or exposed screws.

## **2.06 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Exposed Screws: Chrome plated.
- C. Tape Adhesive: Double sided tape, permanent adhesive.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1. Locate building signage per coordination with local AHJ.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION**

This page intentionally left blank



**SECTION 10 1421  
EXTERIOR SIGNAGE**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Internally illuminated monument mounted dual-sided panel exterior signage

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
  - 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available.

**1.03 QUALITY ASSURANCE**

- A. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

**1.04 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

**1.05 COORDINATION**

- A. Coordinate placement of anchorage devices with templates for installing signs.

**PART 2 PRODUCTS**

**2.01 PANEL SIGNS**

- A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).
- B. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:
  - 1. Impact Resistance: 16 ft-lbf/in. per ASTM D 256, Method A.
  - 2. Tensile Strength: 9000 lbf/sq. in. per ASTM D 638.
  - 3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. per ASTM D 790.
  - 4. Heat Deflection: 265 deg F at 264 lbf/sq. in. per ASTM D 648.
- C. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044

**2.02 ACCESSORIES**

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

**2.03 FABRICATION**

- A. General: Provide manufacturer's standard signs of configurations indicated.
  - 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and

- contact surfaces.
- 2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
- 3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
- 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

#### **2.04 FINISHES, GENERAL**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### **2.05 ACRYLIC SHEET FINISHES**

- A. Colored Coatings for Acrylic Sheet: For copy and background and frame colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for three years for application intended. Coordinate with Owner regarding copy for printing.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items, including anchor inserts, and electrical power are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 CLEANING AND PROTECTION**

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

**END OF SECTION**

**SECTION 10 2800  
TOILET AND BATH ACCESSORIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Residential-use bathroom.
- B. Related Sections
  - 1. 08 8300 Mirrors for mirrors in all apartments.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cut-outs in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Features that will be included for Project.
  - 5. Manufacturer's warranty.

**1.03 COORDINATION**

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

**1.04 WARRANTY**

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.

**1.05 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

**2.02 RESIDENTIAL-USE BATHROOM ACCESSORIES**

- A. Toilet Tissue Dispenser Basis of Design: Moen, Eva Series YB2808BN brushed nickel single post, provide at each bath.

- B. Shower Curtain Rod Basis of Design: Moen, Tension Rod Model TR1001BN brushed nickel, provide at each shower. Provide shower curtain rings, Moen, SR2100BN
- C. Towel Bar Basis of Design: Moen, YB2824BN, Eva Series 24" long, brushed nickel, provide two at each bath.
- D. Robe Hook - Basis of Design: Moen, YB2803BN, Eva Series single robe hook, brushed nickel. Provide one at each bath.
- E. Grab Bars:
  - 1. Moen Home Care 8900 series
  - 2. Mounting: Flanges with concealed fasteners.
  - 3. Material: 11 gauge type 304 Stainless steel.
    - a. Finish: Manufacturer's standard White finish.
  - 4. Outside Diameter: 1-1/2 inches.
  - 5. Configuration and Length: As indicated on Drawings.

### **2.03 FABRICATION**

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated in drawings.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

### **3.02 ADJUSTING AND CLEANING**

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

**END OF SECTION 102800**

**SECTION 10 4416  
FIRE EXTINGUISHERS**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.
- B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

**1.02 QUALITY ASSURANCE**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FMG.

**1.03 COORDINATION**

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

**PART 2 PRODUCTS**

**2.01 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS**

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.
  - 1. Valves: Manufacturer's standard.
  - 2. Handles and Levers: Manufacturer's standard.
  - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type: Rechargeable Home Fire Extinguisher, UL-rated nominal capacity, with mono-ammonium phosphate-based dry chemical in manufacturer's standard enameled container. UL Rated 1-A:10-B:C (Red),
- C. Provide one 10 lb extinguisher in the kitchen of each Unit. Provide clamp-type mounting for inside kitchen cabinet or room (coordinate final location prior to installation).

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

**END OF SECTION 104416**

This page intentionally left blank

**SECTION 10 5500  
POSTAL SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Central mail delivery boxes. Provide delivery box for every home. Provide 1 parcel box for each 5-10 homes. Provide one outgoing slot for each 5-10 homes.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. 39 CFR 111 - U.S. Postal Service Standard 4C Current Edition.
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, maintenance information, and current USPS approval documentation.
- C. Shop Drawings: Indicate plans for each unit or groups of units, front elevations with compartment layout and model number, overall dimensions, rough-in opening sizes, construction and anchorage details.
- D. Samples: Submit two sets of manufacturer's available colors.

**1.04 WARRANTY**

- A. Provide manufacturer's warranty against defects in materials or workmanship for a period of 5 years from Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 CENTRAL MAIL DELIVERY BOXES**

- A. Manufacturers:
  - 1. Florence Manufacturing Company; 4C14D-14-P: [www.florencemailboxes.com/#sle](http://www.florencemailboxes.com/#sle).
  - 2. Salsbury Industries: [www.mailboxes.com/#sle](http://www.mailboxes.com/#sle).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Central Mail Delivery Boxes: Provide products approved for United States Postal Service (USPS) delivery.
  - 1. Materials: Aluminum with stainless steel hardware.
  - 2. Finish: Powder coat in color selected by Architect from manufacturer's standard colors.
  - 3. Unit Types and Sizes: As indicated on drawings.
  - 4. Configurations: See drawings for overall dimensions and layouts.
- C. Cluster Box Units (CBU): Pedestal-mounted, mail receptacle with weather-resistant cabinet for outdoor installation; front-loading, double-column design.
  - 1. Unit A: 14 customer compartments (3 inch high), 1 outgoing mail receptacle, and 2 parcel compartments.
    - a. Florence Manufacturing Company; Model 4C14D-14-P.

**2.02 COMPONENTS**

- A. Locking - Front Loading Master Door: Three-point latching mechanism with USPS master lock furnished and installed by postmaster.
- B. Locking - Customer Compartment Doors: USPS approved cam lock, 3 keys each lock.
- C. Locking - Parcel Compartment Doors: Double-lock arrangement with USPS approved cam lock for customer access, and USPS master lock furnished and installed by postmaster.
- D. Pedestals: Standard aluminum pedestal with rubber mounting pad designed to meet USPS and height requirements of ADA Standards.

- E. Identification - Customer and Parcel Compartments: Sequential numerical or alphabetic characters, top to bottom, left to right; factory-installed.
  - 1. Silver adhesive decals, 3/4 inch high black characters centered on 1-1/2 inch high by 1-3/4 inch long decal.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that concrete base and anchor bolts are ready to receive pedestal-mounted units.
- B. Do not begin installation until unacceptable conditions are corrected.

#### **3.02 INSTALLATION**

- A. Install postal specialties in accordance with approved shop drawings, manufacturer's instructions, and USPS requirements.
- B. Adjust and lubricate door hardware to operate properly.

**END OF SECTION**



**SECTION 10 5723  
CLOSET AND UTILITY SHELVING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall mounted wire closet shelving.
- B. Accessories.

**1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, with installation instructions.
- C. Shop Drawings: Provide drawings prepared specifically for this project; show dimensions of shelving or storage system and attachment to substrates.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.
- C. Store flat to prevent warpage and bending.

**1.04 FIELD CONDITIONS**

- A. Maintain temperature, humidity, and ventilation within limits recommended by manufacturer. Do not install products under environmental conditions outside manufacturer's limits.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Wire Storage Shelving:
  - 1. ClosetMaid Corporation: [www.closetmaid.com/#sle](http://www.closetmaid.com/#sle).
  - 2. RubberMaid, Inc; Wire Closets: [www.rubbermaidpro.com/#sle](http://www.rubbermaidpro.com/#sle).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 WIRE STORAGE SHELVING SYSTEMS**

- A. Applications:
  - 1. Shelf Depth: 12 inches, unless otherwise indicated.
  - 2. Bedroom Closets:
    - a. Wall-to-wall shelf with free sliding hanger rod.
  - 3. Coat Closets:
    - a. Wall-to-wall shelf with integral hanger rod.
  - 4. Storage Closets:
    - a. Wall-to-wall storage shelves, close-mesh cross wire spacing, stacked at 13 inch vertically, not less than 12 inch deep.
- B. Wire Shelving: Factory-assembled coated wire mesh shelf assemblies for wall-mounting, with components and connections required to produce a rigid structure that is free of buckling and warping.
  - 1. Construction: Cold-drawn steel wire with average tensile strength of 100,000 psi resistance welded into uniform mesh units, square, rigid, flat, and free of dents or other distortions, with wires trimmed smooth.
  - 2. Coating: PVC or epoxy, applied after fabrication, covering surfaces.
  - 3. PVC Coating: 9 to 11 mils thick.
  - 4. Epoxy Coating: Nontoxic epoxy-polyester powder coating baked-on finish, 3 to 5 mils thick.
  - 5. Standard Mesh Shelves: Cross deck wires spaced at 1 inch.
  - 6. Shelf and Rod Units: Integral hanging rod at front edge of shelf.

- 7. Corner Units: Same wire spacing as standard mesh shelves; provide wherever shelves meet at right angles.
- C. Mounting Hardware for Wire Shelving: Provide manufacturer's standard mounting hardware; include support braces, wall brackets, back clips, end clips, poles, and other accessories as required for complete and secure installation; factory finished to match shelving.
- D. Fasteners: As recommended by manufacturer for mounting substrates.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Inspect areas to receive shelving or storage system, to verify that spaces are properly prepared to receive shelf units, and are of dimensions indicated on shop drawings.
- B. Verify appropriate fastening hardware.
- C. Do not begin installation until substrates have been properly prepared.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Install wire shelving in accordance with manufacturer's instructions, with shelf surfaces level.
- B. Cap exposed ends of cut wire shelving.
- C. Install wire shelving back clips, end clips at side walls, and support braces at open ends. Install intermediate support braces as recommended by manufacturer.
- D. Wire Shelving Mounting Heights:
  - 1. Single Hanging Rod Units: Install shelf at 68 inches above floor.
  - 2. Double Hanging Rod Units: Install shelves at 42 inches and 84 inches above floor.
  - 3. Other Shelves: See drawings.

#### **3.04 CLEANING**

- A. Clean soiled surfaces after installation.

#### **3.05 PROTECTION**

- A. Protect installed work from damage.
- B. Touch-up, repair, or replace damaged products before Substantial Completion in a manner that eliminates evidence of replacement.

### **END OF SECTION**

**SECTION 11 3100  
RESIDENTIAL APPLIANCES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Cooking equipment:
    - a. Electric ranges.
    - b. Recirculating micro-wave hoods
    - c. Recirculating range hoods
    - d. Freestanding microwave oven
  - 2. Garbage Disposals.
  - 3. Refrigerator/freezers.
  - 4. Dishwashers.
  - 5. Washers and Dryers for residential apartments.
- B. Related Sections include the following:
  - 1. Division 12 Section "Residential Casework" for standard cabinets and countertops that receive residential appliances.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.
- B. Maintenance Data: For each product to include in maintenance manuals.
- C. Warranties: Special warranties specified in this Section.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain residential appliances through one source from a single manufacturer.
  - 1. Provide products from same manufacturer for each type of appliance required.
  - 2. To the greatest extent possible, provide appliances by a single manufacturer for entire Project.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for product's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- D. Regulatory Requirements: Comply with provisions of the following product certifications:
  - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
  - 3. NAECA: Provide residential appliances that comply with NAECA standards.
- E. Regulatory Requirements, Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." ANSI A117.1. FED-STD-795, "Uniform Federal Accessibility Standards."
  - 1. Operable Parts: Provide controls with forward reach no higher than 48 inches (1219 mm) above the floor, horizontal front reach no more than 25 inches (635 mm), horizontal side

- reach no more than 24 inches (610 mm), and that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Range or Cooktop: Per ANSI 117.1-2003, 1003.12.6.4 accessible units in this project have been designed for parallel approach. Kneespace is not required for parallel approach, but front controls must be provided.
  3. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches (1370 mm) of the floor.
- F. AHAM Standards: Provide appliances that comply with the following AHAM standards:
1. Electric Ranges: AHAM ER-1.
  2. Household Refrigerators: AHAM HRF-1.
  3. Household Freezers: AHAM HRF-1.
- G. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.
1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

#### **1.04 WARRANTY**

- A. Special Warranties: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
1. Electric Range: Five-year limited warranty for in-home service on surface-burner elements.
  2. Refrigerator/Freezer: Five-year limited warranty for in-home service on the sealed refrigeration system.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL -**

- A. Manufacturers of other products meeting these specifications can be submitted as equals.

#### **2.02 COOKING APPLIANCES**

- A. Range for the apartments
1. GE JBS460DMBB, Black, 30" wide electric range, slide-in for Type 'B'
    - a. Four burner range- two 8" and two 6" burners
    - b. Standard clean oven.
    - c. Oven window
    - d. Dual element bake and broil
    - e. Full width storage drawer.
- B. Drop-in oven for Type 'A' apartments, refer to enlarged Unit plans in drawings
1. GE JD630DFBB Black, 30" wide built-in oven.
    - a. Ceramic glass cooktop
    - b. Oven window
    - c. Self-clean oven
    - d. ADA compliant when mounted as dimensioned. At Type 'A' units, provide with Broan 30x24 surface mount stainless steel splash plate on wall behind range. Extend plate below back of range.
- C. Accessible Exhaust Hood for the ADA apartments
1. GE JVX3300DJBB range hood, non-vented
    - a. Recirculating installation
    - b. Cooktop lighting
    - c. Variable two-speed fan control, 200 CFM
    - d. Dishwasher safe filter
    - e. Connect fan and light to wall switch

#### **2.03 DISPOSALS**

- A. Disposal - GE GFC325N for apartments
  - 1. Continuous-Feed Operation
  - 2. 1/3 HP Motor, 2,500 RPM
  - 3. Stainless Steel Dual Swivel Impellers
  - 4. Standard sound insulation package
  - 5. Overload Protector with Manual Reset
  - 6. Corded

## **2.04 REFRIGERATION APPLIANCES**

- A. Refrigerator for all apartments
  - 1. General Electric GE® ENERGY STAR® 19.1 Cu. Ft. Top-Freezer Refrigerator
  - 2. Model #: GTE19DTNBB 30" wide top-freezer refrigerator, Black
  - 3. Adjustable shelves, LED lighting
  - 4. ADA compliant.
  - 5. Frost free.
  - 6. Ice maker.

## **2.05 DISHWASHING APPLIANCES**

- A. Dishwasher for the Type 'B' apartments
  - 1. GE GSD3300KBB, 24" wide, Black
  - 2. ENERGY STAR® qualified, Insulation blanket
  - 3. 62 dBA sound level with light on the door
  - 4. Hard food disposer
  - 5. Steam pre-wash
- B. Accessible Dishwasher for the Type 'A' apartments
  - 1. GE GDT225SGLBB 24" wide, Black with hidden controls, 34" high countertop
  - 2. ENERGY STAR® qualified
  - 3. 5 level wash system
  - 4. Optimizes water temperature
  - 5. ADA Compliant
  - 6. 51 dBA sound level

## **2.06 MICROWAVE OVENS**

- A. CounterTop Microwave for Type 'A' Accessible Units
  - 1. GE PEM31DFBB 1.1 cu ft microwave oven
  - 2. Auto and time defrost
  - 3. Optional Hanging Kit
  - 4. Sensor cooking controls - ADA compliant
  - 5. Mount under upper cabinet.
- B. Built-in MicroWave-Hood for the apartments
  - 1. GE JVM3160DFBB, Black, over-the-range microwave oven with recirculating venting, non-vented
    - a. 1.6 CU FT capacity - 1000 watts - 10 power levels, 120V
    - b. 30" wide, top of unit 66" AFF min.
    - c. Two-Speed 300 CFM Ventilation System - recirculating installation, include filter kit
    - d. Filler panels as needed

## **2.07 SIDE-BY-SIDE WASHER-DRYER APPLIANCES FOR APARTMENTS**

- A. Washer - GE GFW148SSMWW, frontload washer
  - 1. Vibration control, 1400 RPM spin speed
  - 2. Load sensing adaptive fill
  - 3. Stainless steel basket
  - 4. 4 wash/spin cycles, total 14 cycles
  - 5. Energy Star qualified, internal water heater
  - 6. ADA compliant

- B. Dryer - GE GFD14ESSNWW, front load electric dryer, White
  - 1. 4 temperature selections, Quick dry
  - 2. Stainless Steel Drum
  - 3. Variable end of cycle signal
  - 4. 13 dry cycles
  - 5. UL-Listed flexible metal ducting required
  - 6. ADA compliant

## **2.08 FINISHES, GENERAL**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Color-Coated Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, color, gloss, and minimum dry film thickness for painted finishes

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION, GENERAL**

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements.

### **3.03 CLEANING AND PROTECTION**

- A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.
- B. Verify that accessories required have been furnished and installed.
- C. Remove packing material from residential appliances and leave units in clean condition, ready for operation.

### **3.04 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances. Refer to Division 01 Section "Demonstration and Training."

**END OF SECTION 113100**

**SECTION 11 6813  
PLAYGROUND EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Playground layout (staking).
- B. Concrete footings for playground equipment.
- C. Playground equipment.
- D. Location of each item of playground equipment is indicated on drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 32 1816.13 - Playground Protective Surfacing: Protective surfacing in playground area.

**1.03 DEFINITIONS**

- A. Play Event: A piece of playground equipment that supports one or more play activities.
- B. Use Zone: Area under and around a play event within which the ground surfacing must meet fall impact attenuation requirements of ASTM F1292 when tested at the fall height specified for the play event.
- C. Fall Height: Vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it, as defined in ASTM F1487.
- D. Protective Surfacing: Resilient ground surfacing, specified in Section 32 1816.13. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
- E. Subgrade: Surface of the ground on which the protective surfacing is installed; the subbase for the protective surfacing is installed over the subgrade.

**1.04 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A135/A135M - Standard Specification for Electric-Resistance-Welded Steel Pipe 2009 (Reapproved 2014).
- C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2020.
- D. ASTM A513/A513M - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing 2020.
- E. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment 2018.
- F. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use 2017.
- G. CPSC Pub. No. 325 - Public Playground Safety Handbook 2010.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
  - 1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
  - 2. Include representatives of Contractor.
  - 3. Notify Architect at least 2 weeks prior to meeting.

**1.06 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Proposals for Substitutions: Substitutions that will increase fall height, platform height, or maximum equipment height will not be considered; submit shop drawings with proposed modifications clearly identified and sufficient information to determine compliance with specified criteria.
- C. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.
- D. Shop Drawings: Detailed scale drawings showing play event layout, Use Zone perimeters, and fall height for each play event.
  - 1. Show locations and dimensions of footings and anchorage points.
  - 2. Clearly identify mounting elevations in relation to a fixed survey point on site and to subgrade elevation and depth of protective surfacing.
  - 3. Show locations of underground utilities, storm drainage system and irrigation system.
  - 4. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Playground Equipment:
  - 1. GameTime, Inc; [\_\_\_\_]: [www.gametime.com/#sle](http://www.gametime.com/#sle).
  - 2. Landscape Structures, Inc; [\_\_\_\_]: [www.playlsi.com/#sle](http://www.playlsi.com/#sle).
  - 3. Park Structures, Inc; [\_\_\_\_]: [www.parkstructures.com/#sle](http://www.parkstructures.com/#sle).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 PLAYGROUND EQUIPMENT - GENERAL**

- A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
  - 1. Playground has been designed for children ages 2 through 12.
  - 2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.
- B. Mount equipment on concrete footings, unless otherwise indicated.
  - 1. Playground protective surfacing constitutes a resilient layer installed over a subbase (non-resilient) that is installed over subgrade; top of footings and anchorage devices is to be covered by full depth of resilient portion of protective surfacing.
  - 2. Protective Surfacing Depth: Refer to Section 32 1816.13.
  - 3. Provide supports as required to mount equipment at proper height above finish and subgrades to allow installation of sufficient depth of protective surfacing; portion of support below top of surfacing must comply with specified requirements for equipment.
  - 4. Paint portion of support that is intended to be installed below top surface of protective surfacing a different color, or mark in other permanent way, so that installers and maintainers of protective surfacing can easily determine whether sufficient depth has been installed.
- C. Provide permanent label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

### **2.03 PLAYGROUND EQUIPMENT**

- A. Comply with ASTM F1487 and CPSC Pub. No. 325; provide equipment complying with specified requirements for relevant age group(s).
  - 1. Provide components having factory-drilled holes; do not use components with extra holes that will not be filled by hardware or covered by other components.
- B. Slides: Slide bed, ship's ladder with handrails, and platform.
  - 1. Location: As indicated on drawings.
  - 2. Slide Bed: Rigid, molded ultraviolet stabilized polyethylene, with anti-static additives, segmented enclosed tube construction.



3. Treads and Handrails: Solid wood with stringers of wood.
  4. Fall Height - Ages Five to Twelve: 48 inches, maximum.
  5. Maximum Slope: 1:5.1.
  6. Supports and Platform: Galvanized steel with PVC coating.
  7. Color: As selected from manufacturer's standard color palette.
  8. Certification: Provide International Play Equipment Manufacturers Association (IPEMA) certification that indicates product complies with ASTM F1487, excluding sections 7.1.1, 10, and 12.6.1.
- C. Freestanding Climbers:
1. Location: As indicated on drawings.
  2. Certification: Provide International Play Equipment Manufacturers Association (IPEMA) certification that indicates product complies with ASTM F1487, excluding sections 7.1.1, 10, and 12.6.1.

## **2.04 MATERIALS**

- A. Steel Pipe and Tube: Comply with ASTM A135/A135M, ASTM A500/A500M, or ASTM A513/A513M; hot-dipped galvanized and free of excess weld and spatter.
1. Tensile Strength: 45,000 psi, minimum.
  2. Yield Point: 33,000 psi, minimum.
  3. Galvanizing: Hot-dip metal components in zinc after fabrication, in accordance with ASTM A123/A123M; remove tailings and sharp protrusions and burnish edges.
- B. Extruded Aluminum: ASTM B221 or ASTM B221M, Alloy 6061, 6062, or 6063.
1. Tensile Strength: 39,000 psi, minimum.
  2. Yield Point: 36,500 psi, minimum.
- C. Hardware: Provide without hazardous protrusions, corners, or finishes, and that require tools for removal after installation; countersunk fasteners are preferred.
1. Use stainless steel for metal-to-metal connections; select type to minimize galvanic corrosion of materials connected by hardware.
  2. Use stainless steel for wood-to-wood and wood-to-metal connections.
  3. Use stainless steel with plastic components.
  4. Bearings: Self lubricating.
  5. Hooks, Including S-Hooks: Closed loop; maximum gap 0.04 inches, less than the thickness of a dime.
  6. Rails, Loops, and Hand Bars: Same metal as item is mounted on or aluminum; with powder coating.
  7. Anchors: In accordance with manufacturer's recommendations.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that playground area has been graded to subgrade elevations required and that excess soil, rocks, and debris have been removed.
- B. Verify that playground equipment footings have been installed in proper locations and at proper elevations.
- C. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor's expense.

### **3.02 PREPARATION**

- A. Stake location of playground elements, including Use Zone perimeters, perimeter of protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.
- B. Stake layout of entire Use Zone perimeter before starting any work and before subbase under resilient surfacing is laid.
1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.

2. Verify that Use Zones are free of obstructions that would extend into resilient portion of protective surfacing.
3. If conflicts or obstructions exist, notify Architect.
4. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

### **3.03 INSTALLATION**

- A. Coordinate work with preparation for and installation of protective surfacing specified in Section 32 1816.13; install resilient portion of protective surfacing after playground equipment installation.
- B. Install concrete footings with top surface a minimum of 1/2 inch below required subgrade elevation.
- C. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).
- D. Anchor equipment securely below bottom elevation of resilient surfacing layer.
- E. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.
- F. Do not modify play events on site without written approval of manufacturer.
- G. Install required signage if not factory-installed.

### **3.04 FIELD QUALITY CONTROL**

- A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.
- B. Repair or replace rejected work until compliance is achieved.

### **3.05 CLEANING**

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- C. Clean playground area of excess construction materials, debris, and waste.
- D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

### **3.06 PROTECTION**

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

### **END OF SECTION**

**SECTION 12 2113  
HORIZONTAL LOUVER BLINDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Horizontal slat louver blinds.
- B. Operating hardware.

**1.02 REFERENCE STANDARDS**

- A. WCMA A100.1 - Safety of Window Covering Products 2018.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the placement of concealed blocking to support blinds. See Section 06 1000.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- C. Samples: Submit two samples, 6 inch long illustrating slat materials and finish, cord type and color.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Extra Blind Assemblies: One of each size.
  - 3. Extra Slats: 20 of each type and size.
  - 4. Extra Lift Cords, Control Cords, and Wands: One of each type.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Horizontal Louver Blinds Without Side Guides:
  - 1. Blinds.Com
  - 2. Hunter Douglas Architectural; CD Model: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  - 3. Levolor; Metal Blinds: [www.levolor.com/commercial/#sle](http://www.levolor.com/commercial/#sle).
  - 4. SWFcontract, a division of Spring Window Fashions, LLC: [www.swfcontract.com/#sle](http://www.swfcontract.com/#sle).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 BLINDS WITHOUT SIDE GUIDES**

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Manual Operation: Control of raising and lowering by cord with full range locking; blade angle adjustable by control wand.
- C. Metal Slats: Spring tempered pre-finished aluminum; square slat corners, with manufacturing burrs removed.
  - 1. Width: 1 inch.
  - 2. Thickness: 0.008 inch.
  - 3. Color: As selected by Architect.
- D. Slat Support: Woven polypropylene cord, ladder configuration.
- E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
  - 1. Color: Same as slats.
- F. Bottom Rail: Pre-finished, formed steel; with end caps.
  - 1. Color: Same as headrail.
- G. Lift Cord: Braided nylon; continuous loop; complying with WCMA A100.1.

1. Free end weighted.
2. Color: As selected by Architect.
- H. Control Wand: Extruded hollow plastic; hexagonal shape.
  1. Non-removable type.
  2. Length of window opening height less 3 inch.
  3. Color: Clear.
- I. Headrail Attachment: Wall brackets.
- J. Accessory Hardware: Type recommended by blind manufacturer.

## **2.03 FABRICATION**

- A. Determine sizes by field measurement.
- B. Fabricate blinds to fit within openings with uniform edge clearance of 1/4 inch each side.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that openings are ready to receive the work.
- B. Ensure structural blocking and supports are correctly placed. See Section 06 1000.

### **3.02 INSTALLATION**

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

### **3.03 TOLERANCES**

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

### **3.04 ADJUSTING**

- A. Adjust blinds for smooth operation.

### **3.05 CLEANING**

- A. Clean blind surfaces just prior to occupancy.

**END OF SECTION**

**SECTION 12 3530  
RESIDENTIAL CASEWORK**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Kitchen cabinets.
  - 2. Vanity cabinets.
  - 3. Plastic-laminate countertops and backsplashes.

**1.02 DEFINITIONS**

- A. Exposed Surfaces of Cabinets: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.
- B. Semiexposed Surfaces of Cabinets: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Bottoms of wall cabinets are defined as "semiexposed."
- C. Concealed Surfaces of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed."

**1.03 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Cabinet hardware.
- B. Shop Drawings: For cabinets, countertops and windows sills. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, methods of joining countertops, and cutouts for plumbing fixtures.
- C. Samples for Initial Selection: For each type of material exposed to view.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations for Cabinets: Obtain cabinets through one source from a single manufacturer.
- B. Quality Standards: Unless otherwise indicated, comply with the following standards:
  - 1. Cabinets: KCMA A161.1.
    - a. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semi-exposed location of each unit and showing compliance with the above standard.
    - b. Member of KCMA Environmental Stewardship Program.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
- C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
- D. Field Measurements for Countertops: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

**1.06 COORDINATION**

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of casework.
- B. Coordinate locations of utilities that will penetrate countertops or backsplashes.

#### **1.07 EXTRA MATERIALS**

- A. See Division 1 section "Project Closeout".

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Kraftmaid Cabinetry, Inc.
- B. Masco Cabinetry
- C. Republic Industries; <https://republicelite.com>
- D. SACO Industries
- E. Triangle Pacific
- F. Wellborn Cabinet, Inc.
- G. Substitutions: See Section 01 6000 - Product Requirements.

#### **2.02 CABINET MATERIALS**

- A. Exposed Materials:
  - 1. Exposed Wood Species: Manufacturer's standard domestic hardwood species
    - a. Select materials for compatible color and grain. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
    - b. Staining and Finish: As selected by Architect from manufacturer's full range.
  - 2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
- B. Semiexposed Materials: Unless otherwise indicated, provide the following:
  - 1. Particleboard construction; 5/8" solid dovetail drawers, 3/4" powdercoated shelves, laminate interior and unexposed sides.
  - 2. Plywood: Hardwood plywood with Grade C faces and not less than Grade 3 backs of same species as faces. Provide plywood sink bases at all sinks and lavatories.
- C. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility; particleboard; medium-density fiberboard; or hardboard. Provide plywood sink base cabinets.

#### **2.03 CABINET HARDWARE**

- A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish as selected by Architect from manufacturer's full range.
- B. Hinges: Pivot (knife) hinges or Concealed European-style self-closing hinges.
- C. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or B05091.
- D. Pulls - at each door and drawer
  - 1. Steel Bar Pull by D.Lawless
  - 2. Model # P2685-96
  - 3. Satin Nickel finish.
  - 4. Or Owner selected equal.

#### **2.04 CABINETS**

- A. Face Style: Modified overlay, square edge.
- B. Cabinet Style: Face Frame.
- C. Door and Drawer Fronts: Flush panel of edge glued hardwood or veneered hardwood. Square edges finished to match face.

- D. Face Frames: 3/4-by-1-5/8-inch (19-by-41-mm) solid wood with glued mortise and tenon or doweled joints.
- E. Products: Subject to compliance with requirements, provide the following:
  - 1. Smart Cabinetry Standard Construction, Lexington Maple door profile in apartments and serving kitchen. Solid wood, veneer and finish from manufacturer's full line; [www.smartcabinetry.com](http://www.smartcabinetry.com). Exposed Cabinet End Finish: Wood veneer panel to match doors.
  - 2. Finish - wood veneer finish to be selected by Architect from manufacturer's full range.
  - 3. Note both regular and accessible-height cabinets shall be provide with standard 4" high toe kick.

## **2.05 PLASTIC-LAMINATE COUNTERTOPS**

- A. Configuration: Provide countertops with the following front, cove (intersection of top with backsplash), backsplash, and endsplash style:
  - 1. Front: Rolled.
  - 2. Backsplash: Curved or waterfall shape.
  - 3. Endsplash: Square edge.
  - 4. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.
    - a. Grade: HGP.
    - b. Colors, Textures, and Patterns: As selected by Architect from plastic-laminate manufacturer's full range.
  - 5. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install cabinets and tops with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.
- C. Install cabinets and countertop level and plumb to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).
- D. Fasten cabinets to adjacent units and to backing.
  - 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches (600 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips. Each cabinet requires no fewer than four corners fastened to substrate.

### **3.02 ADJUSTING AND CLEANING**

- A. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean casework on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

**END OF SECTION 123530**

This page intentionally left blank



**SECTION 22 0517**  
**SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Sleeve-seal systems.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**PART 2 - PRODUCTS**

**2.1 SLEEVES**

- A. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

**2.2 SLEEVE-SEAL SYSTEMS**

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
  - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Carbon steel.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

**PART 3 - EXECUTION**

**3.1 SLEEVE INSTALLATION**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
  - 2. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07 9200 "Joint Sealants."

- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 8413 "Penetration Firestopping."

### **3.2 SLEEVE-SEAL-SYSTEM INSTALLATION**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### **3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE**

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls below Grade:
    - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 2. Concrete Slabs-on-Grade:
    - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 3. Interior Partitions:
    - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.

**END OF SECTION**

**SECTION 22 0518**  
**ESCUTCHEONS FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Escutcheons.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**PART 2 - PRODUCTS**

**2.1 ESCUTCHEONS**

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - c. Insulated Piping: One-piece, Chrome plated brass type or split-plate, type with concealed hinge.
    - d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - e. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - f. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.

**3.2 FIELD QUALITY CONTROL**

- A. Replace broken and damaged escutcheons and floor plates using new materials.

**END OF SECTION**

**SECTION 22 0523.12**  
**BALL VALVES FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Brass ball valves.
  - 2. Bronze ball valves.

**1.3 DEFINITIONS**

- A. CWP: Cold working pressure.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of valve.
  - 1. Certification that products comply with NSF 61 Annex G and NSF 372.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, and soldered ends.
  - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

**PART 2 - PRODUCTS**

**2.1 GENERAL REQUIREMENTS FOR VALVES**

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B1.20.1 for threads for threaded end valves.
  - 2. ASME B16.18 for solder-joint connections.
- C. NSF Compliance: NSF 61 Annex G and NSF 372 for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
  - 1. Handlever: For quarter-turn valves smaller than NPS 4.
- H. Valves in Insulated Piping:
  - 1. Include 2-inch stem extensions.

2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.

## **2.2 BRASS BALL VALVES**

### **A. Two-Piece, Brass Ball Valves with Full Port and Stainless-Steel Trim:**

1. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 600 psig.
  - c. Body Design: Two piece.
  - d. Body Material: Forged brass.
  - e. Ends: Threaded and soldered.
  - f. Seats: PTFE.
  - g. Stem: Stainless steel.
  - h. Ball: Stainless steel, vented.
  - i. Port: Full.

## **2.3 BRONZE BALL VALVES**

### **A. Two-Piece, Bronze Ball Valves with Full Port and Stainless-Steel Trim:**

1. Description:
  - a. Standard: MSS SP-110.
  - b. CWP Rating: 600 psig.
  - c. Body Design: Two piece.
  - d. Body Material: Bronze.
  - e. Ends: Threaded or soldered.
  - f. Seats: PTFE.
  - g. Stem: Stainless steel.
  - h. Ball: Stainless steel, vented.
  - i. Port: Full.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

### **3.2 VALVE INSTALLATION**

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.

- D. Install valves in position to allow full stem movement.

### **3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS**

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

### **3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE**

- A. Pipe NPS 2 and Smaller:
  - 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Two-piece, brass ball valves with full port and stainless-steel trim.
  - 3. Two-piece, bronze ball valves with full port and stainless-steel trim.

**END OF SECTION**

## **SECTION 22 0529**

### **HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Metal pipe hangers and supports.
  - 2. Thermal-hanger shield inserts.
  - 3. Fastener systems.

##### **1.3 DEFINITIONS**

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

#### **PART 2 - PRODUCTS**

##### **2.1 METAL PIPE HANGERS AND SUPPORTS**

- A. Carbon-Steel Pipe Hangers and Supports:
  - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
  - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- B. Stainless-Steel Pipe Hangers and Supports:
  - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  - 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- C. Copper Pipe Hangers:
  - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
  - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

##### **2.2 THERMAL-HANGER SHIELD INSERTS**

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

##### **2.3 FASTENER SYSTEMS**

- A. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## **PART 3 - EXECUTION**

### **3.1 HANGER AND SUPPORT INSTALLATION**

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- C. Fastener System Installation:
  - 1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- H. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4: 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.

### **3.2 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1 inch.

### **3.3 HANGER AND SUPPORT SCHEDULE**

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.



- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
  - 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
  - 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
  - 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
  - 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
  - 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
  - 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.

19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- I. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.

- b. Medium (MSS Type 32): 1500 lb.
  - c. Heavy (MSS Type 33): 3000 lb.
- 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  - 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  - 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- M. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  - 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  - 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
  - 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  - 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
  - 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
  - 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
  - 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    - a. Horizontal (MSS Type 54): Mounted horizontally.
    - b. Vertical (MSS Type 55): Mounted vertically.
    - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- P. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

**END OF SECTION**

**SECTION 22 0719**  
**PLUMBING PIPING INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes insulating the following plumbing piping services:
  - 1. Domestic hot-water piping.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- C. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.6 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

**1.7 SCHEDULING**

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## **PART 2 - PRODUCTS**

### **2.1 INSULATION MATERIALS**

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

### **2.2 ADHESIVES**

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  - 1. Verify that systems to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

### **3.3 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.

- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- K. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- L. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- M. For above-ambient services, do not install insulation to the following:
  - 1. Vibration-control devices.
  - 2. Testing agency labels and stamps.
  - 3. Nameplates and data plates.
  - 4. Cleanouts.

### **3.4 PENETRATIONS**

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
  - 1. Comply with requirements in Section 07 8413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- C. Insulation Installation at Floor Penetrations:
  - 1. Pipe: Install insulation continuously through floor penetrations.
  - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 8413 "Penetration Firestopping."

### **3.5 GENERAL PIPE INSULATION INSTALLATION**

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

### **3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION**

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
  - 1. Install pipe insulation to outer diameter of pipe flange.
  - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
  - 1. Install mitered sections of pipe insulation.
  - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

**3.7 FINISHES**

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

**3.8 PIPING INSULATION SCHEDULE, GENERAL**

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

**3.9 INDOOR PIPING INSULATION SCHEDULE**

- A. Domestic Hot and Recirculated Hot Water:
  - 1. NPS 1-1/4 and Smaller: Insulation shall be the following:
    - a. Flexible Elastomeric: 3/4 inch thick.
  - 2. NPS 1-1/2 and Larger: Insulation shall be the following:
    - a. Flexible Elastomeric: 1 inch thick.

**END OF SECTION**

**SECTION 22 1116**  
**DOMESTIC WATER PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Copper tube and fittings.
  - 2. PEX tube and fittings.
  - 3. Transition fittings.
  - 4. Dielectric fittings.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For transition fittings and dielectric fittings.

**1.4 INFORMATIONAL SUBMITTALS**

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

**1.5 FIELD CONDITIONS**

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
  - 1. Notify Architect no fewer than two days in advance of proposed interruption of water service.

**PART 2 - PRODUCTS**

**2.1 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."
- C. Comply with NSF Standard 372 for low lead.

**2.2 COPPER TUBE AND FITTINGS**

- A. Hard Copper Tube: and [ASTM B 88, Type M] water tube, drawn temper.
- B. Soft Copper Tube: and [ASTM B 88, Type L] water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
  - 1. MSS SP-123.
  - 2. Cast-copper-alloy, hexagonal-stock body.
  - 3. Ball-and-socket, metal-to-metal seating surfaces.
  - 4. Solder-joint or threaded ends.
- G. Copper-Tube, Extruded-Tee Connections:
  - 1. Description: Tee formed in copper tube according to ASTM F 2014.



- H. Appurtenances for Grooved-End Copper Tubing:
1. Bronze Fittings for Grooved-End, Copper Tubing: ASTM B 75/B 75M copper tube or ASTM B 584 bronze castings.
  2. Mechanical Couplings for Grooved-End Copper Tubing:
    - a. Copper-tube dimensions and design similar to AWWA C606.
    - b. Ferrous housing sections.
    - c. EPDM-rubber gaskets suitable for hot and cold water.
    - d. Bolts and nuts.
    - e. Minimum Pressure Rating: 300 psig.

## **2.3 PEX TUBE AND FITTINGS**

- A. Tube Material: PEX plastic according to ASTM F 876.
- B. Fittings: ASTM F 1807, metal insert and copper crimp rings.
- C. Manifold: Multiple-outlet, plastic or corrosion-resistant-metal assembly complying with ASTM F 876; with corrosion-resistant-metal valve for each outlet.
- D. Provide silver or aluminum colored PEX where piping is exposed to view, such as toilet supply.

## **2.4 PIPING JOINING MATERIALS**

- A. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- B. Solder Filler Metals: ASTM B 32, lead-free alloys.
- C. Flux: ASTM B 813, water flushable.
- D. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

## **2.5 ENCASEMENT FOR PIPING**

- A. Standard: ASTM A 674 or AWWA C105/A21.5.
- B. Form: Sheet or tube.
- C. Color: Black.

## **2.6 TRANSITION FITTINGS**

- A. General Requirements:
  1. Same size as pipes to be joined.
  2. Pressure rating at least equal to pipes to be joined.
  3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
- D. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- E. Dielectric Unions:
  1. Standard: ASSE 1079.
  2. Pressure Rating: 125 psig minimum at 180 deg F.
  3. End Connections: Solder-joint copper alloy and threaded ferrous.
- F. Dielectric Nipples:
  1. Standard: IAPMO PS 66.
  2. Electroplated steel nipple complying with ASTM F 1545.
  3. Pressure Rating and Temperature: 300 psig at 225 deg F.

4. End Connections: Male threaded or grooved.
5. Lining: Inert and noncorrosive, propylene.

### **PART 3 - EXECUTION**

#### **3.1 EARTHWORK**

- A. Comply with requirements in Section 31 2000 "Earth Moving" for excavating, trenching, and backfilling.

#### **3.2 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 22 0519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 22 1119 "Domestic Water Piping Specialties."
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 1119 "Domestic Water Piping Specialties."
- G. Install domestic water piping level and plumb.
- H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- L. Install piping to permit valve servicing.
- M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- N. Install piping free of sags and bends.
- O. Install fittings for changes in direction and branch connections.
- P. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- Q. Install PEX tubing with loop at each change of direction of more than 90 degrees.
- R. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 22 1123 "Domestic Water Pumps."
- S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 0517 "Sleeves and Sleeve Seals for Plumbing Piping."

- T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 0517 "Sleeves and Sleeve Seals for Plumbing Piping."
- U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 0518 "Escutcheons for Plumbing Piping."

### **3.3 JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- G. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.
- H. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.
- I. Joints for PEX Tubing: Join according to ASTM F 1807 for metal insert and copper crimp ring fittings and ASTM F 1960 for cold expansion fittings and reinforcing rings.

### **3.4 TRANSITION FITTING INSTALLATION**

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
  - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
  - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings.

### **3.5 DIELECTRIC FITTING INSTALLATION**

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

### **3.6 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for pipe hanger, support products, and installation in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

- b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
  - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
- 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
  - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Install vinyl-coated hangers for PEX tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1 and Smaller: 32 inches with 3/8-inch rod.
- G. Install hangers for vertical PEX tubing every 48 inches.
- H. Support piping and tubing not listed in this article according to MSS SP-58 and manufacturer's written instructions.
- I. PEX tubing to be anchored to wall stud at all shut-off valves.

### **3.7 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
  - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
  - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

### **3.8 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Piping Inspections:
    - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
    - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
      - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
      - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
  - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- 2. Piping Tests:
  - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
  - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
  - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

### **3.9 ADJUSTING**

- A. Perform the following adjustments before operation:
  - 1. Close drain valves, hydrants, and hose bibbs.
  - 2. Open shutoff valves to fully open position.
  - 3. Open throttling valves to proper setting.
  - 4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
  - 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
  - 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
  - 7. Check plumbing specialties and verify proper settings, adjustments, and operation.

### **3.10 CLEANING**

- A. Clean and disinfect potable domestic water piping as follows:
  - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill and isolate system according to either of the following:
      - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.

- 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
- c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
- d. Repeat procedures if biological examination shows contamination.
- e. Submit water samples in sterile bottles to authorities having jurisdiction.

### **3.11 PIPING SCHEDULE**

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be the following:
  1. Soft copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
- E. Aboveground domestic water piping in Community Buildings, NPS 2 and smaller, shall be the following:
  1. Hard copper tube, ASTM B 88, Type M; cast- or wrought-copper, solder-joint fittings; and soldered joints.
- F. Aboveground domestic water piping in Residential Building, NPS 1 and smaller, shall be the following:
  1. Fittings for PEX tube:
    - a. ASTM F 1807, metal insert and copper crimp rings.

### **3.12 VALVE SCHEDULE**

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
  2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
  3. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

### **END OF SECTION**

**SECTION 22 1119**  
**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Outlet boxes.
  - 2. Water-hammer arresters.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For domestic water piping specialties.
  - 1. Include diagrams for power, signal, and control wiring.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

**PART 2 - PRODUCTS**

**2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES**

- A. Potable-water piping and components shall comply with NSF 61 Annex G.

**2.2 PERFORMANCE REQUIREMENTS**

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

**2.3 WATER PRESSURE-REDUCING VALVES**

- A. Water Regulators:
  - 1. Standard: ASSE 1003.
  - 2. Pressure Rating: Initial working pressure of 150 psig.
  - 3. Size: 1 inch.
  - 4. Design Flow Rate: 50 gpm.
  - 5. Design Inlet Pressure: Field verify.
  - 6. Design Outlet Pressure Setting: 50 psf.
  - 7. Body: Bronze with chrome-plated finish for NPS 2 and smaller.
  - 8. End Connections: Threaded for NPS 2 and smaller.

**2.4 OUTLET BOXES**

- A. Icemaker Outlet Boxes:
  - 1. Mounting: Recessed.
  - 2. Material and Finish: Plastic box and faceplate.
  - 3. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
  - 4. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

## **2.5 WATER-HAMMER ARRESTERS**

- A. Water-Hammer Arresters:
  - 1. Standard: ASSE 1010 or PDI-WH 201.
  - 2. Type: Copper tube with piston.
  - 3. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- B. Install water-hammer arresters in water piping according to PDI-WH 201.

### **3.2 CONNECTIONS**

- A. Comply with requirements for ground equipment in Section 26 0526 "Grounding and Bonding for Electrical Systems."
- B. Fire-retardant-treated-wood blocking is specified in Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

### **3.3 ADJUSTING**

- A. Set field-adjustable pressure set points of water pressure-reducing valves.

## **END OF SECTION**



**SECTION 22 1316**  
**SANITARY WASTE AND VENT PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Pipe, tube, and fittings.
  - 2. Specialty pipe fittings.
  - 3. Encasement for underground metal piping.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
  - 1. Soil, Waste, and Vent Piping: 10-foot head of water.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.5 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

**1.6 PROJECT CONDITIONS**

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  - 1. Notify Architect no fewer than two days in advance of proposed interruption of sanitary waste service.

**PART 2 - PRODUCTS**

**2.1 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

**2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS**

- A. Pipe and Fittings: ASTM A 74, Service class(es).
- B. Gaskets: ASTM C 564, rubber.
- C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

**2.3 PVC PIPE AND FITTINGS**

- A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.
- B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- C. Adhesive Primer: ASTM F 656.
  - 1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Solvent Cement: ASTM D 2564.
  1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Solvent cement shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## **2.4 SPECIALTY PIPE FITTINGS**

- A. Transition Couplings:
  1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
  2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
  3. Unshielded, Nonpressure Transition Couplings:
    - a.
    - b. Standard: ASTM C 1173.
    - c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    - d. Sleeve Materials:
      - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
      - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
      - 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
  4. Shielded, Nonpressure Transition Couplings:
    - a. Standard: ASTM C 1460.
    - b. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
  5. Pressure Transition Couplings:
    - a. Standard: AWWA C219.
    - b. Description: Metal, sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
    - c. Center-Sleeve Material: Manufacturer's standard
    - d. Gasket Material: Natural or synthetic rubber.
    - e. Metal Component Finish: Corrosion-resistant coating or material.

## **2.5 ENCASEMENT FOR UNDERGROUND METAL PIPING**

- A. Standard: ASTM A 674 or AWWA C105/A 21.5.
- B. Material: Linear low-density polyethylene film of 0.008-inch minimum thickness.
- C. Form: Sheet.
- D. Color: Black.

## **PART 3 - EXECUTION**

### **3.1 EARTH MOVING**

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 31 2000 "Earth Moving."

### **3.2 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- K. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
  - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
  - 2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
  - 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  - 1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.
- N. Plumbing Specialties:
  - 1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with

requirements for cleanouts specified in Section 22 1319 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 22 1319 "Sanitary Waste Piping Specialties."
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 0517 "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 0517 "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 0518 "Escutcheons for Plumbing Piping."

### **3.3 JOINT CONSTRUCTION**

- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
  3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

### **3.4 SPECIALTY PIPE FITTING INSTALLATION**

- A. Transition Couplings:
  1. Install transition couplings at joints of piping with small differences in OD's.
  2. In Drainage Piping: Unshielded, nonpressure transition couplings.
  3. In Aboveground Force Main Piping: Fitting-type transition couplings.
  4. In Underground Force Main Piping:
    - a. NPS 1-1/2 and Smaller: Fitting-type transition couplings.
    - b. NPS 2 and Larger: Pressure transition couplings.

### **3.5 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for seismic-restraint devices specified in Section 22 0548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 22 0529 "Hangers and Supports for Plumbing Piping and Equipment."
  1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
  2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
  3. Vertical Piping: MSS Type 8 or Type 42, clamps.
  4. Install individual, straight, horizontal piping runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
  5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  6. Base of Vertical Piping: MSS Type 52, spring hangers.

- C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
  - 2. NPS 3: 60 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
- G. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
  - 2. NPS 3: 48 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
- H. Install supports for vertical PVC piping every 48 inches.
- I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### **3.6 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:
  - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
  - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
  - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
  - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
  - 5. Comply with requirements for cleanouts and drains specified in Section 22 1319 "Sanitary Waste Piping Specialties."
  - 6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

### **3.7 IDENTIFICATION**

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 22 0553 "Identification for Plumbing Piping and Equipment."

### **3.8 FIELD QUALITY CONTROL**

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
  - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
  - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  - 2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  - 3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
  - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
  - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  - 6. Prepare reports for tests and required corrective action.

### **3.9 CLEANING AND PROTECTION**

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

### **3.10 PIPING SCHEDULE**

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
  - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 3. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- C. Aboveground, vent piping NPS 4 and smaller shall be the following:

1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  2. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
  2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

**END OF SECTION**

**SECTION 22 1319**  
**SANITARY WASTE PIPING SPECIALTIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Cleanouts.
  - 2. Floor drains.
  - 3. Roof flashing assemblies.
  - 4. Through-penetration firestop assemblies.
  - 5. Miscellaneous sanitary drainage piping specialties.
  - 6. Flashing materials.

**1.3 DEFINITIONS**

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FOG: Fats, oils, and greases.
- C. FRP: Fiberglass-reinforced plastic.
- D. HDPE: High-density polyethylene plastic.
- E. PE: Polyethylene plastic.
- F. PP: Polypropylene plastic.
- G. PVC: Polyvinyl chloride plastic.

**1.4 QUALITY ASSURANCE**

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

**1.5 COORDINATION**

- A. Coordinate size and location of roof penetrations.

**PART 2 - PRODUCTS**

**2.1 CLEANOUTS**

- A. **Cast Iron** Floor Cleanouts:
  - 1. Size: Same as connected branch.
  - 2. Body: **Cast Iron**.
  - 3. Closure Plug: **Cast Iron**.
  - 4. Riser: Drainage pipe fitting and riser to cleanout of same material as drainage piping.

**2.2 FLOOR DRAINS**

- A. Cast Iron Floor Drains:
  - 1. Standard: ASME A112.6.3.
  - 2. Material: Cast Iron.
  - 3. Seepage Flange: Required.
  - 4. Clamping Device: Required.



5. Outlet: Bottom.
6. Sediment Bucket: Not required.
7. Top or Strainer Material: Stainless steel.
8. Top of Body and Strainer Finish: Stainless steel.
9. Top Shape: Round.
10. Dimensions of Top or Strainer: 6 inches.
11. Trap Material: Cast Iron drainage piping.
12. Trap Pattern: Standard P-trap.

## **2.3 ROOF FLASHING ASSEMBLIES**

- A. Roof Flashing Assemblies:
  1. Description: Manufactured assembly made of 4.0-lb/sq. ft., 0.0625-inch-thick, lead flashing collar and skirt extending at least 6 inches from pipe, with galvanized-steel boot reinforcement and counterflashing fitting.
    - a. Open-Top Vent Cap: Without cap.

## **2.4 THROUGH-PENETRATION FIRESTOP ASSEMBLIES**

- A. Through-Penetration Firestop Assemblies:
  1. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
  2. Size: Same as connected soil, waste, or vent stack.
  3. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
  4. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
  5. Special Coating: Corrosion resistant on interior of fittings.

## **2.5 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES**

- A. Floor-Drain, Trap-Seal Primer Fittings:
  1. Size: Same as floor drain outlet with NPS 1/2 side inlet.
- B. Stack Flashing Fittings:
  1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.
  2. Size: Same as connected stack vent or vent stack.

## **2.6 FLASHING MATERIALS**

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
  1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
  2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
  1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  2. Locate at each change in direction of piping greater than 45 degrees.

3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
  1. Position floor drains for easy access and maintenance.
  2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
  3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
  4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- E. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.
- F. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.
- G. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
- H. Assemble open drain fittings and install with top of hub 1 inch above floor.
- I. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- J. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- K. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

### **3.2 CONNECTIONS**

- A. Comply with requirements in Section 22 1316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.

### **3.3 INSTALLATION**

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
  1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
  1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
  2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
  3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 07 6200 "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

### **3.4 FIELD QUALITY CONTROL**

- A. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### **3.5 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION**

**SECTION 22 3300**  
**ELECTRIC, DOMESTIC-WATER HEATERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Residential, small-capacity, electric, domestic-water heaters.
  - 2. Residential, electric, storage, domestic-water heaters.
  - 3. Domestic-water heater accessories.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
  - 1. Wiring Diagrams: For power, signal, and control wiring.

**1.5 INFORMATIONAL SUBMITTALS**

- A. Seismic Qualification Certificates: For commercial domestic-water heaters, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Product Certificates: For each type of residential, electric, domestic-water heater, from manufacturer.
- C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Warranty: Sample of special warranty.

**1.6 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

**1.7 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

## **1.8 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

## **1.9 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including storage tank and supports.
    - b. Faulty operation of controls.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
  - 2. Warranty Periods: From date of Substantial Completion.
    - a. Residential, Electric, Storage, Domestic-Water Heaters:
      - 1) Storage Tank: 10 years.
      - 2) Controls and Other Components: Two years.
    - b. Compression Tanks: Five years.

## **PART 2 - PRODUCTS**

### **2.1 RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATERS**

- A. Residential, Electric, Storage, Domestic-Water Heaters:
  - 1. Standard: UL 174.
  - 2. Storage-Tank Construction: Steel.
    - a. Tappings: ASME B1.20.1 pipe thread.
    - b. Pressure Rating: 150 psig.
    - c. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending lining material into tappings.
  - 3. Factory-Installed Storage-Tank Appurtenances:
    - a. Anode Rod: Replaceable magnesium.
    - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    - c. Drain Valve: ASSE 1005.
    - d. Insulation: Comply with ASHRAE 90.2.
    - e. Jacket: Steel, cylindrical, with enameled finish.
    - f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
    - g. Heating Elements: Two; electric, screw-in immersion type; wired for nonsimultaneous operation unless otherwise indicated. Limited to 12 kW total.
    - h. Temperature Control: Adjustable thermostat.
    - i. Safety Control: High-temperature-limit cutoff device or system.
    - j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.
- B. Capacity and Characteristics:
  - 1. Capacity: See plumbing schedule.

2. Recovery: 21 gph at 90 deg F temperature rise.
3. Temperature Setting: 125 deg F.
4. Power Demand: 4.5 kilowatts.
5. Heating Elements: 4.5 kilowatts.
6. Electrical Characteristics:
  - a. Volts: 240.
  - b. Phases: Single.
  - c. Hertz: 60.

## **2.2 DOMESTIC-WATER HEATER ACCESSORIES**

- A. Domestic-Water Compression Tanks:
  1. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
  2. Construction:
    - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
    - b. Interior Finish: Comply with NSF 61 Annex G barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    - c. Air-Charging Valve: Factory installed.
  3. Capacity and Characteristics:
    - a. Working-Pressure Rating: 150 psig.
    - b. Capacity Acceptable: 2 gal. minimum.
    - c. Air Precharge Pressure: To be field determined by can tractor
- B. Drain Pans: **Plastic** with raised edge. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.
- C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1 or ASHRAE 90.2.
- D. Heat-Trap Fittings: ASHRAE 90.2.

## **PART 3 - EXECUTION**

### **3.1 DOMESTIC-WATER HEATER INSTALLATION**

- A. Residential, Electric, Domestic-Water Heater Mounting: Install residential, electric, domestic-water heaters on floor.
  1. Maintain manufacturer's recommended clearances.
  2. Arrange units so controls and devices that require servicing are accessible.
  3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  4. Install anchor bolts to elevations required for proper attachment to supported equipment.
  5. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
  1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in

Section 22 0523.12 "Ball Valves for Plumbing Piping," Section 22 0523.13 "Butterfly Valves for Plumbing Piping," and Section 22 0523.15 "Gate Valves for Plumbing Piping."

- C. Install commercial, electric, domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 22 0548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 22 1119 "Domestic Water Piping Specialties."
- E. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- F. Fill electric, domestic-water heaters with water.
- G. Charge domestic-water compression tanks with air.

### **3.2 CONNECTIONS**

- A. Comply with requirements for piping specified in Section 22 1116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

### **3.3 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification specified in Section 22 0553 "Identification for Plumbing Piping and Equipment."

### **3.4 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 01 4000 "Quality Requirements" for retesting and reinspecting requirements and Section 01 7300 "Execution" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

### **END OF SECTION**

**SECTION 22 4100**  
**RESIDENTIAL PLUMBING FIXTURES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Bathtubs.
  - 2. Faucets.
  - 3. Kitchen sinks.
  - 4. Laminar-flow, faucet-spout outlets.
  - 5. Disposers.
  - 6. Water closets.
  - 7. Toilet seats.
  - 8. Supply fittings.
  - 9. Waste fittings.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted plumbing fixtures.
- B. Sample Warranty: For special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in emergency, operation, and operation and maintenance manuals.
  - 1. In addition to items specified in Section 01 7823 "Operation and Maintenance Data," include the following:
    - a. Servicing and adjustments of walk-in baths.

**PART 2 - PRODUCTS**

**2.1 BATHTUBS**

- A. Bathtubs: As scheduled on drawings.

**2.2 BATHTUB FAUCETS**

- A. As scheduled on drawings.
  - 1. Shower Head: As scheduled on drawings
  - 2. Bathtub Filler Spout: As scheduled on drawings

**2.3 LAVATORY FAUCETS**

- A. As scheduled on drawings.



## **2.4 KITCHEN SINKS**

- A. Kitchen Sinks: As scheduled on drawings.

## **2.5 SINK FAUCETS**

1. As scheduled on drawings.

## **2.6 DISHWASHER AIR-GAP FITTINGS**

- A. Dishwasher Air-Gap Fittings:
1. Standard: ASSE 1021.
  2. Description: Device designed to prevent backflow of contaminated liquid into domestic dishwashers.
  3. Material: Plastic body with chrome-plated-brass cover.
  4. Hose Connections: 5/8-inch-ID inlet and 7/8-inch-ID outlet.
  5. Capacity: At least 5 gpm; at inlet pressure of at least 5 psig and at temperature of at least 140 deg F.
  6. Mounting: Deck.
  7. Hoses: Rubber and suitable for temperature of at least 140 deg F.
    - a. Inlet Hose: 5/8 inch ID and 48 inches long.
    - b. Outlet Hose: 7/8 inch ID and 48 inches long.

## **2.7 DISPOSERS**

- A. Disposers: Continuous-feed household, food waste.
1. Continuous-Feed Disposers:
  2. Standards: ASSE 1008 and UL 430, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  3. General: Include reset button; wall switch; corrosion-resistant chamber with jam-resistant, cutlery- or stainless-steel grinder or shredder; NPS 1-1/2 outlet; quick-mounting, stainless-steel sink flange; antisplash guard; and combination cover/stopper.
  4. Model: Sound-insulated chamber.
  5. Motor: 115-V ac, 1725 rpm, 1/3 hp with overload protection.

## **2.8 WATER CLOSETS**

- A. Water Closets: As scheduled on drawings.

## **2.9 SUPPLY FITTINGS**

- A. NSF Standard: Comply with NSF/ANSI 61 Annex G, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Lavatory and Kitchen Sink Supply Fittings:
1. Supply Piping: Chrome-plated-brass pipe or chrome-plated-copper tube matching water-supply piping size. Include chrome-plated wall flange.
  2. Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression stop with inlet connection matching water-supply piping type and size.
    - a. Operation: Wheel handle.
  3. Risers:
    - a. Size: NPS 3/8 for lavatories.
    - b. Size: NPS 1/2 for kitchen sinks.
    - c. Material: ASME A112.18.6, braided- or corrugated-stainless-steel flexible hose riser.

## **2.10 WASTE FITTINGS**

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/4 offset tailpiece for accessible lavatories.
- C. Drain: Pop-up type with NPS 1-1/4 straight tailpiece as part of faucet for standard lavatories.
- D. Trap:
  - 1. Size: NPS 1-1/4 for lavatories.
  - 2. Size: NPS 1-1/2 for kitchen sinks.
  - 3. Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated-brass or -steel wall flange.

## **2.11 GROUT**

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing-fixture installation.
- B. Examine walls, floors, cabinets, and counters for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Install plumbing fixtures level and plumb according to roughing-in drawings.
- B. Install floor-mounted water closets on closet flange attachments to drainage piping.
- C. Install counter-mounting fixtures in and attached to casework.
- D. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
  - 1. Exception: Use ball or gate valves if supply stops are not specified with fixture. Comply with valve requirements specified in Section 22 0523.12 "Ball Valves for Plumbing Piping" and Section 22 0523.15 "Gate Valves for Plumbing Piping."
- E. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- F. Install toilet seats on water closets.
- G. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- H. Install shower flow-control fittings with specified maximum flow rates in shower arms.
- I. Install traps on fixture outlets.
  - 1. Exception: Omit trap on fixtures with integral traps.
  - 2. Exception: Omit trap on indirect wastes unless otherwise indicated.
- J. Install disposer in outlet of each sink indicated to have a disposer. Install switch where indicated or in wall adjacent to sink if location is not indicated.
- K. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install in sink deck. Connect inlet hose to dishwasher and outlet hose to disposer.

- L. Set bathtubs in leveling bed of cement grout.
- M. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 0518 "Escutcheons for Plumbing Piping."
- N. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 9200 "Joint Sealants."

### **3.3 CONNECTIONS**

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 22 1116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 22 1316 "Sanitary Waste and Vent Piping."

### **3.4 ADJUSTING**

- A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

### **3.5 CLEANING AND PROTECTION**

- A. After completing installation of plumbing fixtures, inspect and repair damaged finishes.
- B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed plumbing fixtures and fittings.
- D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

### **END OF SECTION**

**SECTION 23 0517**  
**SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Sleeves.
  - 2. Stack-sleeve fittings.
  - 3. Sleeve-seal systems.
  - 4. Sleeve-seal fittings.
  - 5. Grout.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**PART 2 - PRODUCTS**

**2.1 SLEEVES**

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

**2.2 STACK-SLEEVE FITTINGS**

- A. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with setscrews.

**2.3 SLEEVE-SEAL SYSTEMS**

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
  - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Carbon steel.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

**2.4 SLEEVE-SEAL FITTINGS**

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

**2.5 GROUT**

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

**PART 3 - EXECUTION**

**3.1 SLEEVE INSTALLATION**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
  - 2. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 07 9200 "Joint Sealants."
- E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 8413 "Penetration Firestopping."

### **3.2 STACK-SLEEVE-FITTING INSTALLATION**

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
  - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 07 6200 "Sheet Metal Flashing and Trim."
  - 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
  - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 5. Using grout, seal the space around outside of stack-sleeve fittings.
- B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 07 8413 "Penetration Firestopping."

### **3.3 SLEEVE-SEAL-SYSTEM INSTALLATION**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### **3.4 SLEEVE-SEAL-FITTING INSTALLATION**

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

### **3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE**

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls above Grade:
    - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves.
  - 2. Exterior Concrete Walls below Grade:
    - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 3. Concrete Slabs-on-Grade:
    - a. Piping Smaller Than NPS 6: Cast-iron wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 4. Concrete Slabs above Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
  - 5. Interior Partitions:
    - a. Piping Smaller Than NPS 6.

**END OF SECTION**

**SECTION 23 0518**  
**ESCUTCHEONS FOR HVAC PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Escutcheons.
  - 2. Floor plates.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**PART 2 - PRODUCTS**

**2.1 ESCUTCHEONS**

- A. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:
    - a. Chrome-Plated Piping: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - b. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
    - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
    - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
    - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - h. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
    - i. Bare Piping in Equipment Rooms: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
    - j. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
  - 2. Escutcheons for Existing Piping:
    - a. Chrome-Plated Piping: Split-casting brass type with polished, chrome-plated finish.
    - b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge.

- c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
  - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge.
  - e. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.
  - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge.
  - g. Bare Piping in Unfinished Service Spaces: Split-casting brass type with polished, chrome-plated finish.
  - h. Bare Piping in Unfinished Service Spaces: Split-plate, stamped-steel type with concealed hinge.
  - i. Bare Piping in Equipment Rooms: Split-casting brass type with polished, chrome-plated finish.
  - j. Bare Piping in Equipment Rooms: Split-plate, stamped-steel type with concealed hinge.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
- 1. New Piping: One-piece, floor-plate type.
  - 2. Existing Piping: Split-casting, floor-plate type.

### **3.2 FIELD QUALITY CONTROL**

- A. Replace broken and damaged escutcheons and floor plates using new materials.

### **END OF SECTION**



**SECTION 23 0593**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Balancing Air Systems:
    - a. Constant-volume air systems.
  - 2. Duct leakage tests.

**1.3 DEFINITIONS**

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

**1.4 PREINSTALLATION MEETINGS**

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
  - 1. Minimum Agenda Items:
    - a. The Contract Documents examination report.
    - b. The TAB plan.
    - c. Needs for coordination and cooperation of trades and subcontractors.
    - d. Proposed procedures for documentation and communication flow.

**1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: Within 90 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 90 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 90 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 90 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.

2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

#### **1.6 QUALITY ASSURANCE**

- A. TAB Specialists Qualifications: Certified by AABC NEBB or TABB.
  1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC NEBB or TABB.
  2. TAB Technician: Employee of the TAB specialist and certified by AABC NEBB or TABB as a TAB technician.
- B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

#### **1.7 FIELD CONDITIONS**

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

### **PART 2 - PRODUCTS (Not Applicable)**

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- F. Examine equipment performance data including fan and pump curves.
  1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
  2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### **3.2 PREPARATION**

- A. Prepare a TAB plan that includes the following:
  - 1. Equipment and systems to be tested.
  - 2. Strategies and step-by-step procedures for balancing the systems.
  - 3. Instrumentation to be used.
  - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
  - 1. Airside:
    - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
    - b. Duct systems are complete with terminals installed.
    - c. Volume, smoke, and fire dampers are open and functional.
    - d. Clean filters are installed.
    - e. Fans are operating, free of vibration, and rotating in correct direction.
    - f. Automatic temperature-control systems are operational.
    - g. Ceilings are installed.
    - h. Windows and doors are installed.
    - i. Suitable access to balancing devices and equipment is provided.

### **3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING**

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 3300 "Air Duct Accessories."
  - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 0713 "Duct Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### **3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS**

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Test in accordance with ANSI/ACCA 5 QI-2005 protocol..
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 23 3113 "Metal Ducts."

### **3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS**

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
    - b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
    - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
    - d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.
  - 2. Measure fan static pressures as follows:
    - a. Measure static pressure directly at the fan outlet or through the flexible connection.
    - b. Measure static pressure directly at the fan inlet or through the flexible connection.
    - c. Measure static pressure across each component that makes up the air-handling system.
    - d. Report artificial loading of filters at the time static pressures are measured.
  - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  - 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
  - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
  2. Measure inlets and outlets airflow.
  3. Adjust each inlet and outlet for specified airflow.
  4. Re-measure each inlet and outlet after they have been adjusted.
- C. Verify final system conditions.
1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
  2. Re-measure and confirm that total airflow is within design.
  3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
  4. Mark all final settings.
  5. Test system in economizer mode. Verify proper operation and adjust if necessary.
  6. Measure and record all operating data.
  7. Record final fan-performance data.
- D. Measure and record the following:
1. Outdoor ambient temperature.
  2. Return air side temperature.
  3. Liquid line pressure.
  4. Liquid line temperature
  5. Suction line pressure.
  6. Suction line temperature.
  7. Condenser saturation temperature.
  8. Sub cooling valve.
  9. OEM sub cooling goal.
  10. Sub cooling deviation.

### **3.6 PROCEDURES FOR CONTINUOUSLY RUNNING BATH FANS**

- A. Adjust fans to deliver total indicated airflows at constant slow speed.
1. Measure total airflow.
  2. Adjust fan speed to meet scheduled constant minimum volume flow rate.

### **3.7 PROCEDURES FOR CONDENSING UNITS**

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record fan and motor operating data.

### **3.8 DUCT LEAKAGE TESTS**

- A. Witness the duct pressure testing performed by Installer.
- B. Verify that proper test methods are used and that leakage rates are within specified tolerances.
- C. Report deficiencies observed.

### **3.9 CONTROLS VERIFICATION**

- A. In conjunction with system balancing, perform the following:
1. Verify temperature control system is operating within the design limitations.
  2. Confirm that the sequences of operation are in compliance with Contract Documents.
  3. Verify that controllers are calibrated and function as intended.
  4. Verify that controller set points are as indicated.

- B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

### **3.10 TOLERANCES**

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
  - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 20 percent or 25 cfm.
  - 2. Air Outlets and Inlets: Plus or minus 20 percent or 25 cfm.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

### **3.11 PROGRESS REPORTING**

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

### **3.12 FINAL REPORT**

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
  - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  - 2. Include a list of instruments used for procedures, along with proof of calibration.
  - 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
  - 1. Pump curves.
  - 2. Fan curves.
  - 3. Field test reports prepared by system and equipment installers.
  - 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
  - 1. Title page.
  - 2. Name and address of the TAB specialist.
  - 3. Project name.
  - 4. Project location.
  - 5. Architect's name and address.
  - 6. Engineer's name and address.
  - 7. Contractor's name and address.
  - 8. Report date.
  - 9. Signature of TAB supervisor who certifies the report.
  - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  - 11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.

- c. Description of system operation sequence if it varies from the Contract Documents.
- 12. Nomenclature sheets for each item of equipment.
- 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
- 14. Notes to explain why certain final data in the body of reports vary from indicated values.
- 15. Test conditions for fans and pump performance forms including the following:
  - a. Settings for outdoor-, return-, and exhaust-air dampers.
  - b. Conditions of filters.
  - c. Cooling coil, wet- and dry-bulb conditions.
  - d. Face and bypass damper settings at coils.
  - e. Fan drive settings including settings and percentage of maximum pitch diameter.
  - f. Inlet vane settings for variable-air-volume systems.
  - g. Settings for supply-air, static-pressure controller.
  - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
  - 1. Quantities of outdoor, supply, return, and exhaust airflows.
  - 2. Water and steam flow rates.
  - 3. Duct, outlet, and inlet sizes.
  - 4. Pipe and valve sizes and locations.
  - 5. Terminal units.
  - 6. Balancing stations.
  - 7. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
  - 1. Unit Data:
    - a. Unit identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Unit arrangement and class.
    - g. Discharge arrangement.
    - h. Sheave make, size in inches, and bore.
    - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
    - j. Number, make, and size of belts.
    - k. Number, type, and size of filters.
  - 2. Motor Data:
    - a. Motor make, and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.

- f. Center-to-center dimensions of sheave and amount of adjustments in inches.
  - 3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Filter static-pressure differential in inches wg.
    - f. Preheat-coil static-pressure differential in inches wg.
    - g. Cooling-coil static-pressure differential in inches wg.
    - h. Heating-coil static-pressure differential in inches wg.
    - i. Return airflow in cfm.
    - j. Return-air damper position.
- F. Apparatus-Coil Test Reports:
  - 1. Coil Data:
    - a. System identification.
    - b. Location.
    - c. Coil type.
    - d. Number of rows.
    - e. Fin spacing in fins per inch o.c.
    - f. Make and model number.
    - g. Face area in sq. ft..
    - h. Tube size in NPS.
    - i. Tube and fin materials.
    - j. Circuiting arrangement.
  - 2. Test Data (Indicated and Actual Values):
    - a. Airflow rate in cfm.
    - b. Average face velocity in fpm.
    - c. Air pressure drop in inches wg.
    - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
    - e. Return-air, wet- and dry-bulb temperatures in deg F.
    - f. Entering-air, wet- and dry-bulb temperatures in deg F.
    - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
    - h. Refrigerant expansion valve and refrigerant types.
    - i. Refrigerant suction pressure in psig.
    - j. Refrigerant suction temperature in deg F.
    - k. Refrigerant liquid temperature
    - l. Refrigerant liquid pressure
    - m. Condenser saturation temperature.
- G. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
  - 1. Unit Data:
    - a. System identification.



- b. Location.
    - c. Coil identification.
    - d. Capacity in Btu/h.
    - e. Number of stages.
    - f. Connected volts, phase, and hertz.
    - g. Rated amperage.
    - h. Airflow rate in cfm.
    - i. Face area in sq. ft..
    - j. Minimum face velocity in fpm.
  - 2. Test Data (Indicated and Actual Values):
    - a. Heat output in Btu/h.
    - b. Airflow rate in cfm.
    - c. Air velocity in fpm.
    - d. Entering-air temperature in deg F.
    - e. Leaving-air temperature in deg F.
    - f. Voltage at each connection.
    - g. Amperage for each phase.
- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- 1. Fan Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and size.
    - e. Manufacturer's serial number.
    - f. Arrangement and class.
    - g. Sheave make, size in inches, and bore.
    - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
  - 2. Motor Data:
    - a. Motor make, and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.
    - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    - g. Number, make, and size of belts.
  - 3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Suction static pressure in inches wg.

- I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
  1. Report Data:
    - a. System and air-handling-unit number.
    - b. Location and zone.
    - c. Traverse air temperature in deg F.
    - d. Duct static pressure in inches wg.
    - e. Duct size in inches.
    - f. Duct area in sq. ft..
    - g. Indicated airflow rate in cfm.
    - h. Indicated velocity in fpm.
    - i. Actual airflow rate in cfm.
    - j. Actual average velocity in fpm.
    - k. Barometric pressure in psig.

### **3.13 VERIFICATION OF TAB REPORT**

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Construction Manager.
- B. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- C. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- D. If TAB work fails, proceed as follows:
  1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
  2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
  3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.
- E. Prepare test and inspection reports.

### **3.14 ADDITIONAL TESTS**

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

### **END OF SECTION**

**SECTION 23 0713**  
**DUCT INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes insulating the following duct services:
  - 1. Indoor, concealed supply and outdoor air.
  - 2. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
- B. Related Sections:
  - 1. Section 23 3113 "Metal Ducts" for duct liners.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.7 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 0529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 - PRODUCTS**

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
- E. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
  - 1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
  - 2. Service Temperature Range: Minus 20 to plus 180 deg F.
  - 3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
  - 4. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
  - 1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
  - 2. Service Temperature Range: 0 to 180 deg F.
  - 3. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
  - 4. Color: White.
- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
  - 1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
  - 2. Service Temperature Range: Minus 50 to plus 220 deg F.
  - 3. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
  - 4. Color: White.

## 2.4 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
  - 1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
  - 2. Service Temperature Range: 0 to plus 180 deg F.
  - 3. Color: White.

## 2.5 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:
  - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
  - 2. Fire- and water-resistant, flexible, elastomeric sealant.
  - 3. Service Temperature Range: Minus 40 to plus 250 deg F.
  - 4. Color: Aluminum.
- B. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:
  - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
  - 2. Fire- and water-resistant, flexible, elastomeric sealant.
  - 3. Service Temperature Range: Minus 40 to plus 250 deg F.
  - 4. Color: White.

## 2.6 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
  - 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
  - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
  - 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

## 2.7 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
  - 1. Width: 3 inches.
  - 2. Thickness: 11.5 mils.
  - 3. Adhesion: 90 ounces force/inch in width.
  - 4. Elongation: 2 percent.
  - 5. Tensile Strength: 40 lbf/inch in width.
  - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
  - 1. Width: 3 inches.
  - 2. Thickness: 6.5 mils.
  - 3. Adhesion: 90 ounces force/inch in width.
  - 4. Elongation: 2 percent.
  - 5. Tensile Strength: 40 lbf/inch in width.
  - 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
  - 1. Width: 2 inches.
  - 2. Thickness: 6 mils.
  - 3. Adhesion: 64 ounces force/inch in width.
  - 4. Elongation: 500 percent.
  - 5. Tensile Strength: 18 lbf/inch in width.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  - 1. Verify that systems to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

#### **3.3 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- 3.4 PENETRATIONS
- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Floor Penetrations:
1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
  2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 07 8413 "Penetration Firestopping."
- 3.5 INSTALLATION OF MINERAL-FIBER INSULATION
- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
    - e. Impale insulation over pins and attach speed washers.
    - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
  - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
  - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

### 3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

### 3.7 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
  1. Indoor, concealed supply and outdoor air.
  2. Indoor, concealed return located in unconditioned space.
  3. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
- B. Items Not Insulated:
  1. Fibrous-glass ducts.
  2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
  3. Factory-insulated flexible ducts.
  4. Factory-insulated plenums and casings.
  5. Flexible connectors.
  6. Vibration-control devices.
  7. Factory-insulated access panels and doors.

### 3.8 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, round and flat-oval, exhaust-air duct insulation shall be the following:
  1. Mineral-Fiber Blanket: 1 inches thick and 0.75-lb/cu. ft. nominal density.
- B. Concealed, rectangular, supply-air duct insulation shall be the following:
  1. Mineral-Fiber Blanket: 1 inches thick and 0.75-lb/cu. ft. nominal density.
- C. Concealed, rectangular, return-air duct insulation shall be the following:
  1. Mineral-Fiber Blanket: 1 inch thick and 0.75-lb/cu. ft. nominal density.
- D. Concealed, supply-air plenum insulation shall be the following:
  1. Mineral-Fiber Blanket: 1 inches thick and 0.75-lb/cu. ft. nominal density.
- E. Concealed, return-air plenum insulation shall be the following:



1. Mineral-Fiber Blanket: 1 inches thick and 0.75-lb/cu. ft. nominal density.

**END OF SECTION**

**SECTION 23 3113**  
**METAL DUCTS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Single-wall rectangular ducts and fittings.
  - 2. Single-wall round ducts and fittings.
  - 3. Sheet metal materials.
  - 4. Sealants and gaskets.
  - 5. Hangers and supports.
- B. Related Sections:
  - 1. Section 23 0593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
  - 2. Section 23 3300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of the following products:
  - 1. Sealants and gaskets.
- B. Delegated-Design Submittal:
  - 1. Sheet metal thicknesses.
  - 2. Joint and seam construction and sealing.
  - 3. Reinforcement details and spacing.
  - 4. Materials, fabrication, assembly, and spacing of hangers and supports.

**PART 2 - PRODUCTS**

**2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal

Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## **2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 1. Transverse Joints in Ducts Larger Than [60 Inches] <Insert dimension> in Diameter: Flanged.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
  - 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## **2.3 SHEET METAL MATERIALS**

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G90.
  - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
  - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## **2.4 SEALANT AND GASKETS**

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Water-Based Joint and Seam Sealant:
  - 1. Application Method: Brush on.
  - 2. Solids Content: Minimum 65 percent.
  - 3. Shore A Hardness: Minimum 20.
  - 4. Water resistant.
  - 5. Mold and mildew resistant.
  - 6. VOC: Maximum 75 g/L (less water).
  - 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  - 8. Service: Indoor or outdoor.
  - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- C. Flanged Joint Sealant: Comply with ASTM C 920.
  - 1. General: Single-component, acid-curing, silicone, elastomeric.
  - 2. Type: S.
  - 3. Grade: NS.
  - 4. Class: 25.
- D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

## **2.5 HANGERS AND SUPPORTS**

- A. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- D. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- F. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

## **PART 3 - EXECUTION**

### **3.1 DUCT INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.

- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 23 3300 "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

### **3.2 INSTALLATION OF EXPOSED DUCTWORK**

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### **3.3 DUCT SEALING**

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
  - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 2. Outdoor, Supply-Air Ducts: Seal Class A.
  - 3. Outdoor, Exhaust Ducts: Seal Class C.
  - 4. Outdoor, Return-Air Ducts: Seal Class C.
  - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
  - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
  - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
  - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.

9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

### **3.4 HANGER AND SUPPORT INSTALLATION**

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  1. Where practical, install concrete inserts before placing concrete.
  2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
  5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### **3.5 CONNECTIONS**

- A. Make connections to equipment with flexible connectors complying with Section 23 3300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### **3.6 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Leakage Tests:
  1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
  2. Test the following systems:
    - a. Supply Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 100 percent of total installed duct area for each designated pressure class.
    - b. Return Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 100 percent of total installed duct area for each designated pressure class.

- c. Exhaust Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Architect from sections installed, totaling no less than 100 percent of total installed duct area for each designated pressure class.
- 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
- 4. Test for leaks before applying external insulation.
- 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
- 6. Give seven days' advance notice for testing.
- C. Duct system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### **3.7 START UP**

- A. Air Balance: Comply with requirements in Section 23 0593 "Testing, Adjusting, and Balancing for HVAC."

### **3.8 DUCT SCHEDULE**

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:
- B. Supply Ducts:
  - 1. Ducts Connected to Constant-Volume Air-Handling Units:
    - a. Pressure Class: Positive 3-inch wg.
    - b. Minimum SMACNA Seal Class: A.
    - c. SMACNA Leakage Class for Rectangular: 24.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- C. Return Ducts:
  - 1. Ducts Connected to Air-Handling Units:
    - a. Pressure Class: Positive or negative 3-inch wg.
    - b. Minimum SMACNA Seal Class: A.
    - c. SMACNA Leakage Class for Rectangular: 24.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- D. Exhaust Ducts:
  - 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
    - a. Pressure Class: Negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- E. Elbow Configuration
  - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
    - a. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
  - 2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
- F. Branch Configuration:
- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.
    - b. Rectangular Main to Round Branch: Spin in.
  - 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
    - a. Velocity 1000 fpm or Lower: 90-degree tap.
    - b. Velocity 1000 to 1500 fpm: Conical tap.
    - c. Velocity 1500 fpm or Higher: 45-degree lateral.

**END OF SECTION**



**SECTION 23 3300**  
**AIR DUCT ACCESSORIES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Turning vanes.
  - 2. Flexible connectors.
  - 3. Flexible ducts.
  - 4. Duct accessory hardware.

**1.3 ACTION SUBMITTALS**

- A. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
  - 1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
    - a. Manual volume damper installations.

**PART 2 - PRODUCTS**

**2.1 ASSEMBLY DESCRIPTION**

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

**2.2 MATERIALS**

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G60.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

**2.3 TURNING VANES**

- A. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
  - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- B. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

- D. Vane Construction: Single wall.
- E. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.
- F. .

## **2.4 FLEXIBLE CONNECTORS**

- A. Materials: Flame-retardant or noncombustible fabrics.
- B. Coatings and Adhesives: Comply with UL 181, Class 1.
- C. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd..
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 200 deg F.

## **2.5 FLEXIBLE DUCTS**

- A. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
  - 1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
  - 2. Maximum Air Velocity: 4000 fpm.
  - 3. Temperature Range: Minus 20 to plus 175 deg F.
  - 4. Insulation R-Value: Comply with ASHRAE/IESNA 90.1.
  - 5. Clamps: Nylon strap in sizes 3 through 18 inches, to suit duct size.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install flexible connectors to connect ducts to equipment.
- D. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- E. Connect diffusers or light troffer boots to ducts directly or with maximum lengths of flexible duct clamped or strapped in place.
- F. Connect flexible ducts to metal ducts with draw bands.

## **END OF SECTION**

**SECTION 23 3423**  
**HVAC POWER VENTILATORS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Ceiling-mounted ventilators.

**1.3 PERFORMANCE REQUIREMENTS**

- A. Project Altitude: Base fan-performance ratings on sea level.
- B. Operating Limits: Classify according to AMCA 99.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
  - 1. Certified fan performance curves with system operating conditions indicated.
  - 2. Certified fan sound-power ratings.
  - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  - 4. Material thickness and finishes, including color charts.
  - 5. Dampers, including housings, linkages, and operators.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

**1.6 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. UL Standards: Power ventilators shall comply with UL 705.

**PART 2 - PRODUCTS**

**2.1 CEILING-MOUNTED VENTILATORS**

- A. Panasonic Whisper Green
- B. Housing: Steel, lined with acoustical insulation.
- C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- D. Grille: Plastic, louvered grille with flange on intake and thumbscrew attachment to fan housing.
- E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- F. Accessories:
  - 1. Two speed motor where scheduled.
  - 2. Two speed switch.

3. Manual Starter Switch: Single-pole rocker switch assembly with cover.
  4. Isolation: Rubber-in-shear vibration isolators.
  5. Manufacturer's standard roof jack or wall cap, and transition fittings.
  6. ENERGY STAR rated.
- G. Capacities and Characteristics:
1. Electrical Characteristics:
    - a. Volts: 120.
    - b. Phase: 1.
    - c. Hertz: 60.

## **2.2 MOTORS**

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified.
1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
- B. Permanently lubricated.

## **2.3 SOURCE QUALITY CONTROL**

- A. HVI-2100 Certified

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install power ventilators level and plumb.
- B. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- C. Install units with clearances for service and maintenance.

### **3.2 CONNECTIONS**

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 3300 "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

### **3.3 FIELD QUALITY CONTROL**

- A. Tests and Inspections:
1. Verify that shipping, blocking, and bracing are removed.
  2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  3. Verify that cleaning and adjusting are complete.
  4. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  5. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

## **END OF SECTION**

**SECTION 23 3713**  
**DIFFUSERS, REGISTERS, AND GRILLES**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Fixed face registers and grilles.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated, include the following:
  - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.

**PART 2 - PRODUCTS**

**2.1 REGISTERS AND GRILLES**

- A. Floor Register A, B:
  - 1. Material: Steel. Heavy duty.
  - 2. Finish: Baked enamel, color selected by Architect.
  - 3. Face Arrangement: Louvered two-way throw.
  - 4. Frame: 3/4 inch wide.
  - 5. Mounting: Lay in.
  - 6. Damper Type: Adjustable opposed blade. Fast operating.
  - 7. Accessory: Filter.
- B. Side Wall (Ceiling) Register:
  - 1. Material: Steel.
  - 2. Finish: Baked enamel, color selected by Architect.
  - 3. Face Arrangement: 1/2-inch core.
  - 4. Core Construction: Integral multi-shutter dumper with exposed operator.
  - 5. Frame: 1-5/16 inches wide.
  - 6. Mounting: Countersunk screw.
  - 7. Accessory: Filter.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels,

locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

**3.3 ADJUSTING**

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION**

**SECTION 23 7313**  
**AIR HANDLING UNITS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Semi-Custom Air Handling Units

**1.2 REFERENCES**

- A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- B. AMCA 99 - Standards Handbook.
- C. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- E. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
- F. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
- G. AHRI 430 - Central-Station Air-Handling Units.
- H. AHRI 435 - Application of Central-Station Air-Handling Units.
- I. ASTM B117 - Standard Practice for Operating Salt Spray Apparatus.
- J. NEMA MG1 - Motors and Generators.
- K. NFPA 70 - National Electrical Code.
- L. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- M. UL 723 - Test for Surface Burning Characteristics of Building Materials.
- N. UL 900 - Test Performance of Air Filter Units.
- O. UL 1995 - Standard for Heating and Cooling Equipment.
- P. UL 94 - Test for Flammability of Plastic Materials for Parts in Devices and Appliances.
- Q. IBC 2000, 2003 - International Building Code.
- R. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
- S. NFPA 5000 - Building Construction and Safety Code.
- T. ASHRAE 90.1 Energy Code.
- U. AHRI Standard 1060 - Rating Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment.
- V. GSA 2003 Facilities Standard - 5.9 HVAC Systems and Components.

**1.3 SUBMITTALS**

- A. Submit shop drawings and product data in accordance with Division 1.
- B. Submittals shall include the following:
  - 1. Dimensioned plan and elevation view drawings, including motor starter and control cabinets, required clearances, and location of all field connections.
  - 2. Summary of all auxiliary utility requirements such as: electricity, water, compressed air, etc. Summary shall indicate quality and quantity of each required utility.
  - 3. Ladder type schematic drawing of the power and ancillary utility field hookup requirements, indicating all items that are furnished.
  - 4. Manufacturer's performance of each unit. Selection shall indicate, as a minimum, the following:
    - a. Input data used for selection.
    - b. Model number of the unit.

- c. Net capacity.
    - d. Rated load amp draw.
    - e. Noise levels produced by equipment.
    - f. Fan curves.
    - g. Approximate unit shipping weight.
  - C. Seismic Qualification Data: Certificates, for air handling unit, accessories, and components, from manufacturer.
  - D. Mounting Base: For securing air handling unit to concrete base.
    - 1. Seismic Fabrication Requirements: Fabricate mounting base and attachment to air handling unit, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Section 23 0548 "Vibration and Seismic Controls for HVAC" when mounting base is anchored to building structure.
- 1.4 OPERATION AND MAINTENANCE DATA**
- A. Include data on design, inspection and procedures related to preventative maintenance. Operation and Maintenance manuals shall be submitted at the time of unit shipment.
- 1.5 QUALIFICATIONS**
- A. Manufacturer shall be a company specializing in the design and manufacture of commercial / industrial HVAC equipment. Manufacturer shall have been in production of HVAC equipment for a minimum of 5 years.
  - B. Each unit shall bear an ETL or UL label under UL Standard 1995 indicating the complete unit is listed as an assembly. ETL or UL listing of individual components, or control panels only, is not acceptable.
- 1.6 DELIVERY, STORAGE, AND HANDLING**
- A. Deliver, store, protect and handle products to site under the supervision of the owner.
- 1.7 SEQUENCING AND SCHEDULING**
- A. Coordinate work performed under this section with work performed under the separate installation contract.
- 1.8 WARRANTY**
- A. The complete unit shall be covered with a parts only warranty for 18 months as a standard. An optional 24 month shall also be available. The warranty period shall start on the date of equipment shipment from VTS America's manufacturing facility.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Provide air handling units as manufactured by Lennox
  - 1. Acceptable alternate air handling unit manufactures:
    - a. Trane, Daikin
    - b. Racan-Carrier Company

### **2.2 GENERAL**

- A. Furnish and install where shown on the plans air handling units with construction features as specified below. The units shall be provided and installed in strict accordance with the specifications. All units shall be complete with all components and accessories as specified. Any exceptions must be clearly defined. The contractor shall be responsible for any additional expenses that may occur due to any exception made.



## **2.3 FACTORY TESTING AND QUALITY CONTROL**

- A. Standard Factory Tests: The fans shall be factory run tested to ensure structural integrity and proper RPM. All electrical circuits shall be tested to ensure correct operation before shipment of unit. Units shall pass quality control and be thoroughly cleaned prior to shipment.

## **2.4 UNIT CONSTRUCTION DESCRIPTION**

- A. Fabricate unit with heavy gauge channel posts and panels secured with mechanical fasteners. All panels, access doors, and ship sections shall be sealed with permanently applied bulb-type gasket. Shipped loose gasketing is not allowed.
- B. Panels and access doors shall be constructed as a 2-inch nominal thick; thermal broke assembly, injected with foam insulation with an R-value of not less than R-13.
  - 1. The outer panel shall be constructed of G90 galvanized steel.
  - 2. The floor plate shall be constructed of G90 galvanized steel.
  - 3. Unit will be furnished with solid inner liners.
- C. The casing leakage rate shall not exceed 0.50 cfm per square foot of casing surface area at design static pressure up to a maximum of +5" w.c. in positive pressure sections and -6" w.c. in negative pressure sections (.0025 m3/s per square meter of cabinet area at 1.24 kPa static pressure)
- D. Module to module field assembly shall be accomplished with an overlapping, full perimeter internal splice joint that is sealed with bulb type gasketing on both mating modules to minimize on-site labor and meet indoor air quality standards.
- E. Access doors shall be flush mounted to cabinetry, with minimum of two six inch long stainless steel piano-type hinges, latch and full size handle assembly. Access doors shall swing outward for unit sections under negative pressure. Access doors on positive pressure sections, shall have a secondary latch to relieve pressure and prevent injury upon access.
- F. The unit base shall be provided by others.
- G. Construct drain pans from stainless steel with cross break and double sloping pitch to drain connection. Provide drain pans under cooling coil section. Drain connection centerline shall be a minimum of 3" above the base rail to aid in proper condensate trapping. Drain connections that protrude from the base rail are not acceptable. There must be a full 2" thickness of insulation under drain pan.

## **2.5 FAN ASSEMBLIES**

- A. Acceptable fan assembly shall be a double width, double inlet, class II, belt-drive type housed forward curved fan dynamically balanced as an assembly, as shown in schedule. Maximum fan RPM shall be below first critical fan speed. Fan assemblies shall be dynamically balanced by the manufacturer on all three planes and at all bearing supports. Copper lubrication lines shall be provided and extend from the bearings and attached with grease fittings to the fan base assembly near access door. If not supplied at the factory, contractor shall mount copper lube lines in the field. Fan and motor shall be mounted internally on a steel base. Provide access to motor, drive, and bearings through hinged access door.
- B. Fan and motor shall be mounted internally on a steel base. Factory mount motor on slide base that can be slid out the side of the unit if removal is required. Provide access to motor, drive, and bearings through hinged access door. Fan and motor assembly shall be mounted on 2" deflection spring vibration type isolators inside cabinetry. Seismic snubbers shall be provided.

## **2.6 BEARINGS, SHAFTS, AND DRIVES**

- A. Bearings: Basic load rating computed in accordance with AFBMA - ANSI Standards. The bearings shall be designed for service with an L-50 life of 200,000 hours and shall be a heavy duty pillow block, self-aligning, grease-lubricated ball or spherical roller bearing type.
- B. Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.

- C. V-Belt drives shall be cast iron or steel sheaves, dynamically balanced, bored to fit shafts and keyed. Fixed sheaves, matched belts, and drive rated based on motor horsepower. Minimum of 2 belts shall be provided on all fans with 10 HP motors and above. Standard drive service factor minimum shall be 1.1 S.F. for 1/4 HP – 7.5 HP, 1.3 S.F. for 10 HP and larger, calculated based on fan brake horsepower.

## **2.7 ELECTRICAL**

- A. Fan motors shall be manufacturer provided and installed, Open Drip Proof, premium efficiency (meets or exceeds EPA requirements), 1750 RPM, single speed, 200V / 60HZ / 3P. Complete electrical characteristics for each fan motor shall be as shown in schedule.
- B. The air handler(s) shall be ETL and ETL-Canada listed by Intertek Testing Services, Inc. Units shall conform to bi-national standard ANSI/UL Standard 1995/CSA Standard C22.2 No. 236.
- C. Wiring Termination: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclosed terminal lugs in terminal box sized to NFPA 70.
- D. Manufacturer shall provide ASHRAE 90.1 Energy Efficiency equation details for individual equipment to assist Building Engineer for calculating system compliance.
- E. Installing contractor shall provide GFI receptacle within 25 feet of unit to satisfy National Electrical Code requirements.
- F. All electrical connection components shall be field provided and mounted as shown on project schedule.

## **2.8 REFRIGERANT SYSTEM**

- A. Refrigerant: R-410a
- B. Refrigerant line connection: suction (vapor) and liquid lines are internal to cabinet with sweat connections.
- C. Copper Tube/Enhanced fin evaporator coil:
  - 1. Lanced, ripple-edge aluminum fins
  - 2. Seamless copper tubing
  - 3. Rifled copper tubing
  - 4. Flared shoulder tubing joints and silver soldering
  - 5. Factory leak tested under high pressure.
- D. Check and Expansion Valve:
  - 1. Factory installed and piped
  - 2. Internal check valves if required by manufacturer.

## **2.9 FILTERS**

- A. Furnish flat filter in mixing box section with 2-inch pleated MERV 8 filter. Provide side loading and removal of filters.
- B. Filter media shall be UL 900 listed, Class I or Class II.
- C. Filter Magnehelic gauge(s) shall be furnished and mounted by mechanical contractor.

## **2.10 ADDITIONAL SECTIONS**

- A. Economizer section shall be installed to allow for 100% outside air.

### **PART 3 - EXECUTION**

#### **3.1 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, protect and handle products under the supervision of the owner's representative and per the manufacturer's Installation, Operation & Maintenance Instructions. Store in a clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures and finish.

#### **3.2 ENVIRONMENTAL REQUIREMENTS**

- A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings are lubricated, and the fan(s) has been testing run under observation.

#### **3.3 INSTALLATION**

- A. Assemble and install in strict accordance with manufacturer's Operation & Maintenance Instructions, shop drawings and contract documents.
- B. Verify all components, accessories and appurtenances are on site.
- C. Equipment Mounting:
  - 1. Install air-handling units on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 03 3000 "Cast-in-Place Concrete."
  - 2. Comply with requirements for vibration isolation and seismic-control devices.
- D. Arrange installation of units to provide access space around air-handling units for service and maintenance.
- E. Connect duct to air-handling units with flexible connections. Comply with requirements in Section 23 3300 "Air Duct Accessories."

#### **3.4 PIPING CONNECTIONS**

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to air-handling unit, allow for service and maintenance.
- C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.
- D. Connect condensate drain pans using ASTM B 88, Type M (ASTM B 88M, Type C) copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.
- E. Refrigerant Piping: Comply with applicable requirements. Install shutoff valve and union or flange at each supply and return connection.

#### **3.5 ELECTRICAL CONNECTIONS**

- A. Connect wiring according to Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
  - 1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 26 0553 "Identification for Electrical Systems."
  - 2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

**3.6 CONTROL CONNECTIONS**

- A. Install control and electrical power wiring to field-mounted control devices.

**3.7 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
  - 1. Leak Test: After installation, fill water and steam coils with water, and test coils and connections for leaks.
  - 2. Charge refrigerant coils with refrigerant and test for leaks.
  - 3. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Air-handling unit or components will be considered defective if unit or components do not pass tests and inspections.
- D. Prepare test and inspection reports.

**PART 4 - MEASUREMENT AND PAYMENT**

- 4.1** Work under this section shall be incidental to the Mechanical item on the project bid form.

**END OF SECTION**

**SECTION 23 7315**  
**OUTDOOR UNIT SPLIT SYSTEM**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Outdoor Unit Split System

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Product certificates.
- D. Operation and maintenance data.
- E. Seismic Qualification Data: Certificates, for outdoor split system unit, accessories, and components, from manufacturer.
- F. Mounting Base: For securing air handling unit to concrete base.
  - 1. Fabricate mounting base and attachment to outdoor split system unit, accessories, and components.

**PART 2 - PRODUCT**

**2.01 MANUFACTURERS**

- A. Basis of Design: Daikin

**2.02 GENERAL DESCRIPTION**

- A. Furnish as shown on plans, Condensing Unit(s). Unit performance and electrical characteristics shall be per the job schedule.
- B. Configuration: Fabricate as detailed on prints and drawings.
- C. The complete unit shall be ETL listed.
- D. All components included herein are designed, manufactured and independently tested, rated and certified to meet the seismic compliance standards of the International Building Code. Components designated for use in systems that are life safety, toxic, high hazard, combustible or flammable shall meet the on line, anchorage and load path requirements for life safety as defined in IBC sections 1621.1.6, 1621.3.3 ,1707.7.2. and IBC Commentary, Volume II, section 16 21.1.6, IBC notes pertaining to the release of hazardous material. All components u 230548 fl - vibration and seismic controls for hvac sed as part of a system other than the above shall meet as a minimum, all load path and anchorage standards for components as outlined in IBC section 16 21.3.3 & 1707.7.2. All completed component assemblies shall be clearly labeled for field inspection. Seismic Compliance Labels shall include the manufacturer's identification, designation of certified models, definitive information describing the product's compliance characteristics, and the Independent Certifying Agency's name and report identification. In addition to all seismic requirements for IBC Certification listed elsewhere in the project specification, manufacturer's submittals shall include:
  - 1. Certificate of Compliance from the Independent Certifying Agency clearly indicating that components supplied on this project are included in the component manufacturer's Certificate of Compliance.
  - 2. Clear installation instructions including all accessory components that are part of the overall component installation.
- E. Unit shall be completely factory assembled and shipped in one piece.
- F. Unit to be shipped with a nitrogen holding charge only.

- G. The unit shall undergo an operational test prior to shipment. The factory test shall include a refrigeration circuit check test, a unit safety control system operations checkout, and a final unit inspection.
- H. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
- I. Performance: All scheduled capacities and face areas are the minimum accepted value. All scheduled amps, KW, and HP are maximum accepted values that allow scheduled capacity to be met.

## **2.03 CABINET**

- A. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a high quality, polyester resin topcoat of a neutral beige color. Finished surface to withstand a minimum 750-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.
- B. The unit base frame shall be constructed of 15 gauge pre-painted galvanized steel.
- C. Lifting brackets shall be provided on the unit base with lifting holes to accept cable or chain hooks.

## **2.04 ELECTRICAL**

- A. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with unit shall be number and color coded and labeled according to the electrical diagram provided for easy identification.
- B. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch circuit short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Knockouts shall be provided in the side of the main control panels for field wiring entrance.
- C. All 115-600 volt internal and external wiring between control boxes and components shall be protected from damage by raceways or liquid tight conduit.
- D. Unit SCCR rating to be 10 kAIC.
- E. Phase failure and under voltage protection shall be provided to prevent damage from single phasing, phase reversal, and low voltage conditions.
- F. Unit shall be provided with a 24-volt transformer and terminal strip for field supplied controls.

## **2.05 CONDENSING SECTION**

- A. Air Cooled Condenser
  - 1. The condensing section shall be open on the sides and bottom to provide access and to allow airflow through the coils. Condenser coils shall be multi-row and fabricated from cast aluminum micro-channel coils. Each condenser coil shall be factory leak tested with high-pressure air under water. Coils are to be recessed so that the cabinet provides built in hail protection.
  - 2. Condenser fans shall be direct drive, propeller type designed for low tip speed, vertical air discharge, and include service guards. Fan blades shall be constructed of steel and riveted to a steel center hub. Condenser fan motors shall be heavy-duty, inherently protected, three-phase, non-reversing type with permanently lubricated ball bearing and integral rain shield.
  - 3. Units shall have at least one head pressure sensing condenser fan controlled to maintain positive head pressure. An ambient thermostat shall prevent the refrigeration system from operating below 45° F ambient. Fan speed control shall be field adjustable.

- B. Scroll Compressors
  - 1. Each unit shall have multiple, heavy-duty Copeland scroll compressors.
  - 2. Each compressor shall be complete with gauge ports, crankcase heater, sight-glass, anti-slug protection, motor overload protection and a 5 minute time anti-cycling time delay.
  - 3. Compressors shall be isolated with resilient rubber isolators to decrease noise transmission.
- C. Refrigeration Circuit
  - 1. Each unit shall have two independent refrigeration circuits. Each circuit shall be complete with low pressure control, liquid line charging valve with a 3/8" charging port, a manual reset high pressure safety switch. Each Circuit shall be dehydrated, leak tested, and shipped with a Nitrogen holding charge. Unit shall have discharge and suction line shutoff valves.
  - 2. Each compressor shall be complete with gauge, ports, crankcase heater, sight - glass, anti-slug protection, motor overload protection and a 5-minute time anti-cycling time delay.
- D. Hot gas bypass capped T shall be factory installed on the discharge line of refrigerant circuits.

## **2.06 CONTROLS**

- A. Refrigeration capacity control shall be accomplished by staging of the unit's multiple compressors. Unit shall be equipped with a 24V terminal strip for field supplied and installed controls

## **2.07 WARRANTY**

- 1. The manufacturer shall provide 12-month parts only warranty. Defective parts will be repaired or replaced during the warranty period at no charge. The warranty period shall commence at start up, or 6 months after shipment, whichever occurs first.
- 2. The manufacturer will provide extended 48-month parts only warranty on the compressor.

## **2.08 IDENTIFICATION**

- 1. All heat pumps shall be labeled with permanent engraved laminated plastic nameplate identifying by address the apartment served by the heat pump.

# **PART 3 - EXECUTION**

## **3.01 INSTALLATION**

- A. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.
- B. Equipment Mounting:
- C. Retain first subparagraph below to require equipment to be installed on cast-in-place concrete equipment bases.
- D. Retain one of two subparagraphs below. Retain first for projects in seismic areas; retain second for projects not in seismic areas. Indicate vibration isolation and seismic-control device type and minimum deflection in supported equipment schedule on Drawings.
- E. Maintain manufacturer's recommended clearances for service and maintenance.
- F. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

## **3.02 CONNECTIONS**

- A. Install piping adjacent to machine to allow service and maintenance.
- B. Refrigerant Piping: Connect piping to unit with pressure relief, service valve, filter-dryer, and moisture indicator on each refrigerant-circuit liquid line.

**3.03 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Perform electrical test and visual and mechanical inspection.
  - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Complete manufacturer's starting checklist.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 5. Verify proper airflow over coils.
- C. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
- D. Air-cooled condensers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

**PART 4 - MEASUREMENT AND PAYMENT**

- 4.01 Work under this section shall be incidental to the Mechanical item on the project bid form.**

**END OF SECTION**



**SECTION 23 8126**  
**SPLIT-SYSTEM AIR-CONDITIONERS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

**1.6 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Filters: One set(s) for each air-handling unit.
  - 2. Fan Belts: One set(s) for each air-handling unit fan.

**1.7 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
  - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

**1.8 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 03 3000 "Cast-in-Place Concrete."

- B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period:
    - a. For Compressor: Five year(s) from date of Substantial Completion.
    - b. For Parts: Five year(s) from date of Substantial Completion.
    - c. For Labor: One year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 INDOOR UNITS (5 TONS (18 kW) OR LESS)

- A. Floor-Mounted, Evaporator-Fan Components:
  - 1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect.
    - a. Insulation: Faced, glass-fiber duct liner.
    - b. Drain Pans: Galvanized steel, with connection for drain; insulated.
  - 2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
  - 3. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for overcurrent protection.
  - 4. Fan: Direct drive, centrifugal.
  - 5. Fan Motors:
    - a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements.
    - b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
  - 6. Air Filtration Section:
    - a. General Requirements for Air Filtration Section:
      - 1) Comply with NFPA 90A.
      - 2) Minimum MERV according to ASHRAE 52.2.
      - 3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.
    - b. Disposable Panel Filters:
      - 1) Thickness: 1 inch (25 mm).
      - 2) MERV according to ASHRAE 52.2: 8.
      - 3) Media: Interlaced glass fibers sprayed with nonflammable adhesive and antimicrobial agent.
- B. Wall-Mounted, Evaporator-Fan Components:
  - 1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
  - 2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.

3. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for overcurrent protection.
4. Fan: Direct drive, centrifugal.
5. Fan Motors:
  - a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements.
  - b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
  - c. Enclosure Type: Totally enclosed, fan cooled.
  - d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
  - e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
  - f. Mount unit-mounted disconnect switches on exterior of unit.
6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Condensate Drain Pans:
  - a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
    - 1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
    - 2) Depth: A minimum of **1 inch (25 mm)** deep.
  - b. Single-wall, galvanized-steel sheet.
  - c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on both ends of pan.
    - 1) Minimum Connection Size: **NPS 1 (DN 25)**.
  - d. Pan-Top Surface Coating: Asphaltic waterproofing compound.
8. Air Filtration Section:
  - a. General Requirements for Air Filtration Section:
    - 1) Comply with NFPA 90A.
    - 2) Minimum MERV according to ASHRAE 52.2.
    - 3) Filter-Holding Frames: Arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.
  - b. Disposable Panel Filters:
    - 1) Thickness: **1 inch (25 mm)**.
    - 2) MERV according to ASHRAE 52.2: 8.
    - 3) Media: Interlaced glass fibers sprayed with nonflammable adhesive and antimicrobial agent.

## 2.2 OUTDOOR UNITS (**5 TONS (18 kW)** OR LESS)

- A. Air-Cooled, Compressor-Condenser Components:
  1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
  - a. Compressor Type: Scroll.
  - b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
  - c. Refrigerant: R-410A.
  - d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
4. Fan: Aluminum-propeller type, directly connected to motor.
5. Motor: Permanently lubricated, with integral thermal-overload protection.
6. Mounting Base: Polyethylene.

## **2.3 ACCESSORIES**

- A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
  1. 5/2 day scheduler.
  2. Heat/cool/fan only switch.
  3. LCD display.
- B. Automatic-reset timer to prevent rapid cycling of compressor.
- C. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- D. Drain Hose: For condensate.

## **2.4 CAPACITIES AND CHARACTERISTICS**

- A. Cooling Capacity: See heat pump schedule.
- B. Heating Capacity: See heat pump schedule.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install roof-mounted, compressor-condenser components on equipment supports specified in Section 07 7200 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- D. Equipment Mounting:
  1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 3000 "Cast-in-Place Concrete."
  2. Comply with requirements for vibration isolation.
- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

- C. Duct Connections: Duct installation requirements are specified in Section 23 3113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply[ **and return**] ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 23 3300 "Air Duct Accessories."

### **3.3 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Prepare test and inspection reports.

### **3.4 STARTUP SERVICE**

- A. Perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.

### **3.5 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain units.

**END OF SECTION**

**SECTION 26 0526**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Grounding systems and equipment.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.
- C. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- D. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

**PART 2 - PRODUCTS**

**2.1 CONDUCTORS**

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise indicated or required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

**2.2 CONNECTORS**

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

**2.3 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet in length.

## **PART 3 - EXECUTION**

### **3.1 APPLICATIONS**

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install barecopper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  - 3. Connections to Structural Steel: Welded connectors.

### **3.2 EQUIPMENT GROUNDING**

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Flexible raceway runs.
  - 6. Armored and metal-clad cable runs.

### **3.3 INSTALLATION**

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

### **3.4 LABELING**

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

### **3.5 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
  3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
- B. Excessive Ground Resistance: If resistance to ground exceeds 5 ohms, notify Engineer promptly and include recommendations to reduce ground resistance.

**END OF SECTION**



**SECTION 26 0553**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Underground-line warning tape.
  - 5. Warning labels and signs.
  - 6. Instruction signs.
  - 7. Equipment identification labels.
  - 8. Miscellaneous identification products.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each electrical identification product indicated.

**1.3 QUALITY ASSURANCE**

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

**PART 2 - PRODUCTS**

**2.1 POWER RACEWAY IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

**2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Colors for Raceways Carrying Circuits at 600 V and Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

## **2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

## **2.4 CONDUCTOR IDENTIFICATION MATERIALS**

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

## **2.5 FLOOR MARKING TAPE**

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

## **2.6 UNDERGROUND-LINE WARNING TAPE**

- A. Tape:
  - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
  - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
  - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
  - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
  - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
  - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.
- C. Tag: Type I:
  - 1. Pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
  - 2. Thickness: 4 mils.
  - 3. Weight: 18.5 lb/1000 sq. ft..
  - 4. 3-Inch Tensile According to ASTM D 882: 30 lbf, and 2500 psi.

## **2.7 WARNING LABELS AND SIGNS**

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Metal-Backed, Butyrate Warning Signs:
  - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 10 by 14 inches.
- D. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

## **2.8 INSTRUCTION SIGNS**

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
  1. Engraved legend with black letters on white face.
  2. Punched or drilled for mechanical fasteners.
  3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

## **2.9 EQUIPMENT IDENTIFICATION LABELS**

- A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

## **2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
- G. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

## **3.2 IDENTIFICATION SCHEDULE**

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Install labels at 10-foot maximum intervals.

- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
  - 1. Power.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service conductors.
    - a. Color shall be factory applied.
    - b. Colors for 240/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
  - 1. Limit use of underground-line warning tape to direct-buried cables.
  - 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Metal-backed, butyrate warning signs.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage with black letters on an orange background.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.

- J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
  - 1. Labeling Instructions:
    - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
    - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
    - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
    - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
- L. Provide identification labeling for low voltage (Cat 6 and Coax cable).

**END OF SECTION**

## **SECTION 26 0573**

### **OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

##### **1.2 ACTION SUBMITTALS**

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
  - 1. Coordination-study input data, including completed computer program input data sheets.
  - 2. Study and Equipment Evaluation Reports.
  - 3. Coordination-Study Report.

##### **1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For coordination-study specialist.
- B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.

##### **1.4 QUALITY ASSURANCE**

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.
- B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
  - 1. Professional Design Professional, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of Design Professional.
- C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.
- D. Comply with IEEE 399 for general study procedures.

#### **PART 2 - PRODUCTS**

##### **2.1 COMPUTER SOFTWARE DEVELOPERS**

- A. Available Computer Software Developers: Subject to compliance with requirements, companies offering computer software programs that may be used in the Work include, but are not limited to, the following:
  - 1. CGI CYME.
  - 2. EDSA Micro Corporation.
  - 3. ESA Inc.
  - 4. Operation Technology, Inc.
  - 5. SKM Systems Analysis, Inc.

##### **2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS**

- A. Comply with IEEE 399.
- B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

### **PART 3 - EXECUTION**

#### **3.1 POWER SYSTEM DATA**

- A. Gather and tabulate the following input data to support coordination study:
1. Product Data for overcurrent protective devices specified in other Division 26 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  2. Impedance of utility service entrance.
  3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:
    - a. Circuit-breaker and fuse-current ratings and types.
    - b. Relays and associated power and current transformer ratings and ratios.
    - c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    - d. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
    - e. Busway ampacity and impedance.
    - f. Motor horsepower and code letter designation according to NEMA MG 1.
  4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
    - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    - d. Ratings, types, and settings of utility company's overcurrent protective devices.
    - e. Special overcurrent protective device settings or types stipulated by utility company.
    - f. Time-current-characteristic curves of devices indicated to be coordinated.
    - g. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    - h. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    - i. Panelboards, switchboards, ampacity, and interrupting rating in amperes rms symmetrical.

#### **3.2 FAULT-CURRENT STUDY**

- A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a

current immediately after initiation and for a three-phase bolted short circuit at each of the following:

1. Distribution panelboard.
2. Branch circuit panelboard.
- B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.
- C. Calculate momentary and interrupting duties on the basis of maximum available fault current.
- D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.
  1. Transformers:
    - a. ANSI C57.12.22.
    - b. IEEE C57.12.00.
    - c. IEEE C57.96.
  2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
  3. Low-Voltage Fuses: IEEE C37.46.
- E. Study Report:
  1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
- F. Equipment Evaluation Report:
  1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
  2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
  3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

### 3.3 COORDINATION STUDY

- A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.
  1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
  2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.
  3. Calculate the maximum and minimum ground-fault currents.
- B. Comply with IEEE 241 and IEEE 242 recommendations for fault currents and time intervals.
- C. Transformer Primary Overcurrent Protective Devices:
  1. Device shall not operate in response to the following:
    - a. Inrush current when first energized.
    - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
    - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
  2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.



- D. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- E. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:
  - 1. Tabular Format of Settings Selected for Overcurrent Protective Devices:
    - a. Device tag.
    - b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
    - c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
    - d. Fuse-current rating and type.
    - e. Ground-fault relay-pickup and time-delay settings.
  - 2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
    - a. Device tag.
    - b. Voltage and current ratio for curves.
    - c. Three-phase and single-phase damage points for each transformer.
    - d. No damage, melting, and clearing curves for fuses.
    - e. Cable damage curves.
    - f. Transformer inrush points.
    - g. Maximum fault-current cutoff point.
- F. Completed data sheets for setting of overcurrent protective devices.

**END OF SECTION**

**SECTION 26 0574**  
**LOW VOLTAGE ARC FLASH HAZARD ANALYSIS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. The scope of this document is to provide requirements for providing a low voltage (600 volts and below) Arc Flash Hazard Analysis and documentation.

**1.2 REQUIREMENTS**

- A. A low voltage Arc Flash Hazard Analysis shall be provided for this project. The analysis shall be based on the specific equipment installed, and shall be updated to include project "as built" documentation. Where the arc flash hazard/risk category is equal to or greater than level 3, the overcurrent protective device coordination study should be reviewed to reduce the hazard/risk level. The analysis shall be based on the specific devices installed and include (but not be limited to) the following:
1. Service Entrance Equipment.
    - a. All overcurrent protective devices installed in service entrance panels.
  2. Feeder Circuits.
    - a. All three (3) phase Branch circuit overcurrent protective devices installed with a rating equal to or greater than 30 amps.
  3. Branch Circuits.
    - a. All three (3) phase Branch circuit overcurrent protective devices installed with a rating equal to or greater than 30 amps.
    - b. All motor circuit overcurrent protective devices for motors with a rating equal to or greater than 10 horse power.
- B. The project shall include printed waterproof labels for equipment that lists the specific arc flash hazard/risk category at each location.
- C. Format
1. A preliminary Arc Flash Hazard Analysis shall be submitted to the Engineer no later than three (3) weeks after the overcurrent protective device shop drawings have been approved.
  2. The Arc Flash Hazard Analysis shall be reviewed and updated to reflect any changes and corrections to conductor length within one week of the final electrical walk through for punchlist. The low voltage arc flash hazard analysis shall include the stamp or seal and signature of the preparing engineer, and shall be reviewed and approved by the Engineer of Record.
  3. Engineer approved Arc Flash Hazard warning labels shall be furnished and installed prior to project completion.
  4. The low voltage arc flash hazard analysis shall be provided using the SKM Systems Analysis, Inc. SKM Power Tools Electrical Engineering Software (PTW 32).
  5. Prior to project completion, the low voltage arc flash hazard analysis shall be provided in both hard copy and on computer disk. The hard copy shall clearly show each device set point. The computer disk shall include the complete coordination file including all device curves (use the SKM "Project-Backup" command).

**END OF SECTION**

**SECTION 26 0923**  
**LIGHTING CONTROL DEVICES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Photoelectric switches.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.4 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data

**PART 2 - PRODUCTS**

**2.1 OUTDOOR PHOTOELECTRIC SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Cooper Industries, Inc.
  - 2. Intermatic, Inc.
  - 3. NSi Industries LLC; TORK Products.
  - 4. Tyco Electronics; ALR Brand.
- B. Description: Solid state, with SPST dry contacts rated for 1800 VA, to operate connected load, complying with UL 773.
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
  - 3. Time Delay: Thirty-second minimum, to prevent false operation.
  - 4. Lightning Arrester: Air-gap type.
  - 5. Mounting: Twist lock complying with NEMA C136.10, with base.

**2.2 CONDUCTORS AND CABLES**

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

**2.3 LIGHTING CONTACTOR**

- A. Ratings: Current, voltage and number of poles shall be as shown on the Drawings.
- B. Contactor: Contactor shall be mechanically held and shall have coil clearing contacts.
- C. Enclosures: Each lighting contactor shall be provided with a NEMA 1 enclosure.
- D. Accessories: Provide auxiliary contacts, cover mounted switches, pilot lights or other devices as shown on the Drawings or as required by the control system.
- E. Manufacturer: Provide Square D Class 8903 or equal.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.
- B. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
  - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit City's operations.
- C. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch.
- D. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

#### **3.2 FIELD QUALITY CONTROL**

- A. Evaluate lighting control devices and perform tests and inspections.
- B. Perform the following tests and inspections:
  - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

#### **3.3 QUALITY ASSURANCE**

- A. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- B. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

### **END OF SECTION**

**SECTION 26 2416**  
**PANELBOARDS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each panelboard and related equipment.
  - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
  - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
  - 3. Detail bus configuration, current, and voltage ratings.
  - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
  - 5. Include evidence of NRTL listing for series rating of installed devices.
  - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  - 7. Include wiring diagrams for power, signal, and control wiring.
  - 8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.
- B. Panelboard schedules for installation in panelboards.

**1.4 CLOSEOUT SUBMITTALS**

- A. Refer to Section 01 7823 "Operation and maintenance data".

**1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70
- D. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- E. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

**1.6 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

**2.1 GENERAL REQUIREMENTS FOR PANELBOARDS**

- A. Enclosures: Surface-mounted cabinets.
  - 1. Rated for environmental conditions at installed location.

- a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
- b. Outdoor Locations: NEMA 250, Type 3R.
- c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
- 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
- 4. Directory Card: Inside panelboard door, mounted in transparent card holder.
- B. Incoming Mains Location: Top and bottom.
- C. Phase, Neutral, and Ground Buses: Hard-drawn copper, 98 percent conductivity or aluminum.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
  - 1. Material: Hard-drawn copper, 98 percent conductivity.
  - 2. Main and Neutral Lugs: Compression type.
  - 3. Ground Lugs and Bus Configured Terminators: Compression type.
  - 4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
  - 5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.
- F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

## **2.2 PANELBOARDS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type for club house building.
- C. Load centers with Square D breakers for residential units.
- D. Mains: Circuit breaker and lugs only.
- E. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- F. Contactors in Main Bus: NEMA ICS 2, Class A, electrically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.
  - 1. External Control-Power Source: 120-V branch circuit.
- G. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

## **2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  2. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.
    - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Receive, inspect, handle, store and install panelboards and accessories according to NECA 407.
- B. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- D. Install overcurrent protective devices and controllers not already factory installed.
  1. Set field-adjustable, circuit-breaker trip ranges.
- E. Install filler plates in unused spaces.
- F. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.
- G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- H. Comply with NECA 1.

#### **3.2 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads and incorporating City's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

#### **3.3 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  2. Test continuity of each circuit.
- C. Tests and Inspections:
1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

**END OF SECTION**



**SECTION 26 2417**  
**METER CENTERS GANGABLE**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Multi-Metering shall be furnished and wall mounted at locations as shown on the drawings.
- B. Metering shall be UL Listed.
- C. Metering identified for use as service equipment are to be labeled for this application.

**1.2 REFERENCES**

- A. NEMA AB1 - Circuit Breakers
- B. NEMA PB1 – Panelboards
- C. ANSI C12.7

**1.3 ACTION SUBMITTALS**

- A. Product Data
- B. Dimensioned Equipment Plan

**PART 2 - PRODUCTS (Not Applicable)**

**2.1 MANUFACTURERS**

- A. Meter Unit(s) shall be manufactured by Square D Company or approved equal.

**2.2 ENCLOSURES**

- A. Enclosures shall be constructed of formed and welded code gauge galvanized steel NEMA 3R with gray baked electrodeposited enamel finish, over cleaned galvanized
- B. No device disassembly is to be required before mounting.
- C. All devices must be bonded together with bolted connections.
- D. All compartments containing unmetered circuits shall be provided with a sealing means.

**2.3 INTERIOR CONSTRUCTION**

- A. All components shall be factory assembled and all current carrying parts shall be plated bus bars.
- B. Individual units shall be constructed with an integral sliding one bolt joint-pak assembly for a completely bussed meter center. This single bolt is to be a VISI-TITE bolt for tightening without a torque wrench.

**2.4 2.04 METER SOCKETS**

- A. Meter sockets shall be per KCPL requirements.
- B. Sockets shall be rated as shown on the drawings

**2.5 BRANCH MOLDED CASE CIRCUIT BREAKERS**

- A. NEMA AB 1
- B. Circuit Breakers shall be Square D type QO, QO-VH, QDP, or QGP thermal magnetic trip, or approved equal, with an integral crossbar to provide simultaneous opening of all poles in multi-pole circuit breakers.
- C. Breakers shall have an overcenter, tripfree, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication.
- D. Handles shall have ON, and OFF, and Tripped positions in addition, trip indication shall include VISI-TRIP indicator appearing in the window of the breaker case (through 125 amperes using QO type breakers).

- E. Circuit breakers shall be UL Listed in accordance with UL standard 489 with current ratings as noted on the plans. Interrupting ratings shall be selected to provide the required short circuit current rating.

**2.6 SHORT CIRCUIT CURRENT RATING**

- A. Ampere rms symmetrical short circuit current ratings shall be provided per the plans. This rating shall be established by manufacturer testing of a representative meter center with branch overcurrent devices installed.

**2.7 QUALITY ASSURANCE**

- A. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- B. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

**END OF SECTION**

**SECTION 26 2713  
ELECTRICITY METERING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes equipment for electricity metering by utility company.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Dimensioned plans and sections or elevation layouts and wiring diagrams.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT FOR ELECTRICITY METERING BY UTILITY COMPANY**

- A. Meters will be furnished by utility company.
- B. Meter Sockets: Comply with requirements of electrical-power utility company.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Comply with equipment installation requirements in NECA 1.
- B. Install meters furnished by utility company. Install raceways and equipment according to utility company's written requirements. Provide empty conduits for metering leads and extend grounding connections as required by utility company.
- C. Comply with requirements for identification specified in Division 26 Section 26 0553 "Identification for Electrical Systems."
  - 1. Warning Label: Self-adhesive type, with text as required by NFPA 70.
  - 2. Equipment Identification Labels: Adhesive film labels with clear protective overlay. For meters, provide an additional card holder suitable for printed, weather-resistant card with occupant's name.

**3.2 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Connect a load of known kilowatt rating, 1.5 kW minimum, to a circuit supplied by metered feeder.
  - 2. Turn off circuits supplied by metered feeder and secure them in off condition.
  - 3. Run test load continuously for one hour minimum, or longer, to obtain a measurable meter indication. Use test-load placement and setting that ensures continuous, safe operation.
  - 4. Check and record meter reading at end of test period and compare with actual electricity used, based on test-load rating, duration of test, and sample measurements of supply voltage at test-load connection. Record test results.
- C. Electricity metering will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

**3.3 QUALITY ASSURANCE**

- A. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- B. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

**END OF SECTION**

**SECTION 26 2726**  
**WIRING DEVICES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
  - 2. Weather-resistant receptacles.
  - 3. Snap switches.
  - 4. Wall-switch.
  - 5. Communications outlets.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.4 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
  - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  - 3. Leviton Mfg. Company Inc. (Leviton).
  - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

**2.2 GENERAL WIRING-DEVICE REQUIREMENTS**

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

**2.3 STRAIGHT-BLADE RECEPTACLES**

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cooper; 5351 (single), CR5362 (duplex).

- b. Hubbell; HBL5351 (single), HBL5352 (duplex).
- c. Leviton; 5891 (single), 5352 (duplex).
- d. Pass & Seymour; 5361 (single), 5362 (duplex).

## **2.4 GFCI RECEPTACLES**

- A. General Description:
  - 1. Straight blade, non-feed-through type.
  - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
  - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Cooper; VGF20.
    - b. Hubbell; GFR5352L.
    - c. Pass & Seymour; 2095.
    - d. Leviton; 7590.

## **2.5 TOGGLE SWITCHES**

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Single Pole:
      - 1) Cooper; AH1221.
      - 2) Hubbell; HBL1221.
      - 3) Leviton; 1221-2.
      - 4) Pass & Seymour; CSB20AC1.
    - b. Two Pole:
      - 1) Cooper; AH1222.
      - 2) Hubbell; HBL1222.
      - 3) Leviton; 1222-2.
      - 4) Pass & Seymour; CSB20AC2.

## **2.6 WALL PLATES**

- A. Single and combination types shall match corresponding wiring devices.
  - 1. Residential plastic wall plates, White..
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant thermoplastic with lockable cover.

## **2.7 FINISHES**

- A. Device Color: White
  - 1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: For plastic covers, match device color.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  - 4. Branch circuit wiring to be #12 gauge Romex.
  - 5. Control wiring can be #14 gauge Romex.
  - 6. Existing Conductors:
    - a. Cut back and pigtail, or replace all damaged conductors.
    - b. Straighten conductors that remain and remove corrosion and foreign matter.
    - c. Pigtailling existing conductors is permitted, provided the outlet box is large enough.
- D. Device Installation:
  - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
  - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
  - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
  - 8. Tighten unused terminal screws on the device.
  - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

### **3.2 GFCI RECEPTACLES**

- A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

### **3.3 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  1. Test Instruments: Use instruments that comply with UL 1436.
  2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
  1. Line Voltage: Acceptable range is 105 to 132 V.
  2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  3. Ground Impedance: Values of up to 2 ohms are acceptable.
  4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  5. Using the test plug, verify that the device and its outlet box are securely mounted.
  6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### **3.4 QUALITY ASSURANCE**

- A. Seal all penetrations through walls, ceiling and floors and vertical chases adjacent to units. Refer to 003060 Sustainable design requirements.
- B. Energy star air sealing requirements. Refer to 003060 Sustainable design requirements.

### **END OF SECTION**



**SECTION 26 2816**  
**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Fusible switches.
  - 2. Nonfusible switches.
  - 3. Enclosures.

**1.2 DEFINITIONS**

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.

**1.6 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

**PART 2 - PRODUCTS**

**2.1 FUSIBLE SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

## **2.2 NONFUSIBLE SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
  3. Siemens Energy & Automation, Inc.
  4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Accessories:
  1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
  3. Lugs: Suitable for number, size, and conductor material.

## **2.3 ENCLOSURES**

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  2. Outdoor Locations: NEMA 250, Type 3R.
  3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
  4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

### **3.2 IDENTIFICATION**

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

### **3.3 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
  1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
  2. Test continuity of each circuit.
- C. Tests and Inspections:
  1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

**END OF SECTION**

**SECTION 26 5100**  
**INTERIOR LIGHTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior lighting fixtures, lamps, and ballasts.
  - 2. Emergency lighting units.
  - 3. Exit signs.
  - 4. Lighting fixture supports.
- B. Related Sections:
  - 1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.
- B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast from manufacturer.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

**2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS**

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.
- C. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.
- D. Metal Parts: Free of burrs and sharp corners and edges.
- E. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- G. Diffusers and Globes:
  - 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

- a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- b. UV stabilized.
- 2. Glass: Annealed crystal glass unless otherwise indicated.

## **2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS**

- A. General Requirements for Electronic Ballasts:
  - 1. Comply with UL 935 and with ANSI C82.11.
  - 2. Designed for type and quantity of lamps served.
  - 3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
  - 4. Sound Rating: Class A.
  - 5. Total Harmonic Distortion Rating: Less than 10 percent.
  - 6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
  - 7. Operating Frequency: 42 kHz or higher.
  - 8. Lamp Current Crest Factor: 1.7 or less.
  - 9. BF: 0.88 or higher.
  - 10. Power Factor: 0.95 or higher.
- B. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.
- C. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.
  - 1. Ballast Manufacturer Certification: Indicated by label.
- D. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.
- E. Ballasts for Low-Temperature Environments: Electronic type rated for 0 deg F starting and operating temperature with indicated lamp types.
- F. Ballasts for Bi-Level Controlled Lighting Fixtures: Electronic type.
  - 1. Operating Modes: Ballast circuit and leads provide for remote control of the light output of the associated lamp between high- and low-level and off.
    - a. High-Level Operation: 100 percent of rated lamp lumens.
    - b. Low-Level Operation: 30 percent of rated lamp lumens.
  - 2. Ballast shall provide equal current to each lamp in each operating mode.
  - 3. Compatibility: Certified by manufacturer for use with specific bi-level control system and lamp type indicated.

## **2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS**

- A. Description: Electronic-programmed rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:
  - 1. Lamp end-of-life detection and shutdown circuit.
  - 2. Automatic lamp starting after lamp replacement.
  - 3. Sound Rating: Class A.
  - 4. Total Harmonic Distortion Rating: Less than 20 percent.
  - 5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
  - 6. Operating Frequency: 20 kHz or higher.

7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher unless otherwise indicated.
9. Power Factor: 0.95 or higher.
10. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.

## **2.5 EMERGENCY LED POWER UNIT**

- A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
  1. Emergency Connection: Operate led lamp(s) continuously at an output of 320 lumen. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
  2. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
    - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
  3. Battery: Sealed, maintenance-free, nickel-cadmium type.
  4. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
  5. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.
- B. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- C. Internally Lighted Signs:
  1. Lamps for AC Operation: Fluorescent, two for each fixture, 20,000 hours of rated lamp life.
  2. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
  3. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
    - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
    - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
    - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

## **2.6 EMERGENCY LIGHTING UNITS**

- A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.
  1. Battery: Sealed, maintenance-free, lead-acid type.
  2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
7. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

## **2.7 FLUORESCENT LAMPS**

- A. T5 rapid-start lamps, rated 28 W maximum, nominal length of 48 inches, 2700 initial lumens (minimum), CRI 75 (minimum), color temperature 3500 K, and average rated life 20,000 hours unless otherwise indicated.
- B. T5 rapid-start lamps, rated 14 W maximum, nominal length of 24 inches, 1300 initial lumens (minimum), CRI 75 (minimum), color temperature 3500 K, and average rated life of 20,000 hours unless otherwise indicated.
- C. Compact Fluorescent Lamps: 4-Pin, CRI 80 (minimum), color temperature 3500 K, average rated life of 10,000 hours at three hours operation per start unless otherwise indicated.
  1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
  2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
  3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
  4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
  5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
  6. 57 W: T4, triple tube, rated 4300 initial lumens (minimum).
  7. 70 W: T4, triple tube, rated 5200 initial lumens (minimum).

## **2.8 LIGHTING FIXTURE SUPPORT COMPONENTS**

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.
- C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.
- D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.
- E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gage.
- F. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Comply with NFPA 70 for minimum fixture supports.

- C. Suspended Lighting Fixture Support:
  - 1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
  - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
  - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Adjust aimable lighting fixtures to provide required light intensities.
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### **3.2 FIELD QUALITY CONTROL**

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
- B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

**END OF SECTION**



**SECTION 26 5600**  
**EXTERIOR LIGHTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Exterior luminaires with LED lamps
  - 2. Poles and accessories.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, and finishes.
- B. Shop Drawings: Anchor-bolt templates keyed to specific poles and certified by manufacturer.

**1.3 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with IEEE C2, "National Electrical Safety Code."
- C. Comply with NFPA 70.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

**2.2 GENERAL REQUIREMENTS FOR LUMINAIRES**

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
  - 1. LER Tests Incandescent Fixtures: Where LER is specified, test according to NEMA LE 5A.
  - 2. LER Tests HID Fixtures: Where LER is specified, test according to NEMA LE 5B.
- B. Lateral Light Distribution Patterns: Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.
- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- J. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

- K. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

## **2.3 LED LAMPS**

- A. Structural Characteristics: Comply with AASHTO LTS-4-M.

## **PART 3 - EXECUTION**

### **3.1 LUMINAIRE INSTALLATION**

- A. Install lamps in each luminaire.
- B. Fasten luminaire to indicated structural supports.
  - 1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Adjust luminaires that require field adjustment or aiming.

### **3.2 POLE INSTALLATION**

- A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on Drawings:
  - 1. Fire Hydrants and Storm Drainage Piping: 60 inches.
  - 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
  - 3. Trees: 15 feet from tree trunk.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 03 3000 "Cast-in-Place Concrete."
- D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
  - 1. Use anchor bolts and nuts selected to resist seismic forces defined for the application and approved by manufacturer.
  - 2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
  - 3. Install base covers unless otherwise indicated.
  - 4. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

### **3.3 CORROSION PREVENTION**

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Section 26 0533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

### **3.4 GROUNDING**

- A. Ground metal poles and support structures according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
  - 1. Install grounding electrode for each pole unless otherwise indicated.
  - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

- B. Ground nonmetallic poles and support structures according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
1. Install grounding electrode for each pole.
  2. Install grounding conductor and conductor protector.
  3. Ground metallic components of pole accessories and foundations.

**END OF SECTION**

**SECTION 31 2113  
RADON MITIGATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Provide all work necessary to reduce and maintain radon concentration levels below 4.0 PicoCuries per liter (pCi/L) in various buildings specified herein. Perform pre-mitigation diagnostic testing and analysis, provide mitigation system design and installation, and perform post-mitigation testing and monitoring for radon.

**1.02 REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
  - 1. ACI INTERNATIONAL (ACI)
    - a. ACI 301(2005; Errata 2008) Specifications for Structural Concrete
  - 2. AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL (AMCA)
    - a. AMCA 210(2007) Laboratory Methods of Testing Fans for Aerodynamic Performance Rating
  - 3. ASTM INTERNATIONAL (ASTM)
    - a. ASTM B 209(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
    - b. ASTM B 209M(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
    - c. ASTM C 1002(2007) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
    - d. ASTM C 1047(2010) Standard Specification for Accessories or Gypsum Wallboard and Gypsum Veneer Base
    - e. ASTM C 36/C 36M(2003e1) Gypsum Wallboard
    - f. ASTM C 475/C 475M(2002; R 2007) Joint Compound and Joint Tape for Finishing Gypsum Board
    - g. ASTM C 514(2004; R 2009e1) Standard Specification for Nails for the Application of Gypsum Board
    - h. ASTM C 645(2009a) Nonstructural Steel Framing Members
    - i. ASTM C 834(2010) Latex Sealants
    - j. ASTM C 840(2008) Application and Finishing of Gypsum Board
    - k. ASTM C 920(2010) Standard Specification for Elastomeric Joint Sealants
    - l. ASTM D 2665(2009) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
  - 4. GYPSUM ASSOCIATION (GA)
    - a. GA 216(2010) Application and Finishing of Gypsum Panel Products
  - 5. INTERNATIONAL CODE COUNCIL (ICC)
    - a. ICC IMC(2009) International Mechanical Code
    - b. ICC UMC(1997; Errata 2 & 3 1997) Uniform Mechanical Code
  - 6. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
    - a. NEMA MG 1(2009) Motors and Generators
  - 7. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
    - a. NFPA 70(2011) National Electrical Code
  - 8. NORTHEASTERN LUMBER MANUFACTURERS ASSOCIATION (NELMA)
    - a. NELMA Grading Rules(2006) Standard Grading Rules for Northeastern Lumber
  - 9. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
    - a. SMACNA 1378(1995) Thermoplastic Duct (PVC) Construction Manual, 2nd Edition
  - 10. SOUTHERN PINE INSPECTION BUREAU (SPIB)
    - a. SPIB 1003(2002) Standard Grading Rules for Southern Pine Lumber

11. U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
  - a. EPA 402-R-92-004(1992) Indoor Radon and Radon Decay Product Measurement Device Protocols
  - b. EPA 402-R-92-014(1993) Radon Measurement in Schools
  - c. EPA 402-R-93-003(1993) Protocols for Radon and Radon Decay Product Measurements in Homes
  - d. EPA 402-R-93-078(1993; R 1994) Radon Mitigation Standards
  - e. EPA 625-R-92-016(1993; Am 1994) Radon Prevention in Design and Construction of Schools and Other Large Buildings
  - f. EPA 625-R-93-011(1993) Radon Reduction Technique for Existing Detached Houses: Technical Guidance for Active Soil Depressurization Systems
12. U.S. GENERAL SERVICES ADMINISTRATION (GSA)
  - a. CID A-A-2246(Rev B) paint, Latex
  - b. FS TT-P-650(Rev D) Primer Coating, Latex Base, Interior, White (for Gypsum Wallboard, or Plaster)
13. WEST COAST LUMBER INSPECTION BUREAU (WCLIB)
  - a. WCLIB 17(2000) Standard Grading Rules
14. WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)
  - a. WWPA G-5(1998) Western Lumber Grading Rules

### 1.03 DEFINITIONS

- A. Design
  1. Documents which include design drawings, design narrative (basis of design and calculations) and product data prepared and assembled by or under the direct supervision of a United States Environmental Protection Agency (USEPA) Radon Contractor Proficiency (RCP) listed mitigation contractor and proposed by the Contractor to meet the contract requirements.
- B. Design Drawings
  1. Documentation showing in graphic and quantitative form the extent, design, arrangement, location, relationships, and dimensions of the construction to be provided by the Contractor.
- C. Designer
  1. USEPA RCP listed mitigation contractor associated with the Contractor who is responsible for the design and has the qualifications and experience specified.
- D. Contract Documents
  1. Documents furnished to prospective bidders/proposers containing information and specifying criteria and project requirements for diagnostic testing, design, construction and monitoring of multiple radon mitigation systems. The documents include this specification and the drawings listed in and accompanying this specification.
- E. Long Term Radon Detectors
  1. Alpha track, electretion chamber, or approved equivalent. Devices capable of sensing and recording the presences of radon during a time period of 91 days to 12 months which when analyzed provide a numeric value, measured in pCi/L, for radon concentrations during the time exposed.
- F. Short Term Radon Detectors
  1. Charcoal, electretion chamber, or approved equivalent. Devices capable of sensing and recording the presences of radon during a time period of 48 hours to 90 days which when analyzed provide a numeric value, measured in pCi/L, for radon concentrations during the time exposed.
- G. Suction Hole
  1. Location at which vacuum is created for sub-slab communication testing.
- H. Suction Point

1. Vertical standpipe penetrating into the soil gas environment containing radon and serving as the conduit to exhaust radon gas to the atmosphere.
- I. Test Hole
  1. Location at which pressure readings are taken during sub-slab communication testing. Readings are used to evaluate potential effectiveness of a sub-slab depressurization system.

#### **1.04 SYSTEM DESCRIPTION AND REQUIREMENTS**

- A. Performance Requirements
  1. Radon mitigation systems shall reduce and maintain radon concentration levels below 4.0 pCi/L in various buildings specified herein. Test, design and construct radon mitigation systems in accordance with EPA 402-R-93-078, EPA 402-R-93-003, and EPA 402-R-92-004 and as specified herein. Additional guidance for testing, designing and constructing radon mitigation systems is contained in EPA 625-R-92-016 and EPA 625-R-93-011.
- B. Criteria for Diagnostic Testing and Suction Points
  1. Test locations, suction point locations, pipe sizes, number of fans and discharge points to the building exterior, routing of the radon mitigation systems piping, provision of associated enclosures, and all other work necessary to achieve the desired results specified are the Contractor's responsibility and shall be based on the requirements and restrictions, if any, specified herein.

#### **1.05 SUBMITTALS**

- A. Shop Drawings
  1. Radon mitigation
  2. Radon mitigation systems enclosures
- B. Product Data
  1. Radon mitigation systems components
  2. Radon mitigation systems enclosure components
  3. Radon diagnostic testing devices
- C. Design Data
  1. Radon mitigation systems design narrative
- D. Test Reports
  1. Pre-mitigation testing
  2. Post mitigation testing
- E. Certificates
  1. Contractor qualifications
  2. Contractor experience
  3. Worker protection plan
- F. Manufacturer's Instructions
  1. Radon mitigation systems components
  2. Radon mitigation systems enclosure components
- G. Operation and Maintenance Data
  1. Radon Mitigation Systems, Data Package 2
- H. Closeout Submittals
  1. Radon Detector Location Log
  2. Testing laboratory certification
  3. Proof of current calibration for testing devices

#### **1.06 DESIGN REQUIREMENTS**

- A. Prepare designs in accordance with the requirements of EPA 402-R-93-078 except that when the contract specification requirements are more stringent, the contract specification shall take precedence. The Contractor shall:

1. Prepare design drawings and assemble and provide product data for construction of multiple radon mitigation systems;
  2. Prepare design narrative supporting the design shown;
  3. Coordinate all elements of the design to ensure there are no conflicts;
  4. For each building, present information 100 percent complete in a single submission and in sufficient detail to permit a complete review by the Architect. The Architect's review is to check the design for conformance with the requirements contained in the contract documents. Design review shall not be construed as a waiver from performing requirements contained in the contract which may have been omitted from the Contractor prepared design documents.
  5. Provide three copies of the complete design documents.
- B. Design Drawing Requirements
1. Prepare, organize, and present drawings in the format considered standard industry practice for radon mitigation work and as described herein. Provide drawings complete, accurate and explicit enough to show compliance with the contract requirements and to permit construction. Drawings illustrating systems proposed to meet the requirements of the contract specification shall reflect proper detailing for each system to assure appropriate use, proper fit, compatibility of components and coordination with the design narrative and the contract specification. Coordinate drawings to ensure there are no conflicts between design disciplines and between drawings and the contract specification. Each Contractor prepared drawing shall bear the certification number and signature of the RCP listed individual responsible for the work portrayed on that drawing and proposed to meet the contract requirements.
    - a. Radon Mitigation Systems(Format and Content)
      - 1) On copies of the building floor plans, locate and identify each diagnostic test performed using alpha numeric designations. Prepare a separate drawing for each type of diagnostic test performed in each building. Provide grab sample (GS) data. Provide sub-slab communication (SSC) test data on. Provide short term detector (STD) data on copies of the "Device Placement Log" contained in EPA 402-R-92-014.
      - 2) On copies of the building floor plans, show suction point(s) and routing of the radon mitigation system(s) piping to the building exterior. Indicate pipe size, length of piping in the network, number and nature of flow obstructions, such as fittings, and fan characteristics for each system. Supplement the floor plan information with additional drawings keyed to each floor plan location showing riser diagrams, utility connections and routing, component installations, elevations, sections and details of the radon mitigation system(s). Also, provide construction and installation details such as supporting systems, attachment methods and surface penetration and sealing methods.
      - 3) Drawings shall not be smaller than A4 - 8 1/2 by 11 inch.
    - b. Radon Mitigation Systems Enclosures(Format and Content)
      - 1) Prepare drawings not smaller than A4 - 8 1/2 by 11 inch portraying the proposed method for enclosing each radon mitigation system in occupied spaces. All spaces shall be considered to be occupied spaces except for mechanical and electrical rooms, warehouses, storerooms, janitor closets, crawl spaces, and attic spaces. Enclosures are not required for portions of systems installed above suspended acoustical ceilings.
      - 2) Drawings shall indicate methods and materials to be used in constructing the enclosures and accesses for all operating components. Drawings showing typical enclosures and installations are acceptable (i.e. corner installation, mid-wall installation, etc.).
- C. Design Narrative
1. Format
    - a. The design narrative shall include a cover page indicating the project title, location, construction contract number and preparer, a table of contents and tabbed or colored page separations for quick reference. Submit design narrative prepared on A4 - 8

1/2 by 11 inch white paper. The design narrative shall be bound in one volume.

2. Content

- a. The design narrative shall include a basis of design and calculations. Specific requirements relative to the technical content to be provided are specified in this specification section. The design narrative shall be a presentation of facts to demonstrate that the project requirements are fully understood and that the design is based on sound engineering. The design narrative shall include and address the following:
  - 1) Executive summary.
  - 2) Scope of work.
  - 3) Building description.
  - 4) Diagnostic testing performed and results of the testing (include Attachments C and D and the Device Placement Logs for the short term detectors).
  - 5) Diagnostic test devices and equipment used.
  - 6) Locations where readings were recorded (include floor plans).
  - 7) Suspected or confirmed entry points of radon into the buildings (narrative or show on floor plans).
  - 8) Potential problems which may be caused by active (fan-powered) radon mitigation systems, if any.
  - 9) Conclusions and recommendations.
  - 10) Radon mitigation method chosen to reduce radon concentrations levels below 4.0 pCi/L and reasons for choosing the method.
  - 11) Data and calculations to verify negative pressure exists throughout the soil gas environment containing radon sufficient to exhaust the soil gas to the atmosphere under all weather and building operating conditions.
  - 12) Statement of compliance with applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional and local authorities regarding radon mitigation.
  - 13) Appendices (to include design drawings, forms and logs, laboratory analysis sheets, etc.).

D. Design Review and Approval

1. The design will be reviewed by the Architect prior to start of construction. The Architect's review is to check the design for conformance with the contract requirements. Design review does not relieve the Contractor of the responsibility of meeting the requirements of the contract and providing radon mitigation systems which, while active, reduce and maintain radon concentration levels below 4.0 pCi/L. The design of the radon mitigation systems and enclosures shall be approved prior to submission of construction submittals for the materials to be used in the construction of the systems and enclosures.

**1.07 RADON DETECTOR LOCATION LOG**

- A. Prepare and provide to the Owner a Radon Detector Location Log for each building detailing the identity and location of each short term radon detector. Prepare the log using copies of the "Device Placement Log" contained in EPA 402-R-92-014, and provide the appropriate information as line items. In addition to the log, on a copy of the building floor plans, locate and identify each short term detector.

**1.08 WORKER HEALTH AND SAFETY**

- A. Provide in accordance with EPA 402-R-93-078. Prepare a worker protection plan in accordance with EPA 402-R-93-078.

**1.09 QUALITY ASSURANCE**

- A. Contractor Qualifications and Experience
  1. Within 15 days after award, submit written evidence or data demonstrating that the Contractor and/or one or more subcontractors employed by the Contractor possess the qualifications and experience specified below.
- B. Contractor Qualifications



1. The person responsible for diagnostic testing, design, construction and on-site supervision, as required by the specifications, shall have successfully completed the requirements of and shall be maintaining a current listing in the USEPA RCP Program. Alternatively, in a State with legislation requiring mandatory credentialing for this work, compliance with the State legislation is acceptable. Evidence showing successful completion of the requirements of the USEPA National RCP Program shall include copy of current, valid USEPA RCP photo identification card or equivalent documentation issued by the State.
2. Contractor Experience
  - a. Submit written evidence demonstrating that the Contractor has successfully designed and installed at least two radon mitigation systems of the same or similar to the type required herein. Experience proof shall include but not be limited to:
    - 1) The contract name and number, completion dates of the project and the total cost of the project;
    - 2) The names, telephone numbers and fax number of the facility or installation for whom the radon mitigation system design, construction and/or testing were performed;
    - 3) The name, telephone number and fax number of a supervisory level point of contact at each facility or installation who has knowledge of the Contractor's performance.
- C. Testing Laboratory
  1. Submit testing laboratory certification as proof that the testing laboratory performing radon detector analysis has successfully completed the requirements of the USEPA Radon Measurement Proficiency (RMP) Program and is qualified and authorized to perform such analysis. Alternatively, in a State with legislation requiring mandatory credentialing for this work, compliance with the State legislation is acceptable.
- D. Diagnostic Testing Equipment
  1. Submit proof of current calibration for testing devices used in performing diagnostic testing.
- E. On-Site Supervision
  1. No work at the site will be permitted without the presence of a person possessing the qualifications specified elsewhere in this section, namely USEPA RCP listing or the State equivalent, where applicable.

## **1.10 DELIVERY, STORAGE AND HANDLING**

- A. Delivery of Products
  1. Deliver materials to the site in an undamaged condition. Deliver proprietary items in manufacture's original unopened and undamaged containers of packages with manufacture's name and brand and other pertinent data such as specification number, type, and class, date of manufacture. Schedule deliveries of materials to coincide with scheduled installation.
- B. Storage and Handling
  1. Carefully store materials off the ground to provide proper ventilation, drainage and protection against weather and dampness. Protect materials from marring, staining, rust, damage and overload and from contaminants such as grease, oil and dirt. Store materials at temperatures recommended by the manufacturer. Handle material to avoid damage such as chipping and breaking. Replace damaged material.

## **PART 2 PRODUCTS**

### **2.01 RADON MITIGATION SYSTEMS**

- A. System Performance
  1. Radon mitigation systems shall reduce and maintain radon concentration levels below 4.0 pCi/L after activation of the mitigation systems.
    - a. System Piping

- 1) Route radon mitigation systems piping so as not to interfere with the daily operations and functions of the building occupants. Keep visibility of the systems to a minimum. Enclose each radon mitigation system in occupied spaces, however, all operating components shall be accessible for maintenance and repair. All spaces shall be considered to be occupied spaces except for mechanical and electrical rooms, warehouses, storerooms, janitor closets, crawl spaces, and attic spaces. Enclosures are not required for portions of systems installed above suspended acoustical ceilings.
  - b. System Outlet Location
    - 1) Mitigation system discharge points shall be as specified in EPA 402-R-93-078. Prevent foreign objects from entering the outlet. Maintain water tight seal through all penetrations to the building exterior.
  - c. System Failure Warning Monitor
    - 1) Provide a means to detect and announce each radon mitigation system failure. System failure is defined as:
      - (a) System blockage: foreign debris.
      - (b) Mechanical failure: fan or other mechanical failure.
      - (c) System leakage: pipe breakage or crack.
    - 2) Provide an audio or visual annunciator device to indicate system failure and locate the annunciator device in an occupied space. Conform to the requirements of EPA 402-R-93-078.
  - d. Air Cleaners
    - 1) Air cleaners shall NOT be used as a radon reduction method.
  - e. Ventilation Devices
    - 1) Devices which reduce radon solely by increasing ventilation to the occupied space shall NOT be used.
  - f. Back Drafting
    - 1) Radon mitigation system shall NOT cause back drafting of building chimneys.
- B. Radon Mitigation Systems Components
1. Mechanical and electrical materials, fabrication, construction and installation shall conform to the following industry standards:
    - a. Poly(vinyl chloride) (PVC) Piping: ASTM D 2665, Schedule 40.
    - b. In-line Tubular Centrifugal Fans: AMCA 210 and UL listed.
    - c. Electrical Work: NFPA 70, NEMA MG 1 and EPA 402-R-93-078, No. 12 AWG minimum wire size, solid copper installed in EMT or surface metal raceway.
    - d. Mechanical Work: ICC IMC, ICC UMC, SMACNA 1378 and EPA 402-R-93-078.
    - e. Sealants: ASTM C 920, polyurethane, Type S, Grade P for horizontal application, Grade NS for vertical application, Class 25, Use T.
    - f. Crawl space soil-gas retarder membrane shall be minimum 40 mils thick.

## **2.02 RADON MITIGATION SYSTEMS ENCLOSURES**

- A. Radon mitigation systems enclosure components, materials, fabrication, construction and installation for concrete, wood studs and furring, metal studs and furring, gypsum wallboard, sealants and painting shall conform to the requirements specified in the respective specification sections addressing this work contained in the project specification.

## **PART 3 EXECUTION**

### **3.01 RADON TESTING**

- A. Perform radon testing in accordance with EPA 402-R-93-003 and EPA 402-R-92-004. The Contractor shall arrange that all laboratory test results are sent from the testing laboratory directly to the Owner with one copy to the Contractor.
- B. Site investigation data and results obtained from diagnostic testing shall be used to design the radon mitigation systems.
- C. Each sub-slab communication test shall include a suction hole and at least four test holes. Use non-shrink grout to repair all holes resulting from diagnostic testing and restore floor and wall

finishes to match existing adjacent surfaces.

### **3.02 DESIGN RADON MITIGATION SYSTEMS AND SYSTEMS ENCLOSURES**

- A. Design radon mitigation systems as required to achieve radon detection test results below 4.0 pCi/L based on radon diagnostic test results, EPA 402-R-93-078 and the information provided herein. Design the systems enclosures to accommodate the radon mitigation systems configurations and the adjacent or surrounding walls, partitions, ceilings and roof construction.

### **3.03 RADON MITIGATION SYSTEMS INSTALLATION**

- A. Installation
  - 1. Provide radon mitigation systems as indicated in the approved design drawings, as specified in EPA 402-R-93-078 and as required by the specifications and standards referenced herein for the respective materials using workmen skilled in the trades involved. Install piping plumb and parallel to existing walls, partitions and ceilings as appropriate, slope horizontal runs to drain, and secure in place in a rigid and substantial manner.
  - 2. Seal new and existing floor slab penetrations in accordance with EPA 402-R-93-078 and as specified herein. Prevent entry of soil gas into the building and exhausting of conditioned air via the radon mitigation system. Seal cracks and openings around floor slab penetrations with polyurethane sealant. Provide backer rod or comparable filler material as required. Insure that all penetrations to the building exterior are weathertight.
  - 3. Lay work out in advance. Exercise care where cutting, channeling, chasing or drilling floors, walls, partitions, ceilings or other surfaces as necessary for proper installation, support or anchorage. Patch and repair damage to buildings, piping and equipment using workmen skilled in the trades involved.
  - 4. As part of the site investigation, the Contractor shall identify furniture, carpeting or other portable materials and equipment which must be relocated to provide for the installation of the radon mitigation systems, if any. The Owner will work with the Contractor to coordinate relocations.
  - 5. Coordinate all work with the Owner.
- B. Supervision
  - 1. Installation of the radon mitigation systems shall be supervised by the RCP listed individual responsible for the design of the systems.
- C. Electrical Work
  - 1. NFPA 70 and EPA 402-R-93-078, No. 12 AWG minimum wire size, solid copper installed in EMT or surface metal raceway. A source of electric power should be available within 50 feet of each fan installation.
- D. Mechanical Work
  - 1. ICC IMC, ICC UMC, SMACNA 1378 and EPA 402-R-93-078.
- E. System Identification
  - 1. Label all components of the radon mitigation systems including, but not limited to, piping (every ten feet), enclosures, fans, electrical conduit (every ten feet) and circuit breakers. Labels shall read:
    - a. Radon Reduction System. Do Not Turn Off.

### **3.04 RADON MITIGATION SYSTEM ENCLOSURES INSTALLATION**

- A. Provide enclosures as indicated in the approved design drawings and as required by the specifications and standards referenced herein for the respective materials using workmen skilled in the trades involved. Install enclosures plumb, level and parallel to existing walls, partitions and ceilings as appropriate, and secure in place in a rigid and substantial manner.

### **3.05 FIELD QUALITY CONTROL**

- A. Radon Mitigation System Inspection
  - 1. Each system shall be inspected and approved in writing by the RCP listed individual responsible for the design of the system. Verify the presence of fire stops. Deficiencies shall be corrected by the Contractor at no additional cost to the Owner.

B. Post Mitigation Testing and Monitoring

1. Perform post mitigation radon testing in the buildings as specified in EPA 402-R-93-078 and herein.
  - a. Short Term
    - 1) Test each radon mitigation system for effectiveness no sooner than 24 hours nor later than 15 days after activation of the radon mitigation system. Provide short term radon detectors (charcoal, electret ion chamber or approved equivalent) at the rate of one detector per 2,000 square feet but not less than one detector per enclosed space, except for closets. On copies of the building floor plans, locate and identify each short term detector and provide short term detector data on copies of the "Device Placement Log" contained in EPA 402-R-92-014.
    - 2) At the end of the testing period, the Contractor shall collect the detectors and send the detectors to the testing laboratory for analysis. Provide radon test results of the effectiveness of the mitigation systems not later than 30 days after collecting the detectors. Radon test results shall be sent from the testing laboratory directly to the Owner with one copy to the Contractor. Complete the line item information on the "Device Placement Log."
    - 3) Radon test results above 4.0 pCi/L shall require system redesign and installation modifications as necessary to achieve radon test results below 4.0 pCi/L. Submit design modifications to the Government for review and approval. After approval of the design modifications, provide installation modifications to the radon mitigation system and retest for effectiveness. Repeat this short term test procedure until test results below 4.0 pCi/L are achieved.
    - 4) System modifications (as-built systems installations) shall be reflected in the Contractor's design documents (drawings and design narrative).

**END OF SECTION 312113**

This page intentionally left blank

**SECTION 31 3116  
TERMITE CONTROL**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This Section includes the following:
  - 1. Soil treatment with termiticide.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

**1.03 SUBMITTALS**

- A. Product Data: For termiticide.
  - 1. Include the EPA-Registered Label for termiticide products.
- B. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:
  - 1. Date and time of application.
  - 2. Moisture content of soil before application.
  - 3. Brand name and manufacturer of termiticide.
  - 4. Quantity of undiluted termiticide used.
  - 5. Dilutions, methods, volumes, and rates of application used.
  - 6. Areas of application.
  - 7. Water source for application.
- C. Warranty: As specified in this Section.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.
- B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.
- C. Source Limitations: Obtain termite control products through one source.

**1.05 PROJECT CONDITIONS**

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

**1.06 COORDINATION**

- A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

**1.07 WARRANTY**

- A. Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil.
  - 1. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 SOIL TREATMENT**

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide

concentration allowed for each specific use, according to product's EPA-Registered Label.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.
  - 1. Proceed with application only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
  - 1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

#### **3.03 APPLICATION, GENERAL**

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

#### **3.04 APPLYING SOIL TREATMENT**

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
  - 1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
  - 2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

**END OF SECTION 313116**

**SECTION 32 1816.13  
PLAYGROUND PROTECTIVE SURFACING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of existing protective surfacing and correction of grades as necessary.
- B. Protective surfacing for playground area.
- C. Subbase under resilient surfacing.
- D. Containment curbs.

**1.02 REFERENCE STANDARDS**

- A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)) 2012, with Editorial Revision (2015).
- B. ASTM F1292 - Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment 2018.
- C. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use 2017.
- D. CPSC Pub. No. 325 - Public Playground Safety Handbook 2010.

**1.03 DEFINITIONS**

- A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.
- B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.
- C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.
- D. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.
- E. Subbase: A layer under the resilient layer of the protective surfacing but over the subgrade; may be rigid, as in concrete or bituminous, or aggregate.
- F. Subgrade: The surface of the ground on which the protective surfacing is installed.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements - Administrative Requirements, for submittal procedures.
- B. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.
  - 1. Include IPEMA certifications where required.
- C. Shop Drawings: Detailed scale drawings showing locations of existing playground equipment and exposed footings, bases, and anchorage points.
  - 1. Clearly identify footing and base elevations in relation to a fixed survey point on site and to subgrade elevation and depth of protective surfacing, surveyed by land surveyor licensed in the State in which the Project is located.
  - 2. Show locations of underground utilities, storm-drainage system and irrigation system.
  - 3. Show locations of related construction such as walkways and roadways, fences, site furnishings, and plantings.



4. Show measured fall height for each playground equipment item, determined in accordance with ASTM F1487.
5. Show Use Zone perimeters, determined in accordance with ASTM F1487.
- D. Samples: For each product for which color must be selected provide color chart showing full range of colors.
- E. Maintenance Data:
  1. For loose fill surfacing products, provide detailed re-ordering information to enable Owner to match installed material exactly.
- F. Manufacturer's Field Report.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.
- B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than three years of documented experience.
  1. Surfacing installed in minimum 10 sites and been in successful service minimum 5 years.
  2. Provide certificate of Insurance AA rated for minimum 1,000,000 dollars covering both product and general liability.
  3. Manufacturer's Representative: Provide name, company name and address, and qualifications.
- C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.

#### **1.06 PRE-INSTALLATION MEETING**

- A. Coordinate with Section 11 6813.
- B. Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
  1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
  2. Include representatives of Contractor.
  3. Notify Architect at least 2 weeks prior to meeting.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store protective surfacing to project site in accordance with manufacturer's recommendations.
- B. Store materials in a dry, covered area, elevated above grade.

#### **1.08 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum 2 year warranty for playground surfacing.

### **PART 2 PRODUCTS**

#### **2.01 PERFORMANCE CRITERIA**

- A. Because the safety of the playground depends on strict compliance with the performance criteria, this information is provided for Contractor's information.
  1. The protective surfacing constitutes a resilient layer installed over a non-resilient layer, which is installed over the subgrade, with the top of playground equipment footings and anchorage devices covered by full depth of the resilient portion of the protective surfacing.
  2. The top elevation of the protective surfacing is intended to be flush with adjacent grades.
  3. Use Zone: The protective surfacing has been designed to provide acceptable impact attenuation as defined in ASTM F1292 for Critical Height of 4 feet.

- B. If deviation from specified depth is required, it is the Contractor's responsibility to make all changes required to maintain specified top elevation and required impact attenuation at no extra cost to Owner; obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

## **2.02 MATERIALS**

- A. Recycled Rubber Fill: Loose fill; 100 percent recycled rubber chips, shreds, granules, or nuggets; installed over subgrade.
  - 1. Chip Size: 3/8 inch, nominal.
  - 2. Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
  - 3. Color: Manufacturer's standard mixed colors.
  - 4. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
  - 5. Manufacturers:
    - a. No Fault Sport Group; No Fault Loose Fill Rubber Mulch: [www.nofault.com/#sle](http://www.nofault.com/#sle).
    - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Geotextile Fabric: Nonwoven polypropylene sheet.
- C. Containment Curbs: Cast-in-place concrete; free of sharp vertical edges, protruding elements, and trip hazards.
  - 1. Size(s): As indicated on drawings.
  - 2. Minimum Edge Radius: 1/2 inch.
- D. Aggregate Subbase: As specified in Section 32 1123.

## **PART 3 EXECUTION**

### **3.01 PREPARATION FOR REPLACEMENT OF EXISTING LOOSE FILL SURFACING**

- A. Remove existing loose fill.
- B. Measure the location of all playground elements, including perimeter of existing protective surfacing, access and egress points, hard surfaces, walls, fences, and structures, and planting locations.
- C. Stake the layout of the entire Use Zone perimeter before starting any work, based on Contract Documents.
  - 1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
  - 2. Do not proceed until revised drawings have been provided, showing corrected layout.
- D. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.
- E. Make surface of subgrade smooth and evenly sloped.
  - 1. Fill holes and depressions with borrow from same area or soil of similar type.
  - 2. Make changes to grades as indicated on drawings.
- F. After subgrade is correct, mark intended depth of surfacing on the base supports of each item of playground equipment using paint or tape in a manner that will be easily verifiable during installation of surfacing.
- G. Perform percolation test at the lowest elevation of the subgrade in the areas to be covered by protective surfacing.
  - 1. Report results to Architect.
  - 2. If percolation is less than 1 inch in a 3 hour period, do not proceed.

### **3.02 EXAMINATION**

- A. Playground equipment installer will perform playground layout prior to installation of footings; verify correctness of layout before starting this work.

- B. Verify that playground equipment and site furnishings and irrigation system located within playground area are complete.
- C. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities will be repaired at Contractor's expense.
- D. Verify that subgrades are at proper elevations and that smooth grading is complete.
- E. Verify that proper depth of surfacing is marked on base supports of playground equipment.

### **3.03 PREPARATION**

- A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in accordance with manufacturer's requirements.
- B. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.
- C. Remove rocks, debris, and other similar items.
- D. Install containment curbs with top surface flush with intended elevation of top surface of protective surfacing.

### **3.04 SUBBASE**

- A. Install aggregate subbase as indicated on drawings. Compact aggregate to maximum 95 percent, in accordance with ASTM D1557.
- B. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch lower than grades and levels indicated.
- C. Install in true, even plane, sloped to provide positive drainage.
- D. Flatness Tolerance: 1/4 inch in 10 feet, maximum.

### **3.05 RESILIENT SURFACING LAYER**

- A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).
- B. Install proper thickness throughout Use Zone(s).
- C. Clean and dry surface of subbase.
- D. Cover aggregate subbase with geotextile fabric:
  - 1. Verify that aggregate is free of ruts or protruding objects.
  - 2. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.
  - 3. Install fabric smooth, and free of tensile stresses, folds, or wrinkles.
  - 4. Protect fabric from clogging, tears, or other damage during surfacing installation.
  - 5. Repair or replace damaged fabric in accordance with manufacturer's recommendations.

### **3.06 LOOSE FILL SURFACING**

- A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, and requirements of authorities having jurisdiction (AHJ).
- B. Cover Subgrade with Geotextile Fabric:
  - 1. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.
  - 2. Install fabric smooth, and free of tensile stresses, folds, or wrinkles.
  - 3. Protect fabric from clogging, tears, or other damage during surfacing installation.
  - 4. Repair or replace damaged fabric in accordance with manufacturer's recommendations.
- C. Install loose fill to depths indicated, with smooth even surface flush with tops of containment curbs.
- D. Sand: Determine finished elevation after sand has been settled with water and percolating.

### **3.07 FIELD QUALITY CONTROL**

- A. Obtain the services of the equipment manufacturer's field representative to review the finished installation for compliance with specified requirements and with design criteria to the extent known to the Contractor; submit report of field review.
- B. Repair or replace rejected work until compliance is achieved.

**3.08 CLEANING AND PROTECTION**

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- C. Clean playground area of excess construction materials, debris, and waste.
- D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.
- E. Protect installed products until Date of Substantial Completion.
- F. Replace damaged products before Date of Substantial Completion.

**END OF SECTION**

This page intentionally left blank

**SECTION 32 3113**  
**CHAIN LINK FENCES AND GATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Posts, rails, and frames.
- B. Wire fabric.
- C. Concrete.
- D. Manual gates with related hardware.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric 2011a (Reapproved 2017).
- C. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2020.
- D. ASTM F567 - Standard Practice for Installation of Chain-Link Fence 2014a.
- E. CLFMI CLF-PM0610 - Product Manual 2017.
- F. CLFMI CLF-SFR0111 - Security Fencing Recommendations 2014.
- G. FS RR-F-191/1D - Fencing, Wire and Post Metal (Chain-Link Fence Fabric) 1990.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

**1.05 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Chain Link Fences and Gates:
  - 1. Master-Halco, Inc: [www.masterhalco.com/#sle](http://www.masterhalco.com/#sle).
  - 2. Merchants Metals: [www.merchantsmetals.com/#sle](http://www.merchantsmetals.com/#sle).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 COMPONENTS**

- A. Line Posts: 1.9 inch diameter.
- B. Corner and Terminal Posts: 2.38 inch diameter.
- C. Fabric with Pre-Inserted Slats: 2 inch diamond mesh interwoven wire, 6 gage, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.

**2.03 MATERIALS**

- A. Posts, Rails, and Frames:

1. Line Posts: Type I round in accordance with FS RR-F-191/1D
  2. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round in accordance with FS RR-F-191/1D.
- B. Wire Fabric:
1. ASTM A392 zinc coated steel chain link fabric.
  2. Comply with CLFMI CLF-PM0610.
- C. Concrete:
1. Ready-mixed, complying with ASTM C94/C94M; normal Portland cement; 2,500 psi strength at 28 days, 3 inch slump; 3/4 inch nominal size aggregate.

## **2.04 COMPONENTS**

- A. Line Posts: 1.9 inch diameter.
- B. Corner and Terminal Posts: 2.38 inch diameter.
- C. Fabric: 2 inch diamond mesh interwoven wire, 6 gage, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.

## **2.05 MANUAL GATES AND RELATED HARDWARE**

- A. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.
- B. Hinges: Finished to match fence components.
1. Brackets: Round.
  2. Mounting: Center.
  3. Closing: Manual.
- C. Latches: Finished to match fence components.
1. Brackets: Round.

## **2.06 ACCESSORIES**

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

## **2.07 FINISHES**

- A. Components (Other than Fabric): Galvanized in accordance with ASTM A123/A123M, at 1.7 ounces per square foot.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

### **3.02 PREPARATION**

- A. Removal: Obstructions or debris.
- B. Ground Preparation:
1. Final Grading complete.

### **3.03 INSTALLATION**

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Place fabric on outside of posts and rails.
- C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- D. Line Post Footing Depth Below Finish Grade: ASTM F567.
- E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail [\_\_\_\_\_]. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- H. Do not stretch fabric until concrete foundation has cured 7 days.
- I. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- J. Position bottom of fabric 2 inches above finished grade.
- K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- M. Do not attach the hinged side of gate to building wall; provide gate posts.
- N. Install hardware and gate with fabric to match fence.
- O. Peen all bolts upon installation.

#### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Position: 1 inch.

#### **3.05 CLEANING**

- A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- B. Clean fence with mild household detergent and clean water rinse well.

**END OF SECTION**



This page intentionally left blank

**SECTION 32 3119  
DECORATIVE METAL FENCES AND GATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Decorative steel fences.

**1.02 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- C. ASTM D714 - Standard Test Method for Evaluating Degree of Blistering of Paints 2002 (Reapproved 2017).
- D. ASTM D1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments 2008, with Editorial Revision (2017).
- E. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact) 1993 (Reapproved 2019).
- F. ASTM D3359 - Standard Test Method for Rating Adhesion by Tape Test 2017.
- G. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets 2016.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings:
  - 1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Decorative Metal Fences and Gates:
  - 1. Ameristar Perimeter Security, USA: [www.ameristarfence.com/#sle](http://www.ameristarfence.com/#sle).
  - 2. Knotwood, a brand of OmniMax International: [www.knotwood.com/#sle](http://www.knotwood.com/#sle).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 FENCES**

- A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:
  - 1. Capable of resisting vertical load, horizontal load and infill performance requirements for fence categories defined in ASTM F2408.
- B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
  - 1. Total Coating Thickness: 2 mils, minimum.
  - 2. Color: As selected by Architect from manufacturer's standard range.

3. Coating Performance: Comply with general requirements of ASTM F2408.
  - a. Adhesion: ASTM D3359 (Method B); Class 3B with 90 percent or more of coating remaining in tested area.
  - b. Corrosion Resistance: ASTM B117, ASTM D714 and ASTM D1654; 1/8 inch coating loss or medium No.8 blisters after 1,500 hours.
  - c. Impact Resistance: ASTM D2794; 60 inch pounds.
- C. Steel: ASTM A653/A653M; tensile strength 45,000 psi, minimum.
  1. Hot-dip galvanized; ASTM A653/A653M, G60.
  2. 62 percent recycled steel, minimum.

### **2.03 MECHANICALLY FASTENED STEEL FENCE**

- A. Provide fence meeting requirements for Industrial class as defined by ASTM F2408.
- B. Fence Panels: Mechanically fastened with internal reinforcement and tamperproof fasteners; 6 feet high by 6 feet long.
  1. Panel Style: Two rail.
  2. Panel Strength: Capable of supporting 600 pound load applied at midspan without deflection.
  3. Attach panels to posts with manufacturer's standard panel brackets.
- C. Posts: Steel tube.
  1. Size: 4 inches square by 12 gauge, 0.1094 inch, with manufacturer's standard cap.
  2. Post Cap: Ball.
- D. Rails: Manufacturer's standard, double-wall steel channel; 1-3/4 inch square by 14 gauge, 0.0747 inch with pre-punched picket holes.
  1. Picket Retaining Rods: 1/8 inch galvanized steel.
  2. Picket-to-Rail Intersection Seals: PVC grommets.
- E. Pickets: Steel tube.
  1. Spacing: 4.175 inch on center.
  2. Size: 1 inch square by 14 gauge, 0.0747 inch
  3. Style: Pickets with finial extend above top rail.
  4. Finial: Spear point.
- F. Flexibility: Capable of following variable slope of up to 1:4.
- G. Color: Black.

### **2.04 SPECIALITY HARDWARE**

- A. Hinges: Finished to match fence components.
  1. Closing: Manual.
  2. Mechanism: Spring.
  3. Material: Steel.
  4. Mounting: Center.
  5. Brackets: Round.
  6. Bearings: Plain.
- B. Latches: Finished to match fence components.
  1. Mechanism: Gravity.
  2. Locking: Mechanical.
  3. Material: Steel.
  4. Mounting: Center.
  5. Brackets: Round.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.

- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Set fence posts in accordance with the manufacturer recommended spacing.
- C. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
  - 1. Base type and quantity of gate hinges on the application, weight, height, and number of gate cycles.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From Indicated Position: 1 inch.
- C. Minimum Distance from Property Line: 6 inches.

### **3.05 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.
- C. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.
- D. Gates: Inspect for level, plumb, and alignment.
- E. Workmanship: Verify neat installation free of defects.

### **3.06 CLEANING**

- A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- B. Clean fence with mild household detergent and clean water rinse well.
- C. Remove mortar from exposed posts and other fencing material using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.
- D. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

### **3.07 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

### **END OF SECTION**

This page intentionally left blank

**SECTION 32 3300  
SITE FURNISHINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Benches.
- B. Waste receptacles.

**1.02 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- B. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2020.
- C. ASTM A536 - Standard Specification for Ductile Iron Castings 1984 (Reapproved 2014).

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.
- C. Shop Drawings: Indicate plans for each unit or group of units, elevations with model number, overall dimensions, construction, and anchorage details.
- D. Samples: Submit two sets of manufacturer's available colors for metal furnishings.
- E. Samples: Submit two sets of manufacturer's available colors and finishes for precast furnishings.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Metal Furnishings:
  - 1. BRP by Bison, Inc: [www.brpbybison.com/#sle](http://www.brpbybison.com/#sle).
  - 2. Fair Weather Site Furnishings: [www.fairweathersf.com/#sle](http://www.fairweathersf.com/#sle).
  - 3. Neenah Foundry, a division of Neenah Enterprises, Inc: [www.nfco.com/#sle](http://www.nfco.com/#sle).
  - 4. SiteScapes, Inc: [www.sitescapesonline.com/#sle](http://www.sitescapesonline.com/#sle).
  - 5. Tectura Designs, a division of Wausau Tile Inc: [www.tecturadesigns.com/#sle](http://www.tecturadesigns.com/#sle).
  - 6. Victor Stanley, Inc: [www.victorstanley.com/#sle](http://www.victorstanley.com/#sle).
  - 7. Wausau Made, a division of Wausau Tile Inc: [www.tecturadesigns.com/#sle](http://www.tecturadesigns.com/#sle).
  - 8. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 METAL FURNISHINGS**

- A. Metal Furnishings, General:
  - 1. Cast iron components: Ductile iron castings complying with ASTM A536; cleaned, treated, and powder-coated.
    - a. Color: As selected by Architect from manufacturer's standard range.
  - 2. Steel components: Plates, bars, and shapes complying with ASTM A36/A36M and tubing complying with ASTM A500/A500M; cleaned, treated, and powder-coated.
    - a. Color: As selected by Architect from manufacturer's standard range.
  - 3. Hardware: Stainless steel.
- B. Benches: Metal frame and seat section with back.
  - 1. Frame: Steel.
  - 2. Seat: Steel slat.
  - 3. Intermediate support: Locate at midpoint.
  - 4. Intermediate arm rest. Locate at midpoint.
  - 5. Mounting: Surface.
  - 6. Products:
    - a. BRP by Bison, Inc: [www.brpbybison.com/#sle](http://www.brpbybison.com/#sle).

- b. Fair Weather Site Furnishings: [www.fairweathersf.com/#sle](http://www.fairweathersf.com/#sle).
  - c. Neenah Foundry, a division of Neenah Enterprises, Inc: [www.nfco.com/#sle](http://www.nfco.com/#sle).
  - d. SiteScapes, Inc: [www.sitescapesonline.com/#sle](http://www.sitescapesonline.com/#sle).
  - e. Victor Stanley, Inc: [www.victorstanley.com/#sle](http://www.victorstanley.com/#sle).
  - f. Substitutions: See Section 01 6000 - Product Requirements.
- C. Waste Receptacles: Steel frame with steel slats and removable lid.
- 1. Capacity: 20 gallons.
  - 2. Shape: Round.
  - 3. Diameter: [ ] inches.
  - 4. Wall liners: Galvanized steel panels welded inside waste receptacle frame as integral part of waste receptacle unit.
  - 5. Inserts: Removable plastic containers for waste material.
  - 6. Lids:
    - a. Material: Steel.
    - b. Type: Flat.
  - 7. Mounting: Surface.
  - 8. Products:
    - a. Fair Weather Site Furnishings: [www.fairweathersf.com/#sle](http://www.fairweathersf.com/#sle).
    - b. SiteScapes, Inc: [www.sitescapesonline.com/#sle](http://www.sitescapesonline.com/#sle).
    - c. Victor Stanley, Inc: [www.victorstanley.com/#sle](http://www.victorstanley.com/#sle).
    - d. Substitutions: See Section 01 6000 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.
- B. Do not begin installation until unacceptable conditions are corrected.

#### **3.02 INSTALLATION**

- A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.
- B. Provide level mounting surfaces for site furnishing items.

#### **END OF SECTION**

**SECTION 32 3313  
SITE BICYCLE RACKS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior bicycle racks.

**1.02 REFERENCE STANDARDS**

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2018.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Indicate size, shape, and dimensions, including clearances from adjacent walls, doors, and obstructions.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Handle racks with sufficient care to prevent scratches and other damage to the finish.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Exterior Bicycle Racks:
  - 1. American Bicycle Security Company: [www.ameribike.com/#sle](http://www.ameribike.com/#sle).
  - 2. BRP by Bison, Inc: [www.brpbysison.com/#sle](http://www.brpbysison.com/#sle).
  - 3. Columbia Cascade Company: [www.timberform.com/#sle](http://www.timberform.com/#sle).
  - 4. Highland Products Group, LLC: [www.indoorbikeracks.net/#sle](http://www.indoorbikeracks.net/#sle).
  - 5. Huntco Supply, LLC: [www.huntco.com/#sle](http://www.huntco.com/#sle).
  - 6. Neenah Foundry, a division of Neenah Enterprises, Inc: [www.nfco.com/#sle](http://www.nfco.com/#sle).
  - 7. Saris Infrastructure: [www.sarisinfrastructure.com/#sle](http://www.sarisinfrastructure.com/#sle).
  - 8. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 BICYCLE RACKS**

- A. Exterior Bicycle Racks: Device allows user-provided lock to simultaneously secure one wheel and part of the frame on each bicycle parked or racked.
  - 1. Style: Serpentine rack formed from a continuous round pipe.
  - 2. Capacity: Five bicycles per set where indicated on drawings.
  - 3. Mounting, Ground: In-ground anchor.
  - 4. Finish: Powder coat, maintenance-free and weather-resistant.
  - 5. Color: As selected by Architect from manufacturer's standard range.
  - 6. Accessories: In-ground grout cover.
- B. Materials:
  - 1. Pipe: Carbon steel, ASTM A53/A53M, Schedule 40.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine surfaces to receive bicycle racks.



- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory conditions before proceeding.
- C. Do not begin installation until unsatisfactory conditions are corrected.

### **3.02 PREPARATION**

- A. Ensure surfaces to receive bicycle racks are clean, flat, and level.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install level, plumb, square, and correctly located as indicated on drawings.
- C. In-Ground Anchor Installation:
  - 1. Prepare holes in size according to manufacturer's instructions.
  - 2. Place anchoring bolts through the holes in pipe.
  - 3. Lower rack into holes, ensuring the bottom of lower bends are at least 1-1/2 inch from the ground.
  - 4. Place concrete.
  - 5. Level rack before concrete sets.
  - 6. Support until dry.
- D. Freestanding Installation: Place in location indicated on drawings.

### **3.04 CLEANING**

- A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

### **3.05 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

### **END OF SECTION**