

## Energy

At Harmony Castings, our V-Process delivers the excellent casting integrity and tight tolerances required by the oil and natural gas industries. With unmatched speed to market, we can take your drawings or models from concept to completion within three weeks. From prototype to production, and throughout the life of your product, our patterns are guaranteed.

### Key Features and Benefits:

- Excellent Casting Integrity
- Tight tolerances
- Speed to Market
- Zero Degree Draft
- Unlimited Pattern Life
- Quick Pattern Revisions
- Corrosion Resistant
- 150 RMS Finish
- Thin Walls



## MISSION STATEMENT

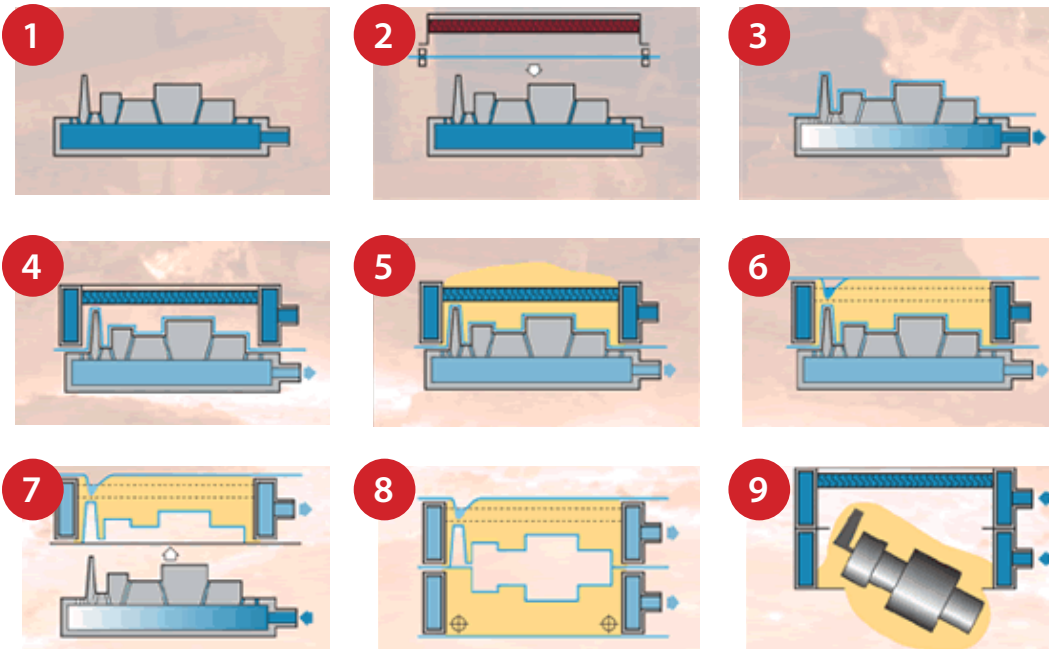
Harmony Castings exceeds customer expectations by delivering quality products and building long-term relationships based on trust and confidence in our performance. Our dealings with our customers, vendors, employees and our community are rooted in integrity.



Visit our website: [harmonycastings.com](http://harmonycastings.com)

Send files and prints to: [quotes@harmonycastings.com](mailto:quotes@harmonycastings.com)

## V-PROCESS Sequence



- Step 1:** The pattern (with vent holes) is placed on a hollow carrier plate.
- Step 2:** A heater softens the .003" to .008" plastic film. Plastic has good elasticity and a high deformation ratio.
- Step 3:** Softened film drapes over the pattern with 200 to 400 mm Hg vacuum acting through the pattern vents to draw it tightly around the pattern.
- Step 4:** The flask is placed on the film-coated pattern. Flask walls are also a vacuum chamber with the outlet shown at right.
- Step 5:** The flask is filled with dry, unbonded sand. A slight vibration compacts sand to maximum bulk density.
- Step 6:** A sprue cup is formed and the mold surface leveled. The back of the mold is covered with unheated plastic film.
- Step 7:** Vacuum is applied to the flask. Atmospheric pressure then hardens the sand. The vacuum is released, pressurized air is introduced into the carrier and the mold is stripped.
- Step 8:** The cope and drag assembly form a plastic-lined cavity. During pouring, molds are kept under vacuum.
- Step 9:** After cooling, the vacuum is released and free-flowing sand drops away leaving a clean casting, with no sand lumps. The sand is cooled for re-use.

## Aluminum Castings: Process Comparisons

Process	Typical Size Range	Tolerances	Surface Finish	Min. Draft Required	Min. Section Thickness	Nominal Lead Time
<b>V-PROCESS Castings</b>	Up to 150 lbs	± .010" for the first 1", then add ± .002" per inch. Add a maximum .020" across parting line	125-150 RMS	None	.125"	Samples: 2 to 6 weeks Production: 2 to 6 weeks after approval
<b>Sand Castings</b>	Ounces to tons	± 1/32" to 6", then add ± .003" per inch. Add ± .020" to .090" across parting line	200-550 RMS	1 to 5 degrees	.25"	Samples: 2 to 6 weeks Production: 2 to 6 weeks after approval
<b>Investment (Lost Wax)</b>	Ounces to 20lbs	± .003" to 1/4" ± .004" to 1/2" ± .005" to 3", then add ± .003" per inch	63-125 RMS	None	.060"	Samples: 8 to 10 weeks Production: 5 to 12 weeks after approval
<b>Permanent Mold</b>	Ounces to 100lbs	± .015" to 1", then add ± .002" per inch. Add ± .010" to .030" across parting line	150-300 RMS	2 to 5 degrees	.1875"	Samples: 8 to 20 weeks Production: 10 to 12 weeks after approval
<b>Plaster Mold</b>	Ounces to 50lbs	± .005" to 2", then add ± .002" per inch. Add ± .010" across parting line	63-125 RMS	1/2 to 2 degrees	.070"	Samples: 2 to 10 weeks Production: 4 to 8 weeks after approval
<b>Die Casting</b>	Ounces to 15 lbs	± .002" per inch. Add ± .015" across parting line	32-63 RMS	1 to 3 degrees	.030" to .060"	Samples: 12 to 22 weeks Production: 8 to 14 weeks after approval



251 Perry Highway  
P.O. Box 230  
Harmony, PA 16037  
P: 724-452-5811  
F: 724-452-0118  
[www.harmonycasting.com](http://www.harmonycasting.com)