

Summary of EN 12975 Test Results						Licence Number		-			
						Issued		-			
Company holding the						Countr	Cyprus				
Brand (optional)		ENVIROENERGY SOLUTIONS ES Ltd				Website	www.enviroenergysolutions.com				
Street, street number		25 Aitolon str - Ayios Andreas				E-mail	yannisvassalos@enviroenergy-solutions.com				
Postal Code / City,		1101 Nicosia				Tel/Fax	30 6984612259				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed					
Thermal / photo voltaic hybrid collector? (PVT collector)						No					
Integration in the roof possible ? (manufacturers declaration)						No					
	Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module				
							G = 1000 W/m ²				
							Tm-Ta				
							0 K	10 K	30 K	50 K	70 K
							W	W	W	W	W
	EFM 1.50	1.38	1,480	1,010	86	1.50	1,145	1,089	964	822	664
	EFM 1.50H	1.38	1,010	1,480	86	1.50	1,145	1,089	964	822	664
	EFM 1.82	1.72	1,480	1,230	86	1.82	1,428	1,357	1,202	1,025	828
	EFM 1.82H	1.72	1,230	1,480	86	1.82	1,428	1,357	1,202	1,025	828
	EFM 2.00	1.86	1,980	1,010	86	2.00	1,544	1,468	1,299	1,109	895
	EFM 2.00H	1.86	1,010	1,980	86	2.00	1,544	1,468	1,299	1,109	895
	EFM 2.37	2.23	1,930	1,230	86	2.37	1,851	1,760	1,558	1,329	1,074
	EFM 2.37H	2.23	1,230	1,930	86	2.37	1,851	1,760	1,558	1,329	1,074
	EFM 2.72	2.57	2,160	1,260	86	2.72	2,133	2,028	1,795	1,532	1,237
	EFM 2.72H	2.57	1,260	2,160	86	2.72	2,133	2,028	1,795	1,532	1,237
Performance test method						Glazed liquid heating collector - steady state - outdoor					
Performance parameters related to aperture		η_0	a1	a2							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1		0.830	3.930	0.015							
Bi-directional incidence angle		No <i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θ)		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
		K θ (θ)					0.96				0.00
Incidence angle modifier not bi-directional - leave fields blank											
Stagnation temperature - Weather conditions see note 2						Tstg	231.09 °C				
Effective thermal capacity						ceff = C/Ag	10.85 kJ/(m ² K)				
Max. intende operation temperature - see note 3						Tmax,op	200 °C				
Max. operation pressure - see note 3						pmax,op	1000 kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m ²)	0.000	0.008	0.013	0.018	0.023	0.028	0.038	0.055		
Pressure drop, ΔP	Pa	0	40	79	116	163	211	335	594		
Optional weather data		Location		Link							
Testing Laboratory		NCSR Demokritos / Solar & other Energy System Laboratory									
Website		www.solar.demokritos.gr									
Test report id. number		4195DE2, 4196DE2, 4197DQ1				Date of test report		16/11/16,30/10/16			
During the test GDIF/GTOT was always between		0.05	and	0.09							
Comments of testing laboratory:											
This data sheet issued upon manufacturer request											
Tstg: Calculated using efficiency parameters											
Note 1	Flow rate	0.021	kg/(s m ²)	Fluid	Water						
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C										
Note 3	Given by manufacturer										

N.C.S.R. "DEMOKRITOS"

SOLAR ENERGY LABORATORY

Head: Dr. Vassilis Belessiotis

Tel: +210 6503819 - Fax: +210 6544892

153 10 Ag. Paraskevi - Attiki - Greece

Annual collector output based on EN 12975 Test Results	Licence Number	-
	Issued	-

Annual collector output kWh/module													
Collector name	Location and collector temperature (T _m)												
	Athens			Davos			Stockholm			Würzburg			
	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	
EFM_1.50	1,862	1,329	863	1,411	970	601	1,043	678	404	1,135	735	431	
EFM_1.50H	1,862	1,329	863	1,411	970	601	1,043	678	404	1,135	735	431	
EFM_1.82	2,321	1,656	1,076	1,759	1,210	749	1,301	845	504	1,414	916	537	
EFM_1.82H	2,321	1,656	1,076	1,759	1,210	749	1,301	845	504	1,414	916	537	
EFM_2.00	2,510	1,791	1,164	1,902	1,308	810	1,406	914	545	1,529	991	581	
EFM_2.00H	2,510	1,791	1,164	1,902	1,308	810	1,406	914	545	1,529	991	581	
EFM_2.37	3,009	2,147	1,395	2,281	1,568	971	1,686	1,096	653	1,834	1,188	696	
EFM_2.37H	3,009	2,147	1,395	2,281	1,568	971	1,686	1,096	653	1,834	1,188	696	
EFM_2.72	3,468	2,475	1,608	2,628	1,807	1,119	1,943	1,263	753	2,113	1,369	802	
EFM_2.72H	3,468	2,475	1,608	2,628	1,807	1,119	1,943	1,263	753	2,113	1,369	802	

Collector mounting: Fixed or tracking

Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °C	Collector orientation or tracking mode
Athens	38	1,765	18.5	South, 25°
Davos	47	1,714	3.2	South, 30°
Stockholm	59	1,166	7.5	South, 45°
Würzburg	50	1,244	9.0	South, 35°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the Keymark spreadsheet tool ScenoCalc (ver. 4.06). The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m).