



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		SKM 9968/1																	
					Date issued		2017-02-20																	
					Issued by		DQS Hellas																	
Licence holder		HELIOAKMI S.A.			Country		GREECE																	
Brand (optional)		HELIOAKMI, MEGASUN, ASSOS BOILERS, NOVASUN, VORMANN, SOLARTOP, ATLASOL, SOLARNET, SOL			Web		www.helioakmi.com																	
Street, Number		Thesi Nea Zoi - Aspropyrgos, Attiki			E-mail		megasun@helioakmi.com																	
Postcode, City		19300	Aspropyrgos, Attiki		Tel		30 210 5595625 / 210 5595723																	
Collector Type					Flat plate collector, glazed																			
Collector name					Gross area (A_G)		Gross length		Gross width		Gross height		Power output per collector $G_b = 850 \text{ W/m}^2$; $G_d = 150 \text{ W/m}^2$ $\vartheta_m - \vartheta_a$											
					m ²		mm		mm		mm		0 K		10 K		30 K		50 K		70 K		62 K	
SOL-2500					2.48		2,010		1,235		70		1,607		1,497		1,267		1,025		772		875	
SOL-2000					1.96		2,010		975		70		1,270		1,183		1,001		810		610		691	
Power output per m ² gross area					648		604		511		414		311		353									
Performance parameters test method					Steady state - outdoor																			
Performance parameters (related to AG)					$\eta_{0,hem}$		a1		a2															
Units					-		W/(m ² K)		W/(m ² K ²)															
Test results					0.650		4.390		0.006															
Incidence angle modifier test method					Steady state - outdoor																			
Bi-directional incidence angle					No																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					$K_{GT, coll}$								0.83										0.00	
Longitudinal					$K_{GL, coll}$								0.83										0.00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A_G)					dm/dt		0.020		kg/(sm ²)															
Maximum temperature difference for thermal performance calculations					$(\vartheta_m - \vartheta_a)_{max}$		62		K															
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30^\circ\text{C}$)					ϑ_{stg}		160.5		°C															
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²		12.67		kJ/(Km ²)															
Maximum operating temperature					$\vartheta_{max, op}$		100		°C															
Maximum operating pressure					$p_{max, op}$		1000		kPa															
Testing laboratory		Demokritos			www.solar.demokritos.gr																			
Test report(s)		4132 DE2, 4133 DE2, 4222 DQ3			Dated		08/11/2018, 12/11/2018, 16/9/2018																	
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01																			
Test Reports 4132DE2, 4133DE3, 4222DQ3 were issued for the transition from EN 12975-2:2006 to EN ISO 9806: 2013					N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilios Belessiotis Tel: +210 6503815 - Fax: +210 6544329 153 10 Ag. Paraskevi - Attiki - Greece																			
Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexou@dqshellas.gr																								



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SKM 9968/1
	Issued	2017-02-20

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations	Athens			Davos			Stockholm			Würzburg			
	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
Collector name													
SOL-2500		2,292	1,400	781	1,620	985	527	1,201	684	358	1,307	726	374
SOL-2000		1,811	1,106	618	1,280	778	416	950	540	283	1,033	574	295
Annual output per m ² gross area		924	564	315	653	397	212	484	276	144	527	293	151
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
Mean annual ambient air temperature		18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑ_m (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SOL-2500	2.48	Collector efficiency (η_{col})	46 %
SOL-2000	1.96	Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.648 --
		First-order coefficient (a_1)	4.39 W/(m ² K)
		Second-order coefficient (a_2)	0.006 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.83 --
		Remark: The data given in this section are related to collector reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.	