



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		OEM 9999/1/4							
						Date issued		2018-03-10							
						Issued by		DQS Hellas							
Licence holder	IRSC (Integrated Renewable & Sustainable Communities)					Country	Egypt								
Brand (optional)	IRSC					Web									
Street, Number	Bld # 60 – El Mokattam Street, Mokattam					E-mail	fatma.ahmed@irs-c.com								
Postcode, City	Cairo					Tel	+202 28467267								
						Flat plate collector, glazed									
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² θ _m - θ _a										
					0 K W	10 K W	30 K W	50 K W	70 K W	50 K W					
HMAX 1.50	1,50	1.480	1.010	86	1.142	1.085	961	819	661	819					
HMAX 1.50H	1,50	1.010	1.480	86	1.142	1.085	961	819	661	819					
HMAX 1.82	1,82	1.480	1.230	86	1.385	1.317	1.166	994	802	994					
HMAX 1.82H	1,82	1.230	1.480	86	1.385	1.317	1.166	994	802	994					
HMAX 2.00	2,00	1.980	1.010	86	1.522	1.447	1.281	1.092	881	1.092					
HMAX 2.00H	2,00	1.010	1.980	86	1.522	1.447	1.281	1.092	881	1.092					
HMAX 2.37	2,37	1.930	1.230	86	1.804	1.715	1.518	1.294	1.044	1.294					
HMAX 2.37H	2,37	1.230	1.930	86	1.804	1.715	1.518	1.294	1.044	1.294					
HMAX 2.72	2,72	2.160	1.260	86	2.070	1.968	1.742	1.485	1.198	1.485					
HMAX 2.72H	2,72	1.260	2.160	86	2.070	1.968	1.742	1.485	1.198	1.485					
Power output per m ² gross area					761	724	640	546	440	546					
Performance parameters test method						Steady state - outdoor									
Performance parameters (related to AG)						η _{0,hem}	a ₁	a ₂							
Units						-	W/(m ² K)	W/(m ² K ²)							
Test results						0,761	3,600	0,014							
Incidence angle modifier test method						Steady state - outdoor									
Bi-directional incidence angle modifiers						No									
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal						K _{θT, coll}					0,96			0,00	
						K _{θL, coll}					0,96			0,00	
						Water - Glycole									
Flow rate for testing (per gross area, A _G)						dm/dt	0,021	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations						(θ _m -θ _a) _{max}	50	K							
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)						θ _{stg}	190,5	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)						C/m ²	10,85	kJ/(Km ²)							
Maximum operating temperature						θ _{max op}	200	°C							
Maximum operating pressure						P _{max,op}	1000	kPa							
Testing laboratory						NCSR Demokritos									
Test report(s)						4195 DE2 4196 DE2 4197 DQ3									
						www.solar.demokritos.gr									
						Dated									
						16/11/2016 16/11/2016 2/6/2017									
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01									
This data sheet was issued based on data appeared in the first SKM certificate.															
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 9999/1/4
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations	ϑ_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
Collector name													
HMAX 1.50		1.856	1.324	859	1.406	966	597	1.040	675	402	1.131	732	428
HMAX 1.50H		1.856	1.324	859	1.406	966	597	1.040	675	402	1.131	732	428
HMAX 1.82		2.252	1.606	1.042	1.706	1.172	724	1.262	819	487	1.372	888	519
HMAX 1.82H		2.252	1.606	1.042	1.706	1.172	724	1.262	819	487	1.372	888	519
HMAX 2.00		2.475	1.765	1.145	1.875	1.288	795	1.387	900	535	1.508	976	571
HMAX 2.00H		2.475	1.765	1.145	1.875	1.288	795	1.387	900	535	1.508	976	571
HMAX 2.37		2.932	2.092	1.357	2.222	1.527	943	1.643	1.067	635	1.787	1.157	676
HMAX 2.37H		2.932	2.092	1.357	2.222	1.527	943	1.643	1.067	635	1.787	1.157	676
HMAX 2.72		3.366	2.400	1.557	2.550	1.752	1.082	1.886	1.224	728	2.051	1.328	776
HMAX 2.72H		3.366	2.400	1.557	2.550	1.752	1.082	1.886	1.224	728	2.051	1.328	776
Annual output per m ² gross area		1.237	883	572	938	644	398	693	450	268	754	488	285
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	3000	Pa
Maximum tested negative load	3000	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}		
HMAX 1.50	1,50	Collector efficiency (η_{col})		%
HMAX 1.50H	1,50	<i>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/m², 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.</i>		
HMAX 1.82	1,82			
HMAX 1.82H	1,82			
HMAX 2.00	2,00			
HMAX 2.00H	2,00			
HMAX 2.37	2,37			
HMAX 2.37H	2,37			
HMAX 2.72	2,72	Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
HMAX 2.72H	2,72	Zero-loss efficiency (η_0)	0,761	--
		First-order coefficient (a_1)	3,60	W/(m ² K)
		Second-order coefficient (a_2)	0,014	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,96	--
<i>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.</i>				