



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results		Licence Number		OEM 9999/1/9							
		Date issued		2019-02-10							
		Issued by		DQS Hellas							
Licence holder	ANDRIANOS X. GEORGIOS			Country	Greece						
Brand (optional)				Web	www.andrianos.gr						
Street, Number	Platonos 30			E-mail	andrianos@andrianos.gr						
Postcode, City	24132 Kalamata			Tel	+30 27210 23124						
Collector Type				Flat plate collector, glazed							
Collector name	Gross area ( $A_G$ ) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Power output per collector G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> $\vartheta_m - \vartheta_a$						
					0 K W	10 K W	30 K W	50 K W	70 K W	50 K W	
AND SOLAR PREMIUM 2.72V	2,72	2.160	1.260	86	2.105	2.016	1.818	1.594	1.344	1.594	
AND SOLAR PREMIUM 2.72H	2,72	1.260	2.160	86	2.105	2.016	1.818	1.594	1.344	1.594	
Power output per m <sup>2</sup> gross area					774	741	668	586	494	586	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to AG)		$\eta_{0,hem}$	a1	a2							
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results		0,774	3,160	0,012							
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		$K_{\theta T, coll}$					0,96				0,00
Longitudinal		$K_{\theta L, coll}$					0,96				0,00
Heat transfer medium for testing				Water-Glycole							
Flow rate for testing (per gross area, $A_G$ )				dm/dt	0,021	kg/(sm <sup>2</sup> )					
Maximum temperature difference for thermal performance calculations				$(\vartheta_m - \vartheta_a)_{max}$	50	K					
Standard stagnation temperature ( $G = 1000 \text{ W/m}^2$ ; $\vartheta_a = 30 \text{ }^\circ\text{C}$ )				$\vartheta_{stg}$	190,5	°C					
Effective thermal capacity, incl. fluid (per gross area, $A_G$ )				C/m <sup>2</sup>	10,85	kJ/(Km <sup>2</sup> )					
Maximum operating temperature				$\vartheta_{max, op}$	200	°C					
Maximum operating pressure				$p_{max, op}$	1000	kPa					
Testing laboratory	NCSR Demokritos / Solar & other Energy System Laboratory			www.solar.demokritos.gr							
Test report(s)	4196 DE2 4197 DQ3			Dated	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 9999/1/9
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Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
Collector name	$\vartheta_m$	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
AND SOLAR PREMIUM 2.72V		3.442	2.574	1.792	2.677	1.941	1.301	1.967	1.354	873	2.133	1.468	930
AND SOLAR PREMIUM 2.72H		3.442	2.574	1.792	2.677	1.941	1.301	1.967	1.354	873	2.133	1.468	930
Annual output per m <sup>2</sup> gross area		1.266	946	659	984	714	478	723	498	321	784	540	342
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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 $\vartheta_m$ (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 <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

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 <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
AND SOLAR PREMIUM 2.72V	2,72	Collector efficiency ( $\eta_{col}$ )	63 %
AND SOLAR PREMIUM 2.72H	2,72	Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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 ( $\eta_0$ )	0,774 --
		First-order coefficient ( $a_1$ )	3,16 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0,012 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0,96 --
		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.	