




Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		SKM 10078				
					Date issued		2019-04-20				
					Issued by		DQS Hellas				
Licence holder		SONNE AKTION LTD			Country		Greece				
Brand (optional)		ATLAS			Web		http://www.sonne.gr				
Street, Number		39 Chalkidikis, 14451 Metamorfoosi			E-mail		info@sonne.gr				
Postcode, City		Athens Greece			Tel		30 2102843376				
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 W/m ² ; G _d = 150 W/m ² θ _m - θ _a						
	m ²	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	50 K	
					W	W	W	W	W	W	
ATLAS CA 160	1.60	1,570	1,020	75	1,228	1,147	984	821	657	821	
ATLAS CA 200	1.90	1,970	965	75	1,457	1,361	1,168	974	780	974	
ATLAS CA 230	2.30	1,970	1,165	75	1,759	1,643	1,410	1,176	941	1,176	
Power output per m² gross area					767	716	614	512	410	512	
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		0.767	5.064	0.000							
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}					0.797				0.00
Longitudinal		K _{θL, coll}					0.797				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		(θ _m - θ _a) _{max}		50	K						
Standard stagnation temperature (G = 1000 W/m²; θ_a = 30 °C)		θ _{stg}		146	°C						
Effective thermal capacity, incl. fluid (per gross area, A_G)		C/m ²		8.9	kJ/(Km ²)						
Maximum operating temperature		θ _{max, op}		100	°C						
Maximum operating pressure		p _{max, op}		100	kPa						
Testing laboratory		NCSR DEMOKRITOS			http://www.solar.demokritos.gr						
Test report(s)		4185 De1 4186 DE1 4187 DQ1			Dated		21/9/2016 21/9/2016 20/9/2016				
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01						
					<p>N.C.S.R "DEMOKRITOS" SOLAR ENERGY LABORATORY Head: Dr Vassilis Belessiotis Tel: +210 6503815 - Fax: +210 6544592 153 10 Ag. Paraskevi - Attiki - Greece</p> 						
<p>Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexioiu@dqshellas.gr</p>											



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SKM 10078
	Issued	2019-04-20

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results													
Collector name	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
ATLAS CA 160		1,709	1,067	640	1,222	777	461	902	534	308	977	565	318
ATLAS CA 200		2,028	1,266	760	1,451	923	547	1,071	634	366	1,160	671	377
ATLAS CA 230		2,449	1,529	917	1,752	1,114	661	1,293	765	442	1,400	810	455
Annual output per m ² gross area		1,067	666	400	763	485	288	563	333	192	610	353	198
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}		
ATLAS CA 160	1.60	Collector efficiency (η_{col})	56	%
ATLAS CA 200	1.90	<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>		
ATLAS CA 230	2.30			
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
		Zero-loss efficiency (η_0)	0.767	--
		First-order coefficient (a_1)	5.06	W/(m ² K)
		Second-order coefficient (a_2)	0.000	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.80	--
<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>				