



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		OEM 9999/2/4								
					Date issued		2020-05-30								
					Issued by		DQS Hellas								
Licence holder		NOBEL INTERNATIONAL EAD			Country		BULGARIA								
Brand (optional)		AELIOS			Web		http://nobel.bg								
Street, Number		48, VITOSHA BLV			E-mail		info@nobel.bg								
Postcode, City		2100, ELIN PELIN			Tel		+359 24210232								
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	
AELIOS PLUS					2,72	2.160	1.260	86	2.105	2.016	1.818	1.594	1.344	1.594	
AELIOS PLUS HORIZONTAL					2,72	1.260	2.160	86	2.105	2.016	1.818	1.594	1.344	1.594	
Power output per m ² gross area					774	741	668	586	494	586					
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					0,774	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 _{θT, coll}					0,96				0,00	
Longitudinal					K _{θL, 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 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 / Solar & other Energy System Laboratory			www.solar.demokritos.gr										
Test report(s)		4196 DE5 4197 DQ7			Dated		29/5/2020 29/5/2020								
Comments of testing laboratory					Datashet 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 9999/2/4
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Annual collector output in kWh/collector at mean fluid temperature $\vartheta_{m,f}$ based on ISO 9806:2013 test results													
Collector name	Standard Locations $\vartheta_{m,f}$	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
AEIOS PLUS		3.442	2.574	1.792	2.677	1.941	1.301	1.967	1.354	873	2.133	1.468	930
AEIOS PLUS HORIZONTAL		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 ² 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 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}	
AEIOS PLUS	2,72	Collector efficiency (η_{col})	63 %
AEIOS PLUS HORIZONTAL	2,72	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)	0,774 --
		First-order coefficient (a ₁)	3,16 W/(m ² K)
		Second-order coefficient (a ₂)	0,012 W/(m ² K ²)
		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.	