



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		OEM 10003/2							
					Date issued		2019-04-10							
					Issued by		DQS HELLAS							
Licence holder	ECOSYSTEM – TSAKIROGLOU ANTONIOS & SIA EE				Country	Greece								
Brand (optional)	Ecosystem, Heliosol				Web	www.ecosystem.com.gr								
Street, Number	Olimpou 29				E-mail	ecosystemtsaki@gmail.com								
Postcode, City	Olimpou 29, 57009 Kalochori, Thessaloniki				Tel	+30 2310 570757 / 2310 570758								
Collector Type					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				
EPI20 NV	1,51	1.501	1.009	85	1.113	1.060	932	774	586	774				
EPI30 NV	1,95	1.500	1.300	85	1.433	1.365	1.200	997	755	997				
EPI25 NV	2,00	2.000	1.000	85	1.470	1.400	1.231	1.023	774	1.023				
EPI16 NV	2,24	1.900	1.180	85	1.648	1.570	1.380	1.146	868	1.146				
EPI54 NV	2,53	2.009	1.258	85	1.857	1.769	1.556	1.292	978	1.292				
Power output per m ² gross area					735	700	616	511	387	511				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η _{0,hem}	a1	a2							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0,735	3,240	0,025							
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}					0,93				0,00
Longitudinal					K _{θL, coll}					0,93				0,00
Heat transfer medium for testing					Water									
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}	146	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	10,7	kJ/(K m ²)							
Maximum operating temperature					θ _{max, op}	100	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory	NCSR "DEMOKRITOS"				www.solar.demokritos.gr									
Test report(s)	4191DE1, 4192DE1 4193DE1 1247DE1				Dated	11/10/2016 25/10/2016 8/5/2017								
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10003/2
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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
EPI20 KNV		1.760	1.234	743	1.333	879	485	985	620	335	1.070	670	356
EPI30 KNV		2.266	1.590	957	1.717	1.132	625	1.268	798	432	1.378	862	459
EPI25 KNV		2.324	1.631	981	1.761	1.161	641	1.301	819	443	1.413	885	471
EPI16 KNV		2.606	1.828	1.100	1.974	1.302	719	1.458	918	497	1.584	992	528
EPI54 KNV		2.937	2.060	1.240	2.225	1.467	810	1.643	1.035	560	1.785	1.118	595
Annual output per m ² gross area		1.162	815	491	881	581	321	650	409	221	707	442	235
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}	
EPI20 KNV	1,51	Collector efficiency (η_{col})	57 %
EPI30 KNV	1,95	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.	
EPI25 KNV	2,00		
EPI16 KNV	2,24		
EPI54 KNV	2,53		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0,735 --
		First-order coefficient (a_1)	3,24 W/(m ² K)
		Second-order coefficient (a_2)	0,025 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,93 --
		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.	