


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2698 F							
						Date issued		2016-09-12							
						Issued by		DIN CERTCO							
Licence holder		DIMAS SA Solar Energy Systems				Country		Greece							
Brand (optional)		-				Web		http://dimas-solar.gr/							
Street, Number		2nd km Argos - Nafplion				E-mail		info@dimas-solar.gr							
Postcode, City		21200, Argos				Tel		+30 +27510-29110 /-20920							
Collector Type						Flat plate collector, glazed									
Collector name						Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s ̑m - ̑a									
						Gross area (A _G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	103 K
						m ²	mm	mm	mm	W	W	W	W	W	W
NAVI+ 15						1.67	1 651	1 011	95	1 194	1 139	1 012	866	700	382
NAVI+ 20						2.05	2 031	1 011	95	1 466	1 398	1 243	1 063	859	469
NAVI+ 25						2.52	2 031	1 241	95	1 802	1 718	1 528	1 307	1 056	576
Power output per m ² gross area						715	682	606	519	419	229				
Performance parameters test method						Quasi dynamic									
Performance parameters (related to AG)						̑ _{0,b}	c1	c2	c3	c4	c6	Kd			
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results						0.718	3.178	0.015	0.000	0.000	0.000	0.973			
Incidence angle modifier test method						Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers						No									
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal						K _{̑T, coll}	1.00	0.99	0.98	0.96	0.93	0.87	0.76	0.40	0.00
Longitudinal						K _{̑L, coll}	1.00	0.99	0.98	0.96	0.93	0.87	0.76	0.40	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						(̑ _m -̑ _a) _{max}	103	K							
Standard stagnation temperature (G = 1000 W/m ² ; ̑ _a = 30 °C)						̑ _{stg}	187	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)						C/m ²	13.18	kJ/(Km ²)							
Maximum operating temperature						̑ _{max, op}	n/a	°C							
Maximum operating pressure						p _{max, op}	1000	kPa							
Testing laboratory						TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de					
Test report(s)						15COL1312 15COL1313 15COL1314Q				Dated		12.09.2016 12.09.2016 12.09.2016			
Comments of testing laboratory						none						Datashet version: 5.01, 2016-03-01			
						 TZS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de															

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2698 F
	Issued	2016-09-12

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
NAVI+ 15		1 937	1 398	911	1 478	1 021	630	1 089	716	427	1 189	778	457
NAVI+ 20		2 377	1 716	1 118	1 815	1 254	774	1 337	878	524	1 459	955	561
NAVI+ 25		2 922	2 109	1 374	2 231	1 541	951	1 643	1 080	644	1 794	1 174	689
Annual output per m ² gross area		1 160	837	545	885	612	377	652	428	256	712	466	273
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)	B	--
Maximum tested positive load	2000	Pa
Maximum tested negative load	2000	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}	
NAVI+ 15	1.67	Collector efficiency (η_{col})	56 %
NAVI+ 20	2.05	<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>	
NAVI+ 25	2.52		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.715 --
		First-order coefficient (a_1)	3.18 W/(m ² K)
		Second-order coefficient (a_2)	0.015 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
<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>			