



Annex to Solar Keymark Certificate		Licence Number		SKM 9987/1							
		Date issued		2023-09-25							
		Issued by		DQS Hellas							
Licence holder		GEORGE I. MELISSAROPOULOS - PRISMA THERM		Country Greece							
Brand (optional)		PRISMA THERM		Web http://www.primatherm.gr							
Street, Number		Location Laimow Aspropyrgou		E-mail info@primatherm.gr							
Postcode, City		19300-Aspropyrgos		Tel +30 210 5570250 / 210 5570257							
Collector Type				Flat plate collector							
Collector name					Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	87 K	
					W	W	W	W	W	W	
PRISMA 200					1,228	1,161	1,002	812	590	376	
PRISMA 240					1,532	1,448	1,250	1,013	736	469	
PRISMA 280					1,532	1,448	1,250	1,013	736	469	
Power output per m² gross area					646	610	527	427	310	198	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A_G)		η_0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results		0.665	3.33	0.021	0.000	0.00	12,130	0.000	0.00	0.0E+00	0.81
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{θT, coll}	1.00	0.98	0.96	0.91	0.84	0.73	0.57	0.34	0.00
Longitudinal		K _{θL, coll}	1.00	0.98	0.96	0.91	0.84	0.73	0.57	0.34	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 during thermal performance test				($\vartheta_m - \vartheta_a$) _{max}	57	K					
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)				ϑ_{stg}	194.4	°C					
Maximum operating temperature				$\vartheta_{max, op}$	200	°C					
Maximum operating pressure				p _{max, op}	1000	kPa					
Testing laboratory		NCSR "DEMOKRITOS"				www.solar.demokritos.gr					
Test report(s)		4168 DE1 4169 DE1 4169 DQ1				Dated		17/11/15 16/12/15 12/01/16			
Comments of testing laboratory				Ver. 6.2 (13.01.2022)							
<i>The data was obtained from the test reports 4168 DE1 (Collector PRISMA 200) and 4169 DQ1 (Collector PRISMA 240).</i>						N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 65044592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece					
Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqs.gr , e-mail: i.alexiou@dqs.gr											

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Supplementary Information		Issued		2023-09-25												
Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m																
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg					
	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			
PRISMA 200		1,813	1,189	660	1,330	826	419	988	584	295	1,072	624	309			
PRISMA 240		2,261	1,483	823	1,659	1,030	523	1,232	728	368	1,337	778	386			
PRISMA 280		2,261	1,483	823	1,659	1,030	523	1,232	728	368	1,337	778	386			
Gross Thermal Yield per m ² gross area		953	625	347	700	434	221	520	307	155	564	328	163			
Annual efficiency, η_a		54%	35%	20%	43%	27%	14%	45%	26%	13%	45%	26%	13%			
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)														
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/																
Additional Information																
Collector heat transfer medium										Water-Glycole						
The collector is deemed to be suitable for roof integration										No						
The collector was tested successfully under the following conditions:																
Climate class (A+, A, B or C)										A		--				
G (W/m ²) >		1000		ϑ_a (°C) >		20		H _x (MJ/m ²) >		600						
Maximum tested positive load										2400		Pa				
Maximum tested negative load										2400		Pa				
Hail resistance using steel ball (maximum drop height)										2		m				
Additional collector attribute(s)																
Using external power source(s) for normal operation				No		Active or passive measure(s) for self-protection				No						
Co-generating thermal and electrical power				No		Façade collector(s)				No						
Energy Labelling Information						Additional Informative Technical Data										
Reference Area, A _{sol} (m ²)						Hydraulic Designation Code			Aperture Area, A _a (m ²)							
PRISMA 200						1.90			9-V-1234S-A:7.2,1830-C:21,1050-D			1.65				
PRISMA 240						2.37			10-V-1234S-A:7.2,1830-C:21,1280-D			2.11				
PRISMA 280						2.37			10-V-1234S-A:7.2,830-C:21,2010-D			2.11				
Data required for CDR (EU) No 811/2013 - Reference Area A _{sol}						Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}										
Collector efficiency (η_{col})						48%			Zero-loss efficiency (η_0)			0.65			--	
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 9806:2017.						First-order coefficient (a ₁)			3.33			W/(m ² K)				
						Second-order coefficient (a ₂)			0.021			W/(m ² K ²)				
						Incidence angle modifier IAM (50°)			0.83			--				
						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.										
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