



Annex to Solar Keymark Certificate		Licence Number		SKM 10093.2							
		Date issued		2020-09-10							
		Issued by		DQS Hellas							
Licence holder	CICERO HELLAS S.A.	Country	Greece								
Brand (optional)	CALPAK	Web	www.calpak.gr								
Street, Number	9, Sygrou Ave.	E-mail	export@calpak.gr								
Postcode, City	11743, 'Athens	Tel	30	2109247250 / 2109231616							
Collector Type		Flat plate collector									
Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	85 K	
	m²	mm	mm	mm	W	W	W	W	W	W	
PRISMA 2.0	2.00	1,625	1,235	85	1,524	1,459	1,296	1,090	841	624	
PRISMA 2.5	2.50	2,020	1,235	85	1,905	1,823	1,620	1,363	1,052	780	
Power output per m² gross area					762	729	648	545	421	312	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A_G)		η_0, b	a_1	a_2	a_3	a_4	a_5	a_6	a_7	a_8	K_d
Units		-	$\text{W}/(\text{m}^2\text{K})$	$\text{W}/(\text{m}^2\text{K}^2)$	$\text{J}/(\text{m}^3\text{K})$	-	$\text{J}/(\text{m}^2\text{K})$	s/m	$\text{W}/(\text{m}^2\text{K}^4)$	$\text{W}/(\text{m}^2\text{K}^4)$	-
Test results		0.777	2.99	0.027	0.000	0.00	0	0.000	0.00	0.0E+00	0.87
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		$K_{\theta T, coll}$	1.00	1.00	0.98	0.96	0.91	0.82	0.68	0.43	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	1.00	0.98	0.96	0.91	0.82	0.68	0.43	0.00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A_G)		dm/dt	0.020		$\text{kg}/(\text{sm}^2)$						
Maximum temperature difference during thermal performance test		$(\vartheta_m - \vartheta_a)_{max}$	55.14		K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30^\circ \text{C}$)		ϑ_{stg}	180		°C						
Maximum operating temperature		$\vartheta_{max, op}$	-								
Maximum operating pressure		$p_{max, op}$	1000								
Testing laboratory		NCSR Demokritos / Solar & other Energy System				www.solar.demokritos.gr					
Test report(s)		4272 DE1 4273 DE1 4274 DQ1				Dated		20/7/2020 20/7/2020 6/8/2020			
Comments of testing laboratory		Datashet version: 6.1, 2019-09-26									
		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece									
Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +301 6233493-4, Fax: +301 6233495, http://www.dqshellas.gr, e-mail: ioannisalexioiu@dqshellas.gr											

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Supplementary Information				Issued		2020-09-10							
Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
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
PRISMA 2.0		2,393	1,723	1,068	1,845	1,248	714	1,355	878	492	1,470	947	522
PRISMA 2.5		2,991	2,154	1,335	2,306	1,560	893	1,694	1,097	615	1,837	1,184	652
Annual output per m ² gross area		1,197	862	534	923	624	357	677	439	246	735	474	261
Annual efficiency, η_a		68%	49%	30%	57%	38%	22%	58%	38%	21%	59%	38%	21%
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. 6.1 (September 2019). 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										3000		Pa	
Maximum tested negative load										3000		Pa	
Hail resistance using steel ball (maximum drop height)										2		m	
Additional collector attribute(s)													
<input type="checkbox"/> Using external power source(s) for normal operation				<input type="checkbox"/> Active or passive measure(s) for self-protection									
<input type="checkbox"/> Co-generating thermal and electrical power				<input type="checkbox"/> Façade collector(s)									
Energy Labelling Information						Additional Informative Technical Data							
						Reference Area, A _{sol} (m ²)		Hydraulic Designation Code		Aperture Area, A _a (m ²)			
PRISMA 2.0						2.00		12-VH-1234S-A:7.2,1525-		1.91			
PRISMA 2.5						2.50		12-VH-1234S-A:7.2,1920-		2.39			
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}							
Collector efficiency (η_{col})						60%							
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 values according to EN 12975-2 or gross area for ISO 9806:2017.						Zero-loss efficiency (η_0)		0.76		--			
						First-order coefficient (a ₁)		2.99		W/(m ² K)			
						Second-order coefficient (a ₂)		0.027		W/(m ² K ²)			
						Incidence angle modifier IAM (50°)		0.91		--			
						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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