Annex to Solar Keymark Certificate

Licence Number	**OEM 9999/2/4/1**
Date issued	**2022-07-27**
Issued by	**DQS Hellas**

Licence holder	FONDERIE SIME SpA	**Country**	Italy
Brand (optional)	SIME	**Web**	www.sime.it
Street, Number	Via Garbo 27	**E-mail**	info@sime.it
Postcode, City	37045 Legnago (VR)	**Tel**	+39 442631111

Collector Type	Flat plate collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	89 K
	m²	mm	mm	mm	W	W	W	W	W	W
SIME PLANO 272	2,72	2.160	1.260	86	2.107	2.018	1.821	1.597	1.348	1.093
SIME PLANO 272 HRZ	2,72	1.260	2.160	86	2.107	2.018	1.821	1.597	1.348	1.093
Power output per m² gross area					775	742	669	587	495	402

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0,784	3,15	0,012	0,000	0,00	9.720	0,000	0,00	0,0E+00	0,92

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	1,00	0,99	0,96	0,90	0,78	0,52	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	1,00	1,00	0,99	0,96	0,90	0,78	0,52	0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,022	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	58,5	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	190,5	°C
Maximum operating temperature	ϑ_{max_op}	200	°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	NCSR Demokritos / Solar & other Energy System	www.solar.demokritos.gr	
Test report(s)	4196DE2 4197DQ3	**Dated**	16/11/2016 2-6-20217

Comments of testing laboratory Ver. 6.2 (13.01.2022)

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Supplementary Information	Issued	2022-07-27

Gross Thermal Yield 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
SIME PLANO 272		3.422	2.564	1.786	2.673	1.943	1.310	1.954	1.349	874	2.121	1.461	932
SIME PLANO 272 HRZ		3.422	2.564	1.786	2.673	1.943	1.310	1.954	1.349	874	2.121	1.461	932
Gross Thermal Yield per m² gross area		1.258	942	657	983	714	482	718	496	321	780	537	343
Annual efficiency, η_a		71%	53%	37%	60%	44%	30%	62%	43%	28%	63%	43%	28%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (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/m²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m²) >	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)

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

	Reference Area, A_{sol} (m²)
SIME PLANO 272	2,72
SIME PLANO 272 HRZ	2,72

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
11-V-1234S-A:7.2,2060-C:20.6,1320-	2,57
18-V-1234S-A:7.2,1158-C:20.6,2240-	2,57

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	63%

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0,77	--
First-order coefficient (a_1)	3,15	W/(m²K)
Second-order coefficient (a_2)	0,012	W/(m²K²)
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.

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