



Annex to Solar Keymark Certificate		Licence Number	OEM 10109.1.1
		Date issued	2022-03-29
		Issued by	DQS Hellas
Licence holder	CLIMART S.R.L	Country	ITALIA
Brand (optional)	SMART SOL	Web	www.smart-sol.it
Street, Number	VIALE DELLA REPUBBLICA 43	E-mail	info@smart-sol.it
Postcode, City	73100 LECCE LE	Tel	+39 832 240041

Collector Type	Flat plate collector
----------------	----------------------

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 & u = 1.3 m/s θ _m - θ _a					
					0 K	10 K	30 K	50 K	70 K	92 K
SMA 2 MQ VT 4 CONN	1,90	1.970	965	80	1.472	1.388	1.198	979	731	538
SMA 2.5 MQ VT 4 CONN	2,40	1.970	1.220	80	1.860	1.753	1.513	1.237	924	679
Power output per m ² gross area					775	730	630	515	385	283

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	0,786	4,24	0,019	0,000	0,00	0	0,000	0,00	0,0E+00	0,91

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	1,00	0,99	0,98	0,94	0,87	0,74	0,48	0,00
Longitudinal	K _{θL, coll}	1,00	1,00	0,99	0,98	0,94	0,87	0,74	0,48	0,00

Heat transfer medium for testing	Water-Glycole	
Flow rate for testing (per gross area, A _G)	dm/dt	0,021 kg/(sm ²)
Maximum temperature difference during thermal performance test	(θ _m -θ _a) _{max}	54,22 K
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)	θ _{stg}	187 °C
Maximum operating temperature	θ _{max, op}	- °C
Maximum operating pressure	p _{max, op}	- kPa

Testing laboratory	NCSR Demokritos	http://www.solar.demokritos.gr
Test report(s)	4284 DQ2 4288 DE2 4294 DE2	Dated 17/12/2020 30/10/2020 30/10/2020

Comments of testing laboratory	Datasheet version: 6.1, 2019-09-26
<p><u>Example comment</u> Qualification tests are in extension of test report 4207 DQ2</p>	



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10109.1.1
	Issued	2022-03-29

Annual collector output 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
SMA 2 MQ VT 4 CONN		2.339	1.565	911	1.722	1.098	596	1.277	770	407	1.393	831	433
SMA 2.5 MQ VT 4 CONN		2.955	1.976	1.151	2.175	1.387	752	1.613	973	514	1.759	1.050	546
Annual output per m ² gross area		1.231	824	480	906	578	313	672	405	214	733	437	228
Annual efficiency, η_a		70%	47%	27%	56%	35%	19%	58%	35%	18%	59%	35%	18%
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		
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
Maximum tested positive load			3000
Maximum tested negative load			3000
Hail resistance using steel ball (maximum drop height)			2

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)
SMA 2 MQ VT 4 CONN	1,90	10-VH-1234S-A:7.2,1890-C:20,1030-D	1,80
SMA 2.5 MQ VT 4 CONN	2,40	11-VH-1234S-A:7.2,1890-C:20,1280-D	2,29

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})	57%	Zero-loss efficiency (η_0)	0,77
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)	4,24
		Second-order coefficient (a_2)	0,019
		Incidence angle modifier IAM (50°)	0,95
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.			