Annex to Solar Keymark Certificate		Licence Number	OEM 10196.2
		Date issued	2024-10-10
		Issued by	DQS Hellas

Licence holder	FORNITURE FOTOVOLTAICHE SRL	Country	Italy
Brand (optional)		Web	www.forniturefotovoltaiche.it
Street, Number	Via Sistina 121	E-mail	info@forniturefotovoltaico.it
Postcode, City	00187 Roma	Tel	+39 0835 383529

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	95 K
	m²	mm	mm	mm	W	W	W	W	W	W
ITALO-25	2,53	2.040	1.240	89	1.911	1.831	1.646	1.429	1.181	827
Power output per m² gross area					755	724	650	565	467	327

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	0,767	3,03	0,016	0,000	0,00	9.597	0,000	0,00	0,0E+00	0,90

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	0,99	0,98	0,94	0,87	0,73	0,48	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	1,00	0,99	0,98	0,94	0,87	0,73	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/(sm²)
Maximum temperature difference during thermal performance test		$(\vartheta_m-\vartheta_a)_{max}$	65 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	209 °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)	1268 DE2 4402 DQ3	Dated	19/1/2024 19/1/2024

Comments of testing laboratory	Ver. 6.2 (13.01.2022)

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Supplementary Information	Issued	2024-10-10

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
ITALO-25		3.067	2.273	1.537	2.387	1.704	1.105	1.746	1.186	741	1.894	1.283	789
Gross Thermal Yield per m² gross area		1.212	898	608	943	674	437	690	469	293	749	507	312
Annual efficiency, η_a		69%	51%	34%	58%	41%	27%	59%	40%	25%	60%	41%	25%
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)
ITALO-25	2,53

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
15-VH-1234S-A:7,1930-C:20.6,1290-D	2,32

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

Collector efficiency (η_{col})	61%

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)	0,76	--
First-order coefficient (a_1)	3,03	W/(m²K)
Second-order coefficient (a_2)	0,016	W/(m²K²)
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.