CERTIFICATION
LICENCE TO USE KEYMARK

Certificate No OEM 10115.1.2

DQS Hellas grants the present certificate to the enterprise:

FERROLI S.p.A.
Via Ritonda 78/A, 37047 San Bonifacio (VR) 37047, Italy

for the product:

Flat plate Solar Collectors type:
SOLEXTECH 2.1 V, SOLEXTECH 2.6 V, SOLEXTECH 2.6 H, SOLEXTECH 3 V, SOLEXTECH 3 H

which is produced in conformity with the normative document:

EN 12975-1:2011
EN ISO 9806:2017

E 31

at the following location:

Kyra Vrisi Korinthias, P.O.Box 25 - Korinthos

The present certificate is granted in accordance with:

- *the DQS Hellas General Rules for the Certification of Products,*
- *the Specific Rule for Certification EKIII.001 «Specific Rule for Certification of Solar Collectors, and Thermal Solar Heating Systems for Domestic Hot Water»,*
- *the Specific CEN Keymark Scheme Rules for Solar Thermal Products,*

and is ruled by the terms of the relevant contract between DQS Hellas and the enterprise.

Date of issue: ***2023-04-20***
Date of valid: ***2024-05-30***

Ioannis Alexiou
Head of Products Certification

Panagiotis Giannoutsos
Director of Certification

Notified Body: 2, Kalavriton Street, 14564 Kifisia - Athens, Greece

EEK.001-07 – 10/11/2011

Annex to Solar Keymark Certificate

Licence Number	**OEM 10115.1.2**
Date issued	**2023-04-20**
Issued by	**DQS Hellas**

Licence holder	**FERROLI S.p.A.**	**Country**	Italy
Brand (optional)	SOLEXTECH	**Web**	www.ferroli.com
Street, Number	Via Ritonda 78/A	**E-mail**	info@ferroli.it
Postcode, City	37047 San Bonifacio (VR) 37047	**Tel**	+39 0456139411

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	88 K
	m²	mm	mm	mm	W	W	W	W	W	W
SOLEXTECH 2.1 V	2,09	1.696	1.230	86	1.640	1.559	1.375	1.165	928	694
SOLEXTECH 2.6 V	2,60	2.111	1.230	86	2.041	1.939	1.711	1.449	1.154	864
SOLEXTECH 2.6 H	2,60	1.230	2.111	86	2.041	1.939	1.711	1.449	1.154	864
SOLEXTECH 3 V	3,00	1.996	1.500	86	2.355	2.237	1.974	1.672	1.332	997
SOLEXTECH 3 H	3,00	1.500	1.996	86	2.355	2.237	1.974	1.672	1.332	997
Power output per m² gross area					785	746	658	557	444	332

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	0,795	3,75	0,016	0,000	0,00	0	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	0,98	0,96	0,89	0,76	0,51	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	1,00	1,00	0,98	0,96	0,89	0,76	0,51	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	$(\vartheta_m-\vartheta_a)_{max}$	57,8	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	175,7	°C
Maximum operating temperature	ϑ_{max_op}		°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	NCSR Demokritos / Solar & other Energy System	www.solar.demokritos.gr	
Test report(s)	4295 DQ1	**Dated**	4/12/2020
	4301 DE1		4/12/2020
	4302 DE1		4/12/2020

Comments of testing laboratory — Datasheet version: 6.1, 2019-09-26

Annex to Solar Keymark Certificate	Licence Number	OEM 10115.1.2
Supplementary Information	Issued	2023-04-20

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
SOLEXTECH 2.1 V		2.637	1.867	1.190	1.999	1.361	826	1.472	948	555	1.602	1.026	591
SOLEXTECH 2.6 V		3.281	2.323	1.480	2.487	1.693	1.027	1.832	1.180	690	1.993	1.277	736
SOLEXTECH 2.6 H		3.281	2.323	1.480	2.487	1.693	1.027	1.832	1.180	690	1.993	1.277	736
SOLEXTECH 3 V		3.785	2.680	1.708	2.870	1.953	1.185	2.113	1.361	797	2.300	1.473	849
SOLEXTECH 3 H		3.785	2.680	1.708	2.870	1.953	1.185	2.113	1.361	797	2.300	1.473	849
Annual output per m² gross area		1.262	893	569	957	651	395	704	454	266	767	491	283
Annual efficiency, η_a		71%	51%	32%	59%	40%	24%	60%	39%	23%	62%	39%	23%
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. 6.1 (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/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)					1,6	m

Additional collector attribute(s)

Using external power source(s) for normal operation	Active or passive measure(s) for self-protection
Co-generating thermal and electrical power	Façade collector(s)

Energy Labelling Information

	Reference Area, A_{sol} (m²)
SOLEXTECH 2.1 V	2,09
SOLEXTECH 2.6 V	2,60
SOLEXTECH 2.6 H	2,60
SOLEXTECH 3 V	3,00
SOLEXTECH 3 H	3,00

Additional Informative Technical Data

	Hydraulic Designation Code	Aperature Area, A_a (m²)
SOLEXTECH 2.1 V	14-VH-1234S-A:7.2,1600-C:20.6,1295-	1,96
SOLEXTECH 2.6 V	14-VH-1234S-A:7.2,2009-C:20.6,1295-	2,44
SOLEXTECH 2.6 H	18-H-1234S-A:7.2,1131-C:20.6,2170-	2,44
SOLEXTECH 3 V	17-VH-1234S-A:7.2,1900-C:20.6,1563-	2,84
SOLEXTECH 3 H	18-H-1234S-A:7.2,1400-C:20.6,2060-	2,84

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)	0,78	--
First-order coefficient (a_1)	3,75	W/(m²K)
Second-order coefficient (a_2)	0,016	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.