CERTIFICATE

Certificate number	16970 Rev.0	Replaces	-
Issued	29/10/2021	First edition	29/10/2021
Report number	IN0000436	Expiry date	28/10/2025
Page	1 of 1	Contract number	IN0000470

Product Certificate Solar Thermal Products

License holder: **Solimpeks Enerji San. Ve Tic. A.Ş.**
Fevzi Çakmak Mh. 10753. Sk. No: 3-3A Karatay/Konya, Turkey

Production site(s): Solimpeks Enerji San. Ve Tic. A.Ş.
Fevzi Çakmak Mh. 10753. Sk. No: 3-3A Karatay/Konya, Turkey

Product Solar thermal collector

Model(s): EXCELLENT 2.3

Kiwa Cermet Italia hereby declares that the product can be considered complying to the testing requirements and is entitled to use the Solar Keymark Label, based upon the following aspects:

Laboratory testing of the solar thermal products, which are performed by an accredited laboratory in accordance to ISO/IEC 17025 -see annex-, using the following standards:

- EN 12975-1:2006+A1:2010
  Thermal solar systems and components - Solar collectors – Part 1: General requirements
- ISO 9806:2017
  Solar Energy – Solar Thermal Collectors – Test Methods

Specific CEN Keymark Scheme Rules for Solar Thermal Products SKN_N0444R5.

Periodic Inspection of the Factory site(s) performed by Kiwa Cermet Italia.

A description of the test results is given in the annex to this certificate.

This certificate is issued in accordance with the Kiwa Cermet Italia regulations.
Publication of the certificate is allowed.
The validity of this certificate is subject to the positive result of periodic surveillance visits.
The validity of this certificate can be verified on request at the following e-mail address: energy@kiwacermet.it.
Any total or partial reproduction of this document in any form, without Kiwa Cermet Italia express authorization, is prohibited.

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Chief Operating Officer
Giampiero Belcredi

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PRD N° 069B

Annex to Solar Keymark Certificate

Licence Number	16970 Rev.0
Date issued	2021-10-29
Issued by	Kiwa Cermet Italia S.p.A.

Licence holder	Solimpeks Enerji San. Ve Tic. A.Ş.	Country	Turkey
Brand (optional)		Web	http://www.solimpeks.com
Street, Number	Fevzi Çakmak Mh. 10753. Sk. No: 3-3A	E-mail	info@solimpeks.com
Postcode, City	Karatay/Konya	Tel	+90 444 06 02

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	78 K
	m²	mm	mm	mm	W	W	W	W	W	W
EXCELLENT 2.3	2.40	2'012	1'195	60	1'797	1'708	1'530	1'351	1'172	1'101
Power output per m² gross area					749	712	637	563	489	459

Performance parameters test method	Steady state - indoor									
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	0.765	3.72	0.000	0.000	0.00	11'242	0.000	0.00	0.0E+00	0.86

Incidence angle modifier test method		Steady state - indoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1.00	1.00	0.99	0.96	0.89	0.77	0.59	0.34	0.00
Longitudinal	$K_{\theta L,coll}$	0.99	0.99	0.99	0.97	0.91	0.80	0.62	0.36	0.00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0.020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	48	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	140	°C
Maximum operating temperature	ϑ_{max_op}	120	°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	Kiwa Cermet Italia S.p.A.	http://www.kiwa.com	
Test report(s)	L0000584 rev.00	Dated	19/10/2021

Comments of testing laboratory

Datasheet version: 6.1, 2019-09-26

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Società con Socio Unico
Via Cadriano 23
40057 - Granarolo dell'Emilia (BO)
P.I. 00627711203 - C.F. 03502820370

Stamp & signature of test lab

Annex to Solar Keymark Certificate	Licence Number	16970 Rev.0
Supplementary Information	Issued	2021-10-29

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
EXCELLENT 2.3	2'781	2'002	1'407	2'125	1'534	1'087	1'547	1'047	704	1'681	1'126	747
Annual output per m² gross area	1'159	834	586	885	639	453	644	436	293	700	469	311
Annual efficiency, η_a	66%	47%	33%	54%	39%	28%	55%	37%	25%	56%	38%	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. 6.1 (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				2500	Pa
Maximum tested negative load				2000	Pa
Hail resistance using steel ball (maximum drop height)				0.6	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)
EXCELLENT 2.3	2.40

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
{F}-{O}-{CL}-{A:Ø,L}-{C:Ø,L}-{D}	2.18

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

Collector efficiency (η_{col})	60%

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)	0.75	--
First-order coefficient (a_1)	3.72	W/(m²K)
Second-order coefficient (a_2)	0.000	W/(m²K²)
Incidence angle modifier IAM (50°)	0.92	--

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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