



Certificate number	16675 Rev.0	Replaces	-
Issued	29/10/2020	First edition	29/10/2020
Report number	PKC0004760	Expiry date	28/10/2025
Page	1 of 1	Contract number	PKC0002392

Product Certificate Solar Thermal Products

License holder:	Pleion Industries S.r.l. Via Venezia 11 – 37053 Cerea (VR), Italy
Production site(s):	Pleion Industries S.r.l. Via Venezia 11 – 37053 Cerea (VR), Italy
Product	Solar thermal collector
Model(s):	X-Ray 10

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
- EN 12975-2:2006
Thermal solar systems and components - Solar collectors - Part 2: Test methods

Specific CEN Keymark Scheme Rules for Solar Thermal Products SKN_N0444R4.

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.

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Annex to Solar Keymark Certificate						Licence Number		16675 Rev.0						
						Date issued		2020-10-29						
						Issued by		Kiwa Cermet Italia S.p.A.						
Licence holder		Pleion Industries S.r.l.				Country		Italy						
Brand (optional)						Web		www.pleion.it						
Street, Number		Via Venezia 11				E-mail		+39 0442 320 295						
Postcode, City		37053, Cerea				Tel		+39 0442 320 742						
Collector Type						Evacuated tubular collector								
Collector name					Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$					
									0 K W	10 K W	30 K W	50 K W	70 K W	105 K W
X-Ray 10					2,20	1.975	1.115	120	1.259	1.244	1.201	1.145	1.075	918
Power output per m ² gross area									572	565	546	521	489	417
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		0,575	0,64	0,008	0,000	0,00	10.906	0,000	0,00	0,0E+00	0,97			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		$K_{gT, coll}$	1,00	1,02	1,06	1,05	1,12	1,16	1,13	0,64	0,00			
Longitudinal		$K_{gL, coll}$	1,00	1,00	0,99	0,96	0,92	0,83	0,69	0,44	0,00			
Heat transfer medium for testing						Water								
Flow rate for testing (per gross area, A_G)						dm/dt		0,020	kg/(sm ²)					
Maximum temperature difference during thermal performance test						$(\vartheta_m - \vartheta_a)_{max}$		75	K					
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$)						ϑ_{stg}		320	°C					
Maximum operating temperature						$\vartheta_{max, op}$		110	°C					
Maximum operating pressure						$p_{max, op}$		1000	kPa					
Testing laboratory		TestLab Solar Thermal Systems, Fraunhofer ISE					http://collectortest.com							
Test report(s)		ktb-2012-04-k					Dated		20/07/2012					
Comments						Datashheet version: 6.1, 2019-09-26								
						TestLab Solar Thermal Systems Heidenhofstraße D-79116 Freiburg Tel: +49 (0)761 4588 5354								
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	16675 Rev.0
	Issued	2020-10-29

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
X-Ray 10		2.224	2.025	1.765	1.936	1.709	1.449	1.397	1.213	1.009	1.498	1.305	1.087
Annual output per m ² gross area		1.011	920	802	880	777	659	635	552	459	681	593	494
Annual efficiency, η_a		57%	52%	45%	54%	48%	40%	54%	47%	39%	55%	48%	40%
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-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)	C --
G (W/m ²) >	850 ϑ_a (°C) >
10	H_x (MJ/m ²) >
Maximum tested positive load	1000 Pa
Maximum tested negative load	- Pa
	- 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		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
X-Ray 10	2,20	10-V-1122S-A:X-C:X	1,91

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})	53%	Zero-loss efficiency (η_0)	0,57 --
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)	0,64 W/(m ² K)
		Second-order coefficient (a_2)	0,008 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1,00 --
		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.	