



CERTIFICATE

Certificate number	16083 Rev.0	Replaces	-
Issued	20/12/2018	First edition	20/12/2018
Report number	PKC0002533	Expiry date	19/12/2023
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 14 R; X-RAY 15 R; X-RAY 16 R; X-RAY 17 R; X-RAY 18 R; X-RAY 19 R; X-RAY 20 R

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 EN ISO/IEC 17025:2005 -see annex-, using the following standards:

- ISO 9806:2013
Solar Energy – Solar Thermal Collectors – Test Methods

Specific CEN Keymark Scheme Rules for Solar Thermal Products R.31.

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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Kiwa Cermet Italia S.p.A.

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Giampiero Belcredi



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		16083 Rev.0																	
					Date issued		2018-12-20																	
					Issued by		Kiwa Cermet Italia S.p.A.																	
Licence holder					Pleion Industries S.r.l.					Country		Italy												
Brand (optional)										Web		http://www.pleion.it												
Street, Number					Via Venezia 11					E-mail		info@pleion.it												
Postcode, City					37053, Cerea (VR)					Tel		+39 0442320295												
Collector Type					Evacuated tubular collector																			
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a																			
					Gross area (A _G)		Gross length		Gross width		Gross height		Power output											
					m ²		mm		mm		mm		0 K		10 K		30 K		50 K		70 K		62 K	
					W		W		W		W		W		W		W		W		W		W	
X-RAY 14 R					2.97		1,546		1,921		114		1,827		1,799		1,727		1,634		1,519		1,567	
X-RAY 15 R					3.18		1,656		1,921		114		1,956		1,926		1,849		1,749		1,626		1,678	
X-RAY 16 R					3.39		1,766		1,921		114		2,085		2,053		1,971		1,865		1,734		1,789	
X-RAY 17 R					3.60		1,876		1,921		114		2,214		2,180		2,093		1,980		1,841		1,900	
X-RAY 18 R					3.82		1,986		1,921		114		2,349		2,313		2,221		2,101		1,954		2,016	
X-RAY 19 R					4.03		2,096		1,921		114		2,478		2,441		2,343		2,217		2,061		2,127	
X-RAY 20 R					4.24		2,206		1,921		114		2,608		2,568		2,465		2,332		2,168		2,237	
Power output per m ² gross area					615		606		581		550		511		528									
Performance parameters test method					Steady state - outdoor																			
Performance parameters (related to AG)					η _{0,hem}		a ₁		a ₂															
Units					-		W/(m ² K)		W/(m ² K ²)															
Test results					0.615		0.850		0.009															
Incidence angle modifier test method					Steady state - outdoor																			
Bi-directional incidence angle modifiers					Yes																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					K _{θT, coll}		1.01		1.02		1.06		1.10		1.14		1.16		1.12				0.00	
Longitudinal					K _{θL, coll}		1.00		0.99		0.98		0.95		0.91		0.84		0.69				0.00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A _G)					dm/dt		0.021		kg/(sm ²)															
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}		62		K															
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}		279		°C															
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²		50.9		kJ/(Km ²)															
Maximum operating temperature					ϑ _{max, op}		130		°C															
Maximum operating pressure					P _{max, op}		1000		kPa															
Testing laboratory					ENEA Centro Ricerche Trisaia							http://www.trisaia.enea.it												
Test report(s)					RP.2018.COL.202.1 RP.2018.COL.202b.1							Dated		18/12/2018 18/12/2018										
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01																			
					 DTE-STSN Dr. Vincenzo Sabatelli																			
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	16083 Rev.0
	Issued	2018-12-20

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Collector name	Standard Locations ϑ_m	Athens			Davos			Stockholm			Würzburg		
		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 14 R		3,229	2,890	2,471	2,783	2,412	2,006	2,012	1,713	1,393	2,160	1,844	1,500
X-RAY 15 R		3,458	3,095	2,646	2,979	2,583	2,148	2,155	1,834	1,492	2,313	1,974	1,606
X-RAY 16 R		3,686	3,299	2,821	3,176	2,753	2,290	2,297	1,956	1,590	2,465	2,104	1,712
X-RAY 17 R		3,914	3,504	2,995	3,373	2,924	2,431	2,439	2,077	1,689	2,618	2,235	1,818
X-RAY 18 R		4,153	3,718	3,179	3,579	3,102	2,580	2,588	2,204	1,792	2,778	2,371	1,929
X-RAY 19 R		4,382	3,922	3,353	3,776	3,273	2,722	2,730	2,325	1,891	2,931	2,502	2,036
X-RAY 20 R		4,610	4,126	3,528	3,972	3,444	2,864	2,873	2,446	1,989	3,084	2,632	2,142
Annual output per m ² gross area		1,087	973	832	937	812	675	678	577	469	727	621	505
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	B	--
Maximum tested positive load	2416	Pa
Maximum tested negative load	2014	Pa
		m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
X-RAY 14 R	2.97	Collector efficiency (η_{col})	57 %
X-RAY 15 R	3.18	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 9806:2013.	
X-RAY 16 R	3.39		
X-RAY 17 R	3.60		
X-RAY 18 R	3.82		
X-RAY 19 R	4.03		
X-RAY 20 R	4.24		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.615 --
		First-order coefficient (a_1)	0.85 W/(m ² K)
		Second-order coefficient (a_2)	0.009 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.05 --
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.			