

Certificate number	16084 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

<b>License holder:</b>	<b>Pleion Industries S.r.l.</b> Via Venezia 11 – 37053 Cerea (VR), Italy
<b>Production site(s):</b>	Pleion Industries S.r.l. Via Venezia 11 – 37053 Cerea (VR), Italy
<b>Product</b>	Solar thermal collector
<b>Model(s):</b>	X-RAY 10 R; X-RAY 11 R; X-RAY 12 R; X-RAY 13 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](mailto:energy@kiwacermet.it).*

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Chief Operating Officer  
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	16084 Rev.0
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Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
Collector name	Standard Locations $\vartheta_m$	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 10 R		2,244	1,966	1,608	1,912	1,603	1,261	1,387	1,142	876	1,491	1,231	944
X-RAY 11 R		2,477	2,170	1,775	2,111	1,769	1,392	1,531	1,261	967	1,645	1,359	1,042
X-RAY 12 R		2,699	2,364	1,934	2,300	1,928	1,517	1,668	1,374	1,054	1,793	1,481	1,135
X-RAY 13 R		2,921	2,559	2,094	2,489	2,086	1,642	1,806	1,487	1,141	1,941	1,603	1,229
Annual output per m <sup>2</sup> gross area		1,058	927	759	902	756	595	654	539	413	703	581	445
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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 $\vartheta_m$ (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 <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

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 <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
X-RAY 10 R	2.12	Collector efficiency ( $\eta_{col}$ )	54 %
X-RAY 11 R	2.34	Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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 12 R	2.55		
X-RAY 13 R	2.76		
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0.600 --
		First-order coefficient ( $a_1$ )	0.91 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.013 W/(m <sup>2</sup> K <sup>2</sup> )
		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.	