

## Holder/Issued to/Manufacturer

### Orionsolar Energietechnik GmbH

Flemingstraße 17, AT-4614 Marchtrenk, Austria

## Product name and description

Vacuum tube solar thermal collectors for water heating.  
For technical information see Appendix (2 pages).

Models: Plasma Spectral CPC8      Plasma Spectral CPC15  
          Plasma Spectral CPC20     Plasma Spectral CPC24

## Performance specification

The product is found to comply with the requirements in EN 12975-1:2006+A1:2010 Solar collectors, Part 1: General requirements and the Specific CEN Keymark Scheme Rules for Solar Thermal Products and are based on test results according to EN 12975-2:2006 Solar collectors Part 2: Test methods.

## Marking

Products conforming to this certificate shall be marked in accordance with the requirements in the Specific CEN Keymark Scheme Rules for Solar Thermal Products. The marking shall, together with the Keymark logo, show the identification code of the empowered certification body (RISE Research Institutes of Sweden AB, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

## Validity

This certificate is valid until 2024-01-20 provided that the conditions in the Solar Keymark Rules are fulfilled and the standard or rules are not modified significantly. The validity of the certificate can be checked in the database, see Solar Keymark website <http://www.solarkeymark.org>.

## Miscellaneous

The manufacturer's factory production control procedures are under surveillance by the responsibility of RISE. This certificate was first issued 2015-01-15. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

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Certificate No. SC0014-15 | issue 2 | 2019-03-01

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2017-08-08



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<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>SC0014-15</b>
	<b>Issued</b>	<b>2019-03-01</b>

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
Plasma Spectral CPC8		1 636	1 409	1 182	1 377	1 164	963	993	815	655	1 071	880	706
Plasma Spectral CPC15		3 021	2 602	2 184	2 543	2 149	1 779	1 833	1 505	1 210	1 978	1 626	1 303
Plasma Spectral CPC20		4 009	3 453	2 898	3 375	2 852	2 361	2 433	1 998	1 606	2 625	2 158	1 729
Plasma Spectral CPC24		4 800	4 134	3 470	4 040	3 415	2 827	2 913	2 392	1 923	3 142	2 583	2 070
Annual output per m <sup>2</sup> gross area		938	808	678	789	667	552	569	467	376	614	505	405
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. 6.0 (October 2018). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

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 <sup>2</sup> ) >	800	$\vartheta_a$ (°C) >	10	$H_x$ (MJ/m <sup>2</sup> ) >
Maximum tested positive load			2860	Pa
Maximum tested negative load			--	Pa
Hail resistance using steel ball (maximum drop height)			0,8	m

Additional collector attribute(s)	
<input type="checkbox"/> Using external power source(s) for normal operation	<input type="checkbox"/> Active or passive measure(s) for self-protection
<input type="checkbox"/> Co-generating thermal and electrical power	<input type="checkbox"/> Wind and/or infrared sensitive collector(s) (WISC)
<input type="checkbox"/> Façade collector(s)	

Energy Labelling Information		
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code
Plasma Spectral CPC8	1,74	1-H-12S-C:19.3,985-D
Plasma Spectral CPC15	3,22	1-H-12S-C:19.3,1755-D
Plasma Spectral CPC20	4,28	1-H-12S-C:19.3,2305-D
Plasma Spectral CPC24	5,12	1-H-12S-C:19.3,2745-D

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 ( $\eta_{col}$ )	48%	Zero-loss efficiency ( $\eta_0$ )	0,54
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 9806:2017.		First-order coefficient ( $a_1$ )	1,21
		Second-order coefficient ( $a_2$ )	0,004
		Incidence angle modifier IAM (50°)	1,01
		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.	