

Holder/Issued to/Manufacturer

Solardirekt24 GmbH

Spiesheimerweg 22, 55286 Wörrstadt, Deutschland

Product name and description

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

Models: EUROTHERM SOLAR CPC 16R
EUROTHERM SOLAR CPC 20R
EUROTHERM SOLAR CPC 24R

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 2014-06-16. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.



Lennart Aronsson



Martin Tillander

Certificate No. SC0501-14 | issue 2 | 2019-06-27

RISE Research Institutes of Sweden AB | Certification
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2017-08-08



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Accred. no. 1002
Certification of
Products
ISO/IEC 17065

Annex to Solar Keymark Certificate						Licence Number		SC0501-14																			
						Date issued		2019-06-27																			
						Issued by		RISE																			
Licence holder			Solardirekt24 GmbH			Country		Germany																			
Brand (optional)						Web		www.solardirekt24.de																			
Street, Number			Spiesheimerweg 22			E-mail		info@solardirekt24.de																			
Postcode, City			55286 Wörrstadt			Tel		+49 6732-6089999																			
Collector Type						Evacuated tubular collector																					
Collector name						Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$																					
						Gross height		Gross area (A _G)		Gross length		Gross width		Aperture area (A _a)		Power output per collector											
		mm		m ²		mm		mm		m ²		0 K		10 K		30 K		50 K		70 K		93 K					
		W		W		W		W		W		W		W		W		W		W		W					
EUROTHERM SOLAR CPC 16R						133		3,43		1 917		1 790		2,91		1 847		1 804		1 710		1 605		1 490		1 342	
EUROTHERM SOLAR CPC 20R						133		4,28		1 917		2 230		3,66		2 301		2 248		2 131		2 001		1 857		1 672	
EUROTHERM SOLAR CPC 24R						133		5,12		1 917		2 670		4,41		2 755		2 691		2 552		2 395		2 223		2 002	
Power output per m² gross area														538		526		499		468		434		391			
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			0,540		1,21		0,004		0,000		0,00		0		0,000		0,00		0		0,98						
Incidence angle modifier test method			Steady state - outdoor																								
Incidence angle modifier			Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°						
Transversal			K _{θT, coll}		1,02		1,03		1,04		1,05		1,12		1,18		0,79		0,39		0,00						
Longitudinal			K _{θL, coll}		1,00		0,99		0,99		0,97		0,95		0,91		0,83		0,57		0,00						
Heat transfer medium for testing						Water																					
Flow rate for testing (per gross area, A_G)						dm/dt		0,016		kg/(sm ²)																	
Maximum temperature difference during thermal performance test						(ϑ _m - ϑ _a) _{max}		63,24		K																	
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)						ϑ _{stg}		280		°C																	
Maximum operating temperature						ϑ _{max op}		120		°C																	
Maximum operating pressure						p _{max, op}		1000		kPa																	
Testing laboratory			Intertek Testing Services Shenzhen Ltd. Guangdong						http://www.intertek.com																		
Test report(s)			140430030GZU-001						Dated		2014-05-06																
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30																					
<p>The "negative pressure test of the collector" according to EN12975-2:2006, 5.9.2 was not performed.</p> <p>Tests were performed based on EN 12975-2:2006.</p>																											
RISE Research Institutes of Sweden AB Certification																											
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SC0501-14
	Issued	2019-06-27

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
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
EUROTHERM SOLAR CPC 16R		3 217	2 770	2 325	2 708	2 288	1 894	1 952	1 603	1 289	2 106	1 731	1 388
EUROTHERM SOLAR CPC 20R		4 009	3 453	2 898	3 375	2 852	2 361	2 433	1 998	1 606	2 625	2 158	1 729
EUROTHERM SOLAR CPC 24R		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 ² 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 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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water
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) >	800
ϑ_a (°C) >	10
H_x (MJ/m ²) >	420
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 ²)	Hydraulic Designation Code
EUROTHERM SOLAR CPC 16R	3,43	1-H-12S-C:19.3,1865-D
EUROTHERM SOLAR CPC 20R	4,28	1-H-12S-C:19.3,2305-D
EUROTHERM SOLAR CPC 24R	5,12	1-H-12S-C:19.3,2745-D

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

Collector efficiency (η_{col})	48%	Zero-loss efficiency (η_0)	0,54	--
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)	1,21	W/(m ² K)	
	Second-order coefficient (a_2)	0,004	W/(m ² K ²)	
	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.			

