

Holder/Issued to/Manufacturer

Bosswerk GmbH & Co. KG

Herrenpfad 38, 41334 Nettetal, Germany

Product name and description

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

Models: Bosswerk SunExtreme CPC-M
Bosswerk SunExtreme CPC-L
Bosswerk SunExtreme CPC-XL

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 2016-02-16. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.



Dag Sjöholm

Magnus Sturesson


Certificate No. SC0058-16 | issue 2 | 2019-07-18

RISE Research Institutes of Sweden AB | Certification
Box 857, SE-501 15 Borås, Sweden
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2017-08-08



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Annex to Solar Keymark Certificate						Licence Number		SC0058-16				
						Date issued		2019-07-18				
						Issued by		RISE				
Licence holder		Bosswerk GmbH & Co. KG				Country		Germany				
Brand (optional)		Bosswerk SunExtreme CPC				Web		www.bosswerk.de				
Street, Number		Herrenpfad 38				E-mail		info@bosswerk.de				
Postcode, City		41334, Netteta				Tel		+49 (0)21531278270				
Collector Type						Evacuated tubular collector						
Collector name						Power output per collector						
						$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$						
		Gross height	Gross area (A_G)	Gross length	Gross width	Aperture area (A_a)	0 K	10 K	30 K	50 K	70 K	93 K
		mm	m ²	mm	mm	m ²	W	W	W	W	W	W
Bosswerk SunExtreme CPC-M		133	2,38	1 917	1 240	1,97	1 281	1 252	1 187	1 114	1 034	931
Bosswerk SunExtreme CPC-L		133	3,64	1 917	1 900	3,10	1 960	1 914	1 815	1 704	1 581	1 424
Bosswerk SunExtreme CPC-XL		133	4,91	1 917	2 560	4,23	2 643	2 582	2 448	2 298	2 133	1 921
Power output per m ² gross area							538	526	499	468	434	391
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A_G)		$\eta_{0, b}$	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	1,206	0,004	0,000	0,000	0,000	0,000	0,000	0,000	0,98	
Incidence angle modifier test method		Steady state - outdoor										
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal		$K_{\theta T, coll}$	1,02	1,03	1,04	1,05	1,12	1,18	0,79	0,39	0,00	
Longitudinal		$K_{\theta L, coll}$	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	0,020	kg/(sm ²)			
Maximum temperature difference during thermal performance test							$(\vartheta_m - \vartheta_a)_{max}$	63,24	K			
Standard stagnation temperature ($G = 1000 \text{ W/m}^2; \vartheta_a = 30 \text{ }^\circ\text{C}$)							ϑ_{stg}	280	°C			
Maximum operating temperature							$\vartheta_{max, op}$	120	°C			
Maximum operating pressure							$p_{max, op}$	1000	kPa			
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou				http://www.intertek.com						
Test report(s)		151228014GZU-001				Dated		2016.1.21				
Comments of testing laboratory							Datasheet version: 6.0, 2018-10-30					
<p>The "negative pressure test of the collector" according to EN 12975-2:2006, 5.9.2 was not performed.</p> <p>Tests were performed based on EN 12975-2:2006.</p>							 <i>William zheng</i>					
<p>RISE Research Institutes of Sweden AB Certification</p> <p>Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifiering@ri.se www.ri.se</p>												

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SC0058-16
	Issued	2019-07-18

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
Bosswerk SunExtreme CPC-M		2 230	1 920	1 612	1 877	1 586	1 313	1 353	1 111	893	1 460	1 200	962
Bosswerk SunExtreme CPC-L		3 411	2 937	2 465	2 871	2 426	2 008	2 069	1 699	1 366	2 233	1 835	1 471
Bosswerk SunExtreme CPC-XL		4 601	3 962	3 325	3 873	3 272	2 708	2 791	2 292	1 842	3 012	2 476	1 984
Annual output per m ² gross area		937	807	677	789	666	552	569	467	375	614	504	404
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
Bosswerk SunExtreme CPC-M	2,38	1-H-12S-C:19.3,1535-D
Bosswerk SunExtreme CPC-L	3,64	1-H-12S-C:19.3,1975-D
Bosswerk SunExtreme CPC-XL	4,91	1-H-12S-C:19.3,2635-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 (η_{col})	48%		
	Zero-loss efficiency (η_0)	0,538	--
	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: 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.	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.		