

Annex to Solar Keymark Certificate					Licence Number		011-7S495 R							
					Date issued		2021-01-13							
					Issued by		DIN CERTCO							
Licence holder		SOLFEX LTD			Country		U.K.							
Brand (optional)					Web		www.solfex.co.uk							
Street, Number		3-5 Charnley Fold Ind. Estate, Bamber Bridge			E-mail		solarthermalsales@solfex.co.uk							
Postcode, City		PRESTON; Lancashire PR5 6PS			Tel		+44 (0) 1772 312847							
Collector Type					Evacuated tubular collector									
Collector name					Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
									0 K	10 K	30 K	50 K	70 K	104 K
					W	W	W	W	W	W	W			
CPC 6 INOX					1.16	1640	707	103	644	636	618	595	569	516
CPC 6 OEM					1.16	1640	707	103	644	636	618	595	569	516
CPC 12 INOX					2.29	1640	1397	103	1272	1256	1219	1175	1123	1019
CPC 12 OEM					2.29	1640	1397	103	1272	1256	1219	1175	1123	1019
CPC 18 INOX					3.42	1640	2087	103	1899	1876	1821	1754	1677	1521
CPC 18 OEM					3.42	1640	2087	103	1899	1876	1821	1754	1677	1521
Power output per m² gross area					555	548	532	513	490	445				
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					0.559	0.646	0.004	0.000	0.00	7.914	0.000	0.00	0.0	0.96
Incidence angle modifier test method					Quasi dynamic - outdoor									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					$K_{\theta T, coll}$	1.01	1.01	1.02	1.02	0.98	1.05	1.14	0.57	0.00
Longitudinal					$K_{\theta L, coll}$	1.00	1.00	0.99	0.98	0.95	0.89	0.76	0.38	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					$(\vartheta_m - \vartheta_a)_{max}$	74		K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30^\circ\text{C}$)					ϑ_{stg}	301		°C						
Maximum operating temperature					$\vartheta_{max, op}$	160		°C						
Maximum operating pressure					$p_{max, op}$	1000		kPa						
Testing laboratory		Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)							http://www.igte.uni-stuttgart.de					
Test report(s)		14COL1031OEM02 14COL1032Q2OEM02 06COL456/7							Dated		25.01.2017 25.01.2017 25.06.2015			
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
Documented performance parameters are taken from test report 06COL456/7 Update of the data sheet to version 6.1. This data sheet replaces the data sheet issued on 25.01.2017					 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70550 Stuttgart (Vaihingen)									
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Supplementary Information

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Annual collector output in kWh/collector at mean fluid temperature ϑ_m

Standard Locations	Athens	Davos	Stockholm	Würzburg									
Collector name	ϑ_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
CPC 6 INOX		1 113	1 021	916	974	878	774	699	618	536	751	665	577
CPC 6 OEM		1 113	1 021	916	974	878	774	699	618	536	751	665	577
CPC 12 INOX		2 197	2 016	1 809	1 923	1 733	1 528	1 380	1 221	1 058	1 482	1 313	1 139
CPC 12 OEM		2 197	2 016	1 809	1 923	1 733	1 528	1 380	1 221	1 058	1 482	1 313	1 139
CPC 18 INOX		3 281	3 012	2 701	2 873	2 588	2 282	2 062	1 823	1 580	2 213	1 961	1 701
CPC 18 OEM		3 281	3 012	2 701	2 873	2 588	2 282	2 062	1 823	1 580	2 213	1 961	1 701
Annual output per m² gross area		959	881	790	840	757	667	603	533	462	647	574	497
Annual efficiency, η_a		54%	50%	45%	52%	46%	41%	52%	46%	40%	52%	46%	40%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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. 6.1 (September 2019). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/													

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)

A

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G (W/m²) >

1000

ϑ_a (°C) >

20

H_x (MJ/m²) >

600

Maximum tested positive load

2250

Pa

Maximum tested negative load

1500

Pa

Hail resistance using ice balls (diameter)

35

mm

Additional collector attribute(s)

☐ Using external power source(s) for normal operation

☐ Active or passive measure(s) for self-protection

☐ Co-generating thermal and electrical power

☐ Façade collector(s)

Energy Labelling Information		Additional Informative Technical Data		
	Reference Area, A _{sol} (m²)	Hydraulic Designation Code	Aperture Area, A _a (m²)	
CPC 6 INOX	1.16	6-V-12S-	1.00	
CPC 6 OEM	1.16	6-V-12S-	1.00	
CPC 12 INOX	2.29	6-V-12S-	2.00	
CPC 12 OEM	2.29	6-V-12S-	2.00	
CPC 18 INOX	3.42	6-V-12S-	3.00	
CPC 18 OEM	3.42	6-V-12S-	3.00	
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})	52%	Zero-loss efficiency (η_0)	0.56	--
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/m², 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)	0.65	W/(m²K)
		Second-order coefficient (a ₂)	0.004	W/(m²K²)
		Incidence angle modifier IAM (50°)	0.99	--
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.				

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