



Annex to Solar Keymark Certificate					Licence Number		011-7S3100 R							
					Date issued		2024-08-07							
					Issued by		DIN CERTCO							
Licence holder		solardirekt24 gmbh			Country		Deutschland							
Brand (optional)					Web		www.solardirekt24.de							
Street, Number		Spiesheimer Weg 22			E-mail		info@solardirekt24.de							
Postcode, City		55286 Wörrstadt			Tel		+49 6732-6089999							
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 θ _m - θ _a					
									0 K W	10 K W	30 K W	50 K W	70 K W	84 K W
EUROTHERM SOLAR CPC 10R					2.24	1980	1130	133	1,298	1,262	1,152	994	788	619
EUROTHERM SOLAR CPC 12R					2.67	1980	1350	133	1,551	1,507	1,377	1,188	942	740
EUROTHERM SOLAR CPC 14R					3.11	1980	1570	133	1,804	1,753	1,601	1,382	1,095	860
EUROTHERM SOLAR CPC 15R					3.33	1980	1680	133	1,930	1,876	1,713	1,479	1,172	920
EUROTHERM SOLAR CPC 16R					3.54	1980	1790	133	2,057	1,999	1,825	1,575	1,249	981
EUROTHERM SOLAR CPC 18R					3.98	1980	2010	133	2,309	2,244	2,050	1,769	1,402	1,101
EUROTHERM SOLAR CPC 20R					4.42	1980	2230	133	2,562	2,490	2,274	1,963	1,556	1,222
EUROTHERM SOLAR CPC 21R					4.63	1980	2340	133	2,689	2,613	2,386	2,059	1,633	1,282
EUROTHERM SOLAR CPC 22R					4.85	1980	2450	133	2,815	6.2 (22)	2,498	2,156	1,709	1,342
EUROTHERM SOLAR CPC 24R					5.29	1980	2670	133	3,068	2,981	2,723	2,350	1,863	1,463
EUROTHERM SOLAR CPC 25R					5.50	1,980	2,780	133	3,194	3,104	2,835	2,447	1,940	1,523
EUROTHERM SOLAR CPC 28R					6.04	1,980	3,050	133	3,504	3,406	3,110	2,684	2,128	1,671
Power output per m ² gross area									580	564	515	444	352	277
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 ² K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-			
Test results		0.583	1.37	0.027	0.000	0.00	12220	0.000	0.00	0	0.97			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{GT, coll}	1.02	1.03	1.04	1.05	1.12	1.18	0.79	0.39	0.00			
Longitudinal		K _{GL, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	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					(θ _m -θ _a) _{max}	53.72	K							
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)					θ _{stg}	280	°C							
Maximum operating temperature					θ _{max, op}	230	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com							
Test report(s)		231031204GZU-003 231031204GZU-001					Dated		2024/8/7 2024/7/10					
Comments of testing laboratory					Draft Ver. 6.2 (22.09.2021)									
Above efficiency parameters come from OEM test type SHC10;					 Stamp & signature									
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Supplementary Information		Issued		2024-08-07									
Gross Thermal Yield 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
EUROTHERM SOLAR CPC 10R		2,242	1,779	1,206	1,823	1,333	823	1,331	950	577	1,440	1,032	618
EUROTHERM SOLAR CPC 12R		2,678	2,126	1,441	2,177	1,593	983	1,590	1,135	689	1,720	1,233	738
EUROTHERM SOLAR CPC 14R		3,114	2,472	1,676	2,532	1,852	1,143	1,849	1,319	802	2,001	1,434	859
EUROTHERM SOLAR CPC 15R		3,333	2,645	1,793	2,710	1,982	1,223	1,978	1,412	858	2,141	1,535	919
EUROTHERM SOLAR CPC 16R		3,551	2,819	1,911	2,887	2,112	1,303	2,108	1,504	914	2,281	1,636	979
EUROTHERM SOLAR CPC 18R		3,987	3,165	2,146	3,242	2,371	1,463	2,367	1,689	1,026	2,561	1,837	1,100
EUROTHERM SOLAR CPC 20R		4,424	3,511	2,380	3,597	2,631	1,623	2,626	1,874	1,139	2,842	2,038	1,220
EUROTHERM SOLAR CPC 21R		4,642	3,685	2,498	3,774	2,760	1,704	2,755	1,966	1,195	2,982	2,138	1,280
EUROTHERM SOLAR CPC 22R		4,860	3,858	2,615	3,952	2,890	1,784	2,885	2,059	1,251	3,122	2,239	1,340
EUROTHERM SOLAR CPC 24R		5,296	4,204	2,850	4,307	3,150	1,944	3,144	2,244	1,363	3,402	2,440	1,461
EUROTHERM SOLAR CPC 25R		5,515	4,378	2,968	4,484	3,280	2,024	3,273	2,336	1,419	3,542	2,540	1,521
EUROTHERM SOLAR CPC 28R		6,050	4,803	3,256	4,920	3,598	2,220	3,591	2,563	1,557	3,886	2,787	1,668
Gross Thermal Yield per m ² gross area		1,002	795	539	815	596	368	595	424	258	644	461	276
Annual efficiency, η_a		57%	45%	31%	50%	37%	23%	51%	36%	22%	52%	37%	22%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane	1765 kWh/m ²			1630 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 Draft Ver. 6.2 (22.09.2021). 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)	B												
G (W/m ²) >	900	ϑ_a (°C) >		15	H_x (MJ/m ²) >		540						
Maximum tested positive load	2800 Pa												
Maximum tested negative load	1000 Pa												
Hail resistance using steel ball (maximum drop height)	0.6 m												
Additional collector attribute(s)													
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection											No
Co-generating thermal and electrical power	No	Façade collector(s)											No
Energy Labelling Information						Additional Informative Technical Data							
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code					Aperture Area, A_a (m ²)						
EUROTHERM SOLAR CPC 10R	2.24	1-H-12S-C:19,1205-D					1.82						
EUROTHERM SOLAR CPC 12R	2.67	1-H-12S-C:19,1425-D					2.16						
EUROTHERM SOLAR CPC 14R	3.11	1-H-12S-C:19,1645-D					2.52						
EUROTHERM SOLAR CPC 15R	3.33	1-H-12S-C:19,1755-D					2.70						
EUROTHERM SOLAR CPC 16R	3.54	1-H-12S-C:19,1865-D					2.87						
EUROTHERM SOLAR CPC 18R	3.98	1-H-12S-C:19,2085-D					3.23						
EUROTHERM SOLAR CPC 20R	4.42	1-H-12S-C:19,2305-D					3.59						
EUROTHERM SOLAR CPC 21R	4.63	1-H-12S-C:19,2415-D					3.77						
EUROTHERM SOLAR CPC 22R	4.85	1-H-12S-C:19,2525-D					3.95						
EUROTHERM SOLAR CPC 24R	5.29	1-H-12S-C:19,2745-D					4.41						
EUROTHERM SOLAR CPC 25R	5.50	1-H-12S-C:19,2855-D					4.59						
EUROTHERM SOLAR CPC 28R	6.04	1-H-12S-C:19,3185-D					5.24						
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)	0.58			--			
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)	1.37			W/(m ² K)			
						Second-order coefficient (a_2)	0.027			W/(m ² K ²)			
						Incidence angle modifier IAM (50°)	1.02			--			
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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