


Annex to Solar Keymark Certificate						Licence Number		011-7S1950 R			
						Date issued		2019-05-15			
						Issued by		DIN CERTCO			
Licence holder		Linuo Ritter International Co., Ltd.				Country		China			
Brand (optional)		-				Web		www.linuo-ritter-international.com			
Street, Number		No. 30766, EAST JINGSHI ROAD				E-mail		info@linuo-ritter-international.com			
Postcode, City		250103, JINAN CITY, SHANDONG PROVINCE				Tel		+86 531 8872 9920			
Collector Type						Flat plate collector					
Collector name						Power output per collector					
						$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$					
						$\vartheta_m - \vartheta_a$					
						0 K	10 K	30 K	50 K	70 K	116 K
						W	W	W	W	W	W
CPC XL 1514						1 491	1 477	1 438	1 384	1 316	1 101
CPC XL 1521						2 231	2 210	2 152	2 071	1 968	1 647
CPC XL 1914						1 872	1 855	1 806	1 738	1 652	1 382
CPC XL 1918						2 399	2 377	2 314	2 227	2 117	1 771
CPC XL 1921						2 797	2 771	2 698	2 597	2 468	2 065
Power output per m² gross area						561	555	541	520	495	414
Performance parameters test method		Quasi dynamic									
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		0.556	0.453	0.007	0.000	0.00	78 478	0.000	0.00	0.0	1.06
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	1.02	1.03	1.04	1.03	1.12	1.57	0.79	0.00
Longitudinal		$K_{\theta L, coll}$	0.98	0.96	0.96	0.96	0.88	0.78	0.68	0.34	0.00
Heat transfer medium for testing						Water-Glycole					
Flow rate for testing (per gross area, A_G)						dm/dt	0.020	kg/(sm ²)			
Maximum temperature difference during thermal performance test						$(\vartheta_m - \vartheta_a)_{max}$	86	K			
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30 \text{ }^\circ\text{C}$)						ϑ_{stg}	345	°C			
Maximum operating temperature						$\vartheta_{max, op}$	100	°C			
Maximum operating pressure						$p_{max, op}$	1000	kPa			
Testing laboratory		TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de					
Test report(s)		17COL1384/1 17COL1384Q/1				Dated		06.05.2019 06.05.2019			
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30					
This data sheet replaces the data sheet issued 31.07.2018 In the collector type designations has changed. Documented performance parameters are taken from test report 17COL1384/1 (CPC XL 1921)						 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)					
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de											

Annex to Solar Keymark Certificate							Licence Number		011-7S1950 R				
Supplementary Information							Issued		2019-05-15				
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 XL 1514		2 669	2 483	2 223	2 346	2 120	1 844	1 699	1 515	1 300	1 828	1 637	1 407
CPC XL 1521		3 994	3 715	3 327	3 510	3 172	2 760	2 542	2 266	1 944	2 735	2 449	2 105
CPC XL 1914		3 351	3 118	2 792	2 946	2 662	2 316	2 133	1 902	1 632	2 295	2 055	1 766
CPC XL 1918		4 295	3 995	3 578	3 775	3 411	2 968	2 733	2 437	2 091	2 941	2 634	2 263
CPC XL 1921		5 007	4 658	4 171	4 401	3 977	3 460	3 187	2 841	2 438	3 429	3 071	2 639
Annual output per m ² gross area		1 003	933	836	882	797	693	639	569	489	687	615	529
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-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										--		
G (W/m ²) >	1000		ϑ_a (°C) >		20		H_x (MJ/m ²) >		600				
Maximum tested positive load	2400										Pa		
Maximum tested negative load	1000										Pa		
Hail resistance using steel ball (maximum drop height)	0.4										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								
CPC XL 1514	2.66				7-VH-12S-A:6.6,6039-C:13,1456-No D								
CPC XL 1521	3.98				7-VH-12S-A:6.6,9104-C:13,2146-No D								
CPC XL 1914	3.34				7-VH-12S-A:6.6,7707-C:13,1456-No D								
CPC XL 1918	4.28				6-VH-12S-A:6.6,11606-C:13,1801-No D								
CPC XL 1921	4.99				7-VH-12S-A:6.6,11606-C:13,2146-No D								
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}													
Collector efficiency (η_{col})	53%												
Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}													
Zero-loss efficiency (η_0)	0.56										--		
First-order coefficient (a_1)	0.45										W/(m ² K)		
Second-order coefficient (a_2)	0.007										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.													
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany													
Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de													