


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2425 R							
					Date issued		2017-07-24							
					Issued by		DIN CERTCO							
Licence holder	Ritter Energie- und Umwelttechnik GmbH & Co. KG				Country	Deutschland								
Brand (optional)	Ritter XL Solar				Web	www.ritter-gruppe.de								
Street, Number	Kuchenäcker 2				E-mail	info@ritter-gruppe.de								
Postcode, City	72135 Dettenhausen				Tel	+49 (0) 7157 5359-1200 / 1209								
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 ϑ _m - ϑ _a									
					0 K W	10 K W	30 K W	50 K W	70 K W	108 K W				
XL 19/49 P	4.94	2 033	2 432	122	3 097	3 070	3 005	2 929	2 841	2 641				
Power output per m² gross area					627	621	608	593	575	535				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to A_G)					η _{0,hem}	a ₁	a ₂							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.627	0.531	0.003							
Incidence angle modifier test method					Steady state - outdoor									
Bi-directional incidence angle modifiers					Yes									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{θT, coll}	1.02	1.03	1.03	1.03	0.96	1.07	1.19	0.60	0.00
Longitudinal					K _{θL, coll}	1.00	0.99	0.96	0.93	0.90	0.87	0.86	0.43	0.00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A_G)					dm/dt	0.018	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	108	K							
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ _{stg}	338	°C							
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	7.998	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	200	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory	TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de									
Test report(s)	11COL1007/2OEM02/1 11COL1007Q/4OEM02/1				Dated	24.07.2017 24.07.2017								
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
This data sheet replaces the data sheet issued on 20.11.2014 Data sheet based on results of test report 11COL1007/2OEM02/1 The company details were changed					 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70550 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 Supplementary Information	Licence Number	011-7S2425 R
	Issued	2017-07-24

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

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
Collector name													
XL 19/49 P		5 354	5 033	4 662	4 747	4 401	4 024	3 416	3 120	2 816	3 653	3 344	3 017
Annual output per m ² gross area		1 084	1 019	944	961	891	815	692	632	570	739	677	611
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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	B	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	-	Pa
Hail resistance using ice balls (diameter)	35	mm

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
XL 19/49 P	4.94	Collector efficiency (η_{col})	60 %
		<i>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 9806:2013.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.627 --
		First-order coefficient (a_1)	0.53 W/(m ² K)
		Second-order coefficient (a_2)	0.003 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.96 --
		<i>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.</i>	