


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S113 R			
						Issued		2015-11-30			
Company holding the		Ritter Energie- und Umwelttechnik GmbH & Co. KG				Country		Deutschland			
Brand (optional)						Website		www.ritter-gruppe.com			
Street, street number		Kuchenäcker 2				E-mail		info@ritter-gruppe.com			
Postal Code / City, province		D-72135		Dettenhausen		Tel/Fax		49 (0)7157 5359 -1200 / -1209			
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Evacuated tubular collector					
Thermal / photo voltaic hybrid collector? (PVT collector)						No					
Integration in the roof possible ? (manufacturers declaration)						No					
Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module					
						G = 1000 W/m ²					
						Tm-Ta					
						0 K	10 K	30 K	50 K	70 K	
						W	W	W	W	W	
CPC 6 INOX mono	1.00	1 616	707	122	1.14	644	636	617	594	567	
CPC 12 INOX mono	2.00	1 616	1 397	122	2.26	1 288	1 272	1 234	1 188	1 134	
CPC 14 INOX mono	2.33	1 616	1 627	122	2.63	1 501	1 482	1 438	1 384	1 321	
CPC 18 INOX mono	3.00	1 616	2 087	122	3.37	1 932	1 908	1 851	1 782	1 701	
CPC 21 INOX mono	3.49	1 616	2 432	122	3.93	2 248	2 220	2 153	2 073	1 979	
CPC 6 INOX RP	1.00	1 616	707	122	1.14	644	636	617	594	567	
CPC 12 INOX RP	2.00	1 616	1 397	122	2.26	1 288	1 272	1 234	1 188	1 134	
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Performance test method	Glazed liquid heating collector - steady state - outdoor										
Performance parameters related to aperture area	η ₀	a ₁	a ₂								
Units	-	W/(m ² K)	W/(m ² K ²)								
Test results - Flow rate and fluid see note 1	0.644	0.749	0.005								
Bi-directional incidence angle modifiers?	Yes	<i>K θ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θT) transversal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
	Kθ(θT)	1.01	1.01	1.02	1.02	0.98	1.05	1.14	0.57	0.00	
Incidence angle modifiers Kθ(θL) longitudinal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
	Kθ(θL)	1.00	1.00	0.99	0.98	0.95	0.89	0.76	0.38	0.00	
Stagnation temperature - Weather conditions see note 2	Tstg					301	°C				
Effective thermal capacity	ceff = C/Ag					9.18	kJ/(m ² K)				
Max. intende operation temperature - see note 3	Tmax,op					160	°C				
Max. operation pressure - see note 3	pmax,op					1000	kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m ²)	-	-	-	-	-	-	-	-	-	
Pressure drop, ΔP	Pa	-	-	-	-	-	-	-	-	-	
Optional weather data	Location					Link					
Testing Laboratory	TZS, ITW University of Stuttgart										
Website	www.itw.uni-stuttgart.de/institut/abteilungen/tzs/										
Test report id. number	14COL1031, 14COL1032Q					Date of test report		2015.11.30			
During the test GDIF/GTOT was always between	0	and	1								
Comments of testing laboratory:											
This data sheet replaces the data sheet issued on 22.06.2015. The reasons for replacement are new test reports, new company name and new collector names.											
Note 1	Flow rate	0.020	kg/(s m ²)	Fluid	Water						
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature , Ta=30 °C										
Note 3	Given by manufacturer										
											
Datasheet version: 4.06, 2014-01-15											
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S113 R
	Issued	30.11.2015

Annual collector output kWh/module													
Collector name	Location and collector temperature (T _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	
CPC 6 INOX mono	1 111	1 019	911	973	874	768	698	616	532	749	663	572	
CPC 12 INOX mono	2 223	2 038	1 822	1 945	1 749	1 536	1 396	1 232	1 063	1 498	1 326	1 145	
CPC 14 INOX mono	2 589	2 374	2 123	2 266	2 037	1 789	1 626	1 435	1 239	1 746	1 544	1 333	
CPC 18 INOX mono	3 334	3 057	2 733	2 918	2 623	2 304	2 094	1 848	1 595	2 248	1 988	1 717	
CPC 21 INOX mono	3 879	3 556	3 180	3 394	3 051	2 680	2 436	2 150	1 855	2 615	2 313	1 997	
CPC 6 INOX RP	1 111	1 019	911	973	874	768	698	616	532	749	663	572	
CPC 12 INOX RP	2 223	2 038	1 822	1 945	1 749	1 536	1 396	1 232	1 063	1 498	1 326	1 145	
CPC 14 INOX RP	2 589	2 374	2 123	2 266	2 037	1 789	1 626	1 435	1 239	1 746	1 544	1 333	
CPC 18 INOX RP	3 334	3 057	2 733	2 918	2 623	2 304	2 094	1 848	1 595	2 248	1 988	1 717	
CPC 21 INOX RP	3 879	3 556	3 180	3 394	3 051	2 680	2 436	2 150	1 855	2 615	2 313	1 997	

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

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	ScenoCalc version: Ver. 4.06 (Jan, 2014)