



Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Certificate No.	011-7S380 R
		Date of issue	11.03.2011
Company	Ritter Solar GmbH	Country	Deutschland
Brand (optional)		Website	www.rittersolar.de
Street, number	Kuchenäcker 2	E-mail	T.Weidemann@ritter
Postal Code	72135	Tel.	+49 71 575 359 172
City	Dettenhausen	Fax	+49 71 575 359 179
Collector Type (flat plate / evacuate tubular / un-glazed)		Evacuated tubular collector	
Integration in the roof possible ?		No	

Collector name	Aperture area (A _a) [m ²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (A _G) [m ²]	Power output per collector unit G = 1000 W/m ² T _m -T _a :				
						0 K	10 K	30 K	50 K	70 K
						[W]	[W]	[W]	[W]	[W]
Vaciosol CPC 6 V2*	1.28	2 057	702	101	1.44	824	814	790	760	726
Vaciosol CPC 12 V2*	2.57	2 057	1 392	101	2.86	1 655	1 635	1 586	1 527	1 457
Vaciosol CPC 6 INOX RP*	1.28	2 083	702	95	1.46	824	814	790	760	726
Vaciosol CPC 12 INOX RP*	2.57	2 083	1 392	95	2.90	1 655	1 635	1 586	1 527	1 457

Collector efficiency parameters related to aperture area (A _a) Type of fluid and flow rate see note 1	η _{0a}	0.644	-
	a _{1a}	0.749	W/(m ² K)
	a _{2a}	0.005	W/(m ² K ²)

Stagnation temperature - Weather conditions see note 2	t _{stg}	301	°C
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Effective thermal capacity	C _{eff} = C/A _a	9.18	kJ/(m ² K)
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Max. operation pressure - see note 3	p _{max}	1000	kPa
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Incidence angle modifiers K _θ (θ)	G _{DIF} /G _{TOT}		θ _T /θ _L	50°	10°	20°	30°	40°	60°	70°
	min	max	K _θ (θ _T)	0.98	1.01	1.01	1.02	1.02	1.05	1.14
	-	-	K _θ (θ _L)	0.95	1.00	1.00	0.99	0.98	0.89	0.76
G _{DIF} /G _{TOT} : min&max - while measuring						Optional values				

Testing Laboratory	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number	06COL456OEM02/2
Date of test report	11.03.2011
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :
* dimensions according to manufacturer

Note 1	Fluid	Water	Flow rate	0.017 kg/s per m ²
Note 2	Irradiance, G _s =1000 W/m ²			
	Ambient temperature, T _a =30 °C			
Note 3	Given by manufacturer			



**Annual collector output based on EN 12975 Test Results,
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Issued

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Annual collector output kWh
Location and collector temperature (T_m)

Collector name	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	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
Vaciosol CPC 6 V2*	1 421	1 303	1 165	1 321	1 197	1 058	893	788	680	958	848	732						
Vaciosol CPC 12 V2*	2 853	2 616	2 339	2 652	2 403	2 124	1 793	1 582	1 365	1 923	1 703	1 470						
Vaciosol CPC 6 INOX RP*	1 421	1 303	1 165	1 321	1 197	1 058	893	788	680	958	848	732						
Vaciosol CPC 12 INOX RP*	2 853	2 616	2 339	2 652	2 403	2 124	1 793	1 582	1 365	1 923	1 703	1 470						

Collector mounting: Fixed or tracking

Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m ²	Ta °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°

Gtot	Annual total irradiation on collector plane	kWh/m ²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

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Datasheet version:

VERSION 3.6, 2012.01.13

Calculation program version:

3.07, October 2011 (SP)