TÜVRheinland®
DIN CERTCO
Genau. Richtig.

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2606 F
	Issued	2016-01-12

Company holding the	Energetyka Solarna ensol SP. Z.o.o.		Country	Poland	
Brand (optional)	ensol		Website	www.ensol.pl	
Street, street number	ul. Piaskowa 11		E-mail	sekretariat@ensol.pl	
Postal Code / City, province	47-400	Racibórz	Tel/Fax	48	(0)32-414 9242/ -415 9665

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m², Tm-Ta 0 K	10 K	30 K	50 K	70 K
	m²	mm	mm	mm	m²	W	W	W	W	W
EM1V/2,0S Al-Cu	1.88	1 988	1 006	85	2.00	1 476	1 408	1 252	1 070	862
EM1V/2,0B Al-Cu	1.88	1 988	1 006	85	2.00	1 476	1 408	1 252	1 070	862

Performance test method		Glazed liquid heating collector - steady state - indoor								
Performance parameters related to aperture		η0	a1	a2						
Units		-	W/(m²K)	W/(m²K²)						
Test results - Flow rate and fluid see note 1		0.787	3.485	0.017						
Bi-directional incidence angle	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)	1.00	0.98	0.96	0.93	0.86	0.75	0.52		0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	185	°C
Effective thermal capacity	ceff = C/Ag	5.6	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	208	°C
Max. operation pressure - see note 3	pmax,op	600	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 m²)									
Pressure drop, ΔP	Pa									

Optional weather data	Location		Link	
Testing Laboratory	TÜV Rheinland Energie und Umwelt GmbH			
Website	http://www.tuv.com/st			
Test report id. number	21228210.001r1		Date of test report	2016.01.12
During the test GDIF/GTOT was always between	0.16	and	0.88	

Comments of testing laboratory:

The only difference between S and B is a silver or dark brown coated aluminium frame.

Note 1	Flow rate	0.021	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

Datasheet version: 4.05, 2013-11-07

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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2606 F
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Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)											
	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
EM1V/2,0S Al-Cu	2 203	1 557	992	1 680	1 148	701	1 231	799	475	1 332	856	498
EM1V/2,0B Al-Cu	2 203	1 557	992	1 680	1 148	701	1 231	799	475	1 332	856	498

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	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/m²
Ta	Mean annual ambient air temperature	°C
Tm	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 (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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

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ScenoCalc version: Ver. 4.05 (Nov, 2013)