


Summary of EN 12975 Test Results,					Licence Number	011-7S2637 F				
annex to Solar KEYMARK Certificate					Issued	2016-03-11				
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 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
ES2V/2,65S AL-CU	2.45	2 356	1 120	85	2.65	2 087	1 988	1 766	1 515	1 235
ES2V/2,65B AL-CU	2.45	2 356	1 120	85	2.65	2 087	1 988	1 766	1 515	1 235
Performance test method	Glazed liquid heating collector - steady state - indoor									
Performance parameters related to aperture	η_0	a1	a2							
Units	-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1	0.852	3.922	0.015							
Bi-directional incidence angle	No	<i>Kθ values are obligatory for 50°.</i>								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	K θ (θ)	1.00	0.99	0.96	0.93	0.87	0.77	0.56	0.28	0.00
Incidence angle modifier not bi-directional - leave fields blank										
Stagnation temperature - Weather conditions see note 2					Tstg	192	°C			
Effective thermal capacity					ceff = C/Ag	6.65	kJ/(m ² K)			
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 m ²)									
Pressure drop, ΔP	Pa									
Optional weather data	Location					Link				
Testing Laboratory	TÜV Rheinland Energy GmbH									
Website	http://www.tuv.com/st									
Test report id. number	21228324.001				Date of test report	2016.03.11				
During the test GDIF/GTOT was always between 0.22 and 0.85										
Comments of testing laboratory:										
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									
 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln 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	011-7S2637 F
	Issued	11.03.2016

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		
ES2V/2,65S AL-CU	3 142	2 218	1 430	2 388	1 640	1 023	1 752	1 141	689	1 897	1 221	724		
ES2V/2,65B AL-CU	3 142	2 218	1 430	2 388	1 640	1 023	1 752	1 141	689	1 897	1 221	724		

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

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>.