

Annex to Solar Keymark Certificate - Summary of ISO 9806:2013 Test Results						Licence Number		011-7S2482 F			
						Date issued		2017-02-09			
						Issued by		ISFH CalTeC			
Licence holder	Solvis GmbH					Country	Germany				
Brand (optional)	-					Web	www.solvis.de				
Street, Number	Grotrian-Steinweg-Str. 12					E-mail	info@solvis-solar.de				
Postcode, City	D-38112 Braunschweig					Tel	+49 531 28904-0				
Collector Type						Flat plate collector, glazed					
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 ∅ _m - ∅ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	90 K W	
SolvisFera 553-I AR	5.61	1 480	3 793	105	4 353	4 173	3 759	3 273	2 716	2 086	
SolvisFera 653-I AR	7.01	1 480	4 735	105	5 440	5 215	4 697	4 090	3 394	2 607	
SolvisFera 803-I AR	8.40	1 480	5 677	105	6 518	6 249	5 629	4 901	4 066	3 124	
Power output per m² gross area					776	744	670	584	484	372	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to AG)		η _{0,hem}	a ₁	a ₂							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results		0.776	3.050	0.016							
Incidence angle modifier test method		Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers		No									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{θT, coll}	1.00	0.99	0.98	0.97	0.94	0.89	0.79	0.48	0.00
Longitudinal		K _{θL, coll}	1.00	0.99	0.98	0.97	0.94	0.89	0.79	0.48	0.00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A_G)		dm/dt	0.020		kg/(sm ²)						
Maximum temperature difference for thermal performance calculations		(∅ _m -∅ _a) _{max}	90		K						
Standard stagnation temperature (G = 1000 W/m²; ∅_a = 30 °C)		∅ _{stg}	210		°C						
Effective thermal capacity, incl. fluid (per gross area, A_G)		C/m ²	4		kJ/(Km ²)						
Maximum operating temperature		∅ _{max, op}	-		°C						
Maximum operating pressure		p _{max, op}	400		kPa						
Testing laboratory		ISFH CalTeC									
Test report(s)		64-14/KT 84-14/KQ 58-16/KT				Dated		24.02.2015 10.02.2015 22.12.2016			
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01									
		The collector efficiency parameter are related to G(DIF)/G(TOT)=0.15.				Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500					
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2482 F
	Issued	2017-02-09

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

Standard Locations Collector name	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
SolvisFera 553-I AR		6 965	5 181	3 520	5 426	3 885	2 524	3 976	2 711	1 700	4 311	2 934	1 809
SolvisFera 653-I AR		8 704	6 474	4 398	6 780	4 855	3 154	4 968	3 388	2 125	5 387	3 666	2 260
SolvisFera 803-I AR		10 430	7 758	5 270	8 124	5 817	3 780	5 953	4 060	2 546	6 455	4 392	2 708
Annual output per m ² gross area		1 242	924	627	967	693	450	709	483	303	769	523	322
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-Glycole	
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 12975-2:2006 under the following conditions:		
Climate class (A, B or C)	--	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SolvisFera 553-I AR	5.61	Collector efficiency (η_{col})	63 %
SolvisFera 653-I AR	7.01	<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>	
SolvisFera 803-I AR	8.40		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.776 --
		First-order coefficient (a_1)	3.05 W/(m ² K)
		Second-order coefficient (a_2)	0.016 W/(m ² K ²)
		incidence angle modifier IAM (50°)	0.94 --
		<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>	

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