

Annex to Solar Keymark Certificate - Summary of EN 12975:2006 Test Results						Licence Number		011-7S1750 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 ϑ _m - ϑ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	88 K W	
SolvisFera 553-S-AR	5.61	1 480	3 793	105	4 241	4 053	3 626	3 130	2 567	2 001	
SolvisFera 653-S-AR	7.01	1 480	4 735	105	5 300	5 065	4 531	3 912	3 207	2 500	
SolvisFera 803-S-AR	8.40	1 480	5 677	105	6 350	6 069	5 429	4 687	3 843	2 996	
SolvisFera 553-D-AR	5.61	1 480	3 793	105	4 241	4 053	3 626	3 130	2 567	2 001	
SolvisFera 653-D-AR	7.01	1 480	4 735	105	5 300	5 065	4 531	3 912	3 207	2 500	
SolvisFera 803-D-AR	8.40	1 480	5 677	105	6 350	6 069	5 429	4 687	3 843	2 996	
Power output per m ² gross area					756	722	646	558	458	357	
Performance parameters test method		Steady state - indoor									
Performance parameters (related to A _G)		η _{0,hem}	a ₁	a ₂							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results		0.756	3.20	0.0152							
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	0.96	0.93	0.88	0.77	0.43	0.00
Longitudinal		K _{θL, coll}	1.00	0.99	0.98	0.96	0.93	0.88	0.77	0.43	0.00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A _G)		dm/dt	0.015	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	88	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	209	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	4	kJ/(Km ²)							
Maximum operating temperature		ϑ _{max, op}	-	°C							
Maximum operating pressure		p _{max, op}	400	kPa							
Testing laboratory		ISFH CalTeC					www.isfh.de				
Test report(s)		06-08/D + supplement report 09.02.2017 07-08/Q + supplement report 09.02.2017				Dated		26.10.2009 27.10.2009			
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01									
The manufacturer distributes of the collector types SolvisFera 553-D, SolvisFera 653-D and SolvisFera 803-D the model "[type name] R/L AR" and "[type name] L/R AR". The models are differing only in the position of collector connections.						Institut für Solarenergieforschung GmbH Am Ohberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500					
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 12975-2:2006 test results

Collector name	Standard Locations 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-S AR		6 723	4 900	3 252	5 179	3 637	2 309	3 803	2 540	1 556	4 127	2 742	1 652
SolvisFera 653-S AR		8 401	6 123	4 063	6 471	4 545	2 885	4 752	3 173	1 944	5 156	3 427	2 064
SolvisFera 803-S AR		10 067	7 337	4 869	7 754	5 446	3 457	5 694	3 803	2 329	6 179	4 106	2 474
SolvisFera 553-D AR		6 723	4 900	3 252	5 179	3 637	2 309	3 803	2 540	1 556	4 127	2 742	1 652
SolvisFera 653-D AR		8 401	6 123	4 063	6 471	4 545	2 885	4 752	3 173	1 944	5 156	3 427	2 064
SolvisFera 803-D AR		10 067	7 337	4 869	7 754	5 446	3 457	5 694	3 803	2 329	6 179	4 106	2 474
Annual output per m ² gross area		1 198	874	580	923	648	412	678	453	277	736	489	294
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-S AR	5.61	Collector efficiency (η_{col})	60 %
SolvisFera 653-S 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-S AR	8.40		
SolvisFera 553-D AR	5.61		
SolvisFera 653-D AR	7.01		
SolvisFera 803-D AR	8.40		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.756 --
		First-order coefficient (a_1)	3.20 W/(m ² K)
		Second-order coefficient (a_2)	0.015 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
		<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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