

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2680 R							
						Date issued		2016-08-02							
						Issued by		ISFH CalTeC							
Licence holder	ATAG ITALIA s.r.l.					Country	Italy								
Brand (optional)	JODO					Web	www.atagitalia.com								
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Postcode, City	37019 Peschiera del Garda (VR)					Tel	+39 (0)309904804								
Collector Type						Evacuated tubular collector									
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					
SOLDF4002	2.77	1 954	1 416	93	1 651	1 620	1 553	1 476	1 391	1 307					
SOLDF4003	4.15	1 954	2 125	93	2 473	2 428	2 326	2 212	2 084	1 958					
Power output per m² gross area					596	585	561	533	502	472					
Performance parameters test method						Steady state - indoor									
Performance parameters (related to AG)						η _{0,hem}	a ₁	a ₂							
Units						-	W/(m ² K)	W/(m ² K ²)							
Test results						0.596	1.06	0.004							
Incidence angle modifier test method						Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers						Yes									
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal						K _{θT, coll}	1.00	1.02	1.04	1.05	0.99	0.85			0.00
Longitudinal						K _{θL, coll}	1.00	0.99	0.98	0.96	0.92	0.86			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/m²; ϑ_a = 30 °C)						ϑ _{stg}	313							°C	
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m ²	6.1							kJ/(Km ²)	
Maximum operating temperature						ϑ _{max, op}	-							°C	
Maximum operating pressure						p _{max, op}	800							kPa	
Testing laboratory						ISFH CalTeC									
Test report(s)						55-15/KB									
						www.isfh.de									
						Dated									
						16.07.2016									
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01									
The test results are based on EN 12975						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	011-7S2680 R
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 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
SOLDF4002		2 716	2 391	2 060	2 336	2 024	1 724	1 666	1 405	1 166	1 789	1 511	1 250
SOLDF4003		4 069	3 583	3 086	3 500	3 033	2 583	2 495	2 106	1 746	2 681	2 264	1 872
Annual output per m ² gross area		980	863	744	843	731	622	601	507	421	646	545	451
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 ISO 9806:2013 under the following conditions:	
Climate class (A, B or C)	--
Maximum tested positive load	- Pa
Maximum tested negative load	- Pa
Hail resistance using steel ball (maximum drop height)	- m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SOLDF4002	2.77	Collector efficiency (η_{col})	55 %
SOLDF4003	4.15	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/m ² , 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.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.596 --
		First-order coefficient (a_1)	1.06 W/(m ² K)
		Second-order coefficient (a_2)	0.004 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.01 --
		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.	