

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2681 R				
					Date issued		2016-08-04				
					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	86 K W	
SOLHP4002	2.77	1 952	1 418	93	1 598	1 571	1 505	1 424	1 327	1 238	
SOLHP4003	4.15	1 952	2 127	93	2 395	2 354	2 255	2 133	1 988	1 855	
Power output per m² gross area					577	567	543	514	479	447	
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		0.577	0.910	0.007							
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}	1.01	1.02	1.04	1.04	0.99	0.90			0.00
Longitudinal		K _{θL, coll}	1.00	0.99	0.97	0.95	0.91	0.83			0.00
Heat transfer medium for testing					Water-Glycole						
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}	86	K				
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ _{stg}	167	°C				
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	3.4	kJ/(Km ²)				
Maximum operating temperature					ϑ _{max op}	70	°C				
Maximum operating pressure					p _{max,op}	1000	kPa				
Testing laboratory	ISFH CalTeC				www.isfh.de						
Test report(s)	56-15/B				Dated	16.07.2016					
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01						
The test results are based on EN 12975. The condenser of the evacuated tubes has a cut-off mechanism which starts operation at about 70°C.					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	011-7S2681 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
SOLHP4002		2 636	2 326	-	2 272	1 952	-	1 624	1 364	-	1 743	1 466	-
SOLHP4003		3 949	3 484	-	3 404	2 925	-	2 433	2 043	-	2 611	2 196	-
Annual output per m ² gross area		951	840	-	820	705	-	586	492	-	629	529	-
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}		
SOLHP4002	2.77	Collector efficiency (η_{col})	53	%
SOLHP4003	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)	0.577	--
		First-order coefficient (a_1)	0.91	W/(m ² K)
		Second-order coefficient (a_2)	0.007	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.99	--
		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.		