
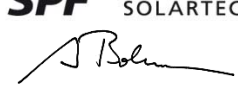


Annex to Solar Keymark Certificate - Summary of EN 12975-2 Test Results						Licence Number		011-7S1430 R					
						Date issued		2016-06-16					
						Issued by							
Licence holder		EHT Italia s.r.l.				Country		Italy					
Brand (optional)		--				Web		www.ehtitalia.it					
Street, Number		Loc. Lacaioli 6				E-mail		ehtitalia@ehtitalia.it					
Postcode, City		IT-06060, Castiglione del Lago (PG)				Tel		+39 075 953 242					
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 = 1000 W/m ² ϑ _m - ϑ _a								
					0 K	10 K	30 K	50 K	70 K	130 K			
					W	W	W	W	W	W			
1100 HP 20	3.100	2'205	1'406	130	1'401	1'377	1'309	1'214	1'092	567			
1100 HP 30	4.631	2'205	2'100	130	2'102	2'065	1'963	1'820	1'637	850			
Power output per m ² gross area					452	444	422	391	352	183			
Performance parameters test method		Steady state - outdoor											
Performance parameters (aperture area)		η _{0,hem}	a ₁	a ₂									
Units		-	W/(m ² K)	W/(m ² K ²)									
Test results		0.690	1.030	0.016									
Incidence angle modifier test method		Steady state - outdoor											
Bi-directional incidence angle modifiers		Yes											
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal		K _{GT, coll}	1.00	1.01	1.01	1.02	1.03	0.91	0.68	0.38	0.00		
Longitudinal		K _{GL, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	0.00		
Heat transfer medium for testing		Water-Glycole											
Flow rate for testing (per gross area, A _G)		dm/dt	0.014	kg/(sm ²)									
Maximum temperature difference for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	130	K									
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	162	°C									
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	3.01	kJ/(Km ²)									
Maximum operating temperature		ϑ _{max, op}	160	°C									
Maximum operating pressure		p _{max, op}	600	kPa									
Testing laboratory		SPF, CH-8640 Rapperswil				www.spf.ch							
Test report(s)		C1220LPEN C1221LPEN C1221QPEN				Dated		21.06.2011 21.06.2011 21.06.2011					
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01											
--		 INSTITUT FÜR SOLARTECHNIK 											
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1430 R
	Issued	2016-06-16

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 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
1100 HP 20		2'339	2'030	1'630	2'002	1'656	1'277	1'436	1'164	872	1'545	1'257	938
1100 HP 30		3'508	3'044	2'445	3'002	2'484	1'915	2'154	1'745	1'308	2'318	1'885	1'406
Annual output per m ² gross area		754	655	526	646	534	412	463	375	281	499	406	303
Annual output per m ² aperture area		1'152	999	803	986	816	629	707	573	429	761	619	462
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 under the following conditions:		
No valid climate reference class	--	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	1000	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}	
1100 HP 20	2.03	Collector efficiency (η_{col})	62 %
1100 HP 30	3.05	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)	0.690 --
		First-order coefficient (a_1)	1.03 W/(m ² K)
		Second-order coefficient (a_2)	0.016 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.00 --
		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.	