





Annex to Solar Keymark Certificate					Licence Number		011-7S606 R				
Summary of EN 12975-2 Test Results					Issued		2015-12-17				
Collector test standard		EN 12975-2									
Licence holder		augusta-solar GmbH			Country		Germany				
Brand (optional)		--			Web		www.augusta-solar.de				
Street, Number		Zirbelstrasse 54			E-mail		info@augusta-solar.de				
Postcode, City		DE-86154 Augsburg			Tel		+49 (0821) 419 020 10				
Collector Type					Evacuated tubular collector						
					Power output per collector G = 1000 W/m ² ∅ _m - ∅ _a						
					0 K	10 K	30 K	50 K	70 K	130 K	
Collector name		Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	W	W	W	W	W	W
AS 100 HP8		2.03	2'137	952	174	1'092	1'069	1'018	961	898	671
AS 100 HP16		4.09	2'137	1'912	174	2'188	2'142	2'040	1'925	1'798	1'344
Power output per m² aperture area. For aperture area, see page 2						740	724	690	651	608	455
Performance parameters test method		Steady state - outdoor									
Performance parameters (aperture area)		η ₀	a ₁	a ₂							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results		0.740	1.520	0.005							
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 _{θT, coll}	1.00	1.01	1.03	1.05	1.03	0.89	0.65	0.34	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.97	0.92	0.84	0.70	0.45	0.00
Fluid for testing		Water-Glycole									
Flow rate for testing (per Aa)		dm/dt	0.025	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		(∅ _m -∅ _a) _{max}	130	K							
Standard stagnation temperature (G = 1000 W/m²; ∅_a = 30 °C)		∅ _{stg}	289	°C							
Effective thermal capacity (per Aa)		C/m ²	6.0	kJ/(Km ²)							
Maximum operating temperature		∅ _{max, op}	120	°C							
Maximum operating pressure		p _{max, op}	600	kPa							
Testing laboratory		SPF, CH-8640 Rapperswil				www.spf.ch					
Test report(s)		C1684LPEN C937LPEN C937QPEN				Dated		17.12.2015 06.12.2008 06.12.2008			
Comments of testing laboratory											
--						 INSTITUT FÜR SOLARTECHNIK 					



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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 12975-2 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
AS 100 HP8		1'815	1'572	1'329	1'542	1'313	1'098	1'104	913	741	1'188	983	795
AS 100 HP16		3'636	3'149	2'662	3'090	2'631	2'199	2'212	1'830	1'485	2'380	1'970	1'593
Annual output per m ² aperture area		1'229	1'065	900	1'045	890	744	748	619	502	805	666	539
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 (July 2015). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Liquid
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	--
Positive Mechanical Load	1000 Pa
Negative Mechanical 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}	
AS 100 HP8	1.48	Collector efficiency (η_{col})	67 %
AS 100 HP16	2.96	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.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.740 --
		First-order coefficient (a_1)	1.52 W/(m ² K)
		Second-order coefficient (a_2)	0.005 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.	