


Annex to Solar Keymark Certificate						Licence Number		011-7S2919 F								
						Date issued		2019-02-18								
						Issued by		TÜV Rheinland Energy GmbH								
Licence holder		Ebner Technology KG des Ebner Markus &				Country		Italy								
Brand (optional)		Ebner Technology				Web		www.ebner-technology.com								
Street, Number		Kreuzweg 39				E-mail		info@ebner-technology.com								
Postcode, City		39057 Eppan (BZ)				Tel		+39 0471 663268								
Collector Type						Flat plate collector										
Collector name						Power output per collector										
						$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$										
	Gross height	Gross area (A _G)	Gross length	Gross width	Aperture area (A _a)	0 K	10 K	30 K	50 K	70 K	100 K					
	mm	m ²	mm	mm	m ²	W	W	W	W	W	W					
EMEK202 "EASSTAR"						85	2.00	1998	1006	1.88	1479	1410	1254	1072	864	505
Power output per m ² gross area						739	705	627	536	432	252					
Performance parameters test method		Steady state - indoor														
Performance parameters (related to A _G)		η _{0, b}	a1	a2	a3	a4	a5	a6	a7	a8	Kd					
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-					
Test results		0.750	3.27	0.016	0.000	0.00	5580	0.000	0.00	0.0E+00	0.91					
Incidence angle modifier test method		Quasi dynamic - outdoor														
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°					
Transversal		K _{θT, coll}	1.00	0.98	0.96	0.93	0.86	0.75	0.52	0.26	0.00					
Longitudinal		K _{θL, coll}	1.00	0.98	0.96	0.93	0.86	0.75	0.52	0.26	0.00					
Heat transfer medium for testing						Water										
Flow rate for testing (per gross area, A _G)						dm/dt	0.020	kg/(sm ²)								
Maximum temperature difference during thermal performance test						(ϑ _m -ϑ _a) _{max}	70	K								
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)						ϑ _{stg}	185	°C								
Maximum operating temperature						ϑ _{max, op}	208	°C								
Maximum operating pressure						p _{max, op}	600	kPa								
Testing laboratory		TÜV Rheinland Energy GmbH				www.tuv.com/solarenergy										
Test report(s)		21246009.001				Dated		18.02.2019								
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30										
The collector was tested according to EN ISO 9806:2013 and η _{0, b} was calculated under consideration of η _{0, hem} = 0.739 and Kd=0.905.						 Geneu. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln										
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Supplementary Information		011-7S2919 F											
		Issued											
		2019-02-18											
Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
EMEK202 "EASYSSTAR"		2 280	1 624	1 041	1 737	1 188	725	1 276	830	493	1 390	897	522
Annual output per m ² gross area		1 140	812	520	868	594	362	638	415	246	695	449	261
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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													
Additional Information													
Collector heat transfer medium	Water-Glycole												
The collector is deemed to be suitable for roof integration	No												
The collector was tested successfully under the following conditions:													
Climate class (A+, A, B or C)											A	--	
G (W/m ²) >	1000	ϑ_a (°C) >		20	H_x (MJ/m ²) >		600						
Maximum tested positive load											5400	Pa	
Maximum tested negative load											3500	Pa	
Hail resistance using ice balls (diameter)											35	mm	
Additional collector attribute(s)													
Using external power source(s) for normal operation				Active or passive measure(s) for self-protection									
Co-generating thermal and electrical power				Wind and/or infrared sensitive collector(s) (WISC)									
Façade collector(s)													
Energy Labelling Information													
	Reference Area, A_{sol} (m ²)			Hydraulic Designation Code									
EMEK202 "EASYSSTAR"	2.00			4.4-VH-12S-7,1880-20,1066									
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}				Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}									
Collector efficiency (η_{col})	58%			Zero-loss efficiency (η_0)	0.74			--					
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 9806:2017.				First-order coefficient (a_1)	3.27			W/(m ² K)					
				Second-order coefficient (a_2)	0.016			W/(m ² K ²)					
				Incidence angle modifier IAM (50°)	0.87			--					
				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.									
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