

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2917 F																	
					Date issued		2019-03-04																	
					Issued by		DIN CERTCO																	
Licence holder		Ebner Technology KG/SAS des/di Ebner Markus&Co			Country		Italien																	
Brand (optional)		-			Web		www.ebner-technology.com																	
Street, Number		Kreuzweg/Crocevia 39			E-mail		info@ebner-technology.com																	
Postcode, City		39057 Eppan/Appiano (BZ)			Tel		+39 047 1663268																	
Collector Type					Flat plate collector, glazed																			
Collector name					Gross area (A _G)		Gross length		Gross width		Gross height		Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a											
					m ²		mm		mm		mm		0 K		10 K		30 K		50 K		70 K		100 K	
EMHK251 "BLACKSTAR"					2.52		2 151		1 170		83		1 885		1 795		1 597		1 372		1 121		695	
EMHK201 "BLACKSTAR"					2.02		1 730		1 169		84		1 511		1 439		1 280		1 100		898		557	
Power output per m ² gross area					748		712		634		544		445		276									
Performance parameters test method					Steady state - indoor																			
Performance parameters (related to A _G)					η _{0,hem}		a ₁		a ₂															
Units					-		W/(m ² K)		W/(m ² K ²)															
Test results					0.748		3.423		0.013															
Incidence angle modifier test method					Quasi dynamic - outdoor																			
Bi-directional incidence angle modifiers					No																			
Incidence angle modifier					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal					K _{θT, coll}								0.93										0.00	
Longitudinal					K _{θL, coll}								0.93										0.00	
Heat transfer medium for testing					Water																			
Flow rate for testing (per gross area, A _G)					dm/dt		0.019		kg/(sm ²)															
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}		100		K															
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}		181		°C															
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²		5.019		kJ/(Km ²)															
Maximum operating temperature					ϑ _{max, op}		n.a.		°C															
Maximum operating pressure					p _{max, op}		1000		kPa															
Testing laboratory					TZS, ITW University Stuttgart							www.itw.uni-stuttgart.de												
Test report(s)					19COLP204010381OEM01 19COLP20401038Q1OEM01 19COLP20400750102OEM01							Dated		20.02.2019 20.02.2019 20.02.2019										
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01																			
none																								
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2917 F
	Issued	2019-03-04

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations Collector name	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
EMHK251 "BLACKSTAR"		2 984	2 139	1 404	2 275	1 579	995	1 673	1 100	668	1 817	1 187	709
EMHK201 "BLACKSTAR"		2 392	1 715	1 125	1 824	1 266	798	1 341	882	535	1 456	952	568
Annual output per m ² gross area		1 184	849	557	903	627	395	664	437	265	721	471	281
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)	C	--
Maximum tested positive load	1210	Pa
Maximum tested negative load	1184	Pa
Hail resistance using steel ball (maximum drop height)	n.a.	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
EMHK251 "BLACKSTAR"	2.52	Collector efficiency (η_{col})	59 %
EMHK201 "BLACKSTAR"	2.02	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)	0.748 --
		First-order coefficient (a_1)	3.42 W/(m ² K)
		Second-order coefficient (a_2)	0.013 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
		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.	