
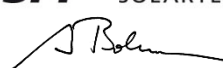


Annex to Solar Keymark Certificate					Licence Number		011-7S3001 F							
					Date issued		2021-01-25							
					Issued by		DIN CERTCO							
Licence holder		HEWALEX Sp. z o.o. Sp. k.			Country		Poland							
Brand (optional)		-			Web		www.hewalex.pl							
Street, Number		Słowackiego 33			E-mail		hewalex@hewalex.pl							
Postcode, City		PL 43-502, Czechowice-Dziedzice			Tel		+48 32 214 17 10							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	85 K				
					m ²	mm	mm	mm	mm	mm	mm			
KS2100F TLP ACRm 4					2.06	2'022	1'019	90	1'642	1'567	1'400	1'210	997	823
KS2200F TLP ACRm 4					2.25	2'022	1'111	90	1'793	1'712	1'530	1'322	1'089	898
KS2400F TLP ACRm 4					2.43	2'022	1'203	90	1'937	1'849	1'652	1'428	1'177	970
KS2550F TLP ACRm 4					2.56	2'188	1'166	90	2'041	1'948	1'740	1'504	1'240	1'022
KS2600F TLP ACRm 4					2.62	2'022	1'294	90	2'088	1'993	1'781	1'539	1'269	1'046
Power output per m ² gross area					797	761	680	588	484	399				
Performance parameters test method		Steady state - outdoor												
Performance parameters (related to A _G)		$\eta_{0,b}$	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		0.808	3.49	0.014	0.000	0.00	6'608	0.000	0.00	0.0E+00	0.91			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{θT, coll}	1.00	1.00	0.99	0.99	0.97	0.90	0.69	0.37	0.00			
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.99	0.97	0.90	0.69	0.37	0.00			
Heat transfer medium for testing		Water-Glycole												
Flow rate for testing (per gross area, A _G)		dm/dt	0.020	kg/(sm ²)										
Maximum temperature difference during thermal performance test		($\vartheta_m - \vartheta_a$) _{max}	55	K										
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)		ϑ_{stg}	200	°C										
Maximum operating temperature		$\vartheta_{max, op}$	180	°C										
Maximum operating pressure		p _{max, op}	1000	kPa										
Testing laboratory		SPF Testing, CH-8640 Rapperswil, Switzerland					www.spf.ch							
Test report(s)		C1829ISO, C1859C1860 (SPF) 30.3182.1-1-1 (CENER)					Dated		01.07.2020, 25.01.2021 31.10.2017					
Comments of testing laboratory		Datasheet version: 6.1, 2019-09-26												
		 INSTITUT FÜR SOLARTECHNIK 												
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S3001 F
	Issued	2021-01-23

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
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
KS2100F TLP ACRm 4		2'642	1'930	1'293	2'040	1'442	933	1'492	1'001	622	1'622	1'082	663
KS2200F TLP ACRm 4		2'886	2'108	1'412	2'228	1'575	1'019	1'630	1'093	680	1'772	1'182	724
KS2400F TLP ACRm 4		3'116	2'276	1'525	2'406	1'701	1'100	1'760	1'181	734	1'913	1'277	782
KS2550F TLP ACRm 4		3'283	2'398	1'607	2'535	1'792	1'159	1'854	1'244	773	2'016	1'345	824
KS2600F TLP ACRm 4		3'360	2'454	1'645	2'595	1'834	1'186	1'898	1'273	792	2'063	1'377	843
Annual output per m ² gross area		1'283	937	628	990	700	453	724	486	302	787	525	322
Annual efficiency, η_a		73%	53%	36%	61%	43%	28%	62%	42%	26%	63%	42%	26%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.1 (September 2019). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/													

Additional Information

Collector heat transfer medium	Water-Glycole
The collector is deemed to be suitable for roof integration	Yes
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	2400 Pa
Hail resistance using ice balls (diameter)	45 mm

Additional collector attribute(s)

<input type="checkbox"/> Using external power source(s) for normal operation	<input type="checkbox"/> Active or passive measure(s) for self-protection
<input type="checkbox"/> Co-generating thermal and electrical power	<input type="checkbox"/> Façade collector(s)

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
KS2100F TLP ACRm 4	2.06	1-V-1234S-A:9,22461-C:16,1052-D	1.93
KS2200F TLP ACRm 4	2.25	1-V-1234S-A:9,24485-C:16,1144-D	2.11
KS2400F TLP ACRm 4	2.43	1-V-1234S-A:9,26509-C:16,1236-D	2.28
KS2550F TLP ACRm 4	2.56	1-V-1234S-A:9,28034-C:16,1199-D	2.40
KS2600F TLP ACRm 4	2.62	1-V-1234S-A:9,28533-C:16,1328-D	2.46

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})	64%	Zero-loss efficiency (η_0)	0.80 --
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)	3.49 W/(m ² K)
		Second-order coefficient (a_2)	0.014 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.97 --
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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