





Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2822 F									
					Date issued		2019-05-14									
					Issued by		DINTCERCO									
Licence holder		Hewalex Sp. z.o.o. Sp. Kom.			Country		POLAND									
Brand (optional)		--			Web		www.hewalex.pl									
Street, Number		Slowackiego 33			E-mail		przemyslaw.tyrala@hewalex.pl									
Postcode, City		43-502 - Czechowice-Dziedzice			Tel		+32 214 17 10									
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	52 K		
KS 2100F TP AC / KS 2100F TLP AC					2.06	2,020	1,019	90	1,551	1,483	1,333	1,163	973	1,145		
KS 2200F TP AC / KS 2200F TLP AC					2.25	2,022	1,110	90	1,694	1,620	1,456	1,270	1,063	1,251		
KS 2400F TP AC / KS 2400F TLP AC					2.43	2,022	1,202	90	1,830	1,750	1,573	1,372	1,148	1,351		
KS 2600F TP AC / KS 2600F TLP AC					2.62	2,022	1,295	90	1,973	1,887	1,696	1,479	1,238	1,456		
Power output per m ² gross area									753	720	647	565	472	556		
Performance parameters test method					Steady state - indoor											
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂									
Units					-	W/(m ² K)	W/(m ² K ²)									
Test results					0.753	3.168	0.012									
Incidence angle modifier test method					Steady state - outdoor											
Bi-directional incidence angle modifiers					No											
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal					K _{θT,coil}					0.94				0.00		
Longitudinal					K _{θL,coil}					0.94				0.00		
Heat transfer medium for testing					Water											
Flow rate for testing (per gross area, A _G)					dm/dt	0.024									kg/(sm ²)	
Maximum temperature difference for thermal performance calculations					(θ _m -θ _a) _{max}	52									K	
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)					θ _{stg}	201.2									°C	
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	4.243									kJ/(Km ²)	
Maximum operating temperature					θ _{max,op}	250									°C	
Maximum operating pressure					p _{max,op}	1000									kPa	
Testing laboratory					Fundación CENER-CIEMAT, LEST					http:// www.cener.com						
Test report(s)					30.3139.1-1-1 30.3139.1-3-1 30.3566.0-2 30.3139.3 R					Dated		31/10/2017 11/12/2017 08/05/2019 10/05/2019				
Comments of testing laboratory					<p>- The only difference between the TLP AC and TP AC collectors is the collector box coating colour.</p> <p>- The collectors models KS 2100F TP AC and KS 26000F TP AC were tested according to ISO 9806:2013 According to SKM rules, the results of the collector model KS 2100F TP AC are representative for the whole KS F-AC family.</p>											
					 CENER 											
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2822 F
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on 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
KS 2100F TP AC / KS 2100F TLP AC		2,487	1,835	1,255	1,924	1,378	910	1,412	959	609	1,531	1,038	647
KS 2200F TP AC / KS 2200F TLP AC		2,716	2,004	1,371	2,102	1,505	994	1,542	1,048	665	1,672	1,133	707
KS 2400F TP AC / KS 2400F TLP AC		2,933	2,165	1,481	2,270	1,626	1,073	1,665	1,132	719	1,806	1,224	764
KS 2600F TP AC / KS 2600F TLP AC		3,163	2,334	1,597	2,447	1,753	1,157	1,796	1,220	775	1,947	1,320	823
Annual output per m ² gross area		1,207	891	609	934	669	442	685	466	296	743	504	314
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	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using ice balls (diameter)	45	mm

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
KS 2100F TP AC / KS 2100 TLP AC	2.06	Collector efficiency (η_{col})	61 %
KS 2200F TP AC / KS 2200 TLP AC	2.25	<i>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/m², 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.</i>	
KS 2400F TP AC / KS 2400 TLP AC	2.43		
KS 2600F TP AC / KS 2600 TLP AC	2.62		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.753 --
		First-order coefficient (a_1)	3.17 W/(m ² K)
		Second-order coefficient (a_2)	0.012 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.94 --
		<i>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.</i>	