



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S1365 F							
					Date issued		2017-03-03							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder		Kioto Clear Energy			Country		Mexico							
Brand (optional)		Kioto			Web		www.kioto.com							
Street, Number		Av.del Hierro N° 10; Parque Industrial CIMEG			E-mail		jean.vaca@kioto.com							
Postcode, City		CP 45680; José del Castillo; El Salto; Jalisco			Tel		+52 33 3688 9190							
Collector Type					Flat plate collector, glazed									
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a									
					0 K	10 K	30 K	50 K	70 K	90 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
FP 1.20.0 LE sc					2.03	1 944	1 045	81	1 386	1 309	1 138	948	739	510
Power output per m ² gross area					683	645	561	467	364	251				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.683	3.717	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, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75		0.00
Longitudinal					K _{θL, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75		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 for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	90	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}	183	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	7.22	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	*	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory					TÜV Rheinland Energy GmbH			www.tuv.com/solarpower						
Test report(s)					21211699b_LE_EN			Dated		09.07.2010				
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
<p><i>*This data sheet is not complete as the testing of the collector was not performed according to ISO 9806:2013. The steady state test evaluation was recalculated with gross area. The former values related to 1.89 m² aperur area had been: eta0a=0.734; a1a=3.992; a2a=0.013.</i></p>					 Genau. Richtig.  TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1365 F
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN ISO 9806:2013 test results													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	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
FP 1.20.0 LE sc		2 202	1 496	914	1 632	1 072	625	1 206	748	421	1 315	806	446
Annual output per m ² gross area		1 085	737	450	804	528	308	594	368	207	648	397	220
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)	*	--
Maximum tested positive load	*	Pa
Maximum tested negative load	*	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}	
FP 1.20.0 LE sc	2.03	Collector efficiency (η_{col})	52 %
		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)	0.683 --
		First-order coefficient (a ₁)	3.72 W/(m ² K)
		Second-order coefficient (a ₂)	0.012 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.95 --
		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.	