


Annex to Solar Keymark Certificate					Licence Number		011-7S1981 F							
					Date issued		2023-03-31							
					Issued by		DINCERTCO							
Licence holder		ELCO Shared Services GmbH			Country		Germany							
Brand (optional)		ELCO			Web		www.elco.net							
Street, Number		Hohenzollernstraße			E-mail		thomas.klink@de.elco.net							
Postcode, City		72379 Hechingen			Tel		+49 7 471 187 142							
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	120 K				
					m ²	mm	mm	mm	mm	mm	mm			
Solatron S 2.5-1 V					2.53	2 240	1 125	99	1 749	1 674	1 505	1 314	1 101	471
Solatron S 2.5-1 H					2.53	1 125	2 240	99	1 749	1 674	1 505	1 314	1 101	471
Power output per m² gross area					691	661	595	519	435	186				
Performance parameters test method					Steady state - indoor									
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					0.702	2.89	0.011	0.000	0.00	5 281	0.000	0.00	0.0E+00	0.90
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	0.97	0.94	0.88	0.74	0.43	0.00
Longitudinal					K _{θL, coll}	1.00	1.00	0.99	0.97	0.94	0.88	0.74	0.43	0.00
Heat transfer medium for testing					Water-Glycol									
Flow rate for testing (per gross area, A_G)					dm/dt		0.020	kg/(sm ²)						
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{\max}$		90	K						
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30\text{ }^\circ\text{C}$)					ϑ_{stg}		210	°C						
Maximum operating temperature					$\vartheta_{\text{max, op}}$		210	°C						
Maximum operating pressure					p _{max, op}		600	kPa						
Testing laboratory					TÜV Rheinland Energy GmbH				http://www.tuv.com/solar					
Test report(s)					300100419.001 (XP 2.5-1 V) 300100419.002 (XP 2.5-1 H) C1894 (SPF; Thermal Performance XP 2.5-1 V)				Dated		30.03.2023 30.03.2023 08.03.2023			
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
					 TÜVRheinland® Genau. Richtig.									
					TÜV Rheinland Solar GmbH Am Grauen Stein 51105 Köln									
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Supplementary Information	Issued	2023-03-31

Gross Thermal Yield 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
XP 2.5-1 V		2 802	2 073	1 422	2 174	1 563	1 038	1 591	1 085	693	1 726	1 173	737
XP 2.5-1 H		2 802	2 073	1 422	2 174	1 563	1 038	1 591	1 085	693	1 726	1 173	737
Gross Thermal Yield per m ² gross area		1 108	819	562	859	618	410	629	429	274	682	464	291
Annual efficiency, η_a		63%	46%	32%	53%	38%	25%	54%	37%	23%	55%	37%	23%
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. 6.2 (13.01.2022). 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) >	1100	ϑ_a (°C) >	40	H _x (MJ/m ²) >	700
Maximum tested positive load			2400	Pa	
Maximum tested negative load			2400	Pa	
Hail resistance using ice balls (diameter)			35	mm	
Additional collector attribute(s)					
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No		
Co-generating thermal and electrical power	No	Façade collector(s)	No		

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A _{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A _a (m ²)
XP 2.5-1 V	2.53	1-H-1234S-A:9.2,22608-C:16.4,1127-D	2.24
XP 2.5-1 H	2.53	1-H-1234S-A:9.2,21760-C:16.4,2232-D	2.24

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})	56%	Zero-loss efficiency (η_0)	0.69
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)	2.89
		Second-order coefficient (a ₂)	0.011
		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.	