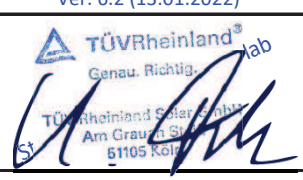


Annex to Solar Keymark Certificate					Licence Number		011-7S3299 F				
					Date issued		2025-05-21				
					Issued by		TÜV Rheinland Solar GmbH				
Licence holder		ELCO GmbH			Country		Germany				
Brand (optional)					Web		www.elco.net				
Street, Number		Hohenzollernstr. 31			E-mail		info@de.elco.net				
Postcode, City		72379 Hechingen			Tel		+49 (0) 7471 / 187-0				
Collector Type					Flat plate collector						
Collector name		Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
						0 K W	10 K W	30 K W	50 K W	70 K W	81 K W
SOLATRON CF 2.0-3		2.02	1 891	1 071	90	1 381	1 311	1 161	1 000	828	729
SOLATRON VN 2.4		2.33	1 071	2 180	90	1 593	1 512	1 339	1 154	955	841
SOLATRON XP 2.7 V		2.77	2 182	1 271	90	1 894	1 797	1 592	1 372	1 136	999
SOLATRON XP 2.7 H		2.76	1 267	2 180	90	1 887	1 791	1 587	1 367	1 132	996
Power output per m ² gross area						684	649	575	495	410	361
Performance parameters test method		Steady state - indoor									
Performance parameters (related to A_G)		η_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		0.691	3.42	0.007	0.000	0.00	0	0.000	0.00	0.0E+00	0.93
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		$K_{\theta T, coll}$	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.37	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.37	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 during thermal performance test		$(\vartheta_m - \vartheta_a)_{max}$	51		K						
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30^\circ\text{C}$)		ϑ_{stg}	222.8		°C						
Maximum operating temperature		$\vartheta_{max, op}$	210		°C						
Maximum operating pressure		$p_{max, op}$	1000		kPa						
Testing laboratory		TÜV Rheinland Solar GmbH					http://www.tuv.com/solar				
Test report(s)		30.3300.0-001 R 30.3300.0-002 / 30.3300.0-003 R / '30.3300.0 R DE25KWTJ 001 (Doc-check EN 12975:2022)					Dated		13.06.2019 25.06.2019 21.05.2025		
Comments of testing laboratory		Ver. 6.2 (13.01.2022)									
The laboratory tests had been performed by CENER (Fundación CENER - CIEMAT, LEST). EN ISO 9806 tests had been performed on former PA-K model as smallest (thermal performance only) and PA-F (XP 2.7 V; full EN ISO 9806) as representative types for the "PA" family.											
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Annex to Solar Keymark Certificate								Licence Number		011-7S3299 F			
Supplementary Information								Issued		2025-05-21			

Gross Thermal Yield 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
SOLATRON CF 2.0-3		2 204	1 562	1 035	1 663	1 153	744	1 225	801	495	1 335	867	527
SOLATRON VN 2.4		2 542	1 802	1 193	1 918	1 330	858	1 413	924	571	1 540	1 000	608
SOLATRON XP 2.7 V		3 022	2 142	1 419	2 280	1 581	1 020	1 680	1 099	679	1 831	1 188	723
SOLATRON XP 2.7 H		3 012	2 134	1 414	2 272	1 575	1 016	1 674	1 095	677	1 824	1 184	720
Gross Thermal Yield per m ² gross area		1 091	773	512	823	571	368	606	397	245	661	429	261
Annual efficiency, η_a		62%	44%	29%	51%	35%	23%	52%	34%	21%	53%	34%	21%
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		No	
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
Maximum tested positive load		2400	Pa
Maximum tested negative load		1500	Pa
Hail resistance using ice balls (diameter)		25	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)
SOLATRON CF 2.0-3	2.02	7-V-1234S-A:7,1788-C:20,1144-D	1.87
SOLATRON VN 2.4	2.33	15-H-1234S-A:7,958-C:20,2256-D	2.16
SOLATRON XP 2.7 V	2.77	8-V-1234S-A:7,2072-C:20,1342-D	2.58
SOLATRON XP 2.7 H	2.76	15-H-1234S-A:7,1154-C:20,2256-D	2.58

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})	54%	Zero-loss efficiency (η_0)	0.68
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)	3.42
		Second-order coefficient (a_2)	0.007
		Incidence angle modifier IAM (50°)	0.92
		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.	

DIN CERTCO • Albainstraße 56 • 12103 Berlin, Germany	
Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de	