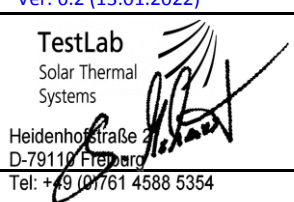




Annex to Solar Keymark Certificate					Licence Number		011-7S1008 F							
					Date issued		2022-07-27							
					Issued by		DIN CERTCO							
Licence holder			Sunex S.A.		Country		Poland							
Brand (optional)					Web		www.sunex.pl							
Street, Number			ul. Piaskowa 7		E-mail		info@sunex.pl							
Postcode, City			47-400 , Raciborz		Tel		+48324149214							
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 ϑ _m - ϑ _a					
									0 K W	10 K W	30 K W	50 K W	70 K W	90 K W
Basicx 2.0 4C					2,02	1.900	1.060	89	1.414	1.344	1.189	1.015	821	608
Basicx 2.38 4C					2,38	2.240	1.060	89	1.666	1.583	1.401	1.196	968	717
Basicx 2.51 4C					2,51	2.240	1.120	89	1.756	1.669	1.477	1.260	1.020	756
Basicx 2.85 4C					2,85	2.240	1.270	89	1.995	1.896	1.677	1.432	1.159	858
Power output per m² gross area									700	665	589	502	407	301
Performance parameters test method					Steady state - indoor									
Performance parameters (related to A_G)					η _{0, b}	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d
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					0,716	3,35	0,012	0,000	0,000	4.600	0,000	0,000	0,000	0,85
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	0,99	0,97	0,94	0,87	0,77	0,59	0,31	0,00
Longitudinal					K _{θL, coll}	1,00	0,99	0,97	0,94	0,87	0,77	0,59	0,31	0,00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A_G)					dm/dt							0,007	kg/(sm ²)	
Maximum temperature difference during thermal performance test					(ϑ _m -ϑ _a) _{max}							60	K	
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ _{stg}							210	°C	
Maximum operating temperature					ϑ _{max, op}							-	°C	
Maximum operating pressure					p _{max, op}							600	kPa	
Testing laboratory			TestLab Solar Thermal Systems, Fraunhofer ISE				http://www.collectortest.com							
Test report(s)			KTB-2021-12 KTB-2022-06				Dated		27.07.2022 27.07.2022					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
The Incidence angle modifier is given for direct solar irradiance.					 <p>TestLab Solar Thermal Systems Heidenhofstraße 2 D-79110 Freiburg Tel: +49 (0)761 4588 5354</p>									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1008 F
	Issued	2022-07-27

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
Basicx 2.0 4C		2.159	1.513	968	1.632	1.111	686	1.199	773	462	1.302	830	486
Basicx 2.38 4C		2.543	1.783	1.140	1.923	1.309	808	1.413	911	544	1.533	978	573
Basicx 2.51 4C		2.681	1.879	1.202	2.027	1.380	852	1.489	960	573	1.616	1.031	604
Basicx 2.85 4C		3.046	2.135	1.365	2.302	1.568	968	1.691	1.091	651	1.836	1.171	686
Gross Thermal Yield per m ² gross area		1.069	749	479	808	550	340	593	383	229	644	411	241
Annual efficiency, η_a		61%	42%	27%	50%	34%	21%	51%	33%	20%	52%	33%	19%
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)				B	--
G (W/m ²) >	900	ϑ_a (°C) >	15	H _x (MJ/m ²) >	540
Maximum tested positive load				1000	Pa
Maximum tested negative load				1000	Pa
Hail resistance using steel ball (maximum drop height)				35	m

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)
Basicx 2.0 4C	2,02	10-V-1234S-8,1790-22,1024	"[Aa]"
Basicx 2.38 4C	2,38	10-V-1234S-8,2130-22,1120	"[Aa]"
Basicx 2.51 4C	2,51	10-V-1234S-8,2130-22,1180	"[Aa]"
Basicx 2.85 4C	2,85	12-V-1234S-8,2130-22,1330	"[Aa]"

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})	55%	Zero-loss efficiency (η_0)	0,70
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)	3,35
		Second-order coefficient (a ₂)	0,012
		Incidence angle modifier IAM (50°)	0,88
		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.	