ICIM S.p.A. a socio unico
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Capitale Soc EUR. 260.000,00 int. versato ed esistente
C.F./P. IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 - R.E.A. n. 1596292

Annex to Solar Keymark Certificate		Licence Number	ICIM-CLS-000120
		Date issued	2024-07-31
		Issued by	ICIM S.p.A.

Licence holder	**Transformados La Medua, S.L.**	**Country**	Spain
Brand (optional)	Thermoslate	**Web**	www.cupapizarras.com
Street, Number	Lugar a Medua, S/N	**E-mail**	info@cupapizarras.com
Postcode, City	ES-32330 Sobradelo de Valdeorras	**Tel**	+34 988 335 410

Collector Type	WISC (Wind and/or infrared sensitive collector)

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector G_b = 850 W/m², G_d = 150 W/m² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	70 K
	m²	mm	mm	mm	W	W	W	W	W	W
THS.3222.S10	1,06	432	2.453	37	775	603	186	0	0	0
THS.3222.S07	1,21	492	2.453	37	884	689	213	0	0	0
THS.3522.S10	1,21	492	2.453	37	884	689	213	0	0	0
THS.4022.S11	1,40	572	2.453	37	1.023	797	246	0	0	0
THS.5025.S10	1,34	587	2.277	37	979	763	235	0	0	0
Power output per m² gross area					731	569	176	0	0	0

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0,797	20,55	0,117	3,265	1,65	15.680	0,061	0,00	0,0E+00	0,96

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	1,00	1,00	1,00	0,99	0,96	0,88	0,64	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	1,00	1,00	1,00	0,99	0,96	0,88	0,64	0,00

Heat transfer medium for testing	Water-Glycole		
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	40	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	90	°C
Maximum operating temperature	ϑ_{max_op}	100	°C
Maximum operating pressure	$p_{max,op}$	600	kPa

Testing laboratory	SPF Institute for Solar Technology	www.spf.ch	
Test report(s)	C1905 C1906	**Dated**	27/02/2024 27/02/2024

Comments of testing laboratory — Draft Ver. 6.2 (22.09.2021)

The collector is a full-surface roof element.
The gross area is specified for the effectively installed elements.

SPF INSTITUT FÜR SOLARTECHNIK

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Annex to Solar Keymark Certificate	**Licence Number**	**ICIM-CLS-000120**
Supplementary Information	**Issued**	**2024-07-31**

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m

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
THS.3222.S10	795	73		351	7		323	21		384	34	
THS.3222.S07	907	83		400	9		369	24		438	39	
THS.3522.S10	907	83		400	9		369	24		438	39	
THS.4022.S11	1.049	96		463	10		427	28		507	45	
THS.5025.S10	1.004	92		443	9		409	26		485	43	
Gross Thermal Yield per m² gross area	750	68	--	331	7	--	305	20	--	362	32	--
Annual efficiency, η_a	42%	4%	--	20%	0%	--	26%	2%	--	29%	3%	--
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Draft Ver. 6.2 (22.09.2021). 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/m²) >	1000	ϑ_a (°C) >	20	H_X (MJ/m²) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				3000	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

	Reference Area, A_{sol} (m²)
THS.3222.S10	1,06
THS.3222.S07	1,21
THS.3522.S10	1,21
THS.4022.S11	1,40
THS.5025.S10	1,34

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	0%

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Additional Informative Technical Data

	Hydraulic Designation Code	Aperture Area, A_a (m²)
THS.3222.S10	16-H-1234S-A:3.7,2170-C:13,305	1,06
THS.3222.S07	16-H-1234S-A:3.7,2170-C:13,305	1,21
THS.3522.S10	16-H-1234S-A:3.7,2170-C:13,305	1,21
THS.4022.S11	16-H-1234S-A:3.7,2170-C:13,404	1,40
THS.5025.S10	21-H-1234S-A:3.7,1966-C:13,404	1,34

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0,73	--
First-order coefficient (a_1)	15,00	W/(m²K)
Second-order coefficient (a_2)	0,117	W/(m²K²)
Incidence angle modifier IAM (50°)	0,99	--

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.