

AENOR

Keymark Certificate Solar thermal energy



078/000032

AENOR certifies that the organization

TERMICOL ENERGIA SOLAR, S.L.

registered office	PI LA ISLA - CL RIO VIEJO, 39 41703 DOS HERMANAS (Sevilla - España)
supplies	Solar collectors
in compliance with	UNE-EN 12975-1:2006+A1:2011 (EN 12975-1:2006 A1:2010)
Trade Mark	T20US, T20USH, T25US, T25USH
Technical information	Specified in Annexes to the Certificate
Production site	PI LA ISLA - CL RIO VIEJO, 39 41703 DOS HERMANAS (Sevilla - España)
Certification scheme	In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP 078.01.
This certificate supersedes 078/000032, dated 2017-01-11	
First issued on	2012-03-29
Modified on	2020-03-10
Validity date	2022-01-11

Rafael GARCÍA MEIRO
Chief Executive Officer

Original Electronic Certificate

AENOR INTERNACIONAL S.A.U.
Génova, 6. 28004 Madrid. España
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Product certification body accredited by ENAC, number 1/C-PR271



Annex to Solar Keymark Certificate					Licence Number		078/000032				
					Date issued		2020-03-10				
					Issued by		AENOR				
Licence holder		TERMICOL ENERGÍA SOLAR, S.L.			Country		SPAIN				
Brand (optional)					Web		http://www.termicol.es				
Street, Number		C/ Rio Viejo, 39			E-mail		julio.castro@termicol.es				
Postcode, City		41703 - Dos Hermanas (Sevilla)			Tel		+34 95 493 0545				
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	100 K W	
T20US	2,07	2.126	973	85	1.505	1.426	1.239	1.012	745	270	
T20USH	2,02	970	2.130	83	1.469	1.392	1.209	987	727	263	
T25USH	2,54	1.200	2.130	83	1.847	1.750	1.520	1.241	914	331	
T25US	2,56	2.130	1.204	85	1.861	1.764	1.532	1.251	921	333	
Power output per m ² gross area					727	689	598	489	360	130	
Performance parameters test method		Steady state - outdoor									
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		0,745	3,57	0,024	0,000	0,00	10.800	0,000	0,00	0,0E+00	0,84
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		$K_{\theta T, coll}$	0,99	0,98	0,95	0,90	0,81	0,66	0,34	0,00	0,00
Longitudinal		$K_{\theta L, coll}$	0,99	0,98	0,95	0,90	0,81	0,66	0,34	0,00	0,00
Heat transfer medium for testing					Water-Glycole						
Flow rate for testing (per gross area, A_G)					dm/dt		0,020		kg/(sm ²)		
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$		70		K		
Standard stagnation temperature (G = 1000 W/m ² ; ϑ_a = 30 °C)					ϑ_{stg}		135		°C		
Maximum operating temperature					$\vartheta_{max, op}$		200		°C		
Maximum operating pressure					$p_{max, op}$		600		kPa		
Testing laboratory		Fundación CENER, LEST					http://www.cener.com				
Test report(s)		CA/RPT/4451/001/INTA/12 Ed02 CA/RPT/4451/009/INTA/11 Ed03					Dated		23/02/2012 01/09/2011		
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26						
T20US is the representative collector for the T-US family. Collectors tested according to EN 12975-2:2006 by the INTA laboratory					 CENER						
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000032
	Issued	2020-03-10

Annual collector output 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
T20US		2.203	1.463	827	1.632	1.027	529	1.203	722	373	1.311	778	391
T20USH		2.150	1.428	807	1.592	1.002	517	1.174	705	364	1.280	759	381
T25USH		2.703	1.795	1.015	2.002	1.260	649	1.476	887	457	1.609	954	479
T25US		2.725	1.809	1.023	2.018	1.270	655	1.488	893	461	1.622	962	483
Annual output per m ² gross area		1.064	707	400	788	496	256	581	349	180	634	376	189
Annual efficiency, η_a		60%	40%	23%	48%	30%	16%	50%	30%	15%	51%	30%	15%
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. 6.1 (September 2019). 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)					C	--
G (W/m ²) >	850	ϑ _a (°C) >	10	H _x (MJ/m ²) >	14	
Maximum tested positive load					1020	Pa
Maximum tested negative load					1010	Pa
Hail resistance using steel ball (maximum drop height)					--	m
Additional collector attribute(s)						
☐	Using external power source(s) for normal operation			☐	Active or passive measure(s) for self-protection	
☐	Co-generating thermal and electrical power			☐	Facade collector(s)	

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
T20US	2,07		1,88
T20USH	2,02		1,89
T25USH	2,54		2,35
T25US	2,56		2,36

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)	0,73
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)	3,57
		Second-order coefficient (a_2)	0,024
		Incidence angle modifier IAM (50°)	0,81
		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.	