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 (EN 12975-1:2006)
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 78.01.
	This certificate supersedes 078/000032, dated 2012-03-29
First issued on	2012-03-29
Modified on	2017-01-11
Validity date	2022-01-11

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Chief Executive Officer

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Product certification body accredited by ENAC, number 01/C-PR002.078

Original Electrónico

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Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results		Licence Number	078/000032
		Date issued	2017-01-11
		Issued by	AENOR

Licence holder	TERMICOL ENERGÍA SOLAR, S.L.	Country	SPAIN	
Brand (optional)		Web	www.termicol.es	
Street, Number	C/Río Viejo, 39	E-mail	ingieneria@termicol.es	
Postcode, City	41703 - Dos Hermanas (Sevilla)	Tel	+34	954930545

Collector Type	Flat plate collector, glazed

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m²; Gd = 150 W/m² ϑm - ϑa: 0 K	10 K	30 K	50 K	70 K	70 K
	m²	mm	mm	mm	W	W	W	W	W	W
T25US	2,56	2.130	1.204	85	1.889	1.790	1.556	1.272	940	940
T25USH	2,54	1.200	2.130	83	1.875	1.776	1.544	1.262	932	932
T20USH	2,02	970	2.130	83	1.491	1.413	1.228	1.004	741	741
T20US	2,07	2.126	973	85	1.528	1.448	1.258	1.029	760	760
Power output per m² gross area					738	699	608	497	367	367

Performance parameters test method	Steady state - outdoor								
Performance parameters (related to AG)	η0,hem	a1	a2						
Units	-	W/(m²K)	W/(m²K²)						
Test results	0,738	3,620	0,024						

Incidence angle modifier test method		Steady state - outdoor								
Bi-directional incidence angle modifiers	No									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$					0,81				0,00
Longitudinal	$K_{\theta L,coll}$					0,81				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 for thermal performance calculations	$(\vartheta_m-\vartheta_a)_{max}$	70	K	
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	135	°C	
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	8,9	kJ/(Km²)	
Maximum operating temperature	$\vartheta_{max\ op}$	200	°C	
Maximum operating pressure	$p_{max,op}$	600	kPa	

Testing laboratory	INTA	http://www.inta.es	
Test report(s)	CA/RPT/4451/001/INTA/12 Ed02	Dated	23/02/2012
	CA/RPT/4451/009/INTA/11 Ed03		01/09/2011

Comments of testing laboratory	Datasheet version: 5.01, 2016-03-01
T20US is the representative collector for the family. Collectors tested according to EN 12975-2:2006.	Stamp test lab

Annex to Solar Keymark Certificate	Licence Number	078/000032
Supplementary Information	Issued	2017-01-11

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results

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
T25US	2.680	1.770	1.006	1.994	1.260	656	1.465	884	460	1.585	940	479
T25USH	2.659	1.756	998	1.978	1.250	651	1.454	877	456	1.572	933	475
T20USH	2.114	1.397	794	1.573	994	518	1.156	698	363	1.250	742	378
T20US	2.167	1.431	813	1.612	1.019	531	1.185	715	372	1.281	760	387
Annual output per m² gross area	1.047	691	393	779	492	256	572	345	180	619	367	187
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1714 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 Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	C	--
Maximum tested positive load	1020	Pa
Maximum tested negative load	1010	Pa
Hail resistance using steel ball (maximum drop height)	-	m

Energy Labelling Information

	Reference Area, A_{sol} (m^2)
T25US	2,56
T25USH	2,54
T20USH	2,02
T20US	2,07

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
Collector efficiency (η_{col})	55	%

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/m², 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 9806:2013.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
Zero-loss efficiency (η_0)	0,738	--
First-order coefficient (a_1)	3,62	W/(m²K)
Second-order coefficient (a_2)	0,024	W/(m²K²)
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.