



Keymark Certificate



078/000309

AENOR certifies that the organization

TERMICOL ENERGÍA 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 S17, S21, S21H
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.

First issued on 2019-02-19
Last issued on 2024-02-19
Validity 2029-02-19

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CEO



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Annex to Solar Keymark Certificate				Licence Number		078/000309								
				Date issued		2024-02-19								
				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		info@termicol.com						
Postcode, City		41703 Dos Hermanas - SEVILLA				Tel		+34 954 930 545						
Collector Type						Flat plate collector								
Collector name					Power output per collector Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	81 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
S17					1,71	2.040	840	49	1.174	1.113	975	818	642	537
S21H					2,14	2.047	1.047	49	1.470	1.393	1.220	1.024	803	672
S21					2,14	1.047	2.047	49	1.470	1.393	1.220	1.024	803	672
Power output per m ² gross area					687	651	570	478	375	314				
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		0,692	3,47	0,014	0,000	0,00	4.025	0,000	0,00	0,0E+00	0,95			
Incidence angle modifier test method		Steady state - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{GT, coll}	1,00	0,99	0,99	0,97	0,95	0,90	0,81	0,54	0,00			
Longitudinal		K _{GL, coll}	1,00	0,99	0,99	0,97	0,95	0,90	0,81	0,54	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 ; ϑ_a = 30 °C)		ϑ_{stg}	201	°C										
Maximum operating temperature		$\vartheta_{max, op}$	210	°C										
Maximum operating pressure		p _{max, op}	800	kPa										
Testing laboratory		Fundación CENER, LEST				http://www.cener.com								
Test report(s)		30.3631.0-001 30.3127.0-002 R 30.3505.0-01 R 30.3736.0-001 / 30.3736.0 R				Dated		04/03/2020 15/06/2022 15/06/2022 26/05/2020 15/06/2022						
Comments of testing laboratory		Ver. 6.2 (13.01.2022)												
- The collectors models S17 and S26 were tested according to ISO 9806:2017. According to SKM rules, the results of the collector model S17 are representative for the whole SILVER family. The members of the family are: S17 , S21H, S21, S26H and S26.														
AENOR CONFÍA S.A.U. - Génova, 6. - 28004 - Madrid, España - Tel. 91 432 60 00- www.aenor.com														
Product certification body accredited by ENAC, number 1/C-PR271														



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000309
	Issued	2024-02-19

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
S17		1.899	1.320	821	1.420	946	555	1.052	663	376	1.148	719	401
S21H		2.377	1.652	1.028	1.777	1.183	694	1.316	829	471	1.436	900	502
S21		2.377	1.652	1.028	1.777	1.183	694	1.316	829	471	1.436	900	502
Gross Thermal Yield per m ² gross area													
		1.111	772	480	830	553	324	615	387	220	671	420	235
Annual efficiency, η_a		63%	44%	27%	51%	34%	20%	53%	33%	19%	54%	34%	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)				A	--
G (W/m ²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m ²) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				2500	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)
S17	1,71	7-V-1234S-A:7,1915-C:16,884-D	1,56
S21H	2,14	9-V-1234S-A:7,1915-C:16,1108-D	2,03
S21H	2,14	18-H-1234S-A:7,915-C:16,1308-D	2,03

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})	53%	Zero-loss efficiency (η_0)	0,69
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)	3,47
		Second-order coefficient (a_2)	0,014
		Incidence angle modifier IAM (50°)	0,94
		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.	