

# AENOR

## Keymark Certificate Solar thermal energy



**078/000348**

AENOR certifies that the organization

### **BDR THERMEA GROUP B.V**

registered office	MARCHANTSTRAAT, 55 7300 AA APELDOORN (Holanda - Países Bajos)
supplies	Solar collectors
in compliance with	UNE-EN 12975-1:2006+A1:2011 (EN 12975-1:2006+A1:2010)
Trade Mark Technical information	CHAPPEE SOL 160 SL Specified in Annexes to the Certificate
Production site	CL MANGANÉS, 2 POLIG. INDUSTRIAL CAN ALBAREDA 08755 CASTELLBISBAL (Barcelona - 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 Validity date	2019-11-08 2024-11-08

Rafael GARCÍA MEIRO  
Chief Executive Officer

Original Electronic Certificate

**AENOR INTERNACIONAL S.A.U.**  
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Product certification body accredited by ENAC, number 01/C-PR271



Annex to Solar Keymark Certificate					Licence Number		078/000348							
					Date issued		2019-11-08							
					Issued by		AENOR							
Licence holder		BDR THERMEA GROUP B.V.			Country		NETHERLANDS							
Brand (optional)					Web		<a href="http://www.bdrthermea.com">http://www.bdrthermea.com</a>							
Street, Number		MARCHANSTRAAT 55			E-mail		oleguer.fuertes@baxi.es							
Postcode, City		7300 AA, APPELDOORN			Tel		+34 902 89 80 00							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					Gb = 850 W/m <sup>2</sup> , Gd = 150 W/m <sup>2</sup> & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	85 K				
					m <sup>2</sup>	mm	mm	mm	mm	mm	mm			
CHAPPEE SOL 160 SL					1,62	1.694	990	46	1.206	1.143	1.003	845	670	526
Power output per m <sup>2</sup> gross area					744	705	619	522	413	324				
Performance parameters test method		Steady state - indoor												
Performance parameters (related to A <sub>G</sub> )		$\eta_0, b$	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-			
Test results		0,750	3,75	0,014	0,000	0,00	5.975	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 <sub>gT, coll</sub>	1,00	0,99	0,99	0,97	0,95	0,90	0,82	0,55	0,00			
Longitudinal		K <sub>gL, coll</sub>	1,00	0,99	0,99	0,97	0,95	0,90	0,82	0,55	0,00			
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt	0,020	kg/(sm <sup>2</sup> )							
Maximum temperature difference during thermal performance test					( $\vartheta_m - \vartheta_a$ ) <sub>max</sub>	55	K							
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; $\vartheta_a = 30$ °C)					$\vartheta_{stg}$	200	°C							
Maximum operating temperature					$\vartheta_{max, op}$	200	°C							
Maximum operating pressure					p <sub>max, op</sub>	1000	kPa							
Testing laboratory		Fundación CENER, LEST					<a href="http://www.cener.com">http://www.cener.com</a>							
Test report(s)		30.3502.0-001 30.3502.0-002 R					Dated		29/03/2019 07/11/2019					
Comments of testing laboratory					Datashet version: 6.1, 2019-09-26									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000348
	Issued	2019-11-08

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
CHAPPEE SOL 160 SL		1.952	1.362	857	1.461	980	584	1.082	686	395	1.180	744	421
Annual output per m <sup>2</sup> gross area		1.205	841	529	902	605	361	668	423	244	729	459	260
Annual efficiency, $\eta_a$		68%	48%	30%	55%	37%	22%	57%	36%	21%	59%	37%	21%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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 $\vartheta_m$ (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 <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>													

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 <sup>2</sup> ) >	1000	$\vartheta_a$ (°C) >	20
		$H_x$ (MJ/m <sup>2</sup> ) >	600
Maximum tested positive load	2400		Pa
Maximum tested negative load	2400		Pa
Hail resistance using steel ball (maximum drop height)	1,4		m

Additional collector attribute(s)			
<input type="checkbox"/>	Using external power source(s) for normal operation	<input type="checkbox"/>	Active or passive measure(s) for self-protection
<input type="checkbox"/>	Co-generating thermal and electrical power	<input type="checkbox"/>	Façade collector(s)

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
CHAPPEE SOL 160 SL	1,62	1-V-12V-A:11,16098	1,53

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 ( $\eta_{col}$ )	57%	Zero-loss efficiency ( $\eta_0$ )	0,74
		First-order coefficient ( $a_1$ )	3,75
		Second-order coefficient ( $a_2$ )	0,014
		Incidence angle modifier IAM (50°)	0,94
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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.		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.	