



## Keymark Certificate



078/000146

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 REMEHA C250V

Technical information Specified in Annexes to the Certificate

Production site CL MANGANÈS, 2 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.

This certificate supersedes 078/000146, dated 2022-07-24

First issued on 2012-07-24

Modified on 2022-12-05

Validity date 2027-07-24

Rafael GARCÍA MEIRO  
Chief Executive Officer





<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>078/000146</b>							
					<b>Date issued</b>		<b>2022-12-05</b>							
					<b>Issued by</b>		<b>AENOR</b>							
<b>Licence holder</b>		<b>BDR THERMEA GROUP B.V.</b>			<b>Country</b>		<b>NETHERLANDS</b>							
<b>Brand (optional)</b>		--			<b>Web</b>		<a href="http://www.bdrthermea.com">http://www.bdrthermea.com</a>							
<b>Street, Number</b>		<b>MARCHANTSTRAAT, 55</b>			<b>E-mail</b>		<b>oscar.mongro@BDRThermea.com</b>							
<b>Postcode, City</b>		<b>7300 AA APELDOORN</b>			<b>Tel</b>		<b>+34 936828040</b>							
<b>Collector Type</b>					<b>Flat plate collector</b>									
<b>Collector name</b>					<b>Power output per collector</b>									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	100 K				
					m <sup>2</sup>	mm	mm	mm	W	W	W			
<b>REMEHA C250V</b>					<b>2,51</b>	<b>2.187</b>	<b>1.147</b>	<b>87</b>	<b>1.914</b>	<b>1.821</b>	<b>1.615</b>	<b>1.383</b>	<b>1.125</b>	<b>689</b>
<b>Power output per m<sup>2</sup> gross area</b>					<b>763</b>	<b>725</b>	<b>643</b>	<b>551</b>	<b>448</b>	<b>275</b>				
<b>Performance parameters test method</b>		<b>Quasi dynamic</b>												
<b>Performance parameters (related to A<sub>G</sub>)</b>		$\eta_0, b$	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
<b>Units</b>		-	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> )	-			
<b>Test results</b>		<b>0,773</b>	<b>3,58</b>	<b>0,013</b>	<b>0,000</b>	<b>0,00</b>	<b>5.083</b>	<b>0,000</b>	<b>0,00</b>	<b>0,0E+00</b>	<b>0,91</b>			
<b>Incidence angle modifier test method</b>		<b>Quasi dynamic - outdoor</b>												
<b>Incidence angle modifier</b>		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
<b>Transversal</b>		$K_{\theta T, coll}$	<b>1,00</b>	<b>0,99</b>	<b>0,97</b>	<b>0,94</b>	<b>0,90</b>	<b>0,82</b>	<b>0,65</b>	<b>0,33</b>	<b>0,00</b>			
<b>Longitudinal</b>		$K_{\theta L, coll}$	<b>1,00</b>	<b>0,99</b>	<b>0,97</b>	<b>0,94</b>	<b>0,90</b>	<b>0,82</b>	<b>0,65</b>	<b>0,33</b>	<b>0,00</b>			
<b>Heat transfer medium for testing</b>		<b>Water</b>												
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>		<b>dm/dt</b>		<b>0,024</b>		<b>kg/(sm<sup>2</sup>)</b>								
<b>Maximum temperature difference during thermal performance test</b>		$(\vartheta_m - \vartheta_a)_{max}$		<b>70</b>		<b>K</b>								
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\vartheta_a = 30</math> °C)</b>		$\vartheta_{stg}$		<b>210</b>		<b>°C</b>								
<b>Maximum operating temperature</b>		$\vartheta_{max, op}$		<b>198</b>		<b>°C</b>								
<b>Maximum operating pressure</b>		$p_{max, op}$		<b>1000</b>		<b>kPa</b>								
<b>Testing laboratory</b>		<b>TÜV Rheinland Solar GmbH</b>					<a href="http://www.tuv.com/solar">http://www.tuv.com/solar</a>							
<b>Test report(s)</b>		<b>300100662.001rev02</b>					<b>Dated</b>		<b>25/11/2022</b>					
<b>Comments of testing laboratory</b>		<b>Ver. 6.2 (13.01.2022)</b>												
<b>AENOR INTERNACIONAL, S.A.U.</b> - Génova, 6. - 28004 - Madrid, España - Tel. 91 432 60 00 - <a href="http://www.aenor.com">www.aenor.com</a>														
Product certification body accredited by ENAC, number 1/C-PR271														



<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>078/000146</b>
	<b>Issued</b>	<b>2022-12-05</b>

<b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>													
Collector name	Standard Locations $\vartheta_m$	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
REMEHA C250V		3.002	2.130	1.381	2.275	1.562	972	1.675	1.091	656	1.823	1.177	696
Gross Thermal Yield per m <sup>2</sup> gross area		1.196	849	550	906	622	387	667	435	261	726	469	277
Annual efficiency, $\eta_a$		68%	48%	31%	56%	38%	24%	57%	37%	22%	58%	38%	22%
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. 6.2 (13.01.2022). A detailed description of the calculations is available at <http://www.estif.org/solarkeymarknew/>

<b>Additional Information</b>					
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> ) >	1100	$\vartheta_a$ (°C) >	40	$H_x$ (MJ/m <sup>2</sup> ) >	700
Maximum tested positive load	3500		Pa		
Maximum tested negative load	2400		Pa		
Hail resistance using ice balls (diameter)	35		mm		

<b>Additional collector attribute(s)</b>			
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)	Yes

<b>Energy Labelling Information</b>		<b>Additional Informative Technical Data</b>	
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	<b>Hydraulic Designation Code</b>	Aperture Area, $A_a$ (m <sup>2</sup> )
REMEHA C250V	2,51	1-H-1234S-A:9.2,22272-C:20.6,1100	2,35

<b>Data required for CDR (EU) No 811/2013 - Reference Area <math>A_{sol}</math></b>		<b>Data required for CDR (EU) No 812/2013 - Reference Area <math>A_{sol}</math></b>	
Collector efficiency ( $\eta_{col}$ )	60%	Zero-loss efficiency ( $\eta_0$ )	0,76
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.		First-order coefficient ( $a_1$ )	3,58
		Second-order coefficient ( $a_2$ )	0,013
		Incidence angle modifier IAM (50°)	0,89
		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.	