

# AENOR

## Keymark Certificate Solar thermal energy



078/000134

AENOR certifies that the organization

### BDR THERMEA GROUP B.V

registered office MERCHANTSTRAAT, 55 7300 AA APELDOORN (Holanda - Países Bajos)

supplies Solar collectors

in compliance with UNE-EN 12975-1:2006 (EN 12975-1:2006)

Trade Mark CHAPEE SOL 200 H  
Technical information Specified in Annexes to the Certificate

Production site CL MANGANÉS, 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 078/000134, dated 2017-07-24

First issued on 2012-07-24  
Modified on 2017-10-10  
Validity date 2022-07-24

Rafael GARCÍA MEIRO  
Chief Executive Officer



| Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results                            |  |                        |  |  |  | Licence Number  |  | 078/000134                |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
|--|--|------------------------|--|--|--|---|--|---------------------------|--|------------------------------------|--|--|--|--|--|-------|--|-------|--|-------|--|------|--|------|--|
|  |  |                        |  |  |  | Date issued   |  | 2017-10-10                |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
|  |  |                        |  |  |  | Issued by   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Licence holder   |  | BDR THERMEA GROUP B.V. |  |  |  | Country   |  | NETHERLANDS               |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Brand (optional)   |  | Abrand                 |  |  |  | Web   |  | http://www.bdrthermea.com |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| 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, glazed  |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Collector name   |  |                        |  |  |  | Gross area ( $A_G$ )  |  | Gross length              |  | Gross width                        |  | Gross height   |  | Power output per collector<br>$G_b = 850 \text{ W/m}^2$ ; $G_d = 150 \text{ W/m}^2$<br>$\vartheta_m - \vartheta_a$ |  |       |  |       |  |       |  |      |  |      |  |
|  |  |                        |  |  |  | m <sup>2</sup>  |  | mm                        |  | mm                                 |  | mm   |  | 0 K  |  | 10 K  |  | 30 K  |  | 50 K  |  | 70 K |  | 90 K |  |
| CHAPEE SOL 200 H   |  |                        |  |  |  | 2,01  |  | 1.147                     |  | 1.753                              |  | 87   |  | 1.534  |  | 1.455 |  | 1.278 |  | 1.075 |  | 847  |  | 593  |  |
| Power output per m <sup>2</sup> gross area   |  |                        |  |  |  | 763   |  | 724                       |  | 636                                |  | 535  |  | 421  |  | 295   |  |       |  |       |  |      |  |      |  |
| Performance parameters test method   |  |                        |  |  |  | Steady state - indoor   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Performance parameters (related to $A_G$ )   |  |                        |  |  |  | $\eta_0, \text{hem}$  |  | a1                        |  | a2                                 |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Units  |  |                        |  |  |  | -   |  | W/(m <sup>2</sup> K)      |  | W/(m <sup>2</sup> K <sup>2</sup> ) |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Test results   |  |                        |  |  |  | 0,763   |  | 3,761                     |  | 0,016                              |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Incidence angle modifier test method   |  |                        |  |  |  | Quasi dynamic - outdoor   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Bi-directional incidence angle modifiers   |  |                        |  |  |  | No  |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Incidence angle modifier   |  |                        |  |  |  | Angle   |  | 10°                       |  | 20°                                |  | 30°  |  | 40°  |  | 50°   |  | 60°   |  | 70°   |  | 80°  |  | 90°  |  |
| Transversal  |  |                        |  |  |  | $K_{GT, \text{coll}}$   |  | 1,00                      |  | 0,99                               |  | 0,97   |  | 0,95   |  | 0,91  |  | 0,83  |  | 0,68  |  | -    |  | 0,00 |  |
| Longitudinal   |  |                        |  |  |  | $K_{GL, \text{coll}}$   |  | 1,00                      |  | 0,99                               |  | 0,97   |  | 0,95   |  | 0,91  |  | 0,83  |  | 0,68  |  | -    |  | 0,00 |  |
| Heat transfer medium for testing   |  |                        |  |  |  | Water   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Flow rate for testing (per gross area, $A_G$ )   |  |                        |  |  |  | dm/dt   |  | 0,020                     |  | kg/(sm <sup>2</sup> )              |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Maximum temperature difference for thermal performance calculations                                      |  |                        |  |  |  | $(\vartheta_m - \vartheta_a)_{\text{max}}$  |  | 90                        |  | K                                  |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Standard stagnation temperature ( $G = 1000 \text{ W/m}^2$ ; $\vartheta_a = 30 \text{ }^\circ\text{C}$ ) |  |                        |  |  |  | $\vartheta_{\text{stg}}$  |  | 200                       |  | °C                                 |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Effective thermal capacity, incl. fluid (per gross area, $A_G$ )   |  |                        |  |  |  | $C/m^2$   |  | 7,19                      |  | kJ/(Km <sup>2</sup> )              |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Maximum operating temperature  |  |                        |  |  |  | $\vartheta_{\text{max, op}}$  |  | n.n.                      |  | °C                                 |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Maximum operating pressure   |  |                        |  |  |  | $p_{\text{max, op}}$  |  | 1000                      |  | kPa                                |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Testing laboratory   |  |                        |  |  |  | TÜV Rheinland Energy GmbH   |  |                           |  |                                    |  | http://www.tuv.com/st  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Test report(s)   |  |                        |  |  |  | 21240494.002_SOL250H_R<br>21217925_EN_P1_SOL200H  |  |                           |  |                                    |  | Dated  |  | 26/09/2017<br>04/06/2012   |  |       |  |       |  |       |  |      |  |      |  |
| Comments of testing laboratory   |  |                        |  |  |  | *The initial thermal performance testing was not performed according to ISO 9806:2013, but EN 12975-2:2006. The steady state test evaluation was recalculated with gross area. The former values related to 1.895 m <sup>2</sup> aperture area had been: $\eta_{a0a}=0.809$ ; $a_{1a}=3.989$ ; $a_{2a}=0.017$ . |  |                           |  |                                    |  | Datashet version: 5.01, 2016-03-01   |  |  |  |       |  |       |  |       |  |      |  |      |  |
|  |  |                        |  |  |  |   |  |                           |  |                                    |  |  <b>TÜVRheinland</b> <sup>®</sup><br>Precisely Right. |  |  |  |       |  |       |  |       |  |      |  |      |  |
| AENOR INTERNACIONAL, S.A.U. - Génova, 6. - 28004 - Madrid, España - Tel. 91 432 60 00- www.aenor.com     |  |                        |  |  |  |   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |
| Product certification body accredited by ENAC, number 01/C-PR002.078                                     |  |                        |  |  |  |   |  |                           |  |                                    |  |  |  |  |  |       |  |       |  |       |  |      |  |      |  |



|   |                |            |
|---|----------------|------------|
| Annex to Solar Keymark Certificate<br>Supplementary Information | Licence Number | 078/000134 |
|   | Issued         | 2017-10-10 |

**Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$ , based on EN ISO 9806:2013 test results**

| Collector name                              | Standard Locations<br>$\vartheta_m$ | 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 |
| CHAPEE SOL 200 H                            |                                     | 2.368   | 1.637 | 1.012 | 1.776                   | 1.183 | 696  | 1.311                   | 828  | 473  | 1.424                   | 889  | 499  |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
|   |                                     |   |       |       |                         |       |      |                         |      |      |                         |      |      |
| Annual output per m <sup>2</sup> gross area |                                     | 1.178   | 814   | 504   | 884                     | 588   | 346  | 652                     | 412  | 235  | 708                     | 442  | 248  |
| Fixed or tracking collector                 |                                     | Fixed (slope = latitude - 15°; rounded to nearest 5°) |       |       |                         |       |      |                         |      |      |                         |      |      |
| Annual irradiation on collector plane       |                                     | 1765 kWh/m <sup>2</sup>                               |       |       | 1714 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. 5.01 (March 2016). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://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   | Yes           |
| The collector was tested successfully according to EN ISO 9806:2013 under the following conditions: |               |
| Climate class (A, B or C)   | A --          |
| Maximum tested positive load  | 5400 Pa       |
| Maximum tested negative load  | 3000 Pa       |
| Hail resistance using ice balls (diameter)  | 35 mm         |

**Energy Labelling Information**

|                  | Reference Area, $A_{sol}$ (m <sup>2</sup> ) | Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$  |  |
|------------------|---|--|--|
| CHAPEE SOL 200 H | 2,01  | Collector efficiency ( $\eta_{col}$ )  | 59 %                                     |
|                  |   | <i>Remark: Collector efficiency (<math>\eta_{col}</math>) 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 <math>\eta_{col}</math> is based on reference area (<math>A_{sol}</math>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.</i> |  |
|                  |   | Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$  |  |
|                  |   | Zero-loss efficiency ( $\eta_0$ )  | 0,763 --                                 |
|                  |   | First-order coefficient ( $a_1$ )  | 3,76 W/(m <sup>2</sup> K)                |
|                  |   | Second-order coefficient ( $a_2$ )   | 0,016 W/(m <sup>2</sup> K <sup>2</sup> ) |
|                  |   | Incidence angle modifier IAM (50°)   | 0,91 --                                  |
|                  |   | <i>Remark: The data given in this section are related to collector reference area (<math>A_{sol}</math>) 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.</i>  |  |