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|---|--|---|----------------------|------------------------------------|--|-------------------------|-----------------------|-----------|------------------------------------|------------------------------------|------|
| Annex to Solar Keymark Certificate  |  |   |                      |                                    | Licence Number   |                         | OEM 10039.3           |           |                                    |                                    |      |
|   |  |   |                      |                                    | Date issued  |                         | 2024-10-09            |           |                                    |                                    |      |
|   |  |   |                      |                                    | Issued by  |                         | DQS Hellas            |           |                                    |                                    |      |
| Licence holder  |  | THERMIC Ltd                                   |                      |                                    | Country  |                         | Greece                |           |                                    |                                    |      |
| Brand (optional)  |  |   |                      |                                    | Web  |                         | www.thermicol.com     |           |                                    |                                    |      |
| Street, Number  |  | Loutsas & Mesologgiou                         |                      |                                    | E-mail   |                         | exports@thermicol.com |           |                                    |                                    |      |
| Postcode, City  |  | 19600 Mandra Attikis                          |                      |                                    | Tel  |                         | 30 210 5555 523       |           |                                    |                                    |      |
| Collector Type  |  |   |                      |                                    | Flat plate collector   |                         |                       |           |                                    |                                    |      |
| Collector name  | Gross area (A <sub>G</sub> )<br>m <sup>2</sup> | Gross length<br>mm                            | Gross width<br>mm    | Gross height<br>mm                 | Power output per collector<br>G <sub>b</sub> = 850 W/m <sup>2</sup> , G <sub>d</sub> = 150 W/m <sup>2</sup> & u = 1.3 m/s<br>$\vartheta_m - \vartheta_a$ |                         |                       |           |                                    |                                    |      |
|   |  |   |                      |                                    | 0 K<br>W   | 10 K<br>W               | 30 K<br>W             | 50 K<br>W | 70 K<br>W                          | 88 K<br>W                          |      |
| CRONOS 2.7  | 2.73   | 2,161   | 1,263                | 102                                | 2,148  | 2,073                   | 1,884                 | 1,640     | 1,343                              | 1,028                              |      |
| CRONOS 2.7H   | 2.73   | 1,263   | 2,161                | 102                                | 2,148  | 2,073                   | 1,884                 | 1,640     | 1,343                              | 1,028                              |      |
|   |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |
|   |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |
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|   |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |
|   |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |
|   |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |
| Power output per m <sup>2</sup> gross area  |  |   |                      |                                    | 787  | 759                     | 690                   | 601       | 492                                | 377                                |      |
| Performance parameters test method  |  | Steady state - outdoor                        |                      |                                    |  |                         |                       |           |                                    |                                    |      |
| 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  |  | 0.799   | 2.48                 | 0.025                              | 0.000  | 0.00                    | 9,797                 | 0.000     | 0.00                               | 0.0E+00                            | 0.90 |
| Incidence angle modifier test method  |  | Steady state - outdoor                        |                      |                                    |  |                         |                       |           |                                    |                                    |      |
| Incidence angle modifier  |  | Angle   | 10°                  | 20°                                | 30°  | 40°                     | 50°                   | 60°       | 70°                                | 80°                                | 90°  |
| Transversal   |  | K <sub>θT, coll</sub>                         | 1.00                 | 1.00                               | 0.99   | 0.98                    | 0.94                  | 0.87      | 0.73                               | 0.48                               | 0.00 |
| Longitudinal  |  | K <sub>θL, coll</sub>                         | 1.00                 | 1.00                               | 0.99   | 0.98                    | 0.94                  | 0.87      | 0.73                               | 0.48                               | 0.00 |
| Heat transfer medium for testing  |  |   |                      |                                    | Water  |                         |                       |           |                                    |                                    |      |
| Flow rate for testing (per gross area, A <sub>G</sub> )   |  |   |                      |                                    | dm/dt  | 0.022                   | kg/(sm <sup>2</sup> ) |           |                                    |                                    |      |
| Maximum temperature difference during thermal performance test  |  |   |                      |                                    | ( $\vartheta_m - \vartheta_a$ ) <sub>max</sub>   | 58                      | K                     |           |                                    |                                    |      |
| Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; $\vartheta_a = 30$ °C)   |  |   |                      |                                    | $\vartheta_{stg}$  | 187                     | °C                    |           |                                    |                                    |      |
| Maximum operating temperature   |  |   |                      |                                    | $\vartheta_{max, op}$  | 210                     | °C                    |           |                                    |                                    |      |
| Maximum operating pressure  |  |   |                      |                                    | p <sub>max, op</sub>   | 1000                    | kPa                   |           |                                    |                                    |      |
| Testing laboratory  |  | NCSR Demokritos / Solar & other Energy System |                      |                                    |  | www.solar.demokritos.gr |                       |           |                                    |                                    |      |
| Test report(s)  |  | 4245DE5<br>4235DQ2                            |                      |                                    |  | Dated                   |                       | 09/10/24  |                                    |                                    |      |
|   |  |   |                      |                                    |  |                         |                       | 09/10/24  |                                    |                                    |      |
| Comments  |  |   |                      |                                    | Ver. 6.2 (13.01.2022)  |                         |                       |           |                                    |                                    |      |
|   |  |   |                      |                                    | N.C.S.R. "DEMOKRITOS"<br>SOLAR ENERGY LABORATORY<br>Tel: +210 6503815 - Fax: +210 6544592<br>P.O. BOX 60037, 15310 Ag. Paraskevi, Greece                 |                         |                       |           |                                    |                                    |      |
| Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqsglobal.com, e-mail: i.alexou@dqs.gr |  |   |                      |                                    |  |                         |                       |           |                                    |                                    |      |



|   |               |   |       |                      |                         |   |  |                                       |       |               |   |       |      |  |
|---|---------------|---|-------|----------------------|-------------------------|---|--|---------------------------------------|-------|---------------|---|-------|------|--|
| <b>Annex to Solar Keymark Certificate</b>   |               | <b>Licence Number</b>                                 |       | <b>OEM 10039.3</b>   |                         |   |  |                                       |       |               |   |       |      |  |
| <b>Supplementary Information</b>  |               | <b>Issued</b>   |       | <b>2024-10-09</b>    |                         |   |  |                                       |       |               |   |       |      |  |
| <b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>  |               |   |       |                      |                         |   |  |                                       |       |               |   |       |      |  |
| <b>Standard Locations</b>   |               | <b>Athens</b>   |       | <b>Davos</b>         |                         |   |  |                                       |       |               |   |       |      |  |
|   |               | <b>Stockholm</b>                                      |       | <b>Würzburg</b>      |                         |   |  |                                       |       |               |   |       |      |  |
| <b>Collector name</b>   | $\vartheta_m$ | 25°C  | 50°C  | 75°C                 | 25°C                    | 50°C  | 75°C   | 25°C                                  | 50°C  | 75°C          | 25°C  | 50°C  | 75°C |  |
| CRONOS 2.7  |               | 3,459   | 2,654 | 1,803                | 2,759                   | 1,998   | 1,274  | 2,011                                 | 1,400 | 866           | 2,178   | 1,517 | 924  |  |
| CRONOS 2.7H   |               | 3,459   | 2,654 | 1,803                | 2,759                   | 1,998   | 1,274  | 2,011                                 | 1,400 | 866           | 2,178   | 1,517 | 924  |  |
| Gross Thermal Yield per m <sup>2</sup> gross area   |               | 1,267   | 972   | 660                  | 1,011                   | 732   | 467  | 737                                   | 513   | 317           | 798   | 556   | 338  |  |
| Annual efficiency, $\eta_a$   |               | 72%   | 55%   | 37%                  | 62%                     | 45%   | 29%  | 63%                                   | 44%   | 27%           | 64%   | 45%   | 27%  |  |
| 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 <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>  |               |   |       |                      |                         |   |  |                                       |       |               |   |       |      |  |
| <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> ) >   |               | 1000  |       | $\vartheta_a$ (°C) > |                         | 20  |  | H <sub>x</sub> (MJ/m <sup>2</sup> ) > |       | 600           |   |       |      |  |
| Maximum tested positive load  |               |   |       |                      |                         |   |  |                                       |       | 3000          |   | Pa    |      |  |
| Maximum tested negative load  |               |   |       |                      |                         |   |  |                                       |       | 3000          |   | Pa    |      |  |
| Hail resistance using steel ball (maximum drop height)  |               |   |       |                      |                         |   |  |                                       |       | 2             |   | m     |      |  |
| <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)                              |                                       |       |               |   | No    |      |  |
| <b>Energy Labelling Information</b>   |               |   |       |                      |                         | <b>Additional Informative Technical Data</b>  |  |                                       |       |               |   |       |      |  |
|   |               |   |       |                      |                         | Reference Area, A <sub>sol</sub> (m <sup>2</sup> )  |  | Hydraulic Designation Code            |       |               | Aperture Area, A <sub>a</sub> (m <sup>2</sup> ) |       |      |  |
| CRONOS 2.7  |               |   |       |                      |                         | 2.73  |  | 14-V-1234S-A:7.2,2060-C:20.6,1320-    |       |               | 2.57  |       |      |  |
| CRONOS 2.7H   |               |   |       |                      |                         | 2.73  |  | 25-V-1234S-A:7.2,1158-C:20.6,2240-    |       |               | 2.57  |       |      |  |
| Data required for CDR (EU) No 811/2013 - Reference Area   |               |   |       |                      |                         | Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>  |  |                                       |       |               |   |       |      |  |
| Collector efficiency ( $\eta_{col}$ )   |               |   |       |                      |                         | 65%   |  | Zero-loss efficiency ( $\eta_0$ )     |       |               | 0.79  |       | --   |  |
| 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 <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for values according to EN 12975-2 or gross area for ISO 9806:2017. |               |   |       |                      |                         | First-order coefficient (a <sub>1</sub> )   |  |                                       | 2.48  |               | W/(m <sup>2</sup> K)                            |       |      |  |
|   |               |   |       |                      |                         | Second-order coefficient (a <sub>2</sub> )  |  |                                       | 0.025 |               | W/(m <sup>2</sup> K <sup>2</sup> )              |       |      |  |
|   |               |   |       |                      |                         | Incidence angle modifier IAM (50°)  |  |                                       | 0.94  |               | --  |       |      |  |
|   |               |   |       |                      |                         | Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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. |  |                                       |       |               |   |       |      |  |
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