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| Annex to Solar Keymark Certificate | | | | | | Licence Number | | 011-7S672 F | | | | | | | | |
| | | | | | | Date issued | | 2019-11-11 | | | | | | | | |
| | | | | | | Issued by | | ISFH CalTeC | | | | | | | | |
| Licence holder | | | Stiebel Eltron GmbH & Co. KG | | | Country | | Germany | | | | | | | | |
| Brand (optional) | | | | | | Web | | http://www.stiebel-eltron.com | | | | | | | | |
| Street, Number | | | Dr. Stiebel Straße | | | E-mail | | info@stiebel-eltron.com | | | | | | | | |
| Postcode, City | | | D- 37603 Holzminden | | | Tel | | +49 55 31 - 70 20 | | | | | | | | |
| 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 | 86 K | | | | | |
| | | | | | | W | W | W | W | W | W | | | | | |
| SOL 27 basic | | | | | | 93 | 2.53 | 2,168 | 1,168 | 2.39 | 1,871 | 1,782 | 1,587 | 1,367 | 1,123 | 911 |
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| Power output per m ² gross area | | | | | | 739 | 704 | 627 | 540 | 444 | 360 | | | | | |
| 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 | | | | | | 0.753 | 3.38 | 0.012 | | | 4,500 | | | | 0.88 | |
| Incidence angle modifier test method | | | | | | Quasi dynamic - outdoor | | | | | | | | | | |
| Incidence angle modifier | | | | | | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° | |
| Transversal | | | | | | K _{θT, coll} | 1.00 | 0.99 | 0.98 | 0.96 | 0.92 | 0.86 | 0.73 | 0.32 | 0.00 | |
| Longitudinal | | | | | | K _{θL, coll} | 1.00 | 0.99 | 0.98 | 0.96 | 0.92 | 0.86 | 0.73 | 0.32 | 0.00 | |
| Heat transfer medium for testing | | | | | | Water-Glycole | | | | | | | | | | |
| Flow rate for testing (per gross area, A _G) | | | | | | dm/dt | 0.033 | kg/(sm ²) | | | | | | | | |
| Maximum temperature difference during thermal performance test | | | | | | ($\vartheta_m - \vartheta_a$) _{max} | 56 | K | | | | | | | | |
| Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C) | | | | | | ϑ_{stg} | 210 | °C | | | | | | | | |
| Maximum operating temperature | | | | | | $\vartheta_{max, op}$ | 100 | °C | | | | | | | | |
| Maximum operating pressure | | | | | | p _{max, op} | 600 | kPa | | | | | | | | |
| Testing laboratory | | | Institut für Solarenergieforschung GmbH | | | http://www.isfh.de | | | | | | | | | | |
| Test report(s) | | | 28-19/K | | | Dated | | 11.10.2019 | | | | | | | | |
| Comments of testing laboratory | | | | | | Datasheet version: 6.0, 2018-10-30 | | | | | | | | | | |
| | | | | | | Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500 | | | | | | | | | | |
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| Supplementary Information | | Issued | | 2019-11-11 | | | | | | | | | |
| Annual collector output in kWh/collector at mean fluid temperature ϑ_m | | | | | | | | | | | | | |
| | Standard Locations | Athens | | | Davos | | | Stockholm | | | Würzburg | | |
| Collector name | ϑ_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 |
| SOL 27 basic | | 2,941 | 2,110 | 1,392 | 2,245 | 1,565 | 997 | 1,648 | 1,089 | 667 | 1,790 | 1,173 | 708 |
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| Annual output per m ² gross area | | 1,162 | 834 | 550 | 887 | 618 | 394 | 651 | 430 | 264 | 708 | 464 | 280 |
| Fixed or tracking collector | Fixed (slope = latitude - 15°; rounded to nearest 5°) | | | | | | | | | | | | |
| Annual irradiation on collector plane | 1765 kWh/m ² | | | 1714 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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | 1859 | Pa | |
| Hail resistance using steel ball (maximum drop height) | | | | | | | | | | | 1.8 | 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"/> Wind and/or infrared sensitive collector(s) (WISC) | | | | | | | | | |
| <input type="checkbox"/> Façade collector(s) | | | | | | | | | | | | | |
| Energy Labelling Information | | | | | | | | | | | | | |
| | Reference Area, A_{sol} (m ²) | | | Hydraulic Designation Code | | | | | | | | | |
| SOL 27 basic | 2.53 | | | 5,5-V-12S-A:7.3,2084-C:16.8,1071 | | | | | | | | | |
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| Data required for CDR (EU) No 811/2013 - Reference Area | | | | Data required for CDR (EU) No 812/2013 - Reference Area A_{sol} | | | | | | | | | |
| Collector efficiency (η_{col}) | 59% | | | Zero-loss efficiency (η_0) | 0.74 | | | -- | | | | | |
| 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) | 3.38 | | | W/(m ² K) | | | | | |
| | | | | Second-order coefficient (a_2) | 0.012 | | | W/(m ² K ²) | | | | | |
| | | | | Incidence angle modifier IAM (50°) | 0.92 | | | -- | | | | | |
| 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. | | | | | | | | | | | | | |
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