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|--|--|---------------------------|--------------------------|---------------------------|---|--------------|----------------------------|--------------------------|-----------|------------|------|------|
| Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results | | | | | Licence Number | | 011-7S2850 F | | | | | |
| | | | | | Date issued | | 2018-03-22 | | | | | |
| | | | | | Issued by | | | | | | | |
| Licence holder | | Riello S.p.A. | | | Country | | Italy | | | | | |
| Brand (optional) | | Sylber | | | Web | | marketing@sylbercaldaie.it | | | | | |
| Street, Number | | Via Ing. Pilade Riello, 7 | | | E-mail | | www.sylber.it | | | | | |
| Postcode, City | | IT-37045 Legnago (VR) | | | Tel | | +39 0341 277111 | | | | | |
| Collector Type | | | | | Flat plate collector, glazed | | | | | | | |
| Collector name | Gross area (A_G) m ² | Gross length mm | Gross width mm | Gross height mm | Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² $\vartheta_m - \vartheta_a$ | | | | | | | |
| | | | | | 0 K W | 10 K W | 30 K W | 50 K W | 70 K W | 130 K W | | |
| CFS-25/4 | 2.30 | 2'004 | 1'148 | 85 | 1'726 | 1'632 | 1'437 | 1'231 | 1'014 | 296 | | |
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| Power output per m² gross area | | | | | 750 | 709 | 625 | 535 | 441 | 129 | | |
| Performance parameters test method | | | Steady state - outdoor | | | | | | | | | |
| Performance parameters (related to AG) | | | $\eta_{0,hem}$ | a1 | a2 | | | | | | | |
| Units | | | - | W/(m ² K) | W/(m ² K ²) | | | | | | | |
| Test results | | | 0.750 | 4.000 | 0.006 | | | | | | | |
| Incidence angle modifier test method | | | Steady state - outdoor | | | | | | | | | |
| Bi-directional incidence angle modifiers | | | Yes | | | | | | | | | |
| Incidence angle modifier | | | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| Transversal | | | $K_{GT, coll}$ | 1.00 | 1.00 | 0.99 | 0.98 | 0.94 | 0.87 | 0.74 | 0.48 | 0.00 |
| Longitudinal | | | $K_{GL, coll}$ | 1.00 | 1.00 | 0.99 | 0.98 | 0.95 | 0.88 | 0.75 | 0.49 | 0.00 |
| Heat transfer medium for testing | | | | | Water-Glycole | | | | | | | |
| Flow rate for testing (per gross area, A_G) | | | | | dm/dt | 0.020 | kg/(sm ²) | | | | | |
| Maximum temperature difference for thermal performance calculations | | | | | $(\vartheta_m - \vartheta_a)_{max}$ | 130 | K | | | | | |
| Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30^\circ\text{C}$) | | | | | ϑ_{stg} | 197 | °C | | | | | |
| Effective thermal capacity, incl. fluid (per gross area, A_G) | | | | | C/m ² | 5.48 | kJ/(Km ²) | | | | | |
| Maximum operating temperature | | | | | $\vartheta_{max, op}$ | -- | °C | | | | | |
| Maximum operating pressure | | | | | P _{max, op} | 1000 | kPa | | | | | |
| Testing laboratory | | | SPF, CH-8640 Rapperswil | | | www.spf.ch | | | | | | |
| Test report(s) | | | C1757LPEN C1757QPEN | | | Dated | | 21.03.2018 21.03.2018 | | | | |
| Comments of testing laboratory | | | | | Datasheet version: 5.01, 2016-03-01 | | | | | | | |
| -- | | | | | INSTITUT FÜR SOLARTECHNIK | | | | | | | |
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|---|-----------------------|---------------------|
| Annex to Solar Keymark Certificate Supplementary Information | Licence Number | 011-7S2850 F |
| | Issued | 2018-03-22 |

| Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN ISO 9806:2013 test results | | | | | | | | | | | | | |
|---|---------------|---|-------|-------|-------------------------|-------|------|-------------------------|------|------|-------------------------|-------|------|
| 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 |
| CFS-25/4 | | 2'751 | 1'919 | 1'257 | 2'060 | 1'415 | 909 | 1'517 | 978 | 600 | 1'652 | 1'055 | 638 |
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| Annual output per m ² gross area | | 1'195 | 834 | 546 | 895 | 615 | 395 | 659 | 425 | 261 | 718 | 458 | 277 |
| 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. 5.01 (March 2016). A detailed description of the calculations is available at 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 | 2400 | Pa |
| Maximum tested negative load | 2400 | Pa |
| Hail resistance using ice balls (diameter) | 45 | mm |

Energy Labelling Information

| | Reference Area, A_{sol} (m ²) | Data required for CDR (EU) No 811/2013 - Reference Area A_{sol} | |
|----------|---|--|--|
| CFS-25/4 | 2.30 | Collector efficiency (η_{col}) | 58 % |
| | | 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 9806:2013. | |
| | | Data required for CDR (EU) No 812/2013 - Reference Area A_{sol} | |
| | | Zero-loss efficiency (η_0) | 0.750 -- |
| | | First-order coefficient (a_1) | 4.00 W/(m ² K) |
| | | Second-order coefficient (a_2) | 0.006 W/(m ² K ²) |
| | | Incidence angle modifier IAM (50°) | 0.96 -- |
| | | 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. | |