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| Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results | | | | | Licence Number | | 011-7S2610 F | | | | | | | |
| | | | | | Date issued | | 2017-08-09 | | | | | | | |
| | | | | | Issued by | | DIN CERTCO | | | | | | | |
| Licence holder | CORDIVARI SRL | | | | Country | Italien | | | | | | | | |
| Brand (optional) | | | | | Web | www.cordivari.it | | | | | | | | |
| Street, Number | Zona Industriale Pagliare | | | | E-mail | info@cordivari.it | | | | | | | | |
| Postcode, City | 64020 Morro D'Oro (TE) | | | | Tel | +39 8 580 401 | | | | | | | | |
| 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 ; u = 3 m/s ϑ _m - ϑ _a | | | | | | | | | |
| | | | | | 0 K W | 10 K W | 30 K W | 50 K W | 70 K W | 108 K W | | | | |
| ASA MQ 2.5 OR 2 CONN | 2.50 | 2 000 | 1 250 | 85 | 1 818 | 1 735 | 1 557 | 1 361 | 1 147 | 691 | | | | |
| Power output per m² gross area | | | | | 727 | 694 | 623 | 545 | 459 | 276 | | | | |
| Performance parameters test method | | | | | Quasi dynamic | | | | | | | | | |
| Performance parameters (related to A_G) | | | | | η _{0,b} | c ₁ | c ₂ | c ₃ | c ₄ | c ₆ | K _d | | | |
| Units | | | | | - | W/(m ² K) | W/(m ² K ²) | J/(m ³ K) | - | s/m | - | | | |
| Test results | | | | | 0.729 | 3.200 | 0.009 | 0.000 | 0.000 | 0.000 | 0.982 | | | |
| 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 _{θT, coll} | 1.00 | 0.99 | 0.98 | 0.96 | 0.93 | 0.87 | 0.75 | 0.38 | 0.00 |
| Longitudinal | | | | | K _{θL, coll} | 1.00 | 0.99 | 0.98 | 0.96 | 0.93 | 0.87 | 0.75 | 0.38 | 0.00 |
| Heat transfer medium for testing | | | | | Water | | | | | | | | | |
| Flow rate for testing (per gross area, A_G) | | | | | dm/dt | 0.020 | kg/(sm ²) | | | | | | | |
| Maximum temperature difference for thermal performance calculations | | | | | (ϑ _m -ϑ _a) _{max} | 108 | K | | | | | | | |
| Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C) | | | | | ϑ _{stg} | 207 | °C | | | | | | | |
| Effective thermal capacity, incl. fluid (per gross area, A_G) | | | | | C/m ² | 13.608 | kJ/(Km ²) | | | | | | | |
| Maximum operating temperature | | | | | ϑ _{max, op} | 199 | °C | | | | | | | |
| Maximum operating pressure | | | | | p _{max, op} | 1000 | kPa | | | | | | | |
| Testing laboratory | | | | | TZS, ITW University Stuttgart | | | | | | | | | |
| Test report(s) | | | | | www.itw.uni-stuttgart.de | | | | | | | | | |
| Test report(s) | | | | | 15COL1316/1 | | Dated | | 09.08.2017 | | | | | |
| Test report(s) | | | | | 15COL1316Q/1 | | | | 09.08.2017 | | | | | |
| Comments of testing laboratory | | | | | Datashet version: 5.01, 2016-03-01 | | | | | | | | | |
| <p>This data sheet replaces the data sheet issued on 17.02.2016</p> <p>Documented performance parameters are taken from 15COL1316/1</p> <p>The test reports were updated.</p> | | | | |  Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen) | | | | | | | | | |
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|-------------------------------------------------------------------------------|-----------------------|---------------------|
| Annex to Solar Keymark Certificate Supplementary Information | Licence Number | 011-7S2610 F |
| | Issued | 2017-08-09 |

| Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on 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 |
| ASA MQ 2.5 OR 2 CONN | | 2 959 | 2 180 | 1 501 | 2 278 | 1 632 | 1 090 | 1 672 | 1 136 | 729 | 1 825 | 1 236 | 780 |
| | | | | | | | | | | | | | |
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| Annual output per m ² gross area | | 1 184 | 872 | 601 | 911 | 653 | 436 | 669 | 454 | 291 | 730 | 494 | 312 |
| 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 | No | |
| The collector was tested successfully according to EN ISO 9806:2013 under the following conditions: | | |
| Climate class (A, B or C) | B | -- |
| Maximum tested positive load | 1750 | Pa |
| Maximum tested negative load | 1750 | Pa |
| Hail resistance using steel ball (maximum drop height) | 2 | m |

| Energy Labelling Information | | | |
|------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| | Reference Area, A_{sol} (m ²) | Data required for CDR (EU) No 811/2013 - Reference Area A_{sol} | |
| ASA MQ 2.5 OR 2 CONN | 2.50 | Collector efficiency (η_{col}) | 58 % |
| | | <i>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/m², 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.</i> | |
| | | Data required for CDR (EU) No 812/2013 - Reference Area A_{sol} | |
| | | Zero-loss efficiency (η_0) | 0.727 -- |
| | | First-order coefficient (a_1) | 3.20 W/(m ² K) |
| | | Second-order coefficient (a_2) | 0.009 W/(m ² K ²) |
| | | Incidence angle modifier IAM (50°) | 0.93 -- |
| | | <i>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.</i> | |