


| Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results | | | | | | Licence Number | | 011-7S2860 F | | | | | | |
|--|--|---|----------------------|------------------------------------|--|---|-------------------|--|--|-----------|-----------|-----------|-----------|------------|
| | | | | | | Date issued | | 2018-06-11 | | | | | | |
| | | | | | | Issued by | | DIN CERTCO | | | | | | |
| Licence holder | | ALISIOS srl | | | | Country | | Italien | | | | | | |
| Brand (optional) | | ITS | | | | Web | | www.alisios.it | | | | | | |
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| Postcode, City | | 31053 Pieve di Soligo (TV) | | | | Tel | | +39 0422 686429 | | | | | | |
| 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 |
| ITS HP180 | | | | | 1.76 | 1 916 | 916 | 92 | 1 252 | 1 192 | 1 060 | 916 | 760 | 427 |
| ITS HP210 | | | | | 2.07 | 1 761 | 1 176 | 92 | 1 473 | 1 401 | 1 247 | 1 078 | 894 | 503 |
| ITS HP230 | | | | | 2.31 | 1 961 | 1 176 | 92 | 1 644 | 1 564 | 1 392 | 1 203 | 997 | 561 |
| ITS HP270 | | | | | 2.66 | 2 261 | 1 176 | 92 | 1 893 | 1 801 | 1 603 | 1 385 | 1 148 | 646 |
| Power output per m ² gross area | | | | | | | | | 712 | 677 | 602 | 521 | 432 | 243 |
| Performance parameters test method | | Quasi dynamic | | | | | | | | | | | | |
| Performance parameters (related to AG) | | 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 | | 0.713 | 3.368 | 0.009 | 0.000 | 0.000 | 0.000 | 0.987 | | | | | | |
| 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, coll} | 1.00 | 1.00 | 0.99 | 0.98 | 0.92 | 0.74 | 0.50 | 0.25 | 0.00 | | | |
| Longitudinal | | K _{gL, coll} | 1.00 | 1.00 | 0.99 | 0.98 | 0.92 | 0.74 | 0.50 | 0.25 | 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/m ² ; ϑ _a = 30 °C) | | ϑ _{stg} | 201 | | °C | | | | | | | | | |
| Effective thermal capacity, incl. fluid (per gross area, A _G) | | C/m ² | 13.38 | | kJ/(Km ²) | | | | | | | | | |
| Maximum operating temperature | | ϑ _{max, op} | 100 | | °C | | | | | | | | | |
| Maximum operating pressure | | p _{max, op} | 1000 | | kPa | | | | | | | | | |
| Testing laboratory | | TZS, ITW University Stuttgart | | | | www.itw.uni-stuttgart.de | | | | | | | | |
| Test report(s) | | 17COL1400OEM01 17COL1401OEM01 17COL1401QOEM01 | | | | Dated | | 11.06.2018 11.06.2018 11.06.2018 | | | | | | |
| Comments of testing laboratory | | Documented performance parameters are taken from test report 17COL1401OEM01 (ITS HP270) The values related to 2.49m ² aperture area are: eta _{0a} = 0.762; c _{1a} =3.598; c _{2a} =0.010. | | | | Datashet version: 5.01, 2016-03-01 | | | | | | | | |
| | | | | | |  Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70560 Stuttgart (Vaihingen) | | | | | | | | |
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| Annex to Solar Keymark Certificate Supplementary Information | Licence Number | 011-7S2860 F |
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

| Collector name | Athens | | | Davos | | | Stockholm | | | Würzburg | | | |
|---|---|-------|-------|-------------------------|-------|-------|-------------------------|-------|-------|-------------------------|-------|-------|------|
| | 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 |
| ITS HP180 | | 2 022 | 1 457 | 976 | 1 545 | 1 085 | 709 | 1 128 | 750 | 470 | 1 235 | 815 | 503 |
| ITS HP210 | | 2 378 | 1 713 | 1 148 | 1 817 | 1 276 | 833 | 1 327 | 882 | 552 | 1 453 | 959 | 592 |
| ITS HP230 | | 2 654 | 1 912 | 1 282 | 2 028 | 1 424 | 930 | 1 481 | 984 | 616 | 1 621 | 1 070 | 660 |
| ITS HP270 | | 3 056 | 2 202 | 1 476 | 2 335 | 1 640 | 1 071 | 1 705 | 1 133 | 710 | 1 867 | 1 232 | 760 |
| Annual output per m ² gross area | | 1 149 | 828 | 555 | 878 | 617 | 403 | 641 | 426 | 267 | 702 | 463 | 286 |
| 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 | 2750 | Pa |
| Maximum tested negative load | 2500 | 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} | |
|-----------|---|--|--|
| ITS HP180 | 1.76 | Collector efficiency (η_{col}) | 56 % |
| ITS HP210 | 2.07 | <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> | |
| ITS HP230 | 2.31 | | |
| ITS HP270 | 2.66 | | |
| | | | |
| | | Data required for CDR (EU) No 812/2013 - Reference Area A_{sol} | |
| | | Zero-loss efficiency (η_0) | 0.712 -- |
| | | First-order coefficient (a_1) | 3.37 W/(m ² K) |
| | | Second-order coefficient (a_2) | 0.009 W/(m ² K ²) |
| | | Incidence angle modifier IAM (50°) | 0.92 -- |
| | | <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> | |