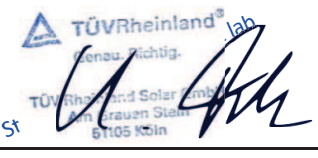


| Annex to Solar Keymark Certificate | | | | | Licence Number | | 011-7S3218 P | | | | | |
|--|--|--|----------------------|------------------------------------|---|--|-------------------------|--------------------------|------------------------------------|------------------------------------|-----------|--|
| | | | | | Date issued | | 2024-01-24 | | | | | |
| | | | | | Issued by | | DINCERTCO | | | | | |
| Licence holder | | Dualsun SAS | | | Country | | France | | | | | |
| Brand (optional) | | | | | Web | | https://www.dualsun.com | | | | | |
| Street, Number | | rue Marc Donadille - CS 80001 2 | | | E-mail | | contact@dualsun.fr | | | | | |
| Postcode, City | | 13453 Marseille Cedex 13 | | | Tel | | +33 413 415 371 | | | | | |
| Collector Type | | | | | WISC (Wind and/or infrared sensitive collector) | | | | | | | |
| 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 = 1.3 m/s $\vartheta_m - \vartheta_a$ | | | | | | |
| | | | | | | 0 K W | 10 K W | 30 K W | 50 K W | 70 K W | 50 K W | |
| DSTN 425-108M10TB-03 | | 1.95 | 1 722 | 1 134 | 71 | 939 | 543 | 0 | 0 | -- | 0 | |
| | | | | | | 0 | 0 | 0 | 0 | -- | 0 | |
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| Power output per m ² gross area | | | | | | 482 | 279 | 0 | 0 | -- | 0 | |
| Performance parameters test method | | Quasi dynamic | | | | | | | | | | |
| Performance parameters (related to A _G) | | $\eta_{0,b}$ | 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 | | 0.448 | 29.83 | 0.000 | 5.603 | 0.00 | 22 353 | 0.020 | 0.00 | 0.0E+00 | 1.00 | |
| 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 | 1.00 | 1.00 | 1.00 | 0.99 | 0.96 | 0.88 | 0.65 | 0.00 | |
| Longitudinal | | K _{θL, coll} | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.96 | 0.88 | 0.65 | 0.00 | |
| Heat transfer medium for testing | | | | | Water | | | | | | | |
| Flow rate for testing (per gross area, A _G) | | | | | dm/dt | | 0.048 | kg/(sm ²) | | | | |
| Maximum temperature difference during thermal performance test | | | | | $(\vartheta_m - \vartheta_a)_{max}$ | | 20 | K | | | | |
| Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C) | | | | | ϑ_{stg} | | 70 | °C | | | | |
| Maximum operating temperature | | | | | $\vartheta_{max, op}$ | | 80 | °C | | | | |
| Maximum operating pressure | | | | | p _{max, op} | | 600 | kPa | | | | |
| Testing laboratory | | TÜV Rheinland Solar GmbH | | | | www.tuv.com/solar | | | | | | |
| Test report(s) | | DE23IF5L 001 DE23W1SR 001 | | | | Dated | | 11.12.2023 11.12.2023 | | | | |
| Comments of testing laboratory | | | | | Draft Ver. 6.2 (22.09.2021) | | | | | | | |
| Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode') | | | | |  | | | | | | | |
| The PVT DSTlxxx-108M10TB-03 will be distributed under the power classes 420 + 425 W. | | | | | | | | | | | | |
| The PVT is certified according to IEC 61215 and IEC 61730 by TÜV Rheinland (PV 60174698 0001; 2024-01-22). | | | | | | | | | | | | |
| DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de | | | | | | | | | | | | |

| Annex to Solar Keymark Certificate | | | | | | Licence Number | | 011-7S3218 P | | | | | | |
|--|---|--|------------------------------------|-------------------------|------------------------------|---|--|--------------|------|-------------------------|----------|------|------|----|
| Supplementary Information | | | | | | Issued | | 2024-01-24 | | | | | | |
| Gross Thermal Yield 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 | |
| DSTN 425-108M10TB-03 | 1378 | 17 | | | 251 | 0 | | | 337 | 1 | | 418 | 5 | |
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| Gross Thermal Yield per m ² gross area | 707 | 9 | -- | -- | 129 | 0 | -- | -- | 173 | 1 | -- | 214 | 3 | -- |
| Annual efficiency, η_a | 40% | 0% | -- | -- | 8% | 0% | -- | -- | 15% | 0% | -- | 17% | 0% | -- |
| Fixed or tracking collector | Fixed (slope = latitude - 15°; rounded to nearest 5°) | | | | | | | | | | | | | |
| Annual irradiation on collector plane | 1765 kWh/m ² | | | 1630 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 Draft Ver. 6.2 (22.09.2021). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/ | | | | | | | | | | | | | | |
| 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 | | | | | | | 6600 | Pa | | | | | | |
| Maximum tested negative load | | | | | | | 3600 | Pa | | | | | | |
| Hail resistance using ice balls (diameter) | | | | | | | 25 | mm | | | | | | |
| Additional collector attribute(s) | | | | | | | | | | | | | | |
| Using external power source(s) for normal operation | No | Active or passive measure(s) for self-protection | | | | | | No | | | | | | |
| Co-generating thermal and electrical power | Yes | Façade collector(s) | | | | | | No | | | | | | |
| Energy Labelling Information | | | | | | Additional Informative Technical Data | | | | | | | | |
| | Reference Area, A_{sol} (m ²) | | Hydraulic Designation Code | | | | Aperture Area, A_a (m ²) | | | | | | | |
| DSTN 425-108M10TB-03 | 1.95 | | 304-V-1234S-A:2.7,1640-C:18.0,1132 | | | | 1.95 | | | | | | | |
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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}) | -33% | | | | | Zero-loss efficiency (η_0) | 0.48 | -- | | | | | | |
| 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) | | | | | 20.30 | W/(m ² K) | | | | | | | |
| | Second-order coefficient (a_2) | | | | | 0.000 | W/(m ² K ²) | | | | | | | |
| | Incidence angle modifier IAM (50°) | | | | | 1.00 | -- | | | | | | | |
| | 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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