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|--|--------------|------------------------------|-------------------------|------------------------------------|-------------------------|--|----------------------|--------------------------|------------------------------------|------------------------------------|-------|
| Annex to Solar Keymark Certificate | | Licence Number | | 011-7S2500 F | | | | | | | |
| | | Date issued | | 2019-09-12 | | | | | | | |
| | | Issued by | | TÜV Rheinland Energy GmbH | | | | | | | |
| Licence holder | | Gasokol GmbH | | | | Country | | Austria | | | |
| Brand (optional) | | - | | | | Web | | www.gasokol.at | | | |
| Street, Number | | Solarpark 1 | | | | E-mail | | office@gasokol.at | | | |
| Postcode, City | | A-4351 Saxen | | | | Tel | | +43 726 976 600 | | | |
| Collector Type | | | | | | Flat plate collector | | | | | |
| Collector name | Gross height | Gross area (A_G) | Gross length | Gross width | Aperture area (A_a) | Power output per collector | | | | | |
| | | | | | | $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$ | | | | | |
| | mm | m ² | mm | mm | m ² | 0 K | 10 K | 30 K | 50 K | 70 K | 120 K |
| | | | | | | W | W | W | W | W | W |
| sunWin 27V | 98 | 2.70 | 2 150 | 1 255 | 2.52 | 1 921 | 1 832 | 1 628 | 1 390 | 1 117 | 284 |
| sunWin 27H | 98 | 2.70 | 1 255 | 2 150 | 2.52 | 1 921 | 1 832 | 1 628 | 1 390 | 1 117 | 284 |
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| Power output per m ² gross area | | | | | | 712 | 679 | 603 | 515 | 414 | 105 |
| Performance parameters test method | | Quasi dynamic | | | | | | | | | |
| 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 | | 0.724 | 3.13 | 0.016 | 0.000 | 0.00 | 3 381 | 0.000 | 0.00 | 0.0E+00 | 0.89 |
| Incidence angle modifier test method | | | Quasi dynamic - outdoor | | | | | | | | |
| Incidence angle modifier | | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| Transversal | | $K_{GT, coll}$ | 1.00 | 0.98 | 0.95 | 0.91 | 0.83 | 0.70 | 0.43 | 0.21 | 0.00 |
| Longitudinal | | $K_{GL, coll}$ | 1.00 | 0.98 | 0.95 | 0.91 | 0.83 | 0.70 | 0.43 | 0.21 | 0.00 |
| Heat transfer medium for testing | | | | | | Water | | | | | |
| Flow rate for testing (per gross area, A_G) | | | | | | dm/dt | 0.021 | kg/(sm ²) | | | |
| Maximum temperature difference during thermal performance test | | | | | | $(\vartheta_m - \vartheta_a)_{max}$ | 90 | K | | | |
| Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$) | | | | | | ϑ_{stg} | 200 | °C | | | |
| Maximum operating temperature | | | | | | $\vartheta_{max, op}$ | 100 | °C | | | |
| Maximum operating pressure | | | | | | $p_{max, op}$ | 1000 | kPa | | | |
| Testing laboratory | | TÜV Rheinland Energy GmbH | | | | www.tuv.com\solarenergy | | | | | |
| Test report(s) | | 21246747.002 21246747.003 | | | | Dated | | 12.09.2019 12.09.2019 | | | |
| Comments of testing laboratory | | | | | | Datasheet version: 6.0, 2018-10-30 | | | | | |
| The collector performance parameter related to the aperture area of 2.52 m ² are h_0 , h_{em} , $a=0.756$, $a1a=3.357$ and $a2a=0.017$. | | | | | |  | | | | | |
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| Annex to Solar Keymark Certificate | | | | | | | Licence Number | | 011-7S2500 F | | | | |
|--|---|---|-------|-------|-----------------------------------|---|----------------|-------------------------|--------------|----------------------|-------------------------|-------|------|
| Supplementary Information | | | | | | | Issued | | 2019-09-12 | | | | |
| 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 |
| sunWin 27V | | 2 906 | 2 059 | 1 308 | 2 210 | 1 503 | 908 | 1 623 | 1 052 | 621 | 1 767 | 1 135 | 654 |
| sunWin 27H | | 2 906 | 2 059 | 1 308 | 2 210 | 1 503 | 908 | 1 623 | 1 052 | 621 | 1 767 | 1 135 | 654 |
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| Annual output per m ² gross area | | 1 076 | 762 | 484 | 819 | 557 | 336 | 601 | 389 | 230 | 654 | 420 | 242 |
| 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 | | | | | | | Yes | | | | | | |
| 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 | | | | | | | 3500 | | | Pa | | | |
| Maximum tested negative load | | | | | | | 2750 | | | Pa | | | |
| Hail resistance using ice balls (diameter) | | | | | | | 35 | | | mm | | | |
| 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 | | | | | | | | |
| sunWin 27V | 2.70 | | | | 1-V-1234S-A:7.2,21840-C:20.8,1295 | | | | | | | | |
| sunWin 27H | 2.70 | | | | 1-V-1234S-A:7.2,20680-C:20.8,2190 | | | | | | | | |
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| Data required for CDR (EU) No 811/2013 - Reference Area A_{sol} | | | | | | Data required for CDR (EU) No 812/2013 - Reference Area A_{sol} | | | | | | | |
| Collector efficiency (η_{col}) | | 56% | | | | Zero-loss efficiency (η_0) | | 0.71 | | -- | | | |
| 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) | | 3.13 | | Second-order coefficient (a_2) | | 0.016 | | W/(m ² K) | | | |
| | | Incidence angle modifier IAM (50°) | | 0.84 | | | | | | -- | | | |
| | | 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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