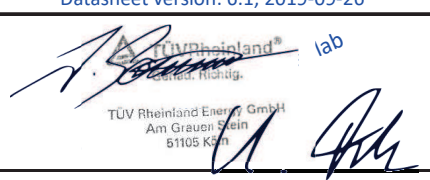


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|--|--|-------------------------------|----------------------|------------------------------------|--|-------|-----------------------|-------|------------------------------------|------------------------------------|-------|-------|-------|-----|
| Annex to Solar Keymark Certificate | | | | | Licence Number | | 011-7S1124 F | | | | | | | |
| | | | | | Date issued | | 2021-08-19 | | | | | | | |
| | | | | | Issued by | | DIN CERTCO | | | | | | | |
| Licence holder | | Viessmann Werke GmbH & Co. KG | | | Country | | Germany | | | | | | | |
| Brand (optional) | | | | | Web | | www.viessmann.com | | | | | | | |
| Street, Number | | Viessmannstr. 1 | | | E-mail | | info@viessmann.com | | | | | | | |
| Postcode, City | | 35107 Allendorf | | | Tel | | +49 (0)6452 70 0 | | | | | | | |
| Collector Type | | | | | Flat plate collector | | | | | | | | | |
| Collector name | | | | | Power output per collector | | | | | | | | | |
| | | | | | $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$ | | | | | | | | | |
| | | | | | 0 K | 10 K | 30 K | 50 K | 70 K | 110 K | | | | |
| | | | | | m ² | mm | mm | mm | mm | mm | mm | | | |
| Vitosol 100-F SV1A | | | | | 2.51 | 2 380 | 1 056 | 72 | 1 804 | 1 707 | 1 503 | 1 282 | 1 045 | 523 |
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| | | | | | | | | | | | | | | |
| Power output per m ² gross area | | | | | 719 | 680 | 599 | 511 | 416 | 208 | | | | |
| 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 | | 0.723 | 3.76 | 0.008 | 0.000 | 0.00 | 6 412 | 0.000 | 0.00 | 0.0E+00 | 0.96 | | | |
| 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 | 0.99 | 0.97 | 0.94 | 0.90 | 0.81 | 0.64 | 0.32 | 0.00 | | | |
| Longitudinal | | $K_{GL, coll}$ | 1.00 | 0.99 | 0.97 | 0.94 | 0.90 | 0.81 | 0.64 | 0.32 | 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 during thermal performance test | | | | | $(\vartheta_m - \vartheta_a)_{max}$ | 80 | K | | | | | | | |
| Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$) | | | | | ϑ_{stg} | 220 | °C | | | | | | | |
| Maximum operating temperature | | | | | $\vartheta_{max, op}$ | - | °C | | | | | | | |
| Maximum operating pressure | | | | | $p_{max, op}$ | 600 | kPa | | | | | | | |
| Testing laboratory | | TÜV Rheinland Energy GmbH | | | www.tuv.com/solar | | | | | | | | | |
| Test report(s) | | 21253119.001 | | | Dated | | 19.08.2021 | | | | | | | |
| Comments of testing laboratory | | | | | Datasheet version: 6.1, 2019-09-26 | | | | | | | | | |
| Vitosol 100-F SV1A will also be distributed as OEM collector with the export distribution: - BV1 | | | | |  | | | | | | | | | |
| 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 | | | | | | | | | | | |
|--|--------------------|---|-------|----------------------|-----------------------------------|-------|---|---------------------------------------|---|------|------------------------------------|-------|------|
| Supplementary Information | | 011-7S1124 F | | | | | | | | | | | |
| | | Issued | | | | | | | | | | | |
| | | 2021-08-19 | | | | | | | | | | | |
| 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 |
| Vitosol 100-F SV1A | | 2 860 | 1 989 | 1 281 | 2 133 | 1 445 | 901 | 1 576 | 1 008 | 605 | 1 723 | 1 092 | 644 |
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| Annual output per m ² gross area | | 1 139 | 792 | 510 | 850 | 576 | 359 | 628 | 401 | 241 | 687 | 435 | 256 |
| Annual efficiency, η_a | | 65% | 45% | 29% | 52% | 35% | 22% | 54% | 34% | 21% | 55% | 35% | 21% |
| 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 Ver. 6.1 (September 2019). 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 | | | | | | | | | | | 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 | | | | | | | | | | | 2750 | | Pa |
| Maximum tested negative load | | | | | | | | | | | 2400 | | 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"/> Façade collector(s) | | | | | | | | | | | | | |
| Energy Labelling Information | | | | | | | Additional Informative Technical Data | | | | | | |
| | | Reference Area, A _{sol} (m ²) | | | Hydraulic Designation Code | | | | Aperture Area, A _a (m ²) | | | | |
| Vitosol 100-F SV1A | | 2.51 | | | 1-V-1234S-A:8.2,14737-C:20.7,1071 | | | | 2.33 | | | | |
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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) | | 0.72 | | -- | | |
| 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) | | 3.76 | | W/(m ² K) | | |
| | | | | | | | Second-order coefficient (a ₂) | | 0.008 | | W/(m ² K ²) | | |
| | | | | | | | Incidence angle modifier IAM (50°) | | 0.90 | | -- | | |
| | | | | | | | 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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