TÜVRheinland®
DIN CERTCO
Precisely Right.

IGTE



| Annex to Solar Keymark Certificate | | Licence Number | 011-7S3080 F |
|---|---|---|---|
| | | Date issued | 2021-12-01 |
| | | Issued by | DIN CERTCO |

| | | | |
|---|---|---|---|
| **Licence holder** | DIMAS SA | **Country** | Greece |
| **Brand** (optional) | | **Web** | https://dimas-solar.gr/ |
| **Street, Number** | 2nd km Argos – Nafplio road | **E-mail** | info@dimas-solar.gr |
| **Postcode, City** | 212 00 Argos | **Tel** | +30 275 10209110 |

| | |
|---|---|
| **Collector Type** | Flat plate collector |

| Collector name | Gross area ($A_G$) | Gross length | Gross width | Gross height | Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 K | 10 K | 30 K | 50 K | 70 K | 112 K |
| | m² | mm | mm | mm | W | W | W | W | W | W |
| SUPREME ENERGY 29 | 2.92 | 2 006 | 1 457 | 85 | 2 217 | 2 114 | 1 891 | 1 647 | 1 382 | 758 |
| **Power output per m² gross area** | | | | | 759 | 724 | 648 | 564 | 473 | 259 |

| **Performance parameters test method** | Quasi dynamic | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Performance parameters (related to $A_G$)** | η0, b | a1 | a2 | a3 | a4 | a5 | a6 | a7 | a8 | Kd |
| **Units** | - | W/(m²K) | W/(m²K²) | J/(m³K) | - | J/(m²K) | s/m | W/(m²K⁴) | W/(m²K⁴) | - |
| **Test results** | 0.761 | 3.46 | 0.009 | 0.000 | 0.00 | 13 070 | 0.000 | 0.00 | 0.0 | 0.99 |

| **Incidence angle modifier test method** | | Quasi dynamic - outdoor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Incidence angle modifier** | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| **Transversal** | $K_{\theta T,coll}$ | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 0.88 | 0.67 | 0.34 | 0.00 |
| **Longitudinal** | $K_{\theta L,coll}$ | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 0.88 | 0.67 | 0.34 | 0.00 |

| | | | |
|---|---|---|---|
| **Heat transfer medium for testing** | | Water | |
| **Flow rate for testing (per gross area, $A_G$)** | | dm/dt | 0.020 kg/(sm²) |
| **Maximum temperature difference during thermal performance test** | | $(\vartheta_m-\vartheta_a)_{max}$ | 82 K |
| **Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a$ = 30 °C)** | | $\vartheta_{stg}$ | 230 °C |
| **Maximum operating temperature** | | $\vartheta_{max\ op}$ | - °C |
| **Maximum operating pressure** | | $p_{max,op}$ | 1000 kPa |
| **Testing laboratory** | Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE) | http://www.igte.uni-stuttgart.de | |
| **Test report(s)** | 21COL1629<br>21COL1629Q | **Dated** | 12.11.2021<br>12.11.2021 |

**Comments of testing laboratory** — Datasheet version: 6.1, 2019-09-26

none

TZS Forschungs- und Testzentrum für Solaranlagen
Institut für Thermodynamik und Wärmetechnik
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| Supplementary Information | Issued | 2021-12-01 |

**Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$**

| Standard Locations | Athens | | | Davos | | | Stockholm | | | Würzburg | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Collector name / $\vartheta_m$ | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C |
| SUPREME ENERGY 29 | 3 647 | 2 678 | 1 840 | 2 811 | 2 012 | 1 346 | 2 055 | 1 392 | 892 | 2 245 | 1 515 | 957 |
| Annual output per m² gross area | 1 249 | 917 | 630 | 963 | 689 | 461 | 704 | 477 | 305 | 769 | 519 | 328 |
| Annual efficiency, $\eta_a$ | 71% | 52% | 36% | 59% | 42% | 28% | 60% | 41% | 26% | 62% | 42% | 26% |
| Fixed or tracking collector | Fixed (slope = latitude - 15°; rounded to nearest 5°) | | | | | | | | | | | |
| Annual irradiation on collector plane | 1765 kWh/m² | | | 1630 kWh/m² | | | 1166 kWh/m² | | | 1244 kWh/m² | | |
| 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 ϑm (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 | | | | No | |
| The collector was tested successfully under the following conditions: | | | | | |
| Climate class (A+, A, B or C) | | | | A | -- |
| G (W/m²) > | 1000 | $\vartheta_a$ (°C) > | 20 | $H_X$ (MJ/m²) > | 600 |
| Maximum tested positive load | | | | 2750 | Pa |
| Maximum tested negative load | | | | 2400 | Pa |
| Hail resistance using steel ball (maximum drop height) | | | | 2 | m |

## Additional collector attribute(s)

- ☐ Using external power source(s) for normal operation
- ☐ Active or passive measure(s) for self-protection
- ☐ Co-generating thermal and electrical power
- ☐ Façade collector(s)

## Energy Labelling Information

| | Reference Area, $A_{sol}$ (m²) |
|---|---|
| SUPREME ENERGY 29 | 2.92 |

## Additional Informative Technical Data

| | Hydraulic Designation Code | Aperature Area, $A_a$ (m²) |
|---|---|---|
| SUPREME ENERGY 29 | 13-V-1234S-7.2,1888-20.6,1510-D | 2.71 |

**Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$**

| | |
|---|---|
| Collector efficiency ($\eta_{col}$) | 61% |

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

**Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$**

| | | |
|---|---|---|
| Zero-loss efficiency ($\eta_0$) | 0.76 | -- |
| First-order coefficient ($a_1$) | 3.46 | W/(m²K) |
| Second-order coefficient ($a_2$) | 0.009 | W/(m²K²) |
| Incidence angle modifier IAM (50°) | 0.98 | -- |

*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.*