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Fraunhofer ISE
TestLab Solar Thermal Systems



| Summary of ISO 9806 Test Results, annex to Solar KEYMARK Certificate | | Licence Number | 011-7S2367 L |
|---|---|---|---|
| | | Issued | 2024-11-27 |

| | | | |
|---|---|---|---|
| Company holding the | GRAMMER Solar GmbH | Country | Deutschland |
| Brand (optional) | | Website | https://grammer-solar.com/de/ |
| Street, street number | Oskar-von-Miller Straße 8 | E-mail | info @ grammer-solar.de |
| Postal Code / City, province | 92224, Amberg | Tel/Fax | 09621-30857-0 |

| | |
|---|---|
| Collector Type (flat plate glazed/un-glazed; evacuate tubular) | Open to ambient air heating collector |
| Thermal / photo voltaic hybid collector? (PVT collector) | No |
| Integration in the roof possible ? (manufacturers declaration) | No |

| Collector name | Gross length | Gross width | Gross height | Gross area (AG) | Power output per collector [W] wind speed, u = 1,3 m/s Ghem = 1000 W/m² | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ṁ | | 122 | 231 | 400 |
| | mm | mm | mm | m² | Tm - Ta (K) | | 18,4 | 14,6 | 13,1 |
| SLK-E, SLK-M, SLK-F, SLK-FPV1 | 2.000 | 1.006 | 138 | **2,01** | Power output (W) | | 950 | 1.111 | 1.194 |
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| Performance test method | Air heating collector - steady state - indoors | | |
| Performance parameters related to gross area | $\eta_{hem}(\dot{m}_{min})$ | $\eta_{hem}(\dot{m}_{mean})$ | $\eta_{hem}(\dot{m}_{max})$ |
| Units | - | - | - |
| Flow rate specific test results | 0,473 | 0,553 | 0,594 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Bi-directional incidence angle modifiers? | No | *Kϑ values are obligatory for 50°.* | | | | | | | | |
| Incidence angle modifiers Kθ(θ) | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| | Kθ(θ) | 1,00 | 1,00 | 0,99 | 0,97 | 0,93 | 0,85 | 0,71 | 0,45 | 0,00 |
| Incidence angle modifier not bi-directional - leave fields blank | | | | | | | | | | |

| | | | |
|---|---|---|---|
| Mass flow rate during testing ($\dot{m}_{min}$ / $m_{mean}$ / $m_{max}$) | 122 | 231 | 400 |
| Stagnation temperature | Tstg | 120 | °C |
| Effective thermal capacity | ceff = C/Ag | 11,4 | kJ/(m²K) |
| Max. intende operation temperature | Tmax,op | 110 | °C |

| Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area | | | | | | |
|---|---|---|---|---|---|---|
| Flow rate | [kg/h] | 100 | 200 | 300 | 400 | 500 |
| Pressure drop, ΔP | Pa | 0,6 | 2,3 | 5,1 | 8,9 | 13,8 |

| | | | | | |
|---|---|---|---|---|---|
| Testing Laboratory | TestLab Solar Thermal Systems, Fraunhofer ISE | | | | |
| Website | | | | | |
| Test report id. number | KTB 2024-04 | | Date of test report | 2024.11.27 | |
| During the test GDIF/GTOT was always between | - | and | - | | |

**Comments of testing laboratory:**

Only the Power Output values for the mean air mass flow are shown in this data sheet. The dependence of the Power Output on the air mass flow can be found in the underlying test report. The pressue drop are given for the collector SLK-M. Further pressure drop results are given within the mentioned test report.

Stefan Mehnert
Digital unterschrieben von Stefan Mehnert
Datum: 2024.12.02 09:22:57 +01'00'