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| Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate | | | | | Licence Number | | 011-7S1645 R | | | | |
| | | | | | Issued | | 2016-03-14 | | | | |
| Company holding the | | S-Power Entwicklungs und Vertriebs GmbH | | | Country | Germany | | | | | |
| Brand (optional) | | s-power | | | Website | www.s-power.de | | | | | |
| Street, street number | | Industriestraße 24-27 | | | E-mail | info@s-power.de | | | | | |
| Postal Code / City, province | | 49716 Meppen | | | Tel/Fax | +49 (0) 5931 88388-0/-99 | | | | | |
| Collector Type (flat plate glazed/un-glazed; evacuate tubular) | | | | | Evacuated tubular collector | | | | | | |
| Thermal / photo voltaic hybrid collector? (PVT collector) | | | | | No | | | | | | |
| Integration in the roof possible ? (manufacturers declaration) | | | | | No | | | | | | |
| Collector name | Aperture area (Aa) m ² | Gross length mm | Gross width mm | Gross height mm | Gross area (AG) m ² | Power output per collector module | | | | | |
| | | | | | | G = 1000 W/m ² | | | | | |
| | | | | | | T _m -T _a | | | | | |
| | | | | | | 0 K | 10 K | 30 K | 50 K | 70 K | |
| | | | | | | W | W | W | W | W | |
| s-power HP30-3000 TPS inside PowerPlus | 3.05 | 2 207 | 2 245 | 88 | 4.95 | 2 144 | 2 075 | 1 927 | 1 767 | 1 595 | |
| s-power HP20-2000 TPS inside PowerPlus | 2.03 | 2 207 | 1 495 | 88 | 3.30 | 1 427 | 1 381 | 1 283 | 1 176 | 1 061 | |
| s-power HP10-1000 TPS inside PowerPlus | 1.02 | 2 207 | 745 | 88 | 1.64 | 717 | 694 | 644 | 591 | 533 | |
| s-power HP30-3000 TPS inside Power* | 3.05 | 2 207 | 2 245 | 88 | 4.95 | 2 144 | 2 075 | 1 927 | 1 767 | 1 595 | |
| s-power HP20-2000 TPS inside Power* | 2.03 | 2 207 | 1 495 | 88 | 3.30 | 1 427 | 1 381 | 1 283 | 1 176 | 1 061 | |
| s-power HP10-1000 TPS inside Power* | 1.02 | 2 207 | 745 | 88 | 1.64 | 717 | 694 | 644 | 591 | 533 | |
| Performance test method | | | | | Glazed liquid heating collector - steady state - outdoor | | | | | | |
| Performance parameters related to aperture area | | | | | η ₀ | a ₁ | a ₂ | | | | |
| Units | | | | | - | W/(m ² K) | W/(m ² K ²) | | | | |
| Test results - Flow rate and fluid see note 1 | | | | | 0.703 | 2.224 | 0.005 | | | | |
| Bi-directional incidence angle modifiers? | | Yes <i>K_θ values are obligatory for 50°.</i> | | | | | | | | | |
| Incidence angle modifiers K_θ(θT) transversal direction | | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| | | K _θ (θT) | 1.02 | 1.02 | 1.02 | 1.05 | 1.05 | 1.00 | 0.73 | | 0.00 |
| Incidence angle modifiers K_θ(θL) longitudinal direction | | Angle | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| | | K _θ (θL) | 1.00 | 1.00 | 0.99 | 0.98 | 0.97 | 0.94 | 0.88 | | 0.00 |
| Stagnation temperature - Weather conditions see note 2 | | | | | T _{stg} | 158 °C | | | | | |
| Effective thermal capacity | | | | | c _{eff} = C/Ag | 4.14 kJ/(m ² K) | | | | | |
| Max. intended operation temperature - see note 3 | | | | | T _{max,op} | 140 °C | | | | | |
| Max. operation pressure - see note 3 | | | | | p _{max,op} | 1000 kPa | | | | | |
| Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area | | | | | | | | | | | |
| Flow rate | kg/(s m ²) | 0.014 | 0.028 | 0.042 | 0.056 | 0.083 | 0.111 | 0.139 | 0.167 | | |
| Pressure drop, ΔP | Pa | 133 | 420 | 846 | 1412 | 2962 | 5070 | 7736 | 10960 | | |
| Optional weather data | | Location | | Link | | | | | | | |
| Testing Laboratory | | TÜV Rheinland Energie und Umwelt GmbH | | | | | | | | | |
| Website | | www.tuv.com/st | | | | | | | | | |
| Test report id. number | | 21210919a_800_10hp_spower; 21210919a_2400_30hp_spower | | | | Date of test report | | all 2011-01-24 | | | |
| During the test GDIF/GTOT was always between | | 0.08 | and | 0.85 | | | | | | | |
| Comments of testing laboratory: | | | | | | | | | | | |
| *The collector was tested with a black backside sheet to minimize backside reflectivity. The tested collector was build with the so called Narva power tube with backside coating (PowerPlus). If the standard tube with only front side coating will be used (Power), the output performance will be the same as for the TPS inside PowerPlus type tested with a black backside sheet. An additional thermal performance test with the collector TPS inside PowerPlus using a high efficiency backside reflector is given on page 3 and 4. | | | | | | | | | | | |
| Note 1 | Flow rate | 0.033 | kg/(s m ²) | Fluid | Water | | | | | | |
| Note 2 | Irradiance, G = 1000 W/m²; Ambient temperature, T_a=30 °C | | | | | | | | | | |
| Note 3 | Given by manufacturer | | | | | | | | | | |
| | | | | | |  | | | | | |
| Datashet version: 4.05, 2013-11-07 | | | | | | | | | | | |
| 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 | | | | | | | | | | | |

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| Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate | Licence Number | 011-751645 R |
| | Issued | 14.03.2016 |

| Annual collector output kWh/module | | | | | | | | | | | | | | |
|-------------------------------------------|------------------------------------------------------|-------|-------|-------|-------|-------|-----------|-------|-------|----------|-------|-------|--|--|
| Collector name | Location and collector temperature (T _m) | | | | | | | | | | | | | |
| | Athens | | | Davos | | | Stockholm | | | Würzburg | | | | |
| | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C | 25°C | 50°C | 75°C | | |
| s-power HP30-3000 TPS inside PowerPlus | 3 621 | 2 937 | 2 313 | 2 951 | 2 357 | 1 832 | 2 134 | 1 636 | 1 228 | 2 309 | 1 770 | 1 313 | | |
| s-power HP20-2000 TPS inside PowerPlus | 2 410 | 1 955 | 1 539 | 1 964 | 1 568 | 1 220 | 1 421 | 1 089 | 817 | 1 537 | 1 178 | 874 | | |
| s-power HP10-1000 TPS inside PowerPlus | 1 211 | 982 | 773 | 987 | 788 | 613 | 714 | 547 | 411 | 772 | 592 | 439 | | |
| s-power HP30-3000 TPS inside Power | 3 621 | 2 937 | 2 313 | 2 951 | 2 357 | 1 832 | 2 134 | 1 636 | 1 228 | 2 309 | 1 770 | 1 313 | | |
| s-power HP20-2000 TPS inside Power | 2 410 | 1 955 | 1 539 | 1 964 | 1 568 | 1 220 | 1 421 | 1 089 | 817 | 1 537 | 1 178 | 874 | | |
| s-power HP10-1000 TPS inside Power | 1 211 | 982 | 773 | 987 | 788 | 613 | 714 | 547 | 411 | 772 | 592 | 439 | | |
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Collector mounting: Fixed or tracking Fixed; slope = latitude - 15° (rounded to nearest 5°)

| Overview of locations | | | | |
|------------------------------|------------|----------------------------------------|----------------------|----------------------------------------|
| Location | Latitude ° | G _{tot} kWh/m ² | T _a °C | Collector orientation or tracking mode |
| Athens | 38 | 1 765 | 18.5 | South, 25° |
| Davos | 47 | 1 714 | 3.2 | South, 30° |
| Stockholm | 59 | 1 166 | 7.5 | South, 45° |
| Würzburg | 50 | 1 244 | 9.0 | South, 35° |
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|------------------|--------------------------------------------------------------------------------|------|
| G _{tot} | Annual total irradiation on collector plane | kWh/ |
| T _a | Mean annual ambient air temperature | °C |
| T _m | Constant collector operating temperature (mean of in- and outlet temperatures) | °C |

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

