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| Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate | Licence number | 011-7S675 F |
| | Date of issue | 14.04.2015 |

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|-----------------------------|-----------------|---------|-------------------------|
| Company holding the licence | Westfalen AG | Country | Germany |
| Brand (optional) | - | Website | www.westfalen-ag.de |
| Street, number | Industrieweg 43 | E-mail | info@westfalen-ag.de |
| Postal Code | 48155 | Tel. | +49 (0)251 - 695 290 |
| City | Münster | Fax | +49 (0)251 - 695 73 290 |

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| Collector Type (flat plate / evacuate tubular / un-g glazed) | Flat plate collector |
|--|----------------------|

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| Integration in the roof possible ? | No |
|------------------------------------|----|

| Collector name | Aperture area (A _a) [m ²] | Gross length [mm] | Gross width [mm] | Gross height [mm] | Gross area (A _G) [m ²] | Power output per collector unit G = 1000 W/m ² T _m -T _a : | | | | |
|----------------|--|----------------------|---------------------|----------------------|---|--|-------|-------|-------|------|
| | | | | | | 0 K | 10 K | 30 K | 50 K | 70 K |
| | | | | | | [W] | [W] | [W] | [W] | [W] |
| Solacept FK22 | 2.01 | 1 933 | 1 163 | 80 | 2.25 | 1 567 | 1 485 | 1 304 | 1 100 | 875 |
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|--|-----------------|-------|------------------------------------|
| Collector efficiency parameters related to aperture area (A _a) Type of fluid and flow rate see note 1 | η _{0a} | 0.780 | - |
| | a _{1a} | 3.95 | W/(m ² K) |
| | a _{2a} | 0.014 | W/(m ² K ²) |

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| Stagnation temperature - Weather conditions see note 2 | t _{stg} | 191 | °C |
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|----------------------------|-------------------------------------|-----|-----------------------|
| Effective thermal capacity | C _{eff} = C/A _a | 4.5 | kJ/(m ² K) |
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| Max. operation pressure - see note 3 | p _{max} | 1000 | kPa |
|--------------------------------------|------------------|------|-----|

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|--|-----------------|------|---------------------------------|------|---------------------------------------|------|--|--|--|--|
| Incidence angle modifiers K _θ (θ) | K _{θd} | 0.82 | θ _T / θ _L | 50° | at G _{DIF} /G _{TOT} | 0.15 | | | | |
| | | 0.25 | K _θ (θ) | 0.88 | | | | | | |

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| Testing Laboratory | Institut für Solarenergieforschung Hameln |
| Website | www.isfh.de |
| Test report id. number | 46-11/KD; 47-11/KQ |
| Date of test report | 24.02.2011; 24.02.2011 |
| Perf. test method | EN 12975-2 6.1.5 (indoor) |

Comments of testing laboratory :

The incidence angle modifier was determined outdoor according to a quasi-dynamic test procedure.

The collector efficiency parameter and incidence angle modifiers are related to a radiation ratio of G(Diffuse)/G(Total)=0.15.

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| Note 1 | Fluid | Water | Flow rate | 0.039 | kg/s per m ² | Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 0 51 51 / 999-100 Fax: 0 51 51 / 999-500 |
| Note 2 | Irradiance, G _s =1000 W/m ² ; Ambient temperature , T _a =30 °C | | | | | |
| Note 3 | Given by manufacturer | | | | | |



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| Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate | Licence number | 011-7S675 F |
| | Issued | 14.04.2015 |

| Annual collector output kWh | | | | | | | | | | | | | | | |
|-----------------------------|--|-------|------|-------|-------|------|-----------|------|------|----------|------|------|--|--|--|
| 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 | | | |
| Solacept FK22 | 2 323 | 1 584 | 980 | 1 852 | 1 220 | 719 | 1 276 | 804 | 465 | 1 384 | 858 | 486 | | | |
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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/m ² |
| T _a | Mean annual ambient air temperature | °C |
| T _m | Constant collector operating temperature (mean of in- and outlet temperatures) | °C |

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

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| DIN CERTCO • Alboinstraße 56 • 12103 Berlin Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de | | Datasheet version: VERSION 3.6, 2012.01.20 Calculation program version: 3.07, October 2011 (SP) |
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