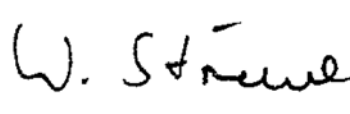




| | | | | | | | | | | | | |
|---|---|---|--|---------------------------|--|---|---------------------------------------|---|---|---|-------------------------------------|---------------------------------|
| Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK | | | | | | Registration No. Registernummer Num. d'enregistrement Date / Datum / Date | | 011-7S1351 A 05.08.2010 | | | | |
| Company / Firma / Société | | | Jiangsu Huayang Solar Energy Co., Ltd, China | | | Country/Land/Pays | | China | | | | |
| Street / Straße / Rue | | | Nr. 22 Muyang Road | | | Website | | http://en.huayang solar.com | | | | |
| Postal Code, Place / PLZ, Ort / Code postal, Place | | | 225127 | Yangzhou | | E-mail | | anthony@jiangsuhuayang.com | | | | |
| | | | | | | Tel. / Fax | | +86 514 8796 0961 / -09 61 | | | | |
| System classification / G / F | | | | | | | | | | | | |
| Flow principle / G / F | | | | | Thermosiphon / G / F | | | | | | | |
| Direct / indirect / G / F | | | | | Indirect / G / F | | | | | | | |
| Press. principle / G / F | | | | | Closed / G / F | | | | | | | |
| Drain back/down / G / F | | | | | No drain (always filled) / G / F | | | | | | | |
| Storage location / G / F | | | | | Outdoor / G / F | | | | | | | |
| Storage position / G / F | | | | | Horizontal / G / F | | | | | | | |
| Int. back-up / G / F | | | | | Electric / G / F | | | | | | | |
| If other: / G / F | | | | | Electric heater is optional | | | | | | | |
| EN12976 type / G / F | | | | | Solar only / G / F | | | | | | | |
| Collector(s) / Kollektor(en) / Capteur(s) | | | | | Storage(s) / Akkumulator(en) / F | | | | | | | |
| Company / Hersteller / Manufactur | | | Huayang Solar Energy Co. | | | Company / Hersteller / Manufactur | | | Huayang Solar Energy Co. | | | |
| Keymark reg. no. (optional) | | | RRRRRRRRR | | | | | | | | | |
| Model Bezeichnung Modèle | Per module / G / F | | | | | | Model Bezeichnung Modèle | Total volume G F | Gross diameter/width Diam. / Breite (Außenmaß) Diam. / Largeur hors Tout | Gross length Länge (Außenmaß) longueur hors tout | Back-up heated volume G F | El. back-up power G F |
| | Aperture area (Aa) Aperturfläche (Aa) Superficie d'entrée (Aa) | Gross length Länge (Außenmaß) Longueur Hors tout | Gross width Breite (Außenmaß) Largeur hors Tout | No. modules G F | litres | mm | | | | | | |
| m ² | m | m | min - max | | | | | | | | | |
| HY-CY-1858-18 | 1.69 | 1.8 | 1.36 | 1 | - | 1 | HY-CY-1858-18 | 150 | 455 | 1610 | n.s. | 1.5 |
| HY-CY-1858-24 | 2.25 | 1.8 | 1.81 | 9 | - | 9 | HY-CY-1858-24 | 200 | 455 | 2060 | n.s. | 1.5 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Controller / G / F | | | | | Fluid / G / F | | | | | | | |
| Company/Hersteller/Manufactur | | | n.a. | | | Company/Hersteller/Manufactur | | | n.s. | | | |
| Model / Bezeichnung / Modèle | | | n.a. | | | Model / Bezeichnung / Modèle | | | n.s. | | | |
| Functions | English | | | | | | Freezing point | | | | | |
| G | Deutsch | | | | | | G | -30 | °C | | | |
| F | Français | | | | | | F | | | | | |
| System family overview / G / F | | | | | | | | | | | | |
| Collector G F | No. collectors / G / F | | | | | | | | | | | |
| | Storage / G / F | | | | | | | | | | | |
| | HY-CY-1858-18 | HY-CY-1858-24 | 0 | 0 | 0 | | | | | | | |
| HY-CY-1858-18 | | 1 | | | | | | | | | | |
| HY-CY-1858-24 | | | 1 | | | | | | | | | |
| 0 | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | |
| Testing Laboratory / Prüflaboratorium / Laboratoire d'essais | | | | | Fraunhofer ISE, TestLab Solar Thermal Systems | | | | | | | |
| Website | | | | | www.kollektortest.de | | | | | | | |
| Test report id. number / Prüfberichtsnummer / F | | | | | STB Nr. 2010-01-k2, STB Nr. 2010-02-k | | | | | | | |
| Date of test report / Datum G / date F | | | | | 18. January 2010 | | | | | | | |
| Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire | | | | | | | | | | | | |
| English | | | | | | | | | | | | |
| Deutsch | | | | | | | | | | | | |
| Français | | | | | | | | | | | | |
|  Stamp | | | | | | | | | | | | |



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| Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK | Registration No. Registernummer Num. d'enregistrement Date / Datum / Date | RRRRRRRRRR 05.08.2010 |
|--|---|--|

| | | | |
|---|--|--|--|
| Company / Firma / Société Street / Straße / Rue Postal Code, Place / PLZ, Ort / Code postal, Place | Jiangsu Huayang Solar Energy Co., Ltd, China Nr. 22 Muyang Road 225127 Yangzhou | Country/Land/Pays Website E-mail Tel. / Fax | China http://en.huayang solar.com anthony@jiangsuhuayang.com +86 514 8796 0961 / -09 61 |
|---|--|--|--|

| System family overview / G / F | | | | | | | | | | | | |
|--------------------------------|------------------------------|---------------|---|---|--|--|--|--|--|--|--|--|
| Collector type G F | Number of collectors / G / F | | | | | | | | | | | |
| | Storage type / G / F | | | | | | | | | | | |
| | HY-CY-1858-18 | HY-CY-1858-24 | | | | | | | | | | |
| HY-CY-1858-18 | | | 1 | | | | | | | | | |
| HY-CY-1858-24 | | | | 1 | | | | | | | | |

| | | | | | | | | | | | | |
|--------------------------------------|---------------|--------------------------|---|------------------------|---------------|--|--|--|--|--|--|---------------|
| Name of system configuration / G / F | | | | | | | | | | | | HY-CY-1858-18 |
| Collector type G F | HY-CY-1858-18 | No. collectors G F | 1 | Storage type G F | HY-CY-1858-18 | | | | | | | |

| Calculated annual results / G / F | | | | | | | | | | | | |
|-----------------------------------|-------------------------------------|-------|-------|----------------------|-------|-------|--------------------|------|------|------------------------|-----|-----|
| Location G F | Daily draw-off litres/day / G / F / | | | | | | | | | | | |
| | 80 | 140 | 200 | 80 | 140 | 200 | 80 | 140 | 200 | 80 | 140 | 200 |
| | l/d | l/d | l/d | l/d | l/d | l/d | l/d | l/d | l/d | l/d | l/d | l/d |
| | Q _d kWh/y | | | Q _L kWh/y | | | f _{sol} % | | | Q _{par} kWh/y | | |
| Stockholm, SE | 1,241 | 2,180 | 3,109 | 778 | 1,079 | 1,184 | 62.7 | 49.5 | 38.1 | - | - | - |
| Würzburg, DE | 1,191 | 2,082 | 2,982 | 819 | 1,193 | 1,369 | 68.8 | 57.3 | 45.9 | - | - | - |
| Davos, CH | 1,349 | 2,356 | 3,372 | 1,202 | 1,685 | 1,851 | 89.1 | 71.5 | 54.9 | - | - | - |
| Athens, GR | 924 | 1,620 | 2,311 | 792 | 1,220 | 1,465 | 85.7 | 75.3 | 63.4 | - | - | - |

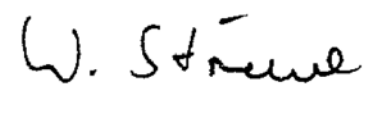
| | | |
|----------------------------|------------------|---|
| Perf. indicators G F | Q _d | Heat demand / G / F |
| | Q _L | System output / G / F |
| | f _{sol} | Q _L /Q _d ; solar fraction / G / F |
| | Q _{par} | Elec. for pumps/controllers / G / F |

| Ref. conditions G F | Stockholm SE | | | | | Würzburg DE | | | | | Davos CH | | | | | Athens GR | | | | |
|---------------------------|--------------|------------|-----------|-------------|-------|-------------|--|--|--|--|----------|--|--|--|--|-----------|--|--|--|--|
| | G | 1,113 | 1,230 | 1,684 | 1,718 | | | | | | | | | | | | | | | |
| T _a | 6.9 | 9.0 | 3.2 | 18.5 | | | | | | | | | | | | | | | | |
| T _c | 8.5 | 10.0 | 5.4 | 17.8 | | | | | | | | | | | | | | | | |
| ΔT _c | 2.1 - 14.9 | 7.0 - 13.0 | 4.6 - 6.2 | 10.4 - 25.2 | | | | | | | | | | | | | | | | |

| | | |
|-----------------|--------|--|
| G | kWh/m² | Annual irradiation South, 45° / G / F |
| T _a | °C | Annual mean air temp. / G / F |
| T _c | °C | Annual mean cold water temp. / G / F |
| ΔT _c | °C | Seasonal variation of T _c / G / F |
| T _h | 45°C | Desired (mix. valve) temp. / G / F |

| | | | | | |
|--|---------------------|-----|---|-----|-----|
| Max. operating press. - collector side G F | n.a. (heat pipe) | kPa | Max. operating press. - tank side G F | 650 | kPa |
|--|---------------------|-----|---|-----|-----|

| | |
|--|---|
| Testing Laboratory / Prüflaboratorium / Laboratoire d'essais | Fraunhofer ISE, TestLab Solar Thermal Systems |
| Website | www.kollektortest.de |
| Test report id. number / Prüberichtnummer / F | STB Nr. 2010-02-k |
| Date of test report / G / F | 18. January 2010 |
| Test method / G / F | ISO 9459-5 (DST) |

| | |
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| Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Français |  Stamp |
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| Summary of EN 12976 Test Results, annex to Solar KEYMARK Certificate Kurzfassung EN 12976 Test Ergebnisse, Anlage zum Solar KEYMARK-Zertifikat Synthèse des résultats d'essais selon EN 12976, Annexe au certificat Solar KEYMARK | Registration No., Registernummer Num, d'enregistremen Date / Datum / Date | RRRRRRRRRR 05,08,2010 |
| | Company / Firma / Société Jiangsu Huayang Solar Energy Co., Ltd, China | |
| | Street / Straße / Rue Nr, 22 Muyang Road | |

| | |
|--|---|
| Country/Land/Pays China Website http://en.huayang solar.com E-mail anthony@jiangsuhuayang.com Tel, / Fax +86 514 8796 0961 / -09 61 | Postal Code, Place / PLZ, Ort / Code postal, Place 225127 Yangzhou |
|--|---|

| System family overview / G / F | | | | | | | | | | | | |
|--------------------------------|------------------------------|---------------|--|--|--|--|--|--|--|--|--|--|
| Collector type G F | Number of collectors / G / F | | | | | | | | | | | |
| | Storage type / G / F | | | | | | | | | | | |
| | HY-CY-1858-18 | HY-CY-1858-24 | | | | | | | | | | |
| HY-CY-1858-18 | 1 | | | | | | | | | | | |
| HY-CY-1858-24 | | 1 | | | | | | | | | | |

| | | | | | | | | | | | | |
|--------------------------------------|---------------|--------------------------|---|------------------------|---------------|--|--|--|--|--|--|---------------|
| Name of system konfiguration / G / F | | | | | | | | | | | | HY-CY-1858-24 |
| Collector type G F | HY-CY-1858-24 | No, collectors G F | 1 | Storage type G F | HY-CY-1858-24 | | | | | | | |

| Calculated annual results / G / F | | | | | | | | | | | | |
|-----------------------------------|-------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Location G F | Daily draw-off litres/day / G / F / | | | | | | | | | | | |
| | 110 l/d | 200 l/d | 300 l/d | 110 l/d | 200 l/d | 300 l/d | 110 l/d | 200 l/d | 300 l/d | 110 l/d | 200 l/d | 300 l/d |
| | Qd kWh/y | | | QL kWh/y | | | fsol % | | | Qpar kWh/y | | |
| Stockholm, SE | 1,703 | 3,110 | 4,673 | 1,088 | 1,571 | 1,720 | 63.9 | 50.5 | 36.8 | - | - | - |
| Würzburg, DE | 1,641 | 2,971 | 4,458 | 1,141 | 1,702 | 1,921 | 69.5 | 57.3 | 43.1 | - | - | - |
| Davos, CH | 1,847 | 3,371 | 5,058 | 1,649 | 2,386 | 2,580 | 89.3 | 70.8 | 51.0 | - | - | - |
| Athens, GR | 1,271 | 2,310 | 3,465 | 1,097 | 1,737 | 2,062 | 86.3 | 75.2 | 59.5 | - | - | - |

| | | |
|----------------------------|------|-------------------------------------|
| Perf, indicators G F | Qd | Heat demand / G / F |
| | QL | System output / G / F |
| | fsol | QL/Qd; solar fraction / G / F |
| | Qpar | Elec, for pumps/controllers / G / F |

| Ref, conditions G F | Stockholm SE | | | | | Würzburg DE | | | | | Davos CH | | | | | Athens GR | | | | | |
|---------------------------|--------------|------------|--|--|--|-------------|------------|--|--|--|----------|-----------|--|--|--|-----------|-------------|--|--|--|--|
| | G | 1,113 | | | | | 1,230 | | | | | 1,684 | | | | | 1,718 | | | | |
| | Ta | 6.9 | | | | | 9.0 | | | | | 3.2 | | | | | 18.5 | | | | |
| | Tc | 8.5 | | | | | 10.0 | | | | | 5.4 | | | | | 17.8 | | | | |
| | ΔTc | 2.1 - 14.9 | | | | | 7.0 - 13.0 | | | | | 4.6 - 6.2 | | | | | 10.4 - 25.2 | | | | |

| | | |
|-----|--------|---------------------------------------|
| G | kWh/m² | Annual irradiation South, 45° / G / F |
| Ta | °C | Annual mean air temp, / G / F |
| Tc | °C | Annual mean cold water temp, / G / F |
| ΔTc | °C | Seasonal variation of Tc / G / F |
| Th | 45°C | Desired (mix, valve) temp, / G F |

| | | | | | |
|--|---------------------|-----|---|-----|-----|
| Max, operating press, - collector side G F | n.a. (heat pipe) | kPa | Max, operating press, - tank side G F | 650 | kPa |
|--|---------------------|-----|---|-----|-----|

| | |
|--|--|
| Testing Laboratory / Prüflaboratorium / Laboratoire d'essais | Fraunhofer ISE, TestLab Solar Thermal Systems |
| Website | www.kollektortest.de |
| Test report id, number / Prüberichtsnummer / F | STB Nr. 2010-01-k2 |
| Date of test report / G / F | 18. January 2010 |
| Test method / G / F | ISO 9459-5 (DST) |

| | |
|---|-----------|
| Comments of test lab / Kommentare des laboratoriums / Commentaires du laboratoire English Deutsch Français | Stamp |
|---|-----------|