

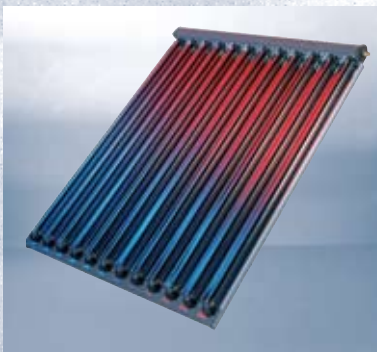


The competence brand for energy saving systems



## Solar technology

High performance flat-plate collectors  
High performance vacuum tube collectors  
Swimming pool absorber  
DHW cylinder options



|                               |  |
|-------------------------------|--|
| <b>Stiftung<br/>Warentest</b> | <b>GUT (1,6)</b>   |
| <b>test</b>                   | Solarkollektor TopSon F3 *<br>Standspeicher SEM-1-300<br>Solarregelung SM-1/BM-Solar |
|                               | Im Test:<br>12 Solaranlagen zur<br>Trinkwassererwärmung                              |
|                               | <b>Ausgabe 3/2008</b>  |

\*Nota: Successor TopSon F3-1 with improved performance data out now

# TopLine / ComfortLine

High performance flat-plate collectors TopSon F3-1 / F3-Q

High performance flat-plate collector CFK-1

for solar heating systems used for DHW heating

for solar heating system used for central heating backup

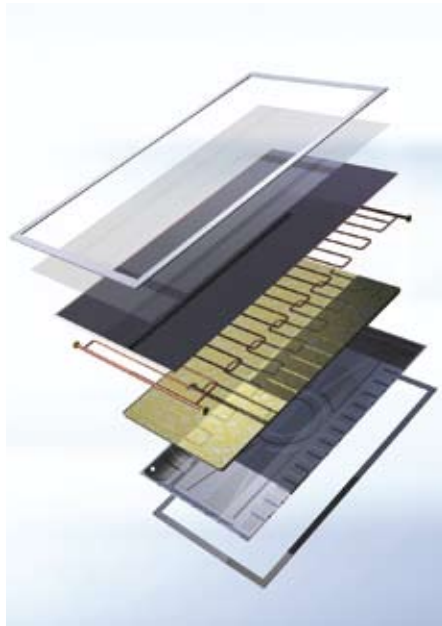


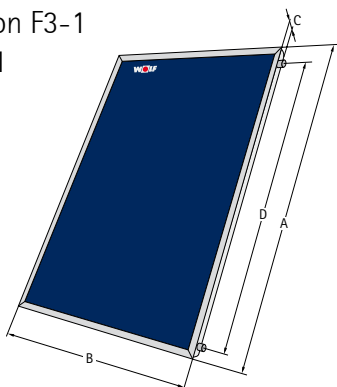
Abbildung: TopSon F3-1

## Benefits of Wolf high performance flat-plate collectors:

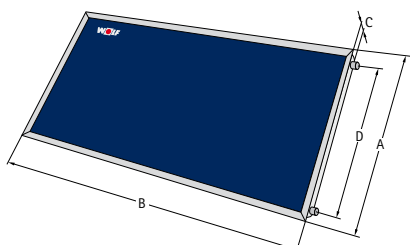
- High performance flat-plate collectors tested to EN 12975 part 2 with Top-energy utilisation; the minimum yield for grants/subsidies [Germany] has been certified
- Certified in accordance with Solar-Keymark (F3-1)
- The conditions set for the „Blue Angel“ certificate of environmental excellence acc. to RAL UZ 73 are met
- Deep-drawn, highly weather resistant aluminium collector housing
- Thermal insulation made from Rockwool, 60 mm thick for minimum cool-down losses, TopSon F3-1/F3-Q with additional insulation on the sides
- Absorber with highly selective coating for extremely high yield  
Meander (TopSon F3-1/F3-Q) or harp (CFK-1) layout ensure an even flow and effective function during „Low Flow“ operation
- Expansion joints between collectors
- Safety glass, 3,2 mm (TopSon F3-1/F3-Q) or 3,0 mm (CFK-1) thick; hail-proof to EN 12975, thermally pre-stressed, TopSon F3-1/F3-Q with improved transparency
- EPDM seal, pressed into a single-piece grip moulding
- With the TopSon F3-1/F3-Q, up to 5 collectors can be connected to one side; connection either on the l.h. or r.h. side
- Flat-plate collectors TopSon F3-1 and CFK-1 for „portrait“ installation, TopSon F3-Q for „landscape“ installation can be individually fitted with various assembly kits (accessory):
  - In-roof mounting kit suitable for double depression interlocking tiles
  - „AluPlus“ on-roof mounting kit suitable for double depression interlocking tiles, slate or similar, corrugated or flat sheet roof coverings
  - „AluFlex“ installing stands suitable for flat roofs or horizontal surfaces
  - „AluFlex“ triangle stands designed for roofs with a low pitch to optimize the irradiation angle (adjustable to 20°, 30°, 45°), suitable for double depression interlocking tiles, slate or similar, corrugated or flat sheet roof coverings
- 5 year warranty

## Specification

TopSon F3-1  
CFK-1



TopSon F3-Q



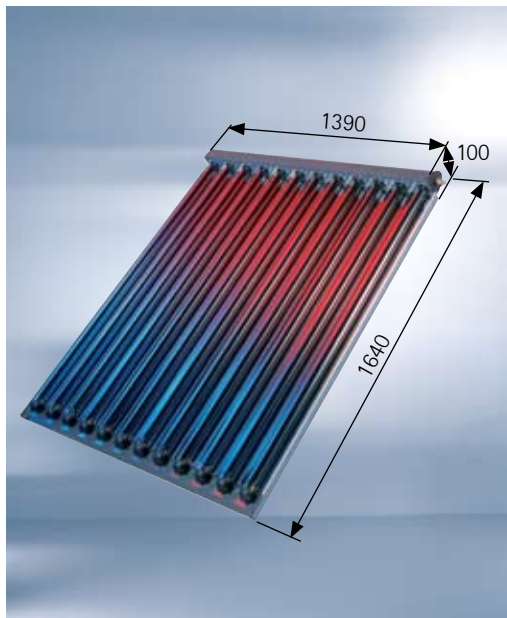
| High performance flat-plate collector        | Type                               | TopSon F3-1      | TopSon F3-Q | CFK-1      |
|--|------------------------------------|------------------|-------------|------------|
| Length                                       | A mm                               | 2099             | 1099        | 2099       |
| Width  | B mm                               | 1099             | 2099        | 1099       |
| Depth  | C mm                               | 110              | 110         | 110        |
| Flow/return                                  | D mm                               | 1900             | 900         | 1900       |
| Connections (flat sealing with union nut)    | G                                  | 3/4"             | 3/4"        | 3/4"       |
| Angle of inclination                         |                                    | 15° to 90°       | 15° to 90°  | 15° to 90° |
| Optical efficiency *                         | %                                  | 80,4             | 81,9        | 71,2       |
| Heat loss coefficient a <sub>1</sub> *       | W/(m <sup>2</sup> K)               | 3,235            | 3,312       | 3,5        |
| Heat loss coefficient a <sub>2</sub> *       | W/(m <sup>2</sup> K <sup>2</sup> ) | 0,0117           | 0,0181      | 0,0084     |
| Max. idle temperature                        | °C                                 | 194              | 198         | 196        |
| Irradiation angle correction factor IAM-50 * | %                                  | 94               | 93          | 95,2       |
| Thermal capacity C *                         | kJ/(m <sup>2</sup> K)              | 5,85             | 6,3         | 4,723      |
| Max. operating pressure                      | bar                                | 10               | 10          | 10         |
| Gross area                                   | m <sup>2</sup>                     | 2,3              | 2,3         | 2,3        |
| Effective absorber area                      | m <sup>2</sup>                     | 2,0              | 2,0         | 2,0        |
| Content                                      | litres                             | 1,7              | 1,9         | 1,1        |
| Weight (dry)                                 | kg                                 | 40               | 41          | 36         |
| Recommend flow vol. per collector            | litres/h                           | 30 - 90          | 30 - 90     | 90         |
| Heat transfer medium                         |                                    | ANRO (undiluted) |             |            |
| Solar-Keymark registration no.               |                                    | 011-7S260F       | -           | -          |

\* Values to EN 12975



# ComfortLine

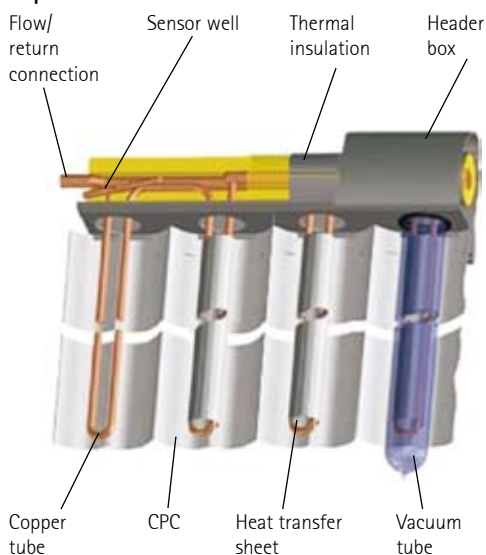
High performance vacuum tube collectors CRK  
for solar heating systems used for DHW heating  
for solar heating systems used for central heating backup



## CRK benefits at a glance:

- The CRK collectors meet the requirements set for the „blue Angel“ certificate of environmental excellence acc. to RAL UZ 73
- Powerful: high performance on the smallest of footprints; high yields particularly during spring and autumn; especially suitable for a combination of DHW heating and central heating backup
- Durable: Direct flow collector designed similar to a Thermos flask, enables a life-long vacuum and therefore ensures high thermal insulation; borosilicate glass hail-proof to DIN EN 12 975
- Constant: Absorber with highly selective coating on the external surface of the internal glass tube inside the high vacuum and therefore protected from environmental influences, no degradation and thus permanently high efficiency
- Flexible: modular layouts for ideal matching to the space available on the roof
- High aesthetics: elegant appearance through small tube diameter, optimised distance between pipes and appealing design
- Easy to install: compact and handy; fully assembled; ready to plug in; suitable for on-roof mounting and free-standing installation
- Warranty: 5 years

## Specification



The CPC (Compound Parabolic Concentrator) increases the efficiency of the tubes by its specific geometry. Thus, even diffuse sunlight is directed to the absorber, in case of an unfavourable irradiation angle.

| Vakuum-Röhrenkollektor                               | Typ                                       | CRK-12         |
|--|---|----------------|
| Connections (flat sealing with union nut)            | mm  | 15             |
| Angle of inclination                                 |   | 15° to 90°     |
| Absorption (energy absorption)                       | %   | 95             |
| Emissions  | %   | 5              |
| Optical efficiency *                                 | %   | 64,2           |
| Heat loss coefficient $a_1$ *                        | W/(m <sup>2</sup> K)                      | 0,885          |
| Heat loss coefficient $a_2$ *                        | W/(m <sup>2</sup> K <sup>2</sup> )        | 0,001          |
| Max. idle temperature                                | °C  | 272            |
| Irradiation angle correction factor $K_{50^\circ}$ * | %   | 0,89           |
| Effective thermal capacity *                         | C <sub>eff</sub> in kJ/(m <sup>2</sup> K) | 8,416          |
| Max. operating pressure                              | bar                                       | 10             |
| Pressure drop  | mbar                                      | 7              |
| Number of vacuum tubes per collector                 | Stück                                     | 12             |
| Diameter of glass tubes                              | mm  | 47/37/1,6      |
| Gross area   | m <sup>2</sup>                            | 2,28           |
| Effective absorber area                              | m <sup>2</sup>                            | 2,0            |
| Content  | Ltr.                                      | 1,6            |
| Weight (dry)   | kg  | 37,6           |
| Heat transfer medium                                 |   | LS (undiluted) |
| Solar-Keymark  |   | 011-7S321 R    |

\* Values to EN 12975

# Swimming pool absorber

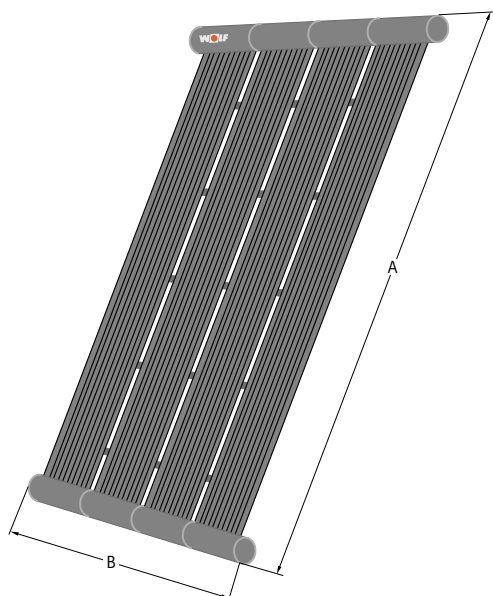
Economic solution for efficiently heating swimming pool water



## Benefits of the swimming pool absorber at a glance:

- Low investment and operating costs
- Long service life through robust absorber tubes
- Scale and dirt-repellent absorber system
- High energy yields through the utilisation of solar and environmental energy
- UV and weather-resistant
- Small attack areas for gusts of wind
- Compact panel dimensions of 3,23 m x 1,24 m
- 5 year warranty

## Specification



| Swimming pool absorber                 |                |      |
|--|----------------|------|
| Length                                 | A mm           | 3230 |
| Width                                  | B mm           | 1240 |
| Operating temperature                  | °C             | 5-90 |
| Permissible operating pressure at 20°C | bar            | 25   |
| Permissible operating pressure at 80°C | bar            | 8    |
| Pressure drop                          | mbar           | 2    |
| Absorber surface area                  | m <sup>2</sup> | 3,5  |
| Content                                | litres         | 12   |
| Weight (dry)                           | kg             | 10   |
| Recommended flow volume per absorber   | litres/h       | 350  |

# Control units

## TopLine solar technology



### Solar module SM1

- Extension module for the regulation of one solar circuit
- In conjunction with Wolf boilers, greater energy saving through intelligent cylinder reheating, i.e. blocking cylinder reheating when there is sufficient solar yield
- Optional connection of heat meters
- Display of the set and actual values on the BM programming module, BM-solar
- eBus interface
- Rast-5 connection technology

incl. one collector sensor (PT 1000) and one storage sensor (NTC 5K) each with sensor well



### Solar module SM2

- Extension module for the regulation of a solar system including up to 2 cylinders and 2 collector fields, incl. 1 collector sensor, 1 cylinder sensor, each with sensor well
- Easy configuration of the controller through selection of pre-defined system options
- In conjunction with Wolf boilers, great energy saving through intelligent cylinder reheating, i.e. blocking cylinder reheating when there is sufficient solar yield
- Heat meter function
- Display of the set actual values on the BM and BM-Solar programming module
- eBus interface with automatic energy management
- Rast-5 connection technology

incl. one collector sensor (PT 1000) and one storage sensor (NTC 5K) each with sensor well



### Programming module BM-Solar

- required for solar module SM1 when used as an independant solar control (Stand-Alone operation)
- LC-Display
- Control by rotary selector with key function
- eBus interface
- the programming module may be installed in a wall mounting base as a remote control for SM1 or SM2

# Stratification cylinder BSP / BSP-W

BSP-800/1000 for combination with solar systems, biomass and fossil cumbustibles

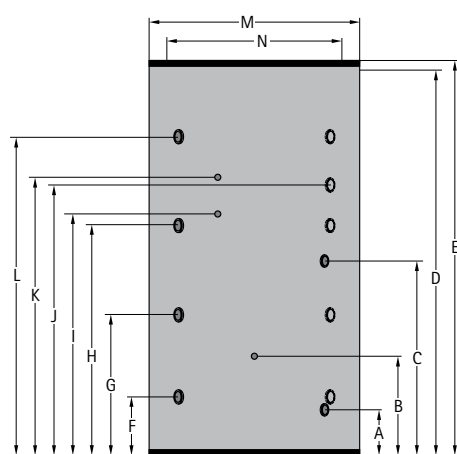
BSP-W1000 for combination with solar systems and heat pumps



## Benefits of the Wolf stratification cylinder BSP:

- Space-saving stratification cylinder
- Hydraulic components e.g. fresh water module, 2 mixing valve circuits, solar pump/fitting assembly are suitable for optimal installation either on the cylinder or the wall
- Stratification sheet inserts stabilize the temperature levels in the cylinder and improve the solar yield considerably
- Hygienic hot water preparation via highly efficient fresh water module (30l/min)
- DHW circulation kit optional; control via timer, thermostat or opening the water tap
- Optional with 2 mixing valve circuit assemblies for high or low temperature circuit
- Minimum energy loss through single-cylinder system
- Economic solution for heating backup
- Removable thermal insulation for easier transport into the installation room
- 5 year warranty on the freestanding cylinder  
2 year warranty on all electrical and moving parts

## Specification



| Stratification cylinder                      |        | BSP-800 | BSP/BSP-W1000 |
|--|--------|---------|---------------|
| Cylinder capacity                            | litres | 785     | 915           |
| Solar return                                 | A mm   | 230     | 230           |
| Solar sensor                                 | B mm   | 490     | 550           |
| Solar flow                                   | C mm   | 910     | 1030          |
| Overall height without insulation            | D mm   | 1755    | 2040          |
| Overall height with insulation               | E mm   | 1825    | 2110          |
| Connection                                   | F mm   | 260     | 310           |
| Connection                                   | G mm   | 630     | 745           |
| Connection                                   | H mm   | 1030    | 1250          |
| Sensor                                       | I mm   | 1230    | 1300          |
| Connection (BSP-W1000 only)                  | J mm   | -       | 1430          |
| Sensor                                       | K mm   | 1350    | 1510          |
| Connection                                   | L mm   | 1430    | 1710          |
| Outside diameter incl. insulation            | M mm   | 1000    | 1000          |
| Outside diameter excl. insulation            | N mm   | 790     | 790           |
| Height of unit when tilted, excl. insulation | mm     | 1788    | 2068          |
| Solar flow/return                            | G      | 1"      | 1"            |
| Connection                                   | Rp     | 1½"     | 1½"           |
| Sensor (4 pcs.) internal diameter            | mm     | 15      | 15            |
| Heat exchanger surface - solar               | m²     | 2,5     | 3             |
| Heat exchanger capacity - solar              | litres | 16,5    | 19,8          |
| Max. operating pressure of cylinder          | bar    | 3       | 3             |
| Max. operating pressure of heat exchanger    | bar    | 10      | 10            |
| Max. operating temperature of cylinder       | °C     | 95      | 95            |
| Weight                                       | kg     | 160     | 180           |

## Accessories

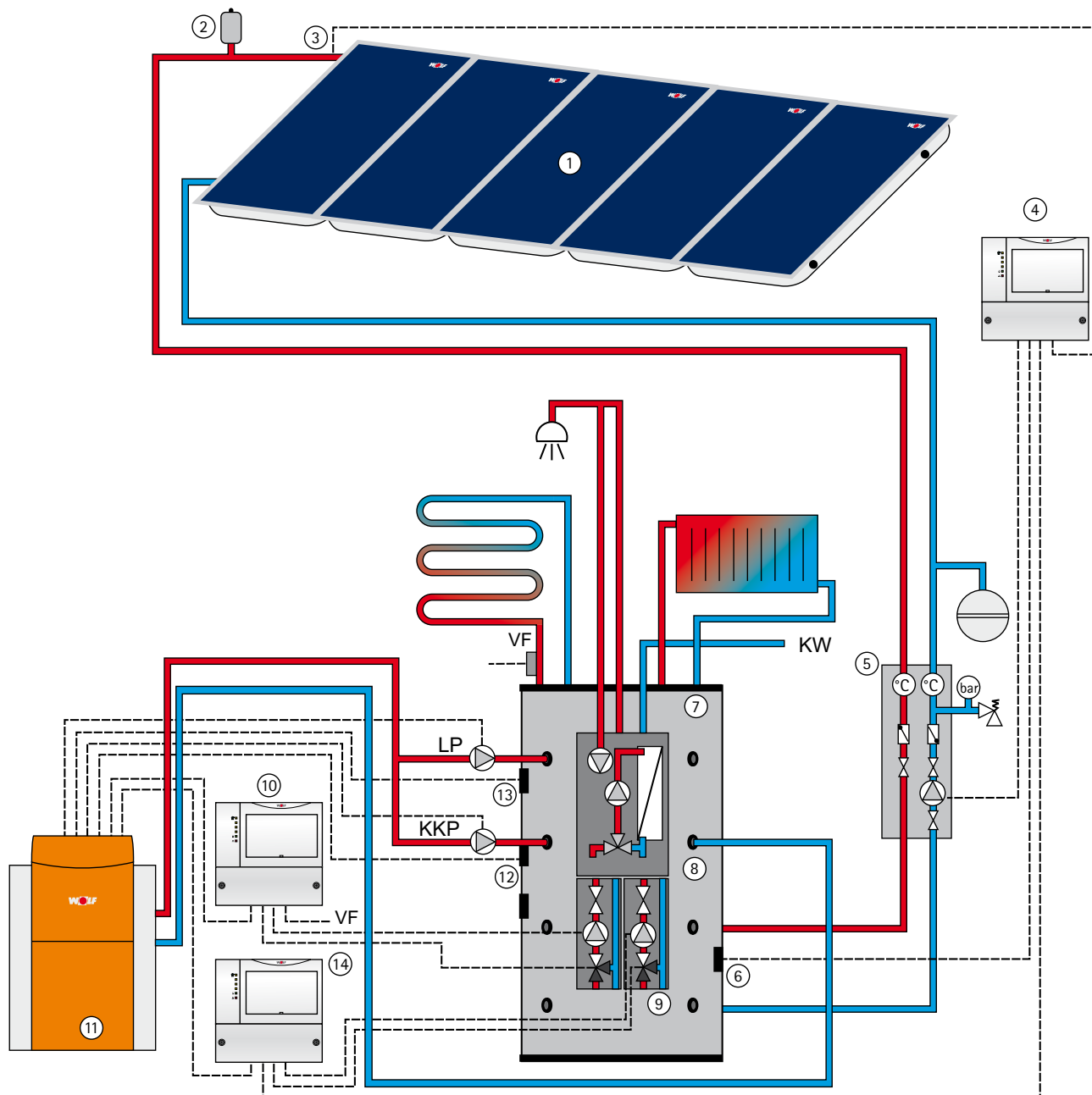
- Mixing valve assembly BSP-MK 1\* for low temperature circuit
- Mixing valve assembly BSP-MK 2\* for high temperature circuit
- Mixing valve assembly BSP-MK 1 and 2\* for both low temperature and high temperature circuit
- DHW circulation module for fresh water module

\* BSP-800/1000 only

| Fresh water module BSP-FW                   |            |           |
|---|------------|-----------|
| Hot water output at 90°C buffer temp.       | litres/min | 30        |
| Weight                                      | kg         | 16        |
| Fresh water module BSP-FWL (BSP-W1000 only) |            |           |
| Hot water output at 50°C buffer temp.       | litres/min | 10        |
| Weight                                      | kg         | 20        |
| Fresh water module BSP-FW / BSP-FWL         |            |           |
| Max. operating pressure - heating           | bar        | 3         |
| Max. operating pressure - sanitary water    | bar        | 10        |
| Max. operating temperature                  | °C         | 95        |
| Power consumption                           | W          | 95        |
| Electrical connection                       |            | 230V/50Hz |

# Pipework layout „Wolf-Solar heating“

Solar DHW heating and central heating backup with stratification cylinder BSP



- |                                      |   |
|--------------------------------------|---|
| ① Collector array                    | ⑧ Fresh water module for DHW heating                |
| ② Air vent trap                      | ⑨ Heating circuit and mixing valve circuit assembly |
| ③ Collector sensor                   | ⑩ Mixer module MM                                   |
| ④ Solar module SM1                   | ⑪ Oil/gas boiler with control R2                    |
| ⑤ Pump/fitting assembly              | ⑫ Collective sensor                                 |
| ⑥ Solar control unit cylinder sensor | ⑬ Cylinder sensor, heating water                    |
| ⑦ Stratification cylinder BSP        | ⑭ Mixer module MM                                   |

When using a control system R3, there is no return temperature boost required for central heating backup with the stratification cylinder.

# Buffer cylinder SPU-2-W / SPU-2

made from steel, with quality certificate

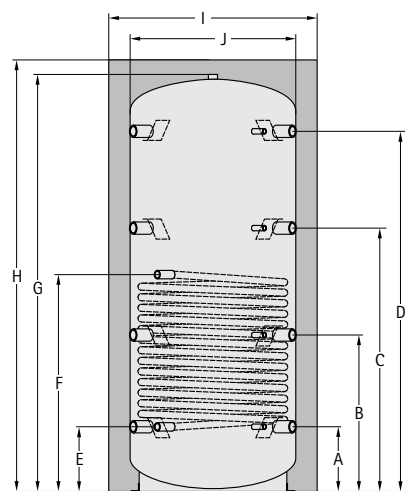
Indirect steel coils for the SPU-2-W



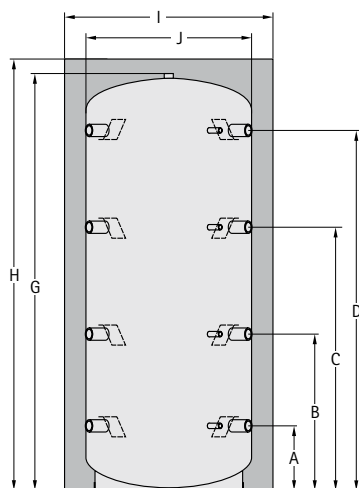
## Benefits of the Wolf SPU-2-W / SPU-2:

- Steel buffer cylinder with 500 to 1500 litre capacity with indirect steel coil, max. operating pressure 3 bar  
Type SPU-2 without indirect coils
- 8 1/2" connections and 4 1/2" connections in the cylinder wall
- Highly effective thermal insulation and low thermal losses through high-grade soft foam thermal insulation, 100 mm thick
- Removable thermal insulation for easier transport into the installation room
- Thermal insulation (CFC free)
- 5 year warranty on the freestanding cylinder  
2 year warranty on all electrical and moving parts

## Specification



Type SPU-2-W



Type SPU-2

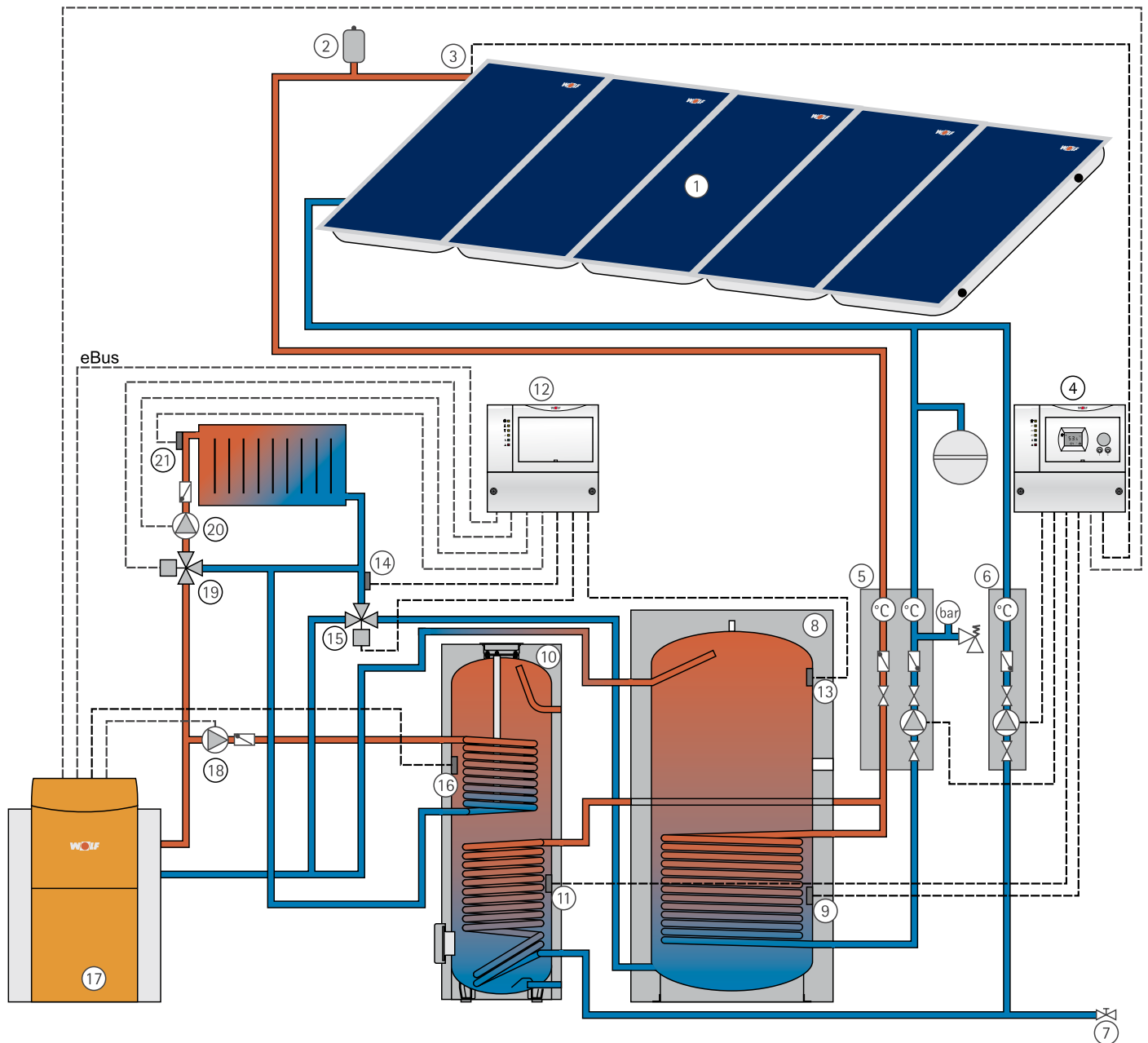
| Buffer cylinder                           | Type SPU-2-W   | 500    | 800    | 1000   | 1500   |
|---|----------------|--------|--------|--------|--------|
|   | Type SPU-2     | 500    | 800    | 1000   | 1500   |
| Cylinder capacity                         | SPU-2-W Ltr.   | 480    | 730    | 915    | 1520   |
|   | SPU-2 Ltr.     | 490    | 775    | 935    | 1545   |
| Connection / thermometer / sensor strip   | A mm           | 210    | 260    | 307    | 372    |
| Connection / thermometer / sensor strip   | B mm           | 605    | 630    | 745    | 817    |
| Connection / thermometer / sensor strip   | C mm           | 995    | 1030   | 1250   | 1342   |
| Connection / thermometer / sensor strip   | D mm           | 1345   | 1380   | 1710   | 1752   |
| Indirect coil return *                    | E mm           | 210    | 260    | 307    | 372    |
| Indirect coil flow *                      | F mm           | 1105   | 930    | 1030   | 1172   |
| Height excl. thermal insulation           | G mm           | 1560   | 1640   | 1980   | 2070   |
| Height incl. thermal insulation           | H mm           | 1640   | 1700   | 2050   | 2150   |
| Diameter incl. thermal insulation         | I mm           | 850    | 990    | 990    | 1200   |
| Diameter excl. thermal insulation         | J mm           | 650    | 790    | 790    | 1000   |
| Height tilted, incl. thermal insulation   | mm             | 1860   | 1980   | 2290   | 2460   |
| Height tilted, excl. thermal insulation   | mm             | 1630   | 1720   | 2060   | 2180   |
| Connections (8 pcs.)                      | Rp             | 1 1/2" | 1 1/2" | 1 1/2" | 1 1/2" |
| Thermometer (4 pcs.)                      | Rp             | 1/2"   | 1/2"   | 1/2"   | 1/2"   |
| Indirect coil connection *                | Rp             | 1"     | 1"     | 1"     | 1"     |
| Indirect coil area *                      | m <sup>2</sup> | 1,8    | 2,4    | 3      | 3,6    |
| Coil content *                            | litres         | 10,5   | 13,5   | 17,0   | 20,5   |
| Max. operating pressure prim. * / sec.    | bar            | 10/3   | 10/3   | 10/3   | 10/3   |
| Max. operating temperature prim. * / sec. | °C             | 110/95 | 110/95 | 110/95 | 110/95 |
| Weight                                    | SPU-2-W kg     | 110    | 140    | 175    | 230    |
|   | SPU-2 kg       | 85     | 106    | 133    | 180    |

\* only for SPU-2-W



# Pipework layout

Solar DHW heating and central heating backup with solar cylinder SEM-1 and buffer cylinder SPU-2-W



- |   |   |
|---|---|
| ① Collector array                                 | ⑫ Mixer module MM (config. 4)           |
| ② Air vent trap                                   | ⑬ Buffer cylinder sensor                |
| ③ Collector sensor                                | ⑭ Return temperature sensor             |
| ④ Temperature differential control unit SM2       | ⑮ Three-way diverter valve              |
| ⑤ Pump/fitting assembly                           | ⑯ Cylinder sensor, heating water        |
| ⑥ Pump/fitting assembly extension                 | ⑰ Boiler with control R2                |
| ⑦ Fill & drain valve                              | ⑱ Cylinder charging pump, heating water |
| ⑧ Buffer cylinder SPU-2-W                         | ⑲ Mixing valve motor                    |
| ⑨ Solar circuit cylinder sensor (buffer cylinder) | ⑳ Mixing valve circuit pump             |
| ⑩ DHW cylinder                                    | ㉑ Flow sensor mixing valve circuit      |
| ⑪ Solar circuit cylinder sensor (DHW)             |   |

# Dual cylinder SED-750/250

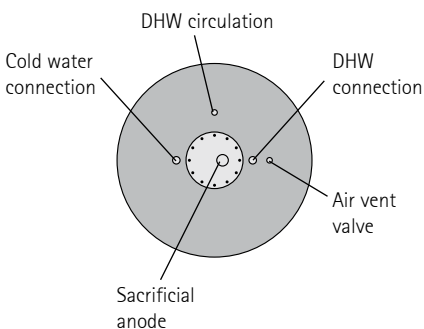
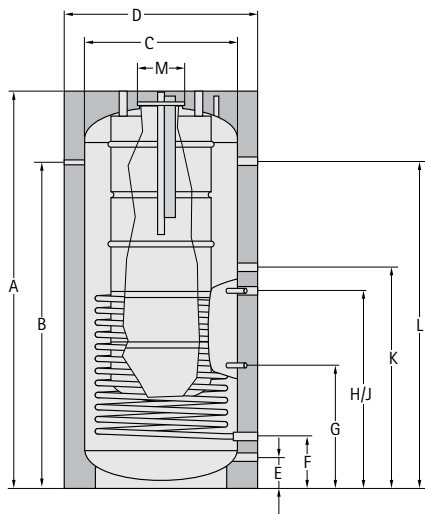
made from steel, with quality certificate and internal DHW cylinder and thermostatic water mixing valve



## Benefits of the Wolf SED-750/250:

- Dual cylinder made from steel, tested to DIN 4753, total capacity 750 l, buffer cylinder 500 l with internal indirect coil for solar heating and one DHW cylinder with 250 l capacity
- The interior of the DHW cylinder is protected against corrosion by a two-layer enamel coating and a protective magnesium anode
- Highly effective thermal insulation and low thermal losses through high-grade soft foam thermal insulation, 100 mm thick
- Removable thermal insulation for easier transport into the installation room
- Thermal insulation (CFC free)
- 5 year warranty on the freestanding cylinder  
2 year warranty on all electrical and moving parts

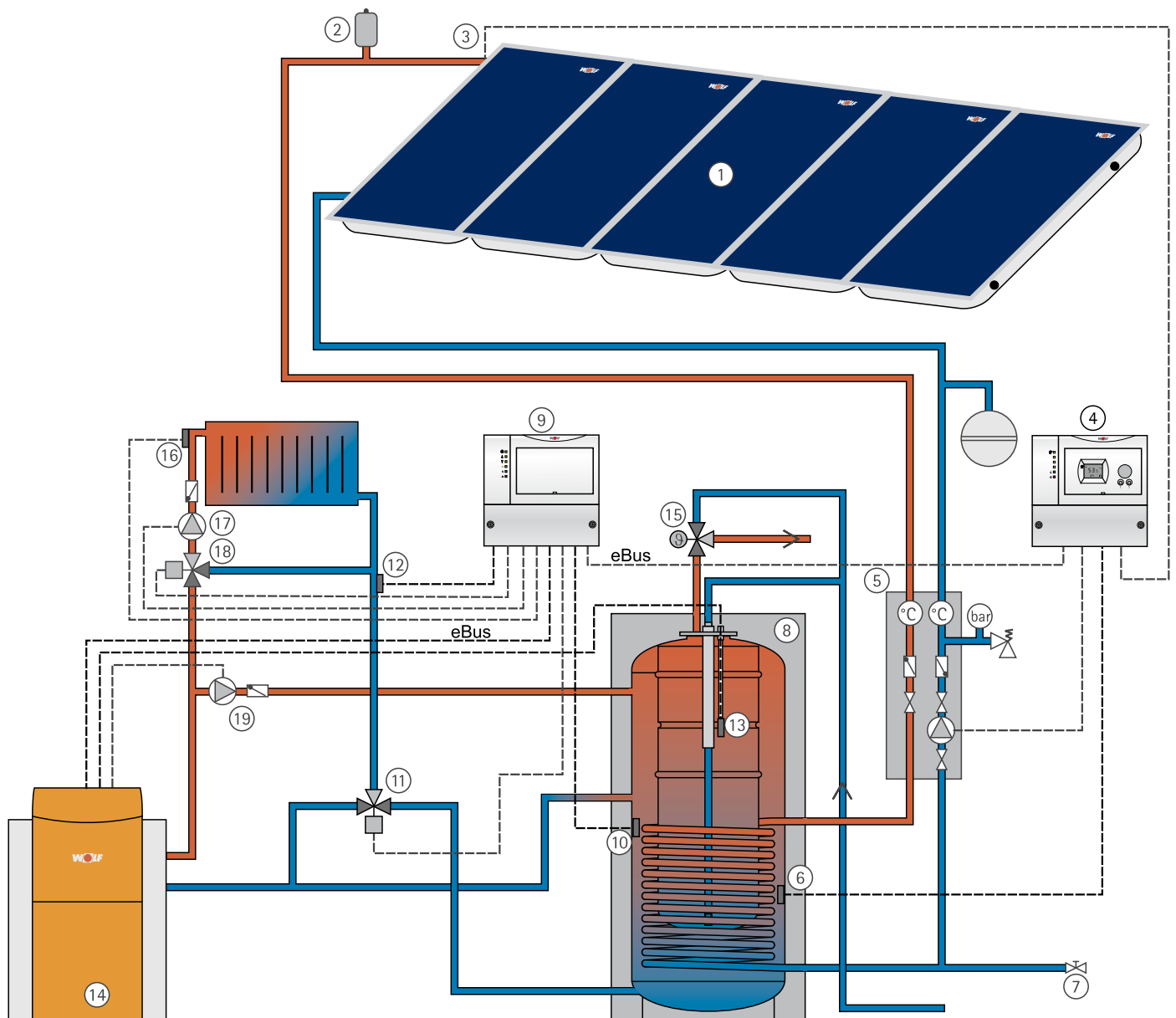
## Specification



| Dual cylinder  | Type             | SED-750/250 |
|--|------------------|-------------|
| Total cylinder capacity  | litres           | 750         |
| DHW cylinder capacity  | litres           | 250         |
| Constant DHW cylinder rating 80/60-10/45°C                         | kW - l/h         | 18 - 446    |
| Performance factor   | NL <sub>60</sub> | 2,9         |
| Overall height   | A mm             | 2005        |
| Thermometer  | B mm             | 1635        |
| Diameter excl. thermal insulation                                  | C mm             | 750         |
| Diameter incl. thermal insulation                                  | D mm             | 950         |
| Heating backup return  | E mm             | 155         |
| Solar return   | F mm             | 260         |
| Solar circuit cylinder sensor                                      | G mm             | 625         |
| Solar circuit flow   | H mm             | 990         |
| Cylinder sensor for solar return temperature raising facility SRTA | J mm             | 990         |
| Heating backup flow /  |                  |             |
| DHW re-heating return  | K mm             | 1100        |
| DHW re-heating flow  | L mm             | 1635        |
| Internal flange diameter   | M mm             | 110         |
| Height when tilted, incl. thermal insulation                       | mm               | 2200        |
| Height of unit when tilted, excl. thermal insulation               | mm               | 2020        |
| Solar flow   | Rp               | 1"          |
| Solar return   | Rp               | 1"          |
| DHW re-heating flow  | Rp               | 1"          |
| Heating backup flow /  |                  |             |
| DHW re-heating return  | Rp               | 1"          |
| Heating backup return  | Rp               | 1"          |
| Top flange, cold water connection                                  | Rp               | 1"          |
| Top flange, DHW connection   | Rp               | 1"          |
| Top flange, DHW circulation  | Rp               | 1"          |
| Thermometer  | Rp               | ½"          |
| Cylinder sensor for SRTA   | Rp               | ½"          |
| Solar circuit cylinder sensor                                      | Rp               | ½"          |
| Indirect coil area   | m²               | 2,5         |
| Coil content   | litres           | 15          |
| Max. operating pressure, DHW                                       | bar              | 10          |
| Max. operating pressure, heating water                             | bar              | 3           |
| Max. operating temperature   | °C               | 95          |
| Weight   | kg               | 250         |

# Pipework layout

Solar DHW heating and central heating backup with dual cylinder SED-750/250



- |   |   |
|---|---|
| ① Collector array                             | ⑪ Three-way diverter valve              |
| ② Air vent trap                               | ⑫ Return temperature sensor             |
| ③ Collector sensor                            | ⑬ Cylinder sensor, heating water        |
| ④ Temperature differential control (e.g. SM1) | ⑭ Boiler with control R2                |
| ⑤ Pump/fitting assembly                       | ⑮ Thermostatic DHW mixing valve         |
| ⑥ Solar control unit cylinder sensor          | ⑯ Flow sensor mixing valve circuit      |
| ⑦ Fill & drain valve                          | ⑰ Mixing valve circuit pump             |
| ⑧ Dual cylinder SED-750/250                   | ⑱ Mixing valve motor                    |
| ⑨ Mixer module MM (config. 4)                 | ⑲ Cylinder charging pump, heating water |
| ⑩ Buffer sensor                               |   |

# Freestanding cylinder SEM-1

with two indirect coils

Freestanding steel cylinder with quality certificate,

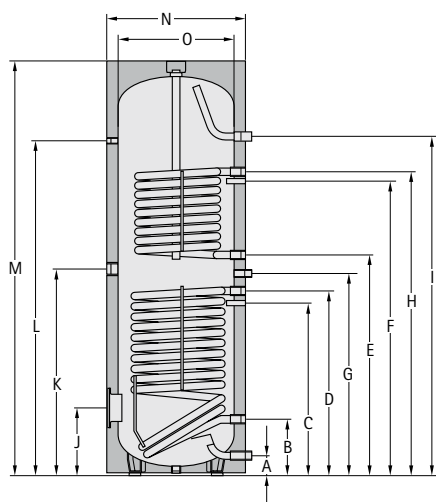
heating water max. 110°C and 10 bar, DHW max. 95°C and 10 bar



## Benefits of the Wolf SEM-1:

- Solar cylinder made from steel with two enamel-coated indirect coils to DIN 4753
- Highly-effective thermal insulation and low thermal losses through high-grade hard PU foam insulation below the cylinder foil casing
- Thermal insulation (CFC free)
- The interior of the cylinder and the indirect coils are protected by enamel coating and a protective magnesium anode
- Large heat exchanger areas ensure a short heat-up time and a high constant DHW output
- Side flange for additional indirect coils and simple maintenance
- Optimised ratio between diameter and height for good temperature stratification
- 5 year warranty on the freestanding cylinder,  
2 year warranty on all electrical and moving parts

## Specification



| DHW cylinder  | Type SEM-1       | 300    | 400        | 500    | 750     | 1000    |
|---|------------------|--------|------------|--------|---------|---------|
| Cylinder capacity                                       | litres           | 300    | 400        | 500    | 750     | 1000    |
| Constant DHW cylinder output<br>80/60-10/45°C (heating) | kW - Ltr./h      | 20-490 | 20-490     | 20-490 | 50-1200 | 50-1200 |
| Performance factor (heating)                            | NL <sub>60</sub> | 2,3    | 4,8        | 6      | 13,5    | 18      |
| Cold water connection                                   | A mm             | 90     | 85         | 99     | 220     | 220     |
| Solar return  | B mm             | 253    | 320        | 304    | 345     | 345     |
| Solar cylinder sensor                                   | C mm             | 491    | 350-910*   | 586    | 603     | 603     |
| Solar flow  | D mm             | 806    | 880        | 865    | 920     | 975     |
| Central heating return                                  | E mm             | 974    | 1100       | 985    | 1025    | 1340    |
| Cylinder sensor, heating water                          | F mm             | 1154   | 1090-1490* | 1160   | 1185    | 1500    |
| DHW circulation   | G mm             | 1077   | 1000       | 1195   | 1290    | 1605    |
| Central heating flow                                    | H mm             | 1334   | 1415       | 1335   | 1475    | 1790    |
| DHW connection  | I mm             | 1728   | 1525       | 1451   | 1590    | 1940    |
| Flange (bottom)   | J mm             | 324    | 345        | 335    | 384     | 384     |
| Electric immersion heater                               | K mm             | 887    | 1000       | 949    | 970     | 1145    |
| Thermometer   | L mm             | 1504   | 1521       | 1404   | 1460    | 1810    |
| Overall height  | M mm             | 1794   | 1800       | 1780   | 1830    | 2180    |
| Diameter incl. thermal insulation                       | N mm             | 600    | 670        | 760    | 940     | 940     |
| Diameter excl. thermal insulation                       | O mm             | 500    | -          | 650    | 800     | 800     |
| Height tilted, incl. thermal ins.                       | mm               | 1898   | 1920       | 1935   | 2057    | 2374    |
| Heating water (primary)                                 | bar/°C           | 10/110 | 10/110     | 10/110 | 10/110  | 10/110  |
| DHW (secondary)   | bar/°C           | 10/95  | 10/95      | 10/95  | 10/95   | 10/95   |
| Internal flange diameter                                | mm               | 110    | 120        | 114    | 114     | 114     |
| Cold water connection                                   | G (IG)           | 1" **  | 1" **      | 1"     | 1¼"     | 1¼"     |
| Heating/solar flow                                      | G (IG)           | 1"     | 1"         | 1"     | 1¼"     | 1¼"     |
| Heating/solar return                                    | G (IG)           | 1"     | 1"         | 1"     | 1¼"     | 1¼"     |
| DHW circulation   | G (IG)           | ¾"     | ¾" **      | ¾"     | 1"      | 1"      |
| DHW connection  | G (IG)           | 1" **  | 1" **      | 1"     | 1¼"     | 1¼"     |
| Electric immersion heater                               | G (IG)           | 1½"    | 1½"        | 1½"    | 1½"     | 1½"     |
| Thermometer   | G (IG)           | ½"     | ½"         | ½"     | ½"      | ½"      |
| Heat exchanger area (heating)                           | m²               | 0,95   | 0,95       | 0,95   | 1,45    | 1,45    |
| Heat exchanger area (solar)                             | m²               | 1,34   | 1,8        | 1,8    | 2,1     | 2,4     |
| Heat exchanger content (heating)                        | litres           | 6      | 6,7        | 6,1    | 12,5    | 12,5    |
| Heat exchanger content (solar)                          | litres           | 8,8    | 11,6       | 11,5   | 16      | 18      |
| Weight  | kg               | 130    | 159        | 182    | 290     | 350     |

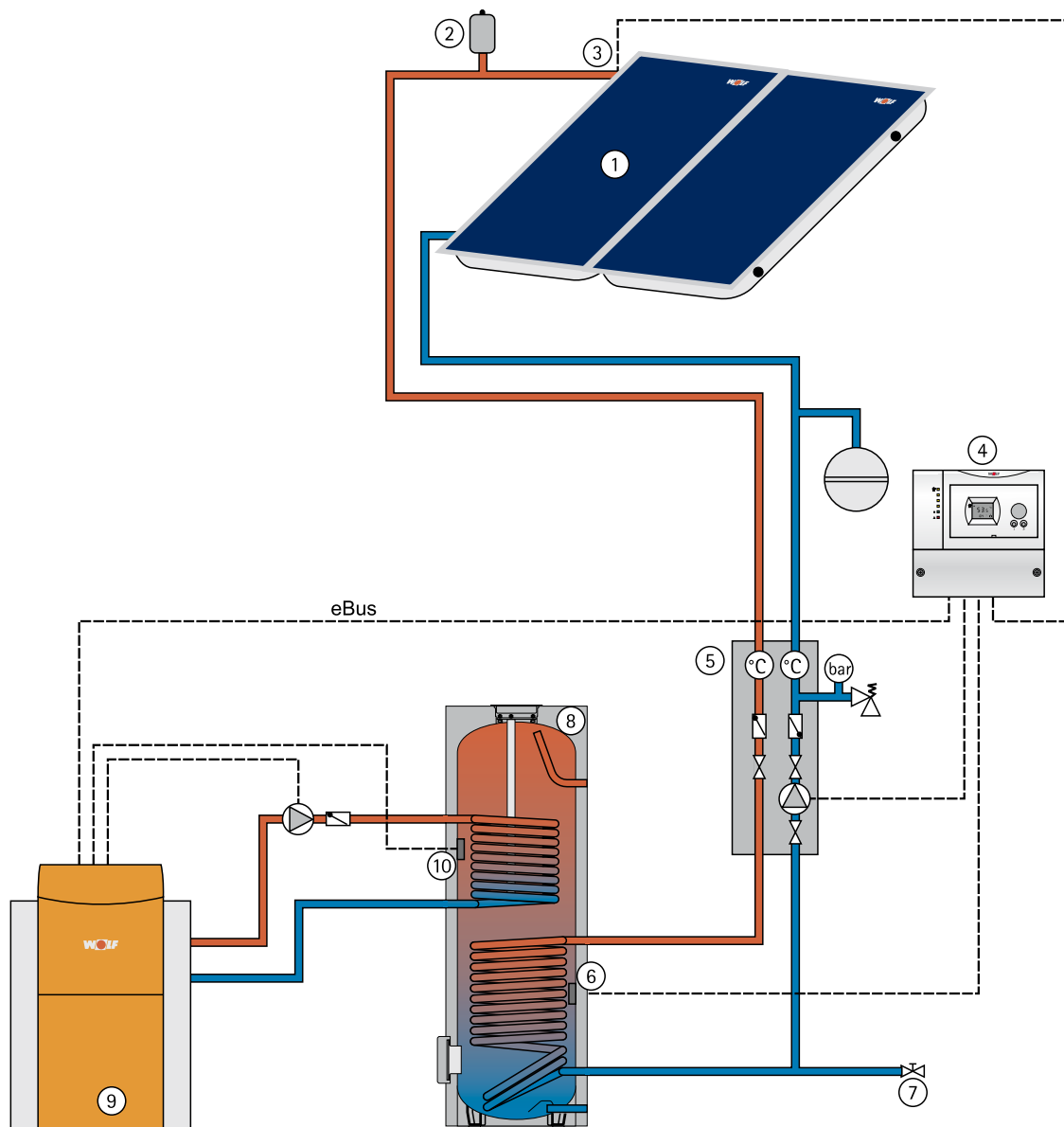
\* vertical sensor position variable

\*\* R (AG)



# Pipework layout

Solar DHW heating with the SEM-1 solar cylinder



- |  |                                      |
|--|--------------------------------------|
| ① Collector array                                  | ⑥ Solar control unit cylinder sensor |
| ② Air vent trap                                    | ⑦ Fill & drain valve                 |
| ③ Collector sensor                                 | ⑧ SEM-1 solar cylinder               |
| ④ Temperature differential control unit (e.g. SM1) | ⑨ Boiler with control R2             |
| ⑤ Pump/fitting assembly                            | ⑩ Cylinder sensor, heating water     |

# Accessories

## TopLine solar technology



### Pump/fitting assembly

Comprising:  
2 x multi-valves with gravity brake,  
may be installed with an air passage,  
display thermometer, safety valve 6  
bar, pressure gauge 10 bar, flow rate  
regulation with fill & drain valve, air  
separator with manual air vent valve,  
mounting plate, wall retainer and  
installation material, insulation EPP,  
resistant to 130 °C (short term up to  
180 °C).

Including integral pump, with cable.  
Rated voltage 230 V AC.



### Pump/fitting assembly E \*

For the easy water connection of a  
second DHW cylinder.

\*Pumps as for the pump fitting  
assemblies 10/20

### Pump/fitting assembly 10; pump UPS 25-60

For up to 10 flat-plate collectors at 50 l flow rate per hour and collector.

|                                  |         |     |
|----------------------------------|---------|-----|
| Power consumption $P_{el. pump}$ | stage 1 | 45W |
|                                  | stage 2 | 65W |
|                                  | stage 3 | 90W |

### Pump/fitting assembly 20; pump UPS 25-80

For up to 20 flat-plate collectors at 50 l flow rate per hour and collector.

|                                  |         |      |
|----------------------------------|---------|------|
| Power consumption $P_{el. pump}$ | stage 1 | 140W |
|                                  | stage 2 | 210W |
|                                  | stage 3 | 245W |



### Flow rate regulation

For the accurate control of the heat  
transfer medium. This achieves the  
best possible system yield, making it  
easier to obtain government subsi-  
dies [check local regulations].



### Calorimeter kit for SM1 and SM2\*

for yield measurement;  
consisting of:  
- flow meter  
- return sensor (contact type)  
- Union nut fittings

\* applicable for configurations 1/3/4/5/6



### Return temperature raising facility for MM

For tying the solar energy into the  
heating circuit, comprising of:

- three-way diverter valve
- return contact sensor
- cylinder sensor
- sensor well for cylinder sensor

| Expansion vessel [litres] |             |         |         |         |         |             |         |          |        |        |
|---------------------------|-------------|---------|---------|---------|---------|-------------|---------|----------|--------|--------|
| Collector type            | F3-1 / F3-Q |         |         |         |         | CFK-1 / CRK |         |          |        |        |
| Pipe-Ø                    | 12x1        | 15x1    | 18x1    | 22x1    | 28x1,5  | 12x1        | 15x1    | 18x1     | 22x1   | 28x1,5 |
| 2 collectors              | 12 / 18     | 18 / 25 | 18 / -  | -       | -       | 12 / -      | 12 / 35 | - / 35   | -      | -      |
| 3 collectors              | -           | 18 / 25 | 25 / 25 | -       | -       | 12 / -      | 18 / -  | 18 / 50  | -      | -      |
| 4 collectors              | -           | 25 / 25 | 25 / 35 | 35 / 35 | -       | 18 / -      | 18 / -  | 25 / 80  | -      | -      |
| 5 collectors              | -           | 35 / 35 | 35 / 35 | 35 / 50 | -       | -           | 25 / -  | 25 / 80  | -      | -      |
| 6 collectors              | -           | 35 / 50 | 35 / 50 | 50 / 50 | -       | -           | 25 / -  | 25 / 80  | 35 / - | -      |
| 7 collectors              | -           | 50 / 50 | 50 / 50 | 50 / 50 | 80 / 80 | -           | -       | 35 / 105 | 35 / - | -      |
| 8 collectors              | -           | 50 / 50 | 50 / 50 | 50 / 80 | 80 / 80 | -           | -       | 35 / 105 | 35 / - | -      |
| 9 collectors              | -           | -       | 50 / 80 | 80 / 80 | 80 / 80 | -           | -       | 35 / -   | 50 / - | 50 / - |
| 10 collectors             | -           | -       | 80 / 80 | 80 / 80 | 80 / 80 | -           | -       | -        | 50 / - | 50 / - |

The selection is based on max. line lengths resulting from the max. residual height of the pump/fitting assembly

# Technical information for solar DHW heating with flat-plate collectors

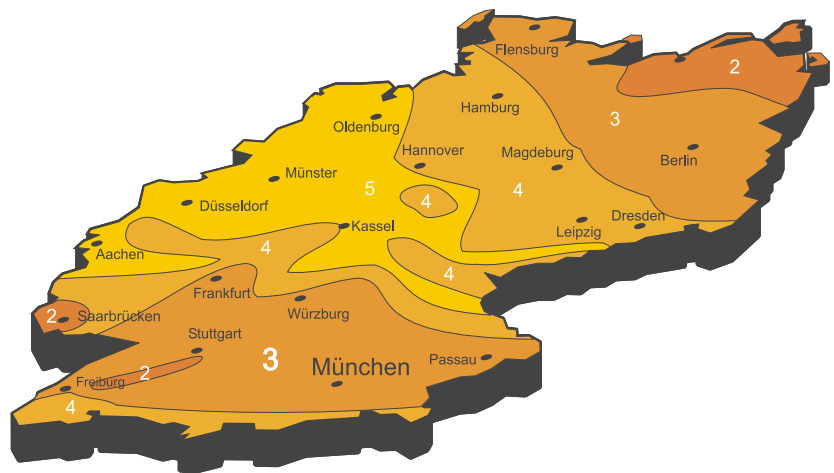
Example:

Climate zone Munich

Roof inclination 45°, collector orientation SE

DHW demand (approx. 75 l / person / day)

Number of occupants: 4



## Climate zone

| Climate zone | Minimum hours of sunshine | Factor |
|--------------|---------------------------|--------|
| 1            | 1900 - 2000               | 0,8    |
| 2            | 1800 - 1900               | 0,9    |
| 3            | 1700 - 1800               | 1,0    |
| 4            | 1600 - 1700               | 1,1    |
| 5            | 1500 - 1600               | 1,2    |

→ Factor: 1,0

## Roof orientation

| Roof inclination | Collector orientation |       |     |
|------------------|-----------------------|-------|-----|
|                  | S                     | SE/SW | E/W |
| 15°              | 1,2                   | 1,2   | 1,3 |
| 25°              | 1,1                   | 1,2   | 1,4 |
| 35°              | 1,0                   | 1,2   | 1,5 |
| 45°              | 1,0                   | 1,1   | 1,5 |
| 55°              | 1,1                   | 1,2   | 1,6 |
| 65°              | 1,2                   | 1,3   | 1,7 |
| 75°              | 1,3                   | 1,4   | 1,8 |

→ Factor: 1,1

## Hot water requirement

| Low |     | Standard |     | High |
|-----|-----|----------|-----|------|
| 0,6 | 0,8 | 1,0      | 1,2 | 1,5  |

→ Factor: 1,0

## Number of flat-plate collectors

| Factor Climate zone |   | Factor Roof orientation |   | Factor DHW demand |   | Number House Occupants |   |     | Number Collectors * |
|---------------------|---|-------------------------|---|-------------------|---|------------------------|---|-----|---------------------|
| 1,0                 | x | 1,1                     | x | 1,0               | x | 4                      | x | 0,4 | = 1,76              |
|                     |   |                         |   |                   |   |                        |   |     | ≙ 2 collectors      |

\* All details relate to a solar DHW coverage rate of 60%.

The coverage rate can be increased or reduced by rounding up or down.

## Required cylinder size

| Number House occupants |   | Factor DHW demand |   |           | Cylinder size |
|------------------------|---|-------------------|---|-----------|---------------|
| 4                      | x | 1,0               | x | e.g. 75 l | = 300 l       |

# Technical information for solar DHW heating with collectors

## System sizing

All details are recommendations and may differ from system to system.

| Number of coll. / array | Collector type | Array pressure drop * [mbar] |
|-------------------------|----------------|------------------------------|
| 1 - 3                   | F3-1           | 65 - 75                      |
|                         | F3-Q           | 83 - 105                     |
|                         | CFK1           | 12                           |
|                         | CRK            | 7 - 22                       |
| 4 - 6                   | F3-1           | 82 - 110                     |
|                         | F3-Q           | 100 - 125                    |
|                         | CFK-1          | 35                           |
|                         | CRK            | 38 - 58                      |
| 7 - 10                  | F3-1           | 123 - 150                    |
|                         | F3-Q           | 130 - 175                    |
|                         | CFK-1          | 85                           |
| 7 - 8                   | CRK            | 70 - 100                     |

\*(90 l/h\*coll., acc. to EN 12975)

## Expansion vessel

The diaphragm expansion vessel is designed for three functions when using solar circuits:

1. To accommodate the incoming liquid resulting from the thermal expansion inside the solar circuit
2. To accommodate the liquid seal
3. To accommodate the incoming liquid resulting from the steam generated inside the collector

Calculation according to the following formula:

$$V_N > \frac{V_G \times 0,1 + V_A \times 1,1}{N}$$

$V_N$  = Nominal volume of the diaphragm expansion vessel  
 $V_G$  = Total liquid content inside the solar circuit in litres  
 $V_A$  = Liquid volume inside the collector array in litres  
 $N$  = Efficiency

$$N = \frac{P_e - P_0}{P_e + 1}$$

$P_0$  = Vessel inlet pressure in bar  
 $P_e$  = System pressure in bar

Recommendation:  $P_e$  = Response pressure of the safety valve - 0,5 bar.

Copper pipe content l/m

| Cu pipe  | Ø mm | DN 10x1 | DN 12x1 | DN 15x1 | DN 18x1 | DN 22x1 |
|----------|------|---------|---------|---------|---------|---------|
| Contents | l/m  | 0,055   | 0,079   | 0,133   | 0,201   | 0,314   |

## Example:

System comprising:

2 TopSon F3-1 collectors; 20 m Cu riser 15x1;

Solar cylinder type SEM-1-300

with indirect coils, 8,8 l content; safety valve 6 bar; vessel inlet pressure (static head) 2,5 bar;

$$N = \frac{(6 \text{ bar} - 0,5 \text{ bar}) - 2,5 \text{ bar}}{(6 \text{ bar} - 0,5 \text{ bar}) + 1} = 0,46$$

Total system volume ( $V_G$ ) in litres

|      |                        |                 |             |
|------|------------------------|-----------------|-------------|
| 2    | TopSon F3-1 collectors | 1,7 Ltr. x 2    | 3,40 litres |
| 20 m | Riser 15x1             | 0,133 Ltr. x 20 | 2,66 litres |
| 1    | Indirect coil          | 8,8 Ltr. x 1    | 8,80 litres |

Total system volume ( $V_G$ ): 14,86 litres

$$V_N > \frac{14,86 \times 0,1 + 3,4 \times 1,1}{0,46} = 11,36 \text{ litres}$$

Selected: diaphragm expansion vessel with 12 l capacity and 2,5 bar inlet pressure.



# Wolf TopLine Solar technology

## High performance flat-plate collector TopSon F3-1 for „portrait“ installation / F3-Q for „landscape“ installation

Flat-plate collector tested to EN 12975.

With highly selective coating, collector housing made from weather-resistant aluminium, 3,2 mm safety glass, hail-proof. Self-supporting housing. Weather and temperature resistant collector. Single piece grip moulding, pressed onto the sealing frame. With integral distribution line and connecting fittings. Expansion joints in the connection fittings.

|                |       |                          |
|----------------|-------|--------------------------|
| Collector type | ..... | Dimensions: (see page 2) |
| Make           | Wolf  | Height: mm               |
|                |       | Width: mm                |
|                |       | Area: m <sup>2</sup>     |
|                |       | Weight: kg               |

No. Price each Total price

## High performance flat-plate collector CFK-1 for „portrait“ installation

Flat-plate collector tested to EN 12975 part 2.

With highly selective coating, collector housing made from weather-resistant aluminium, 3,0 mm safety glass, hail-proof. Self-supporting housing. Weather and temperature-resistant collector. Single piece grip moulding, pressed onto the sealing frame. With integral distribution line with connection fittings. Expansion joints in the connection fittings.

|                |       |                          |
|----------------|-------|--------------------------|
| Collector type | CFK-1 | Dimensions: (see page 2) |
| Make           | Wolf  | Height: mm               |
|                |       | Width: mm                |
|                |       | Area: m <sup>2</sup>     |
|                |       | Weight: kg               |

## High performance vacuum tube collector CRK

Vacuum tube collector tested to EN 12975.

Direct flow collector designed similar to a Thermos flask. The absorbers are in the vacuum and are therefore protected against ageing and contamination. Borosilicate glass, resistant to chemicals and temperature fluctuations. Hail-proof to EN 12 975

|                |      |                          |
|----------------|------|--------------------------|
| Collector type | CRK  | Dimensions: (see page 3) |
| Make           | Wolf | Height: mm               |
|                |      | Width: mm                |
|                |      | Area: m <sup>2</sup>     |
|                |      | Weight: kg               |

## Swimming pool absorber

UV and weather-resistant plastic absorber with high energy utilisation

|                        |      |                          |
|------------------------|------|--------------------------|
| Swimming pool absorber |      | Dimensions: (see page 4) |
| Make                   | Wolf | Height: mm               |
|                        |      | Width: mm                |
|                        |      | Area: m <sup>2</sup>     |
|                        |      | Weight: kg               |

## Control units for high performance solar collectors:

### Solar module SM1

Extension module for the regulation of one solar circuit in conjunction with Wolf boilers

### Solar module SM2

Extension module for the regulation of a solar system including up to 2 cylinders and 2 collector fields in conjunction with Wolf boilers

### Programming module BM-Solar

required for a solar module SM1 or SM2 when used as an independent solar control (Stand-Alone operation)

# Wolf Solar technology

## Solar cylinder SEM-1 made from steel

With two enamel-coated indirect coils.

Additional corrosion protection through magnesium anode.

Highly effective thermal insulation through high-grade hard foam insulation.

|                        |             |                                      |
|------------------------|-------------|--------------------------------------|
| Freestanding cylinders | SEM-1-_____ | Dimensions: (see page 6)             |
|                        |             | Ø casing: mm                         |
|                        |             | Ø cylinder: mm                       |
|                        |             | Height: mm                           |
|                        |             | Heating surface, central heating: m² |
|                        |             | Heating surface, solar: m²           |
|                        |             | Weight: kg                           |

No.

Price each

Total price

## Dual cylinder SED-750/250 made from steel. Total capacity 750 l

Buffer cylinder, 500 l with internal indirect coil for solar heating and one DHW cylinder with 250 l capacity.

The interior of the DHW cylinder is protected against corrosion by a two-layer enamel coating and a protective magnesium anode.

Highly effective thermal insulation through high-grade soft foam insulation.

|               |             |                                |
|---------------|-------------|--------------------------------|
| Dual cylinder | SED-750/250 | Dimensions:                    |
|               |             | Ø casing: 950 mm               |
|               |             | Ø cylinder: 750 mm             |
|               |             | Height: 2005 mm                |
|               |             | Heating surface, solar: 2,5 m² |
|               |             | Weight: 250 kg                 |

## Buffer cylinder SPU-2 / SPU-2-W made from steel

With indirect steel coils for the SPU-2-W

Max. operating pressure 6 bar.

Water capacity 500 to 1500 l

Highly effective thermal insulation through high-grade soft foam insulation.

|                 |             |                            |
|-----------------|-------------|----------------------------|
| Buffer cylinder | SPU-2-_____ | Dimensions: (see page 10)  |
|                 |             | Ø casing: mm               |
|                 |             | Ø cylinder: mm             |
|                 |             | Height: mm                 |
|                 |             | Heating surface, solar: m² |
|                 |             | Weight: kg                 |

## Stratification cylinder BSP / BSP-W from steel with fresh water module

Buffer cylinder with plain tube heat exchanger from steel for solar application.

Highly efficient thermal protection due to overall hard foam insulation.

|                         |           |                           |
|-------------------------|-----------|---------------------------|
| Stratification cylinder | BSP-_____ | Dimensions: (see page 12) |
|                         |           | Ø casing: mm              |
|                         |           | Ø cylinder: mm            |
|                         |           | Height: mm                |
|                         |           | Weight: kg                |

Mixing valve assembly BSP-MK 1 for low temperature circuit (accessory)

Mixing valve assembly BSP-MK 2 for high temperature circuit (accessory)

Mixing valve assembly BSP-MK 1 and 2 for both low temperature and high temperature circuit (accessory)

DHW circulation module for fresh water module (accessory)

## Wolf Solar technology

| Accessories:   | F3-1<br>CFK-1 | F3-Q | CRK | Swimming-<br>pool absorber |
|--|---------------|------|-----|----------------------------|
| <b>Return temperature raising facility MM or SM2</b><br>for tying the solar energy into the heating circuit  | •             | •    | •   |                            |
| <b>Roof integration set for 2 collectors</b><br>roof integration frames for an architecturally attractive roof integration of the collectors into the tile surface, powder-coated, dark grey RAL 7021. | •             |      |     |                            |
| <b>Extension set for the roof integration set for 1 collector each</b>   | •             |      |     |                            |
| <b>"AluPlus" on-roof mounting kit ("portrait" installation) for 1 collector</b>  | •             |      |     |                            |
| <b>"AluPlus" on-roof mounting kit ("portrait" installation) for 2 or 3 collectors</b>  | •             |      |     |                            |
| <b>"AluPlus" snow load extension ("portrait" installation)</b><br>required for a surface load from 2,4 kN/m <sup>2</sup> on, suitable up to a maximum of 4kN/m <sup>2</sup> , for 1, 2 or 3 collectors | •             |      |     |                            |
| <b>"AluFlex" triangle stands („portrait" installation)</b><br>for roofs with a low pitch to optimized the irradiation angle for 1, 2 or 3 collectors (adjustable to 20°, 30°, 45°)                     | •             |      |     |                            |
| <b>"AluPlus" on-roof mounting kit ("landscape" installation) for 1 collector</b>   |               | •    |     |                            |
| <b>"AluPlus" on-roof mounting kit ("landscape" installation) for 2 or 3 collectors</b>   |               | •    |     |                            |
| <b>"AluPlus" snow load extension ("landscape" installation)</b><br>required for a surface load from 2,4kN/m <sup>2</sup> on, suitable up to a maximum of 4kN/m <sup>2</sup> , for 1, 2 or 3 collectors |               | •    |     |                            |
| <b>"AluFlex" triangle stands ("landscape" installation)</b><br>for roofs with a low pitch to optimized the irradiation angle for 1, 2 or 3 collectors (adjustable to 20°, 30°, 45°)                    |               | •    |     |                            |
| <b>"AluFlex" installing stands („portrait" installation) for 1, 2 or 3 collectors,</b><br>for the easy and quick installation on horizontal surfaces (adjustable to 20°, 30°, 45°)                     | •             |      |     |                            |
| <b>"AluFlex" installing stands ("landscape" installation) for 1, 2 or 3 collectors,</b><br>for the easy and quick installation on horizontal surfaces (adjustable to 20°, 30°, 45°)                    |               | •    |     |                            |
| <b>Connection kit for on-roof mounting and roof integration for one array of collectors</b>  | •             | •    |     |                            |
| <b>Connection kit for on-roof mounting for one array of collectors</b>   | •             | •    |     |                            |
| <b>Compansator for collector fittings,</b> two pieces are required per collector connection  | •             | •    |     |                            |
| <b>Rooftop fixing set "CRK" ("portrait" installation) for one tube collector</b>   |               |      | •   |                            |
| <b>Connection kit for 2 rooftop fixing sets for one tube collector</b>   |               |      | •   |                            |
| <b>Connection kit tube collector</b>   |               |      | •   |                            |
| <b>Flexible connection kit</b>   |               |      | •   |                            |
| <b>Inclination correction kit</b><br>for roofs with a low pitch to optimize the irradiation angle (adjustable to 0°, 30°, 45°)   |               |      |     |                            |
| <b>Connection accessories</b> swimming pool absorber per row of collectors (up to 10 absorbers per row)  |               |      |     | •                          |
| <b>Pump/fitting assembly 10</b><br>suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector  | •             | •    | •   |                            |
| <b>Pump/fitting assembly 20</b><br>suitable for up to 20 flat-plate collectors as 50 l flow rate per hour and collector  | •             | •    | •   |                            |
| <b>Pump/fitting assembly 10E,</b> for the connection of a second heat consumer<br>suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector                                 | •             | •    | •   |                            |
| <b>Pump/fitting assembly 20E,</b> for the connection of a second heat consumer<br>suitable for up to 20 flat-plate collectors at 50 l flow rate per hour and collector                                 | •             | •    | •   |                            |
| <b>Solar heating expansion vessel,</b> with fixing material, 2,5 bar inlet pressure  | •             | •    | •   |                            |
| <b>Connection kit for solar heating expansion vessel</b>   | •             | •    | •   |                            |
| <b>Air vent trap</b> 0,15l, insulated, connection Ø 22 mm, copper  | •             | •    | •   | •                          |
| <b>Thermostatic water mixing valve</b> with integral non-return valve and anti-scalding protection   | •             | •    | •   | •                          |
| <b>Heat transfer medium ANRO 10 / 20 / 30 kg</b>   | •             | •    |     |                            |
| <b>Heat transfer medium LS 10 / 20 kg</b>  |               |      | •   |                            |

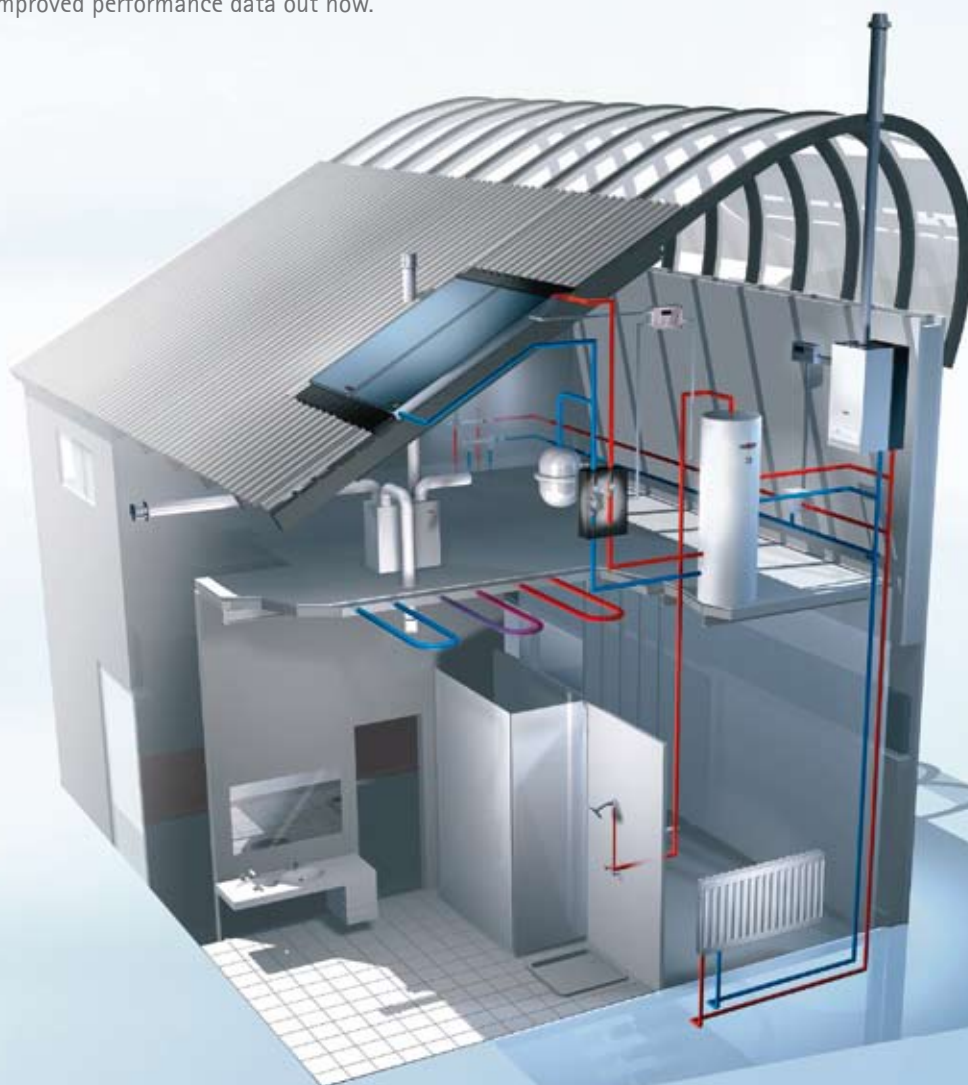
# Test result "GUT"! The Wolf solar package: TopSon F3, solar cylinder SEM-1-300, solar control unit SM-1/BM Solar



## INDIVIDUAL TEST RESULTS

ENERGY EFFICIENCY AND COMFORT  
OF DHW-PREPARATION: "SEHR GUT" (1,5)  
(very high degree of solar yield: 40%)  
OPERATION AND DURABILITY: "SEHR GUT" (1,3)  
FURTHER ENVIRONMENTAL FEATURES: "SEHR GUT" (1,5)  
(very low power consumption of the pump: 37 kWh/a)

\*Nota: Successor TopSon F3-1 with improved performance data out now.



The brand of competence for energy saving systems