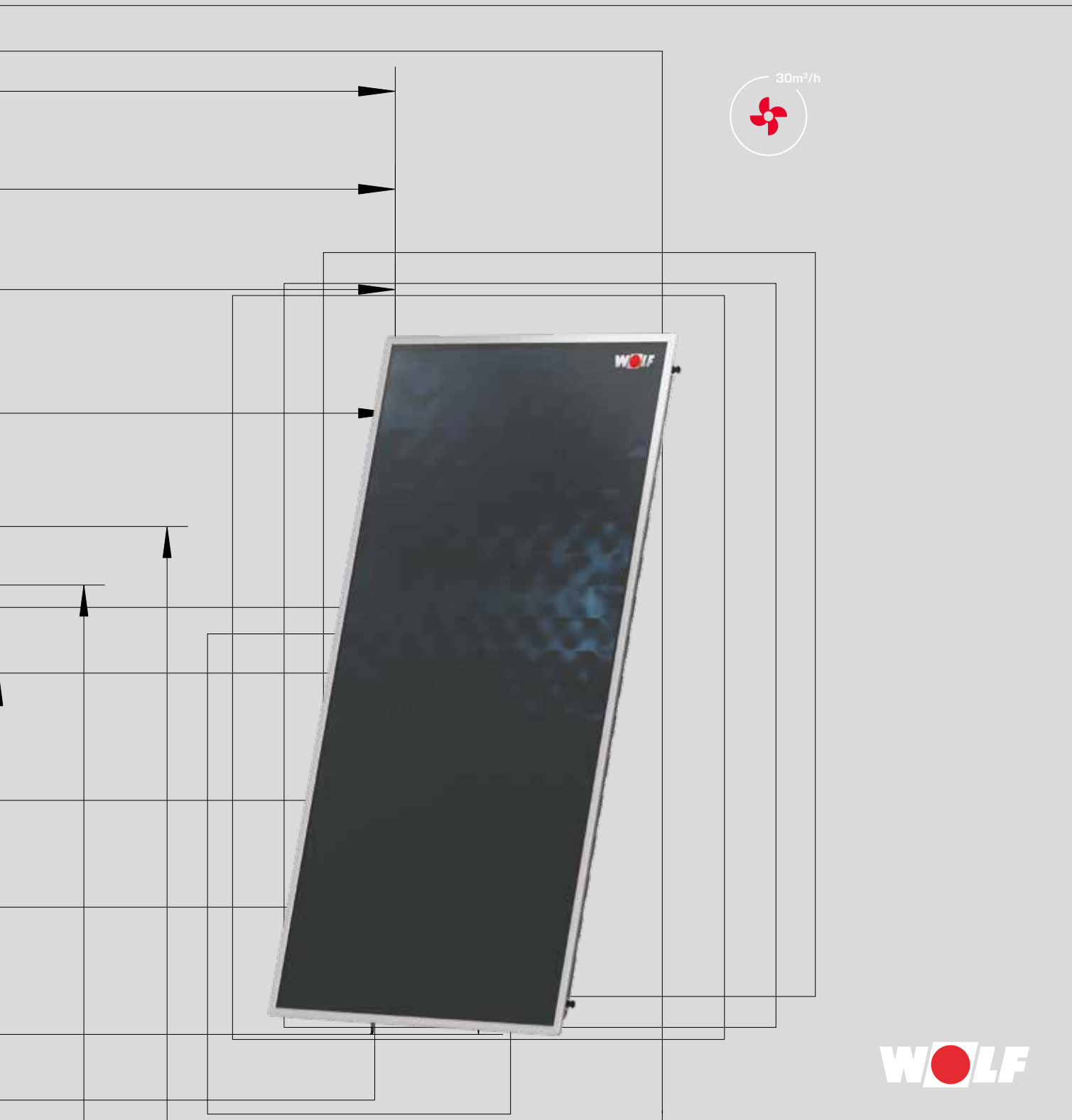
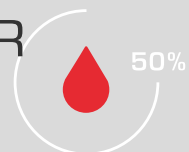
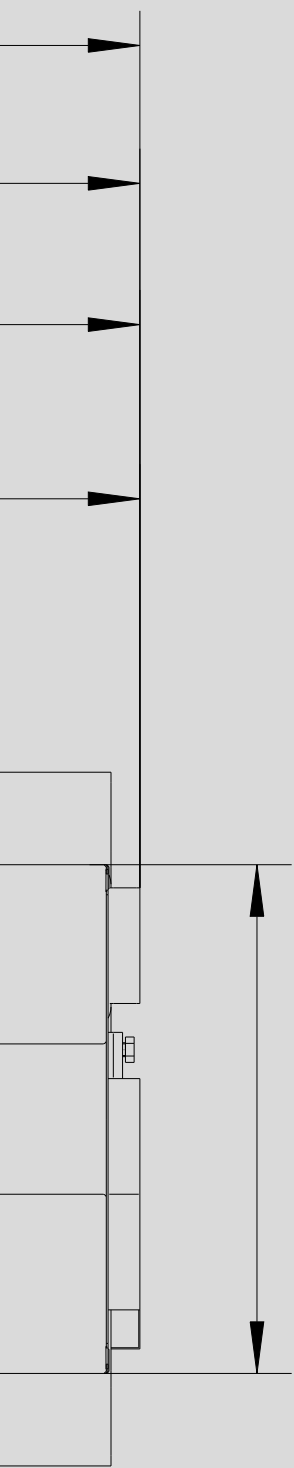


TECHNICAL DOCUMENTATION

WOLF SOLAR TECHNOLOGY HIGH PERFORMANCE FLAT-PLATE COLLECTOR

CFK-1 / TOPSON F3-1/F3-1Q





THE EXTENSIVE EQUIPMENT RANGE

from system supplier WOLF offers the ideal solution for commercial and industrial buildings, new build and modernisation projects alike.

The range of WOLF control units can meet any requirement for heating convenience.

All equipment is easy to operate, highly energy efficient and reliable.

Solar thermal systems can be swiftly integrated into existing systems.

WOLF equipment is easy and quick to install and maintain.

WOLF SOLAR TECHNOLOGY		
HIGH PERFORMANCE FLAT-PLATE COLLECTORS		04-05
	TopSon F3-1 / F3-1Q	06
	CFK-1	06
CONTROL UNIT		07
SOLAR DHW CYLINDER	SEM-1 / SEM2	08
PIPEWORK LAYOUT		09
TECHNICAL INFORMATION		12-10
ACCESSORIES TOPLINE SOLAR TECHNOLOGY		11-13

Certified
by Solar Keymark

Meets the requirements for the
"Blue Angel" certificate of environmental excellence to RAL UZ 73

Aluminium collector pan
deep-drawn, highly weather-resistant

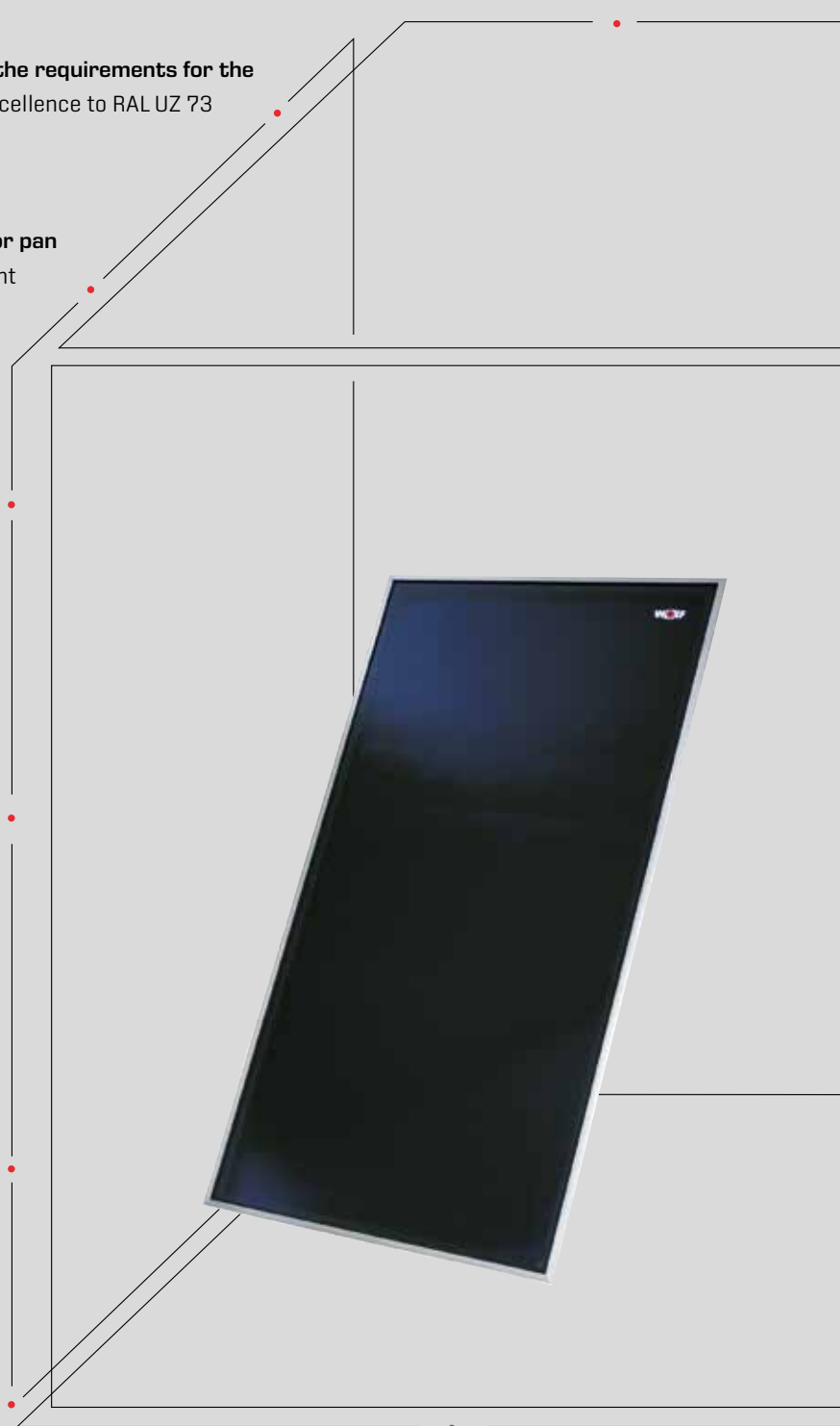
Thermal insulation
made from mineral wool, 60 mm thick for
minimal cool-down losses, TopSon F3-1/F3-1Q
with additional thermal insulation at the side

Absorber with highly selective coating
for extremely high yields; meander (TopSon
F3-1/F3-1Q) or harp (CFK-1) design ensures
an even flow and effective function

Expansion compensators
between collectors

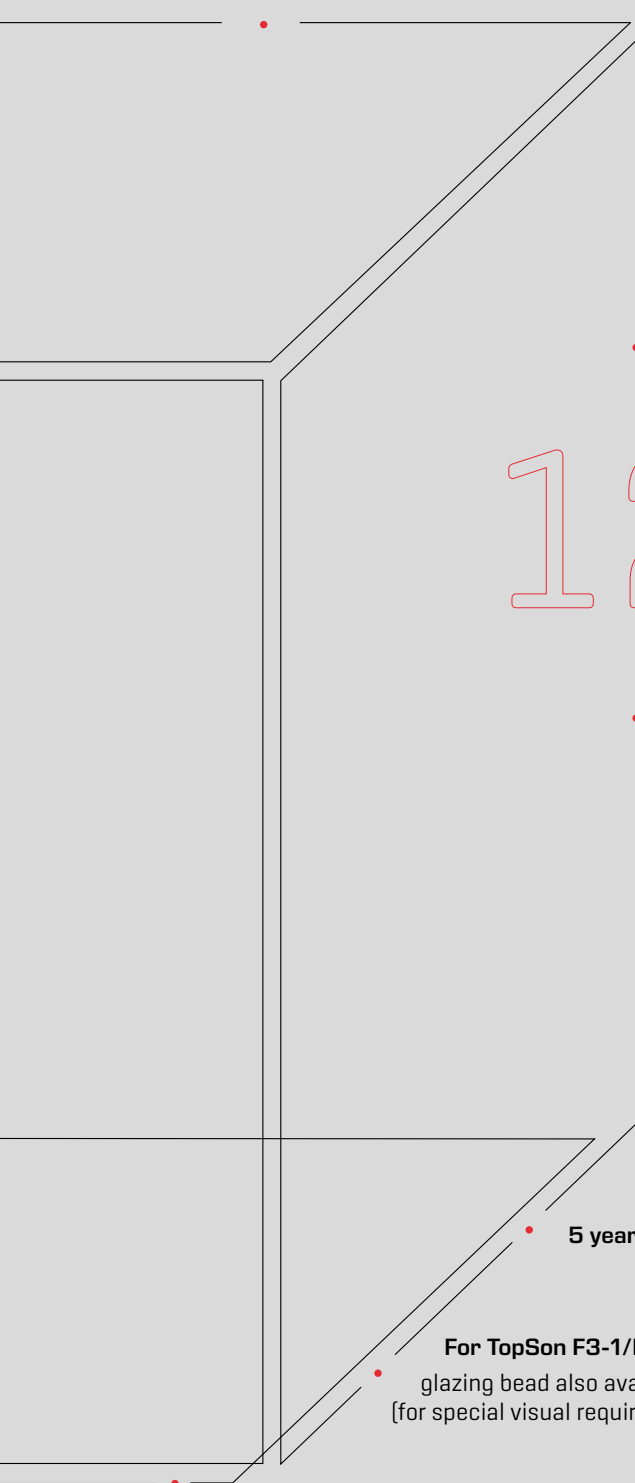
Safety glass
3.2 mm (TopSon F3-1/F3-1Q) or 3.0 mm (CFK-1) thick;
hail-proof to DIN EN ISO 9806, thermally pre-stressed;
TopSon F3-1/F3-1Q with improved transparency

EPDM seal
pressed into a single-piece grip moulding



High performance flat-plate collectors

tested to EN ISO 9806 with maximum energy efficiency
- the minimum yield for grants/subsidies [Germany] has been certified



1 2

BENEFITS OF WOLF HIGH PERFORMANCE FLAT-PLATE COLLECTORS

TopSon F3-1 / F3-1Q

CFK-1

5 year statutory warranty

For TopSon F3-1/F3-1Q

glazing bead also available in black grey
(for special visual requirements)

For TopSon F3-1/F3-1Q

up to 5 collectors can be connected on one
side; connection either on the right or left

TOPLINE / COMFORTLINE

HIGH PERFORMANCE FLAT-PLATE COLLECTORS TOPSON F3-1 / F3-1Q

HIGH PERFORMANCE FLAT-PLATE COLLECTORS CFK-1

FOR SOLAR THERMAL SYSTEMS FOR DHW HEATING

FOR SOLAR THERMAL SYSTEMS FOR CENTRAL HEATING BACKUP

Flat-plate collectors TopSon F3-1 and CFK-1 for portrait format, TopSon F3-1Q for landscape format

Different installation kits (accessories) enable individual installation:

Roof integration kit, for interlocking tile, slate tile and barrel tile roofing

- AluPlus rooftop installation kit for interlocking tile, plain tile, slate tile, corrugated and sheet steel roofing

- AluFlex-U support stands for horizontal surfaces

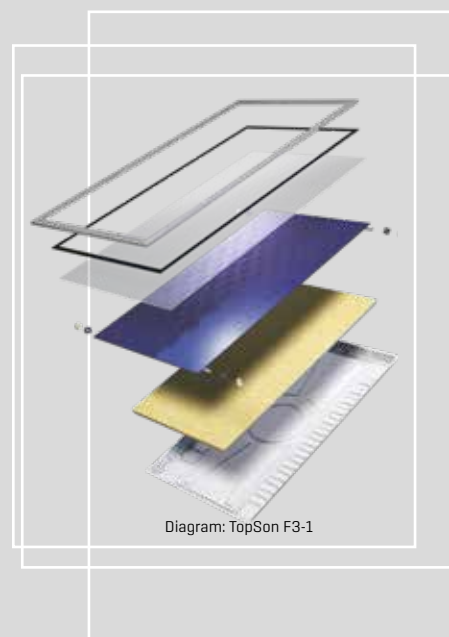
- AluFlex-U support triangles to optimise the angle of incidence on flat roofs

(adjustable 20°, 30°, 45°) for interlocking tile, plain tile, slate tile, corrugated and sheet steel roofing

The connection between the support stands and the roof structure must be implemented on site by a qualified contractor. The applicable standards and regulations must be observed when sizing the connecting elements.



SPECIFICATION	TopSon	F3-1	F3-1Q	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 gasket with union nut)	G	¾"	¾"	¾"
Installation angle		15° to 75°	15° to 75°	15° to 75°
Gross surface area	m ²	2.3	2.3	2.3
Optical efficiency $\eta_{0\text{hem}}^{1)}$	%	70.4	70.7	70.8
Heat loss coefficient $a_1^{1)}$	W/(m ² K)	3.037	3.152	3.380
Heat loss coefficient $a_2^{1)}$	W/(m ² K ²)	0.014	0.010	0.016
Angle of incidence correction factor $K_{50^\circ}^{1)}$	%	95.0	94.0	95.0
Thermal capacity C ¹⁾	kJ/(m ² K)	5.85	5.88	7.78
Absorber area	m ²	2.0	2.0	2.0
Optical efficiency $\eta_{0\text{hem}}^{2)}$	%	81.0	81.4	81.3
Heat loss coefficient $a_1^{2)}$	W/(m ² K)	3.492	3.630	3.888
Heat loss coefficient $a_2^{2)}$	W/(m ² K ²)	0.016	0.012	0.019
Angle of incidence correction factor $K_{50^\circ}^{2)}$	%	95.0	94.0	95.0
Thermal capacity C ²⁾	kJ/(m ² K)	5.85	5.88	7.78
Max. stagnation temperature	°C	194	189	196
Max. operating pressure	bar	10	10	10
Capacity	l	1.7	1.9	1.1
Weight (empty)	kg	40	41	36
Recommended flow rate per collector	l/h	30 - 90	30 - 90	90
Heat transfer medium		ANRO (undiluted)	ANRO (undiluted)	ANRO (undiluted)
Solar Keymark registration no.		011-7S260F	011-7S2439F	011-7S591F



¹⁾ Values to ISO 9806 in relation to gross area

²⁾ Values to ISO 9806 in relation to absorber area





Solar module SM1-2

- Extension module to control one solar circuit incl. collector temperature sensor, cylinder temperature sensor and sensor wells
- Greater energy savings in conjunction with WOLF heat generators, due to intelligent cylinder reheating, i.e. blocking cylinder reheating when there is sufficient solar yield
- Heat metering with external heat meter
- Function check for flow rate and gravity brake
- Temperature differential control for one heat consumer
- Maximum cylinder temperature limit
- Indication of set and actual values on the BM-2 programming unit
- Integral hours run meter
- eBUS interface with automatic energy management
- Rast 5 connection technology



SM2-2 solar module

- Extension module to control a solar thermal system with up to 2 cylinders and 2 collector arrays, incl. 1 collector sensor and 1 cylinder sensor, each with sensor well
- Easy controller configuration by selecting one of the preset system versions
- Greater energy savings in conjunction with WOLF heat generators, due to intelligent cylinder reheating, i.e. blocking cylinder reheating when there is sufficient solar yield
- Heat metering with external heat meter for all configurations
- Selection of cylinder operating mode
- Indication of set and actual values on the BM-2 programming unit
- eBUS interface with automatic energy management
- Rast 5 connection technology



BM-2 Solar programming unit

- Can be used for SM1-2 and SM2-2
- 3.5" colour display
- Easy user prompts via plain text display
- Graphic representation of system schemes, temperature curves and solar yields
- Operation by rotary selector with pushbutton function
- eBUS interface

SOLAR DHW CYLINDER

SEM-1 / SEM-2

FOR DHW HEATING,

MADE FROM STEEL, WITH TWO-LAYER ENAMEL COATING AND TWO BARE-TUBE HEAT EXCHANGERS

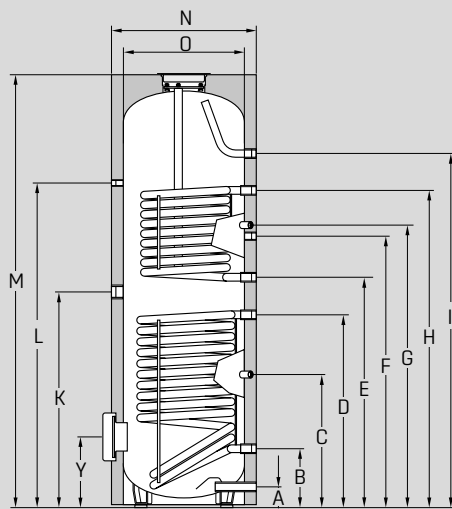
Benefits of the WOLF SEM at a glance

- Steel solar DHW cylinder with quality certificate, two-layer enamel coating and two bare-tube heat exchangers
- Solar pump assembly can be fitted directly to the solar DHW cylinder
- High grade rigid PUR foam or polyester fleece thermal insulation below the foil jacket of the cylinder for low heat losses
- The interior of the cylinder and the internal indirect coils are protected against corrosion by a two-layer enamel coating and sacrificial magnesium anode
- Large internal indirect coil surface areas ensure a short heat-up time and a high continuous DHW output
- Side flange for additional indirect coils and easy maintenance
- Connection for an electric booster heater
- Optimised diameter/height ratio for good temperature stratification
- 5 year statutory warranty on the floorstanding DHW cylinder
2 years on electrical and moving parts

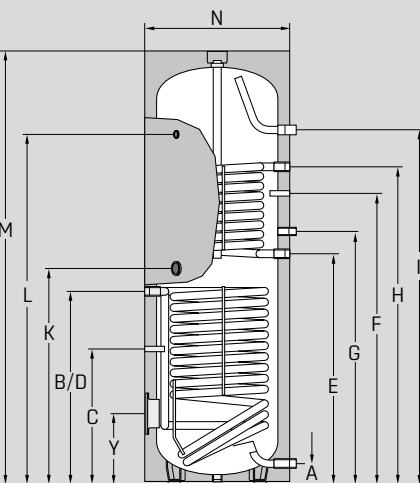


SEM-1

SEM-2



SEM-1



SEM-2

SPECIFICATION

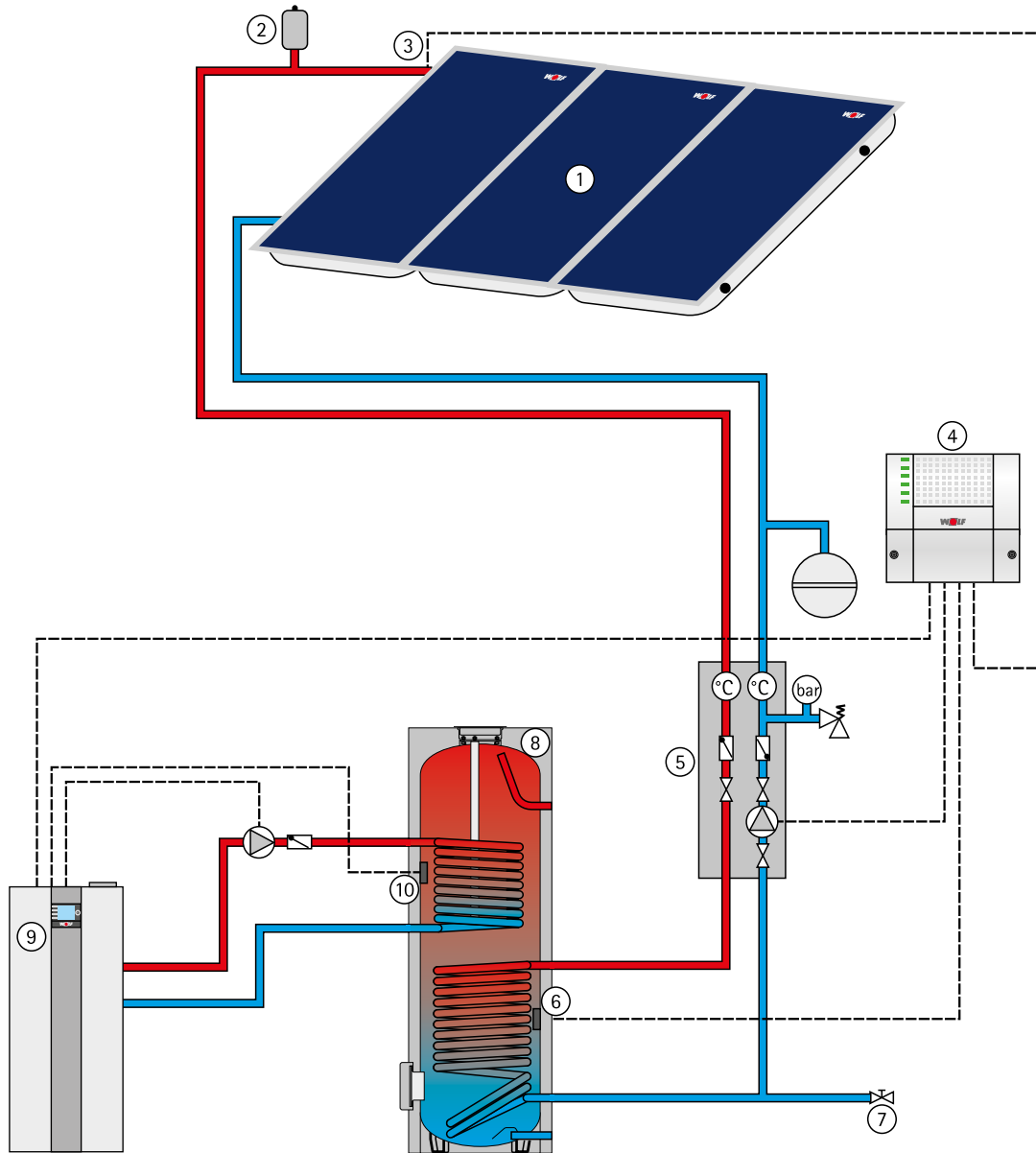
	SEM-1	-	-	500	750	1000
	SEM-2	300	400	-	-	-
Energy efficiency class ¹⁾		C	C	C	-	-
DHW cylinder capacity	l	285	385	500	750	935
Continuous cylinder output 80/60-10/45 °C [heating]	kw - l/h	20 - 490	20 - 490	20 - 490	50 - 1200	50 - 1200
Output factor (heating)	NL60	2.3	4.8	6.0	13.5	18.0
Cold water connection	A mm	90	55	99	220	220
Return, solar	B mm	815	874	305	345	345
Cylinder sensor, solar	C mm	506	416	586	603	603
Flow, solar	D mm	815	874	865	920	975
Return, heating	E mm	974	987	985	1025	1340
Cylinder sensor, heating	F mm	1154	1204	1160	1185	1500
Circulation	G mm	1077	1092	1195	1290	1605
Flow, heating	H mm	1334	1335	1335	1475	1790
DHW connection	I mm	1728	1586	1451	1590	1940
Flange (bottom)	J mm	324	275	335	384	384
Electric booster heater	K mm	887	915	949	970	1145
Thermometer	L mm	1504	1416	1404	1460	1810
Total height	M mm	1794	1651	1780	1850	2180
Diameter incl. thermal insulation	N mm	600	701	760	1000	1000
Diameter excl. thermal insulation	O mm	-	-	-	800	800
Height when tilted, incl. thermal insulation	mm	1898	1820	1935	2030	2350
Primary heating water	bar/°C			10/110		
Secondary DHW	bar/°C			10/95		
Internal flange diameter	mm	110	110	114	114	114
Cold water connection	G (male)	1"	1"	1"	1¼"	1¼"
Heating flow / return	G (fem.)	1"	1"	1"	1¼"	1¼"
Solar flow / return	G (male)	¾"	¾"	1"*	1¼"*	1¼"*
Circulation	G (male)	¾"	¾"	¾"	1"	1"
DHW connection	G (male)	1"	1"	1"	1¼"	1¼"
Electric booster heater	G (fem.)			1½"		
Thermometer	G (fem.)			½"		
Indirect coil surface area (heating)	m ²	1.0	1.2	1.0	1.5	1.5
Indirect coil surface area (solar)	m ²	1.6	1.8	1.8	2.1	2.4
Indirect coil capacity (heating)	l	5.8	7.0	6.1	9.2	9.2
Indirect coil capacity (solar)	l	9.4	13.0	11.5	13.5	14.5
Weight	kg	130	159	182	290	350

* G (female thread)

¹⁾ Energy class according to Ecodesign Directive for cylinders ≤ 500 l

PIPEWORK LAYOUT

SOLAR DHW HEATING WITH SOLAR CYLINDER SEM-...



- | | |
|-------------------------|---|
| ① Collector array | ⑥ Cylinder sensor, solar control module |
| ② Air vent trap | ⑦ Drain & fill valve |
| ③ Collector sensor | ⑧ Solar DHW cylinder SEM-... |
| ④ SM1-2 solar module | ⑨ TOB oil condensing boiler |
| ⑤ Pump/fitting assembly | ⑩ Cylinder sensor, heating |

TECHNICAL INFORMATION

Note: Use appropriate sizing programs (e.g. GetSolar) and observe rules and standards.

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	120 - 130
	F3-1Q	120 - 132
	CFK-1	4 - 10
4 - 6	F3-1	130 - 155
	F3-1Q	143 - 182
	CFK-1	16 - 36
7 - 10	F3-1	170 - 240
	F3-1Q	212 - 350
	CFK-1	50 - 113

*(90 l/h*coll., to DIN EN ISO 9806)

Solar expansion vessel selection

The highlighted fields are recommendations.

Number of collectors	Line cross-section				
	12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
2 "TopSon F3-1" collectors	18	18	25	-	-
3 "TopSon F3-1" collectors	-	25	35	-	-
4 "TopSon F3-1" collectors	-	35	35	50	-
5 "TopSon F3-1" collectors	-	50	50	50	-
6 "TopSon F3-1" collectors	-	50	50	80	-
7 "TopSon F3-1" collectors	-	80	80	80	80
8 "TopSon F3-1" collectors	-	80	80	80	80
9 "TopSon F3-1" collectors	-	-	80	80	80
10 "TopSon F3-1" collectors	-	-	80	80	100
2 "TopSon F3-1Q" collectors	18	18	25	-	-
3 "TopSon F3-1Q" collectors	-	35	35	-	-
4 "TopSon F3-1Q" collectors	-	35	50	50	-
5 "TopSon F3-1Q" collectors	-	50	50	50	-
6 "TopSon F3-1Q" collectors	-	80	80	80	-
7 "TopSon F3-1Q" collectors	-	80	80	80	80
8 "TopSon F3-1Q" collectors	-	80	80	80	100
9 "TopSon F3-1Q" collectors	-	-	80	80	100
10 "TopSon F3-1Q" collectors	-	-	80	100	100
2 "CFK-1" collectors	18	18	-	-	-
3 "CFK-1" collectors	-	25	25	-	-
4 "CFK-1" collectors	-	-	35	35	-
5 "CFK-1" collectors	-	-	35	50	-
6 "CFK-1" collectors	-	-	50	50	-
7 "CFK-1" collectors	-	-	50	50	80
8 "CFK-1" collectors	-	-	50	80	80
9 "CFK-1" collectors	-	-	-	80	80
10 "CFK-1" collectors	-	-	-	80	80



Solar pump assembly

Comprising:
High efficiency pump (EEI < 0.20), variably adjustable
 Fully wired with cable
 Ball valves with thermometer in flow and return
 Gravity brakes in flow and return
 6 bar safety valve, 0-10 bar pressure gauge



Solar pump assembly extension

To connect a second heat consumer
 Comprising:
High efficiency pump (EEI < 0.20), variably adjustable
 Fully wired with cable
 Ball valve with thermometer, gravity brake, wall retainer and installation material
 Dimensions HxWxD:
 375x182x210 mm
 EPP thermal insulation, resistant up to 130 °C

Drain & fill valve, air separator and manual air-vent valve

Wall retainer and installation material; dimensions HxWxD: 375 x 400(250) x 190 mm, well designed EPP thermal insulation shells, resistant up to 130 °C.

Note: SM1-2 and SM2-2 solar modules can be integrated into pump assembly

Solar pump assembly 10

Suitable for up to 10 solar collectors at 50 l flow rate per hour and collector (subject to system sizing)
 Flow regulation 2 to 15 l/min.
 Connection: 18 mm locking ring fitting

Solar pump assembly 20

Suitable for up to 20 solar collectors at 50 l flow rate per hour and collector (subject to system sizing)
 Flow regulation 7 to 30 l/min.
 Connection: 22 mm locking ring fitting

Solar pump assembly 10E

Suitable for up to 10 solar collectors at 50 l flow rate per hour and collector (subject to system sizing)
 Flow regulation 2 to 15 l/min
 Connection: 18 mm locking ring fitting

Solar pump assembly 20E

Suitable for up to 20 solar collectors at 50 l flow rate per hour and collector (subject to system sizing)
 Flow regulation 7 to 30 l/min.
 Connection: 22 mm locking ring fitting



Heat meter kit for SM1-2 and SM2-2*

For capturing the yield
 Comprising:
 - Flow meter
 - Return contact sensor
 - Union connections
 - $Q_{min/max}$ 1.5/3 m³/h
 - $Q_{min/max}$ 2.5/5 m³/h

* Can be used in configurations 1/3/4/5/6



Solar flow regulator for installation in the return

For precise adjustment and hydraulic balancing when several collector arrays are installed

DN 20 2 - 12 l/min
 (up to 8 collectors)
 DN 20 8 - 30 l/min
 (from 6 to 20 collectors)



Solar expansion vessels

With fixing materials
 2.5 bar pre-charge pressure

In sizes:
 12 l 18 l 25 l
 35 l 50 l 80 l
 100 l 150 l 200 l



Return temperature raising kit for MM-2, SM2-2 or KM-2

For solar central heating backup in single circuit systems

Comprising:
 - 3-way changeover valve
 - Return contact sensor
 - Cylinder sensor
 - Sensor well for cylinder sensor



Solar pre-cooling vessels

To protect the solar expansion vessel from excessive temperatures

In sizes:
 18 l
 35 l
 50 l



Solar fill & flush pump Unistar 2000A

Dry self-priming impeller pump with inlet filter made of clear glass, for filling solar thermal systems with heat transfer medium; intake, filling and flushing hose with 3/4" union nut, plastic container with lid, max. 30 l/min, max. 5 bar, 230 V, 50 Hz, 3.2 A

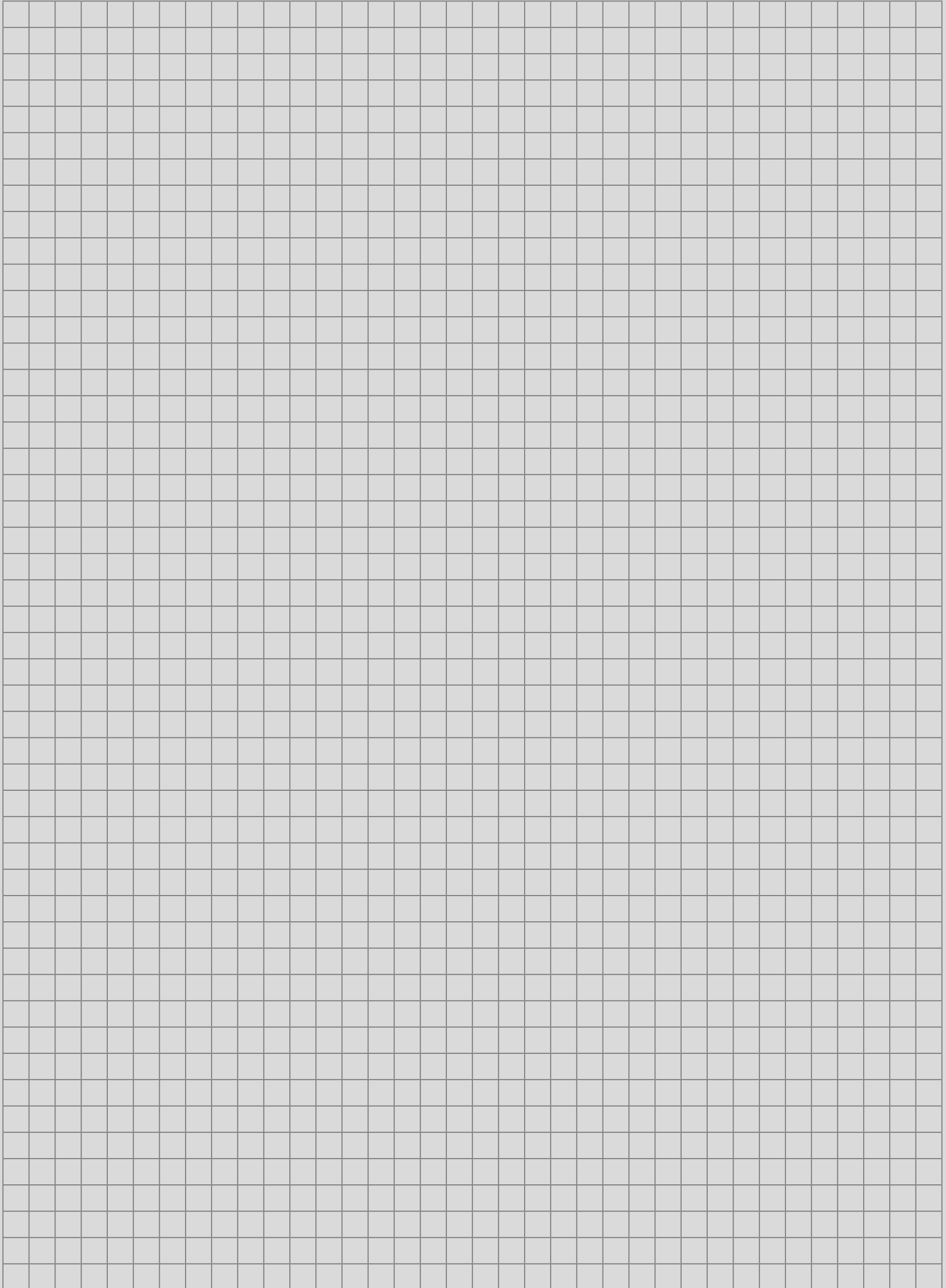
ACCESSORIES

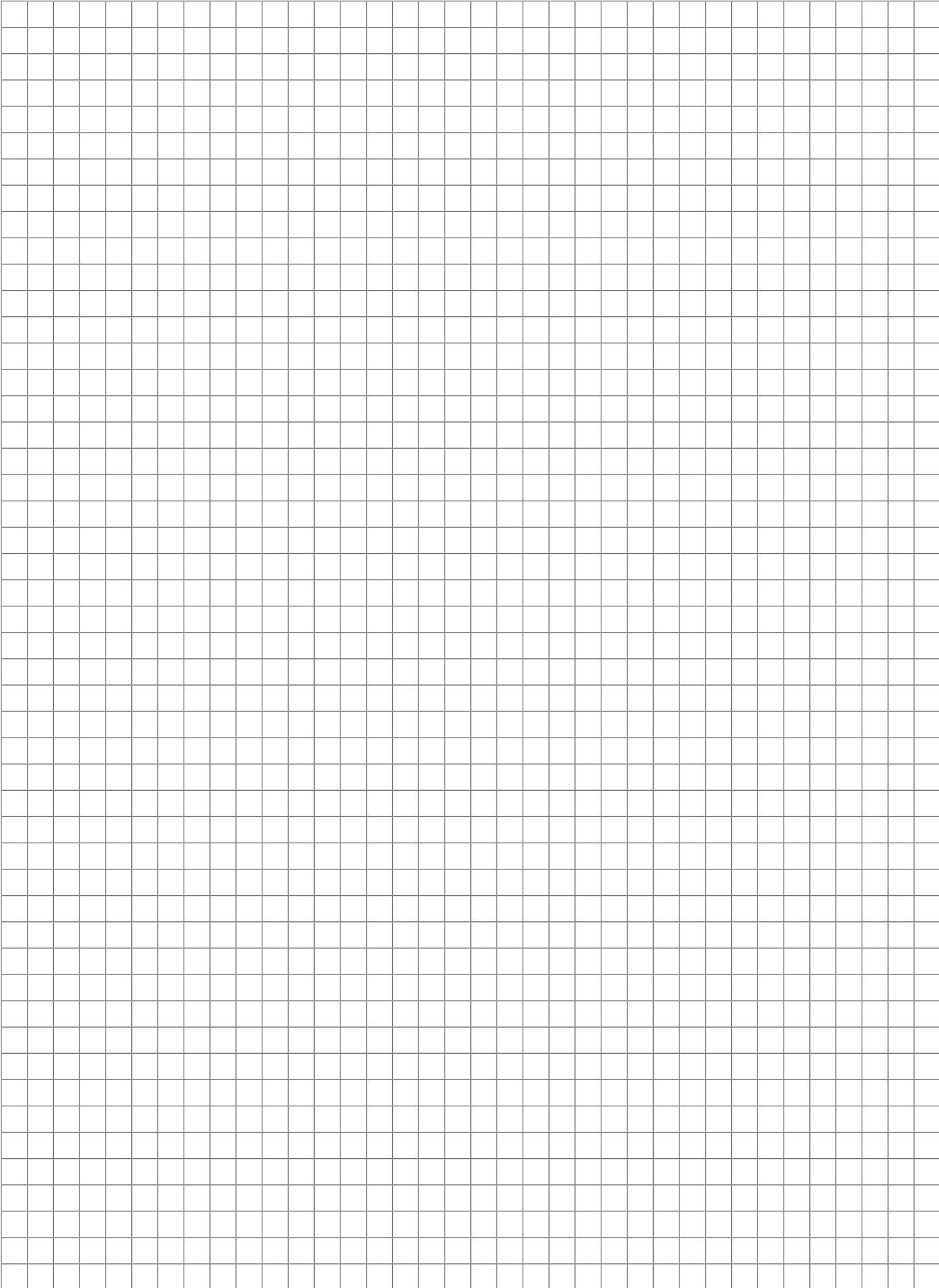
TOPLINE SOLAR TECHNOLOGY

Accessories:	F3-1 CFK-1	F3-1Q
Return temperature raising kit for MM-2 or SM2-2 For solar central heating backup in single circuit systems	•	•
Roof integration kit "Interlocking tiles/slate/plain tiles/barrel tiles" for one collector Roof integration frame for architecturally attractive roof integration of the collectors into the interlocking tile roofing, with coated aluminium black grey.	•	
Roof integration kit "Interlocking tiles/slate/plain tiles/barrel tiles" for two collectors Roof integration frame for architecturally attractive roof integration of the collectors into the roof cover, powder-coated, with coated aluminium black grey.	•	
Extension kit, roof integration kit for 1 collector each	•	
Roof integration kit, multi-row, for "interlocking tiles" (only for F3-1) Recommendation: collectors with black grey glazing bead.	•	
AluPlus rooftop installation kit (portrait format) for two or three collectors	•	
AluPlus snow load extension (portrait format) Required for surface loads of 2.4 kN/m ² and above, up to max. 4 kN/m ² , for one, two or three collectors.	•	
AluPlus rooftop installation kit (landscape format) for one collector		•
AluFlex-U support stands (portrait format) for one, two or three collectors For mounting on horizontal surfaces [adjustable 20°, 30°, 45°].	•	
AluFlex-U support stands (landscape format) for one, two or three collectors For mounting on horizontal surfaces [adjustable 20°, 30°, 45°].		•
Connection kit for roof integration for one collector array	•	
Connection kit for rooftop installation for one collector array	•	•
Compensator for collector fitting, two pieces required per collector connection	•	•
Solar pump assembly 10, with variably adjustable high efficiency pump Suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector.	•	•
Solar pump assembly 20 Suitable for up to 20 flat-plate collectors at 50 l flow rate per hour and collector.	•	•

Accessories:	F3-1 CFK-1	F3-1Q
Solar pump assembly 10E , with variably adjustable high efficiency pump. For connecting a second heat consumer, suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector.	•	•
Solar pump assembly 20E For connecting a second heat consumer, suitable for up to 20 flat-plate collectors at 50 l flow rate per hour and collector.	•	•
Solar expansion vessel , with fixing materials, 2.5 bar pre-charge pressure	•	•
Connection kit for solar expansion vessels	•	•
Solar pre-cooling vessels	•	•
Air vent trap 0.15 l, insulated, connection Ø 22 mm, copper	•	•
Thermostatic water mixer with integral non-return valve and anti-scalding protection.	•	•
Heat transfer medium ANRO 10 / 20 / 30 kg	•	•
Unistar 2000A solar fill & flush pump	•	•
Heat meter kit for solar modules SM1-2 and SM2-2	•	•
Solar flow regulator for installation in the return	•	•

NOTES





Dealer address :

WOLF GMBH / P.O. BOX 1380 / D-84048 MAINBURG / TEL. +49.0.875174-0 / FAX +49.0.875174-1600 / www.WOLF.eu

