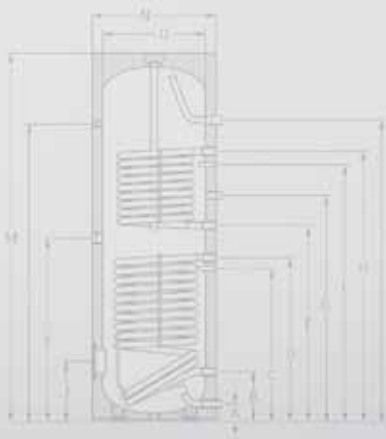




Technical documentation

Solar technology

Flat-plate collectors CFK-1/TopSon F3-1/F3-1Q • Vacuum tube collector CRK



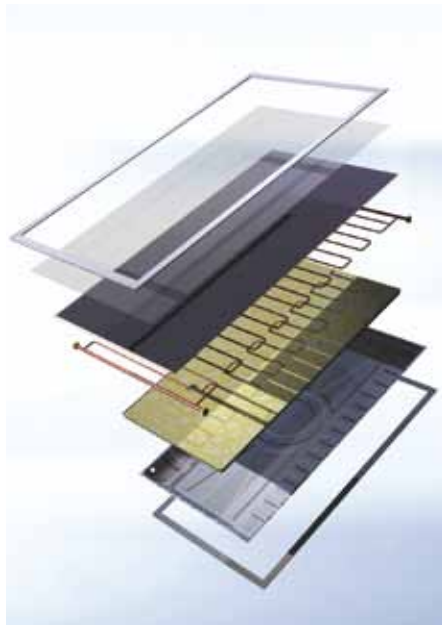
TopLine / ComfortLine

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

High performance flat-plate collector CFK-1

for solar heating systems used for DHW heating

for solar heating systems used for central heating backup



TopSon F3-1

Benefits of the Wolf high performance flat-plate collectors at a glance:

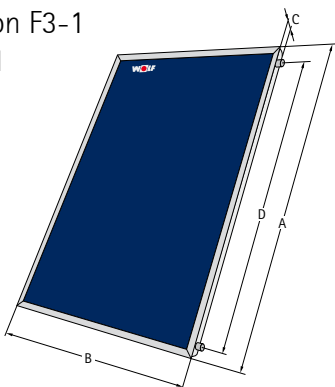
- High performance flat-plate collectors tested to EN 12975 part 2 with top energy utilisation; the minimum yield for grants/subsidies [Germany] has been certified
- Certified in accordance with Solar-Keymark (F3-1)
- The conditions set for the "Blue Angel" certificate of environmental excellence acc. 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/F3-1Q with additional insulation on the sides
- Absorber with highly selective coating for extremely high yield; Meander (TopSon F3-1/F3-1Q) 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/F3-1Q) or 3.0 mm (CFK-1) thick; hail-proof to EN 12975, thermally pre-stressed, TopSon F3-1/F3-1Q with improved transparency
- EPDM seal, pressed into a single-piece grip moulding
- With the TopSon F3-1/F3-1Q, up to 5 collectors can be connected to one side; connection either on the l.h. or r.h. side
- For TopSon F3-1/F3-1Q, the glass retaining strip is also available in grey-black (for special optical requirements)
- Flat-plate collectors TopSon F3-1 and CFK-1 for "portrait" installation, TopSon F3-1Q for "landscape" installation can be individually fitted with various assembly kits (accessory):
 - Roof integration kit suitable for double depression interlocking tiles
 - "AluPlus" rooftop installation kit suitable for double depression interlocking tiles, slate or similar, corrugated or flat sheet roof coverings
 - "AluFlex-U" installing stands suitable for flat roofs or horizontal surfaces
 - "AluFlex-U" 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

The customer must ensure that the connection between the roof structure and the triangle stands is professionally executed. The applicable standards and regulations must be observed when dimensioning the connecting elements.

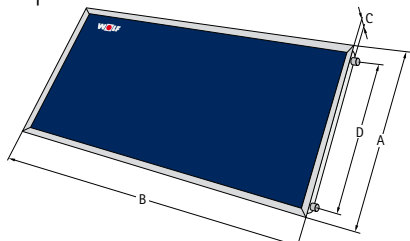
- 5 year warranty

Specification

TopSon F3-1
CFK-1



TopSon F3-1Q

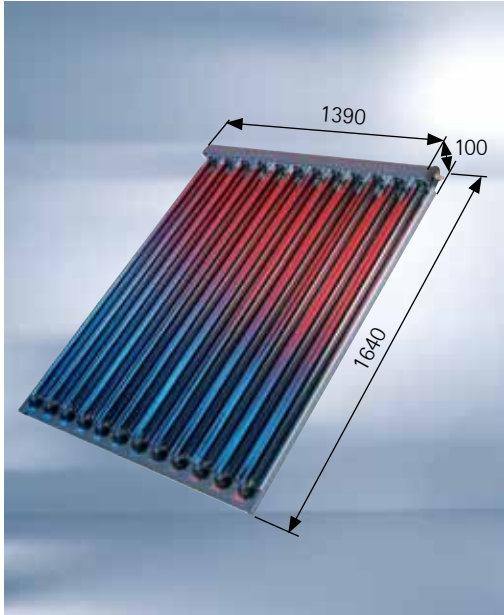


High performance flat-plate collector		TopSon F3-1	TopSon F3-1Q	CFK-1
Length	A mm	2099	1099	2099
Width	B mm	1099	2099	1099
Depth	C mm	110	110	110
Flow/return	D mm	1900	900	1900
Connections (flat sealing with union nut)	G	3/4"	3/4"	3/4"
Angle of inclination		15° to 75°	15° to 75°	15° to 75°
Optical efficiency *	%	80,4	77,0	76,7
Heat loss coefficient a ₁ *	W/(m ² K)	3,235	3,434	3,669
Heat loss coefficient a ₂ *	W/(m ² K ²)	0,0117	0,011	0,018
Max. idle temperature	°C	194	190	196
Irradiation angle correction factor K _{30°} *	%	94,0	94,0	95,0
Thermal capacity C *	kJ/(m ² K)	5,85	5,88	7,78
Max. operating pressure	bar	10	10	10
Gross area	m ²	2,3	2,3	2,3
Effective absorber area	m ²	2,0	2,0	2,1
Content	l	1,7	1,9	1,1
Weight (dry)	kg	40	41	36
Recommend flow vol. 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

* Values to EN 12975

ComfortLine

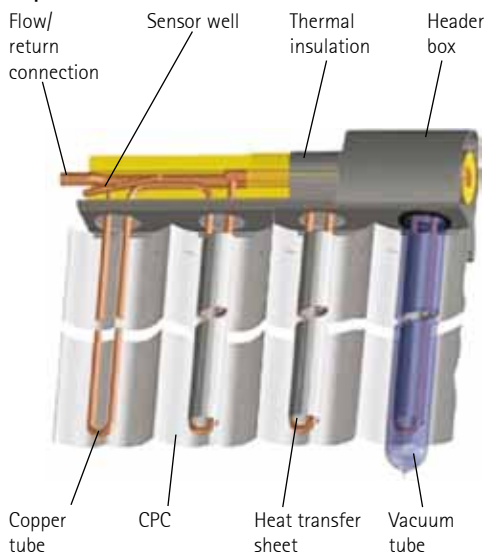
High performance CRK vacuum tube collectors
for solar heating systems used for DHW heating
for solar heating systems used for central heating backup



CRK benefits at a glance:

- Solar-Keymark certified
- 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
- 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 rooftop installation and freestanding 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.

Vacuum tube collector	Typ	CRK-12
Connections (flat sealing with union nut)	mm	15
Angle of inclination		15° to 90°
Absorption (energy absorption)	%	> 93,5
Emissions	%	≤ 6
Optical efficiency *	%	64,2
Heat loss coefficient a_1 *	W/(m ² K)	0,885
Heat loss coefficient a_2 *	W/(m ² K ²)	0,001
Max. idle temperature	°C	272
Irradiation angle correction factor $K_{50°}$ *	%	89 / 99
longitudinal / transversal	C_{eff} in kJ/(m ² K)	8,416
Effective thermal capacity *	bar	10
Max. operating pressure	mbar	5
Pressure drop (at 15 litres/h x m ² and 40°C)	pce.	12
Number of vacuum tubes per collector	mm	47 / 36 / 1,6
Diameter of glass tubes	m ²	2,28
Gross area	m ²	2,0
Effective absorber area	l	1,6
Content	kg	37,6
Weight (dry)		ANRO LS (undiluted)
Heat transfer medium		011-7S321 R
Solar-Keymark registration no.		

* Values to EN 12975

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
- Capturing the amount of heat with an external calorimeter
- function check of flow rate and gravity brake
- 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
- 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
- Capturing the amount of heat with an external calorimeter for any configuration
- function check of flow rate and gravity brake
- selection of the operating mode of the storage cylinder (prior, subordinate and parallel operation)
- 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 independent solar control (Stand-Alone operation)
- LC-Display
- Control by rotary selector with key function
- eBus interface



Programming module BM-Solar Grafik

- Usable for SM1 and SM2 alternatively to BM-Solar
- graphic display with backlight
- easy menu-driven operation thanks to clear text display
- graphic display of system configurations, temperature profiles and solar yield
- operation by rotary knob with pushbutton function
- e-Bus interface

Freestanding cylinder SEM-1 / SEM-2

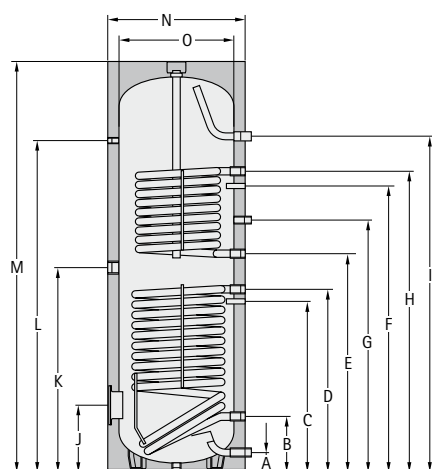
for DHW heating, made from steel with two-layer enamel coating and with two indirect coils



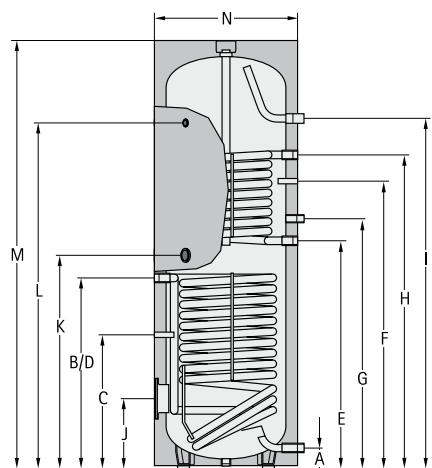
Benefits of the Wolf SEM

- Solar steel cylinder with quality certificate and two-layer enamel coating with two smooth tube internal indirect coils
- Solar pump assembly for optional fitting immediately on the SEM-2 solar cylinder
- High grade rigid PU foam or polyester fleece thermal insulation below the foil jacket of the cylinder for low thermal losses
- The interior of the cylinder and the indirect coils are protected against corrosion by two-layer 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 easy maintenance
- Connection for an electric immersion heater
- Optimised ratio between diameter and height for good temperature stratification
- 5 year warranty on the floorstanding cylinder,
2 year warranty on all electrical or moving parts

Specification



SEM-1



SEM-2

DHW cylinder	SEM-1 SEM-2	- 300	- 400	500 -	750 -	1000 -
Energy efficiency class ¹⁾		C	C	C		
Cylinder capacity	l	285	385	500	750	935
Constant DHW cylinder output 80/60-10/45°C (heating)	kW - l/h	20 - 490	20 - 490	20 - 490	50 - 1200	50 - 1200
Performance factor (heating)	NL60	2,3	4,8	6	13,5	18
Cold water connection	A mm	90	55	99	220	220
Solar return	B mm	815	874	305	345	345
Solar cylinder sensor	C mm	506	416	586	603	603
Solar flow	D mm	815	874	865	920	975
Central heating return	E mm	974	987	985	1025	1340
Cylinder sensor, heating	F mm	1154	1204	1160	1185	1500
DHW circulation	G mm	1077	1092	1195	1290	1605
Central heating flow	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 immersion heater	K mm	887	915	949	970	1145
Thermometer	L mm	1504	1416	1404	1460	1810
Overall height	M mm	1794	1651	1780	1830	2180
Diameter incl. thermal insulation	N mm	600	701	760	1000	1000
Diameter excl. thermal insulation	O mm	-	-	650	800	800
Height when tilted, incl. thermal insulation	mm	1898	1820	1935	2030	2350
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	110	114	114	114
Cold water connection	G (IG)	1" *	1" *	1"	1¼"	1¼"
Heating flow/return	G (IG)	1"	1"	1"	1¼"	1¼"
Solar flow/return	G (IG)	¾" **	¾" **	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"
Indirect coil surface area (heating)	m ²	0,95	0,95	0,95	1,5	1,5
Indirect coil surface area (solar)	m ²	1,30	1,8	1,8	2,1	2,4
Indirect coil content (heating)	l	6,6	7,0	6,1	9,15	9,15
Indirect coil content (solar)	l	9,0	12,8	11,5	13,5	14,5
Weight	kg	130	159	182	290	350

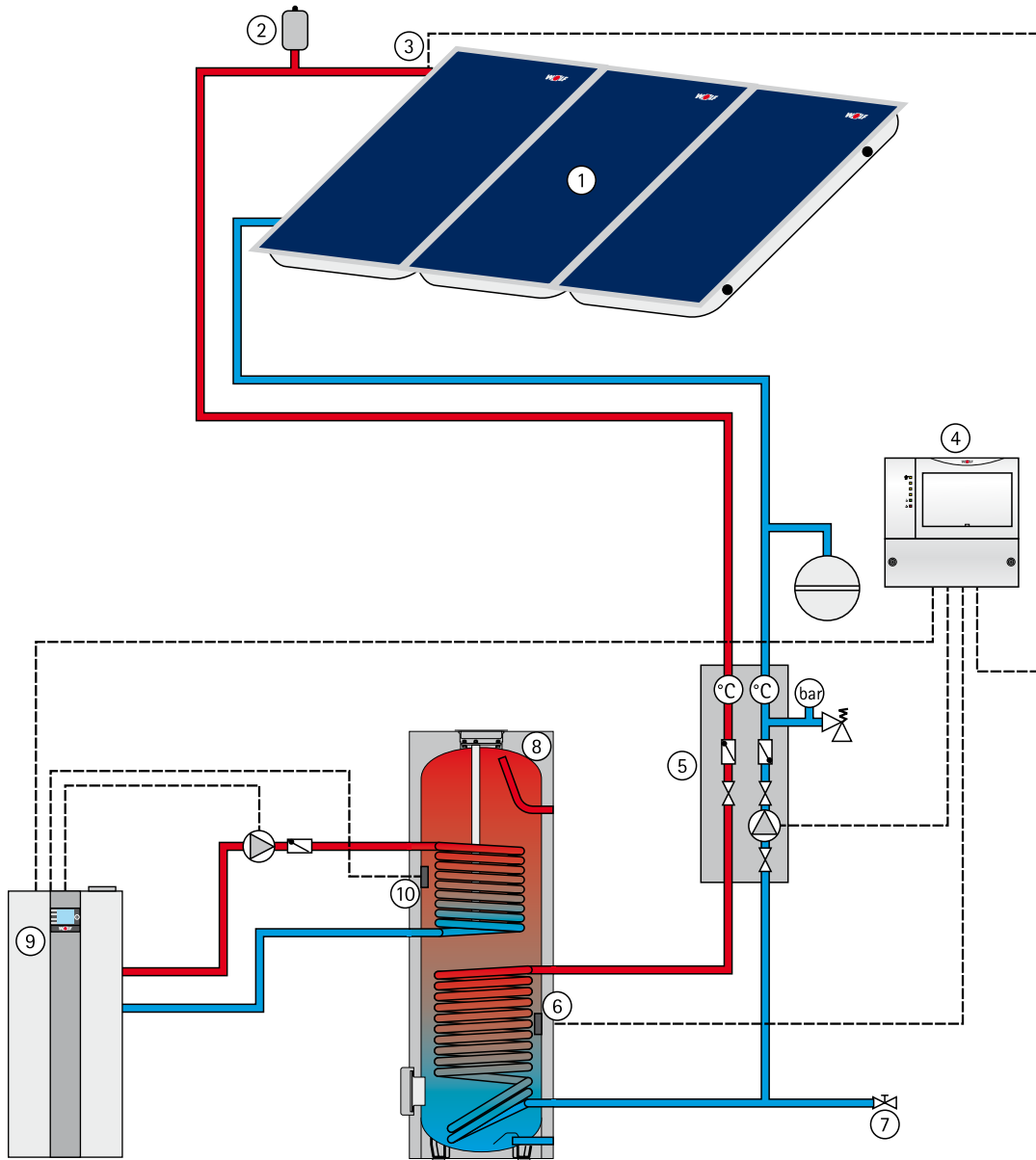
* R (male thread)

** G (male thread)

¹⁾ Energy labeling in accordance with Ecodesign Directive for cylinders ≤ 500l

Pipework layout

Solar DHW heating with the SEM-... solar cylinder



- | | | | |
|---|-----------------------|---|------------------------------------|
| ① | Collector array | ⑥ | Solar control unit cylinder sensor |
| ② | Air vent trap | ⑦ | Fill & drain valve |
| ③ | Collector sensor | ⑧ | Solar cylinder SEM-... |
| ④ | Solar module SM1 | ⑨ | Oil condensing boiler TOB |
| ⑤ | Pump/fitting assembly | ⑩ | Cylinder sensor, heating water |

Please see our „Cylinder systems“ documentation for further cylinder solutions with Wolf solar heating.

Accessories

TopLine solar technology



Pump/fitting assembly comprising:
2 x multi-valves with $\varnothing 18$ mm ($\varnothing 22$ mm for solar pump assembly 20) locking ring fittings, each with a **gravity brake in the flow and return**; can be installed with air grille, two integral dial thermometers, one 6 bar safety valve, one 0-10 bar pressure gauge.

With drain & fill valve, air separator and manual air vent valve.

Wall retainer and installation material, insulation made from EPP, temperature-resistant up to 130 °C

With infinitely adjustable high efficiency pump (EEI < 0,23).

Pump/fitting assembly 10

For up to 10 flat-plate collectors at 50 l flow rate per hour and collector. Flow regulation 2 to 15 l/min.

Pump/fitting assembly 20

For up to 20 flat-plate collectors at 50 l flow rate per hour and collector. Flow regulation 7 to 30 l/min.



Pump/fitting assembly to connect a second heat consumer, comprising:
Multi-valve with gravity brake, can be installed with air grille, integral dial thermometer, one 1" ball valve, EPP insulation, temperature-resistant up to 130 °C.

With infinitely adjustable high efficiency pump (EEI < 0,23).

Pump/fitting assembly 10E

Suitable for up to 10 solar collectors at 50 l flow rate per hour and collector. Flow regulation 2 to 15 l/min.

Pump/fitting assembly 20E

Suitable for up to 20 solar collectors at 50 l flow rate per hour and collector. Flow regulation 7 to 30 l/min.



Calorimeter kit for SM1 and SM2*

for yield measurement; comprising:
- flow meter
- return sensor
- union nut fittings
- $Q_{\min/\max}$ 1,5/3 m³/h
- $Q_{\min/\max}$ 2,5/5 m³/h

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



Solar flow regulation for installation in the return

For precise adjustment and hydraulic balancing for several collector fields.

DN20 2 - 12 l/min

(up to 8 collectors)

DN20 8 - 30 l/min

(from 6 to 20 collectors)



Solar expansion vessel

With fixing material;
2.5 bar pre-charge pressure,

Available sizes:

12 litres	18 litres	25 litres
35 litres	50 litres	80 litres
105 litres	150 litres	200 litres



Return temperature raising facility for MM, SM2 or KM

For tying the solar energy into the heating circuit, for single circuit systems comprising:

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



Solar pre-cooling vessels

To protect the solar expansion vessel from excessive temperatures.

Available sizes:

18 litres
35 litres
50 litres



Unistar 2000A solar fill & flush pump

dry self-priming impeller pump with inlet filter made of clear glass to fill solar thermal systems with heat transfer medium; suction, fill & flush hose with 3/4" union, plastic tank with cover, max. 30 l/min, max. 5 bar, 230 V, 50 Hz, 3.2 A

Technical information

Example:
 Climate region Munich
 Roof inclination 45°, collector orientation SE
 DHW demand (approx. 75 l / person / day)
 Number of occupants: 4



Climate region

Climate region	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 region	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

Notice:

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
	CRK	7 - 22
4 - 6	F3-1	130 - 155
	F3-1Q	143 - 182
	CFK-1	16 - 36
	CRK	38 - 58
7 - 10	F3-1	170 - 240
	F3-1Q	212 - 350
	CFK-1	50 - 113
7 - 8	CRK	70 - 100

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

Selection of solar heating expansion vessel

The fields with a grey background are recommendations.

Number of coll.	Pipe diameter	Pipe diameter				
		12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
2 collectors "TopSon F3-1"	L	18	18	25	-	-
3 collectors "TopSon F3-1"	L	-	25	35	-	-
4 collectors "TopSon F3-1"	L	-	35	35	50	-
5 collectors "TopSon F3-1"	L	-	50	50	50	-
6 collectors "TopSon F3-1"	L	-	50	50	80	-
7 collectors "TopSon F3-1"	L	-	80	80	80	80
8 collectors "TopSon F3-1"	L	-	80	80	80	80
9 collectors "TopSon F3-1"	L	-	-	80	80	80
10 collectors "TopSon F3-1"	L	-	-	80	80	105

Number of coll.	Pipe diameter	Pipe diameter				
		12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
2 collectors "TopSon F3-1Q"	L	18	18	25	-	-
3 collectors "TopSon F3-1Q"	L	-	35	35	-	-
4 collectors "TopSon F3-1Q"	L	-	35	50	50	-
5 collectors "TopSon F3-1Q"	L	-	50	50	50	-
6 collectors "TopSon F3-1Q"	L	-	80	80	80	-
7 collectors "TopSon F3-1Q"	L	-	80	80	80	80
8 collectors "TopSon F3-1Q"	L	-	80	80	80	105
9 collectors "TopSon F3-1Q"	L	-	-	80	80	105
10 collectors "TopSon F3-1Q"	L	-	-	80	105	105

Number of coll.	Pipe diameter	Pipe diameter				
		12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
2 collectors "CFK-1"	L	18	18	-	-	-
3 collectors "CFK-1"	L	-	25	25	-	-
4 collectors "CFK-1"	L	-	-	35	35	-
5 collectors "CFK-1"	L	-	-	35	50	-
6 collectors "CFK-1"	L	-	-	50	50	-
7 collectors "CFK-1"	L	-	-	50	50	80
8 collectors "CFK-1"	L	-	-	50	80	80
9 collectors "CFK-1"	L	-	-	-	80	80
10 collectors "CFK-1"	L	-	-	-	80	80

Number of coll.	Pipe diameter	Pipe diameter	
		15 x 1	18 x 1
2 collectors "CRK"	L	35	35
3 collectors "CRK"	L	-	50
4 collectors "CRK"	L	-	80
5 collectors "CRK"	L	-	80
6 collectors "CRK"	L	-	80
7 collectors "CRK"	L	-	105
8 collectors "CRK"	L	-	105

Wolf solar technology

High performance flat-plate collector TopSon F3-1 for „portrait“ installation / F3-1Q 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 ²
		Weight:	kg

No.

Price each

Total price

High performance flat-plate collector CFK-1 for "portrait" installation

Flat-plate collector tested to EN 12975

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 ²
		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.

Collector type	CRK	Dimensions: (see page 3)	
Make	Wolf	Height:	mm
		Width:	mm
		Area:	m ²
		Weight:	kg

Wolf solar technology

Control units for high performance solar collectors:

	No.	Price each	Total price
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)			
Programming module BM-Solar Grafik Usable for SM1 and SM2 alternatively to BM-Solar			

Solar cylinder SEM-1 / SEM-2 made from steel
for SEM-2, the solar pump assembly can be fitted directly to the cylinder.
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-..._____	Dimensions: (see page 12)		
	Ø casing:	mm	
	Ø cylinder:	mm	
	Height:	mm	
	Heating surface, central heating:	m ²	
	Heating surface, solar:	m ²	
	Weight:	kg	

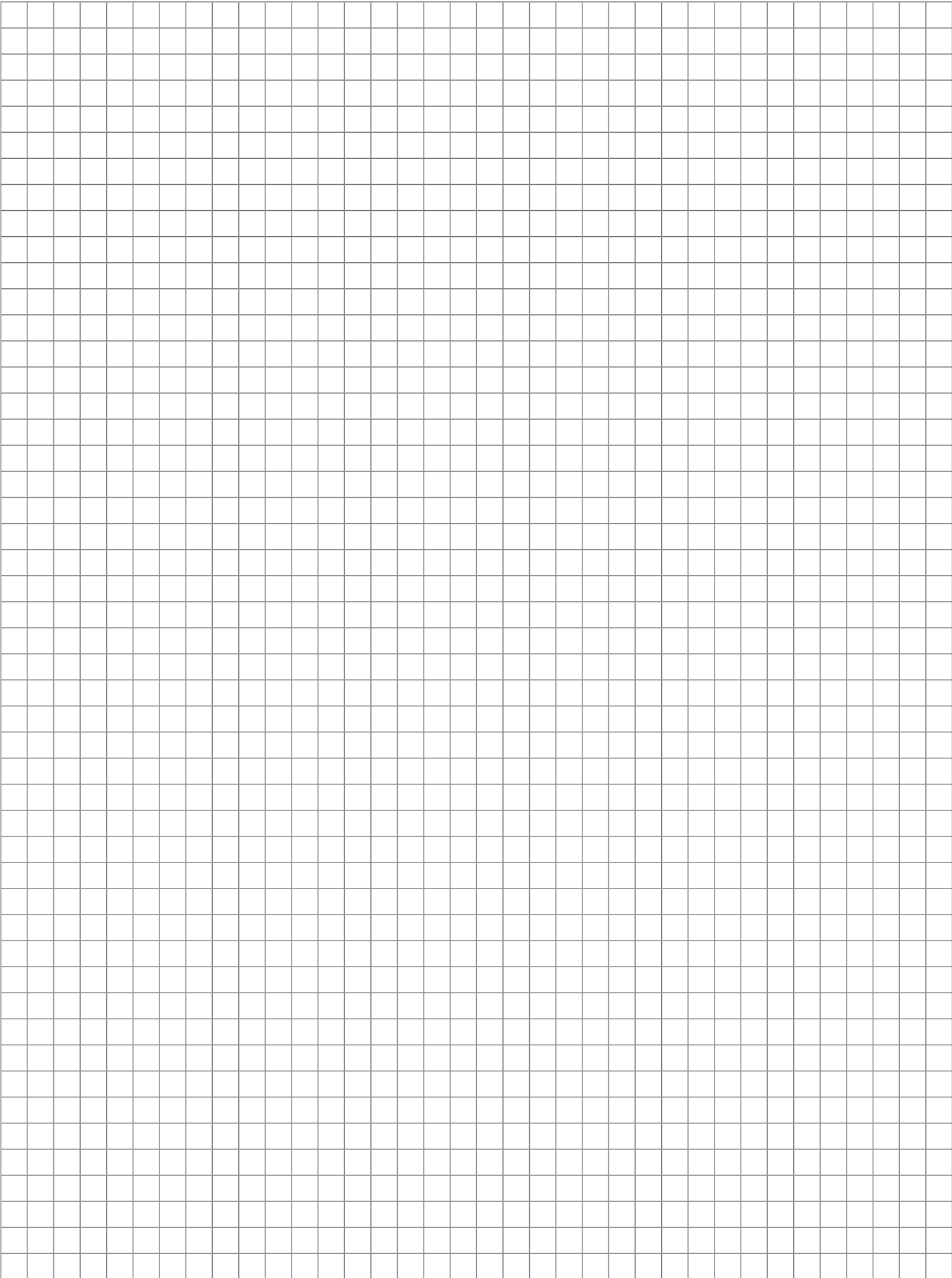
Wolf solar technology

Accessories:	F3-1 CFK-1	F3-1Q	CRK
Return temperature raising facility MM or SM2 for tying the solar energy into the heating circuit	•	•	•
Roof integration set "Interlocking tiles/slate/barrel roof tiles" for 1 collectors roof integration frames for an architecturally attractive roof integration of the collectors into the tile surface, powder-coated, dark grey RAL 7021.	•		
Roof integration set "Interlocking tiles/slate/barrel roof tiles" for 2 collectors roof integration frames for an architecturally attractive roof integration of the collectors into the tile surface, powder-coated, dark grey RAL 7021.	•		
Extension set for the roof integration set for 1 collector each	•		
Multi-row roof integration set for "interlocking tiles" (only for F3-1) Recommendation: Collectors with grey-black glass strip	•		
"AluPlus" rooftop installation kit ("portrait" installation) for 1 collector	•		
"AluPlus" rooftop installation kit ("portrait" installation) for 2 or 3 collectors	•		
"AluPlus" snow load extension ("portrait" installation) required for a surface load from 2.4 kN/m ² on, suitable up to a maximum of 4kN/m ² , for 1, 2 or 3 collectors	•		
"AluFlex-U" triangle stands ("portrait" installation) for roofs with a low pitch to optimized the irradiation angle for 1, 2 or 3 collectors (adjustable to 20°, 30°, 45°)	•		
"AluPlus" rooftop installation kit ("landscape" installation) for 1 collector		•	
"AluPlus" rooftop installation kit ("landscape" installation) for 2 or 3 collectors		•	
"AluFlex-U" triangle stands ("landscape" installation) for roofs with a low pitch to optimized the irradiation angle for 1, 2 or 3 collectors (adjustable to 20°, 30°, 45°)		•	
"AluFlex-U" installing stands ("portrait" installation) for 1, 2 or 3 collectors, for the easy and quick installation on horizontal surfaces (adjustable to 20°, 30°, 45°)	•		
"AluFlex-U" installing stands ("landscape" installation) for 1, 2 or 3 collectors, for the easy and quick installation on horizontal surfaces (adjustable to 20°, 30°, 45°)		•	
Connection kit for roof integration for one array of collectors	•		
Connection kit for rooftop installation for one array of collectors	•	•	
Compensator for collector fittings, two pieces are required per collector connection	•	•	
Rooftop installation kit set "CRK" ("portrait" installation) for one tube collector			•

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Accessories:	F3-1 CFK-1	F3-1Q	CRK
Connection kit for the optical connection of two tube collectors			•
Connection kit tube collector			•
Flexible connection kit			•
Inclination correction kit for roofs with a low pitch to optimize the irradiation angle (adjustable to 20°, 30°, 45°)			•
Connection accessories swimming pool absorber per row of collectors (up to 10 absorbers per row)			
Pump/fitting assembly 10 , with infinitely adjustable high efficiency pump suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector	•	•	•
Pump/fitting assembly 20 suitable for up to 20 flat-plate collectors at 50 l flow rate per hour and collector	•	•	•
Pump/fitting assembly 10E , with infinitely adjustable high efficiency pump for the connection of a second heat consumer suitable for up to 10 flat-plate collectors at 50 l flow rate per hour and collector	•	•	•
Pump/fitting assembly 20E , for the connection of a second heat consumer suitable for up to 20 flat-plate collectors at 50 l flow rate per hour and collector	•	•	•
Solar heating expansion vessel , with fixing material, 2.5 bar inlet pressure	•	•	•
Connection kit for solar heating expansion vessel	•	•	•
Solar pre-cooling vessels	•	•	•
Air vent trap 0.15l, insulated, connection Ø 22 mm, copper	•	•	•
Thermostatic water mixing valve with integral non-return valve and anti-scalding protection	•	•	•
Heat transfer medium ANRO 10 / 20 / 30 kg	•	•	
Heat transfer medium ANRO LS 10 / 20 kg			•
Unistar 2000A solar fill & flush pump	•	•	•
Calorimeter kit for for solar module SM1 and SM2	•	•	•
Unistar 2000A solar fill & flush pump	•	•	•

Notice





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