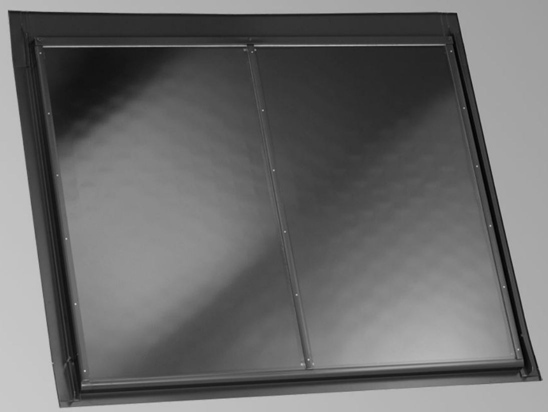
VIESSMANN

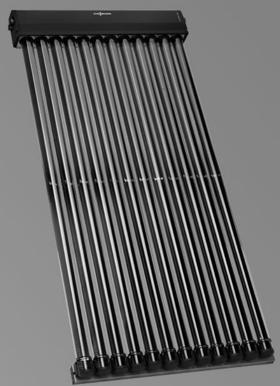
VITOSOL

Technical guide



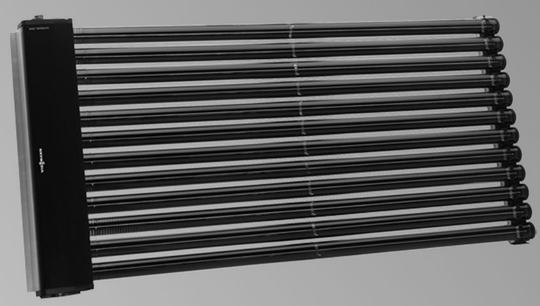
Vitosol 200-F, 5 DIA

Vitosol -F



Vitosol 300-T, SP3B

Vitosol 200-T, SPE



Vitosol 200-T, SP2A

VITOSOL 100-F

Flat-plate collector, type SV and SH
For installation on flat and pitched roofs and for freestanding installation
Type SH also for installation on walls

VITOSOL 200-F

Flat-plate collector, type SVE and SHE
For installation on flat and pitched roofs and for freestanding installation

VITOSOL 200-F

Large area flat-plate collector, type 5DIA
For roof integration on pitched roofs with roof tiles

VITOSOL 200-F, 300-F

Flat-plate collector, type SV and SH
For installation on flat and pitched roofs as well as for roof integration and freestanding installation
Type SH also for installation on walls

VITOSOL 200-T

Type SP2A
For installation on flat or pitched roofs, on walls and for free-standing installation

VITOSOL 200-T

Type SPE
For installation on flat and pitched roofs, and for freestanding installation.

VITOSOL 300-T

Type SP3B
For installation on flat and pitched roofs, and for freestanding installation.

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Principles

Together with Viessmann heating systems, solar thermal systems create an optimum system solution for DHW and swimming pool heating, central heating backup and other applications.

This technical guide includes a summary of all technical documents for the required components, as well as design and sizing information especially for systems for detached houses. This technical guide is a product-related addition to Viessmann's "Solar thermal systems" technical guide. You can obtain a printed version from your Viessmann sales consultant or download it from the Viessmann website (www.viessmann.de), where you will also find electronic aids regarding collector fixing and maintaining the correct pressure in solar thermal systems.

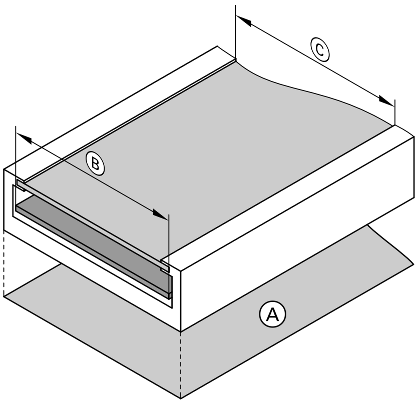
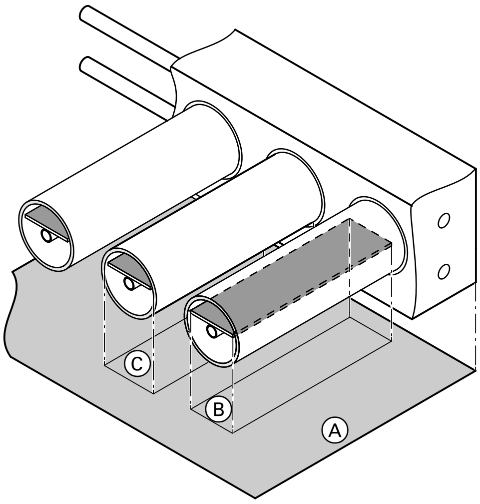
1.1 Viessmann collector range

Flat-plate and vacuum tube collectors from Viessmann are suitable for DHW and swimming pool heating, for central heating backup, as well as for the generation of process heat. The conversion of light into heat at the absorber is identical for both types of collector.
Flat-plate collectors are easily and safely installed above and integrated into domestic roofs. Increasingly, collectors are also mounted on walls or as floorstanding units. Flat-plate collectors are more affordable than vacuum tube collectors. They are used for DHW heating systems, swimming pool heating and for central heating backup.
In vacuum tube collectors, the absorber is similar to a Thermos flask in that it is set into an evacuated glass tube. A vacuum has good thermal insulation properties. Heat losses are therefore lower than with flat-plate collectors, especially with high inside or low outside temperatures, i.e. under the particular operating conditions that are to be expected when heating or air conditioning a building.
In Viessmann vacuum tube collectors, every vacuum tube can be rotated. This means the absorber can be optimally aligned to the sun even in unfavourable installation situations. Vitosol 200-T vacuum tube collectors, type SP2A and type SPE, which use the heat pipe principle, can also be mounted horizontally on flat roofs. The yield per m^2 collector area is a little reduced in this case, but this can be offset by a correspondingly larger collector area. The Viessmann "ESOP" calculation program produces a yield comparison.

Flat-plate collectors cannot be mounted horizontally, as the glass cover cannot be kept clean simply through rain, and the venting of the collector would be more difficult. Vitosol-F, type SH and Vitosol 200-T, type SP2A can also be installed on walls. When installed parallel to a wall (facing south), on an annual average, approximately 30 % less radiation hits the collector than in installations on 45° supports. If the main period of use falls in spring, autumn or winter (central heating backup), higher yields may still be achieved from the collectors, subject to the prevailing conditions. It should be noted that installation on walls is subject to certain legal requirements. For the rules regarding the implementation of collector systems, see the "technical rules for the use of linear supported glazing" (TRLV) issued by the Deutsches Institut für Bautechnik (DIBT) (see chapter "Technical Building Regulations").

1.2 Parameters for collectors

Area designations

Flat-plate collector	Vacuum tube collector
	

- **Gross area** Ⓐ
  Describes the external dimensions (length x width) of a collector. It is decisive when planning the installation and when calculating the roof area required, as well as for most subsidy programs when applying for subsidies.
- **Absorber area** Ⓑ
  Selectively coated metal area, which is set into the collector.
- **Aperture area** Ⓒ
  The aperture area is the technically relevant specification for designing a solar thermal system and for the use of sizing programs.
  Flat-plate collector:
  Area of collector cover through which solar rays can enter.
  Vacuum tube collector:
  Sum of longitudinal sections of the single tubes. Since the tubes are smaller at the top and bottom with no absorber area, the aperture area of these devices is slightly larger than the absorber area.

Collector efficiency

The efficiency of a collector (see chapter "Specification" for the relevant collector) specifies the proportion of insolation hitting the absorber area that can be converted into useable heat. The efficiency depends, among other things, on the operating conditions of the collector. The calculation method is the same for all collector types.
Some of the insolation striking the collectors is "lost" through reflection and absorption at the glass pane and through absorber reflection. The ratio between the insolation striking the collector and the radiation that is converted into heat on the absorber is used to calculate the **optical efficiency η_0**.
When the collector heats up, it transfers some of that heat to the ambience through thermal conduction of the collector material, thermal radiation and convection. These losses are calculated by means of the heat loss factors k_1 and k_2 and the temperature differential ΔT (given in K) between the absorber and the surroundings:

$$\eta = \eta_0 - \frac{k_1 \cdot \Delta T}{E_g} - \frac{k_2 \cdot \Delta T^2}{E_g}$$

Efficiency curves
The optical efficiency η_0 and the heat loss factors k_1 and k_2 together with temperature differential ΔT and the irradiance E_g are sufficient to determine the efficiency curve. Maximum efficiency is achieved when the differential between the absorber and ambient temperature ΔT and the thermal losses is zero. The higher the collector temperature, the higher the heat losses and the lower the efficiency.
The typical operating ranges of the collectors can be read off the efficiency curves. This gives the adjustment options of the collectors.

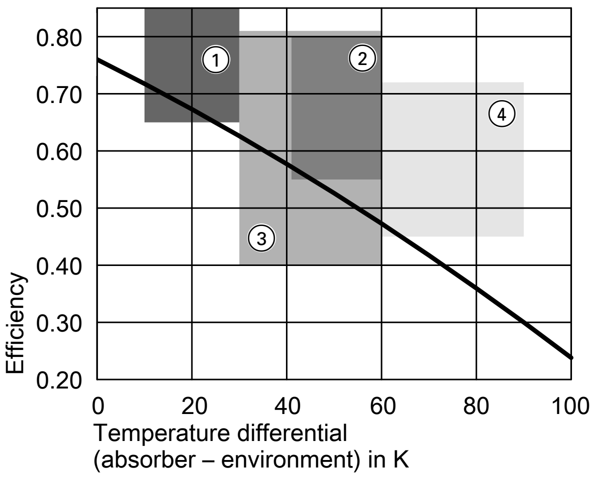
Typical operating ranges (see following diagram):
① Solar thermal system for DHW at low coverage
② Solar thermal system for DHW at higher coverage
③ Solar thermal systems for DHW and solar central heating backup
④ Solar thermal systems for process heat/solar-powered air conditioning

The following diagrams show the efficiency curves with respect to the absorber surfaces of the collectors.

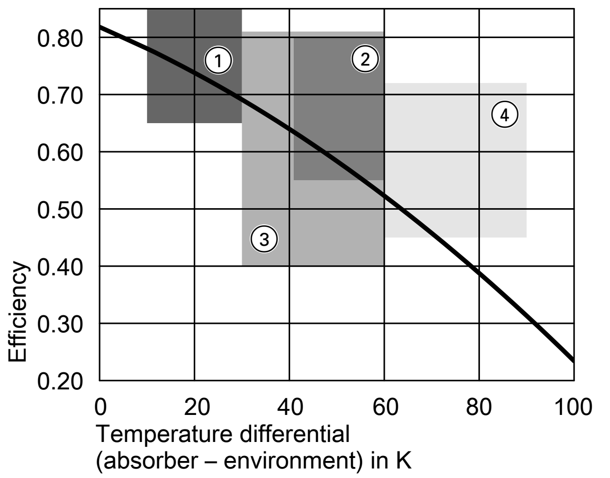
1

Flat-plate collectors

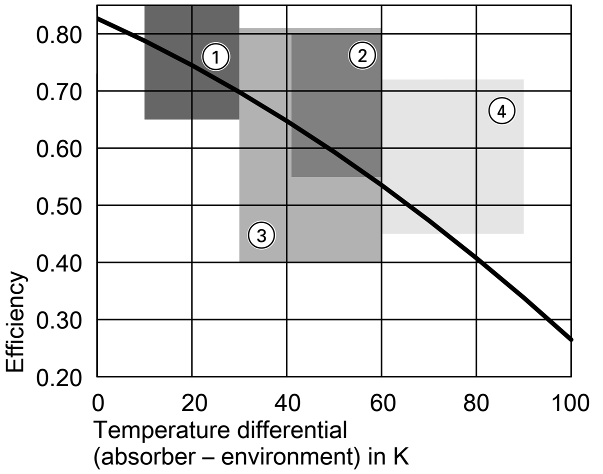
Vitosol 100-F, type SV1/SH1



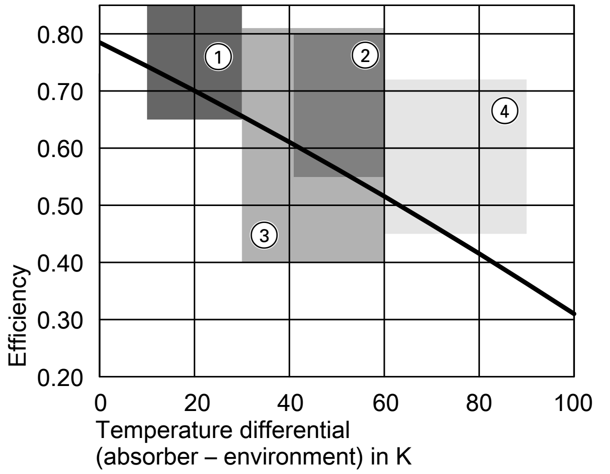
Vitosol 200-F, type SV2D



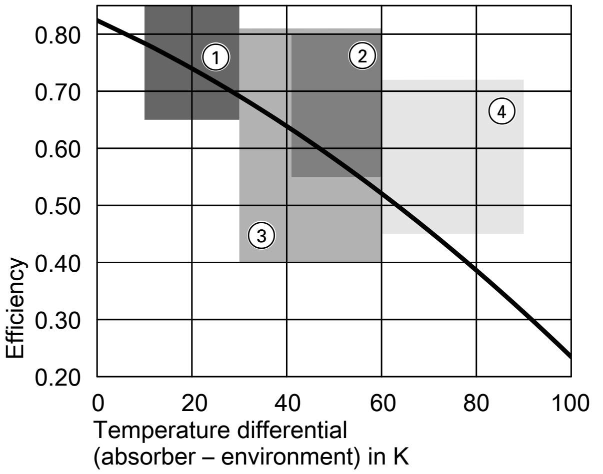
Vitosol 200-F, type SVE/SHE



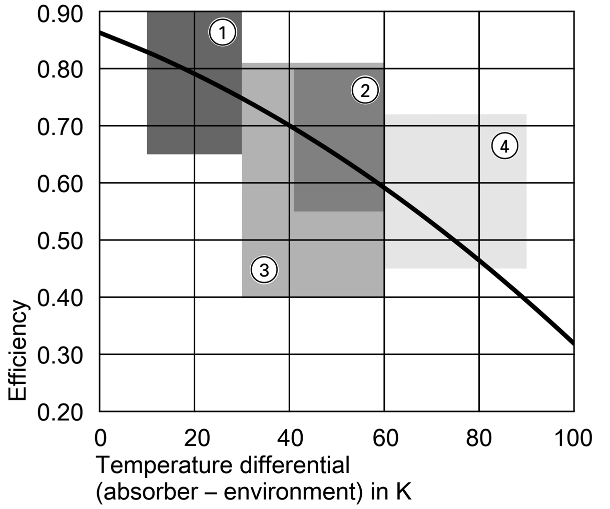
Vitosol 200-F, type 5DIA



Vitosol 200-F, type SV2/SH2



Vitosol 300-F, type SV3/SH3



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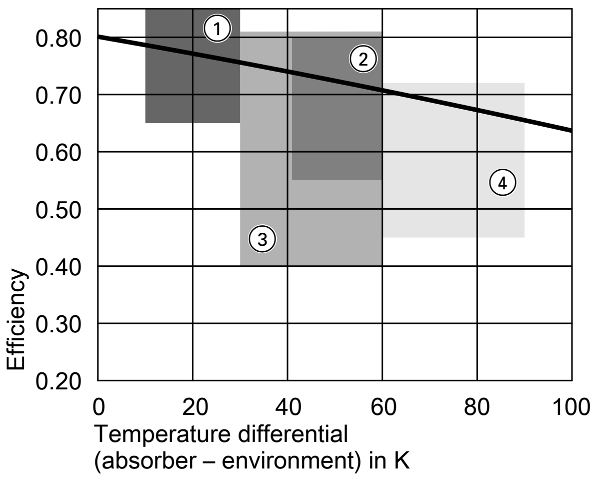
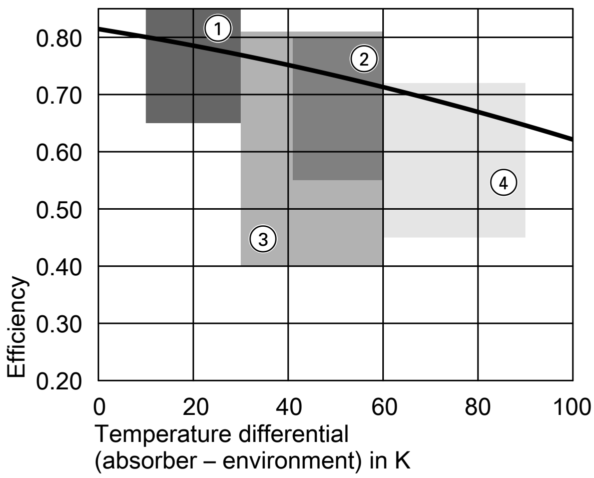
Vacuum tube collectors

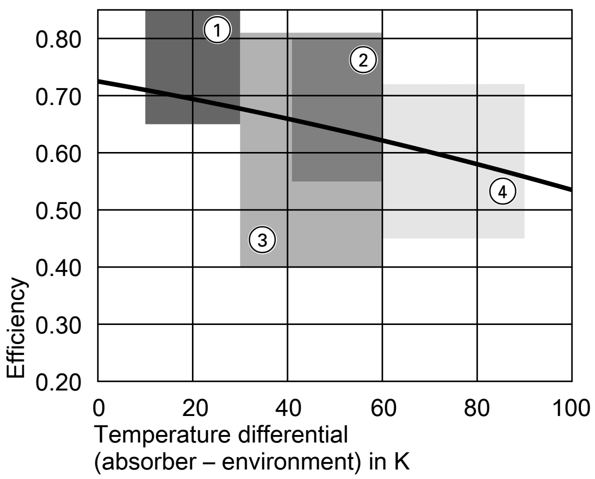
Vitosol 200-T, type SP2A



Vitosol 300-T, type SP3B



Vitosol 200-T, type SPE



Thermal capacity

The thermal capacity in kJ/(m^2 · K) indicates the amount of heat absorbed by the collector per m^2 and K. This heat is only available to the system to a limited extent.

Idle temperature

The stagnation temperature is the maximum temperature that the collector can reach during insolation of 1000 W/m^2.

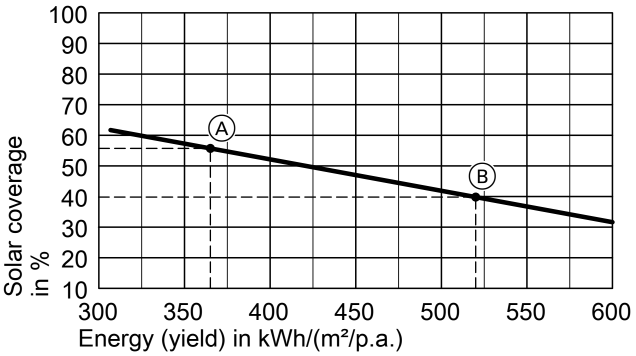
If no heat is drawn from the collector, it will heat up until it reaches the stagnation temperature. In this state, the thermal losses are of the same magnitude as the radiation absorbed.

Steam production capacity

The steam production capacity in W/m^2 indicates the maximum output at which a collector produces steam during stagnation and transfers it to the system, when evaporation occurs.

1

Solar coverage



Ⓐ Conventional sizing for DHW systems in detached houses
Ⓑ Conventional sizing for large solar thermal systems

The solar coverage rate indicates what percentage of the energy required annually for DHW applications can be covered by the solar thermal system.
Designing a solar thermal system always entails finding a good compromise between yield and solar coverage. The higher the selected solar coverage, the more conventional energy is saved.
However, this is linked to an excess of heat in summer. This means a lower average collector efficiency and consequently lower yields (energy in kWh) per m^2 absorber area.

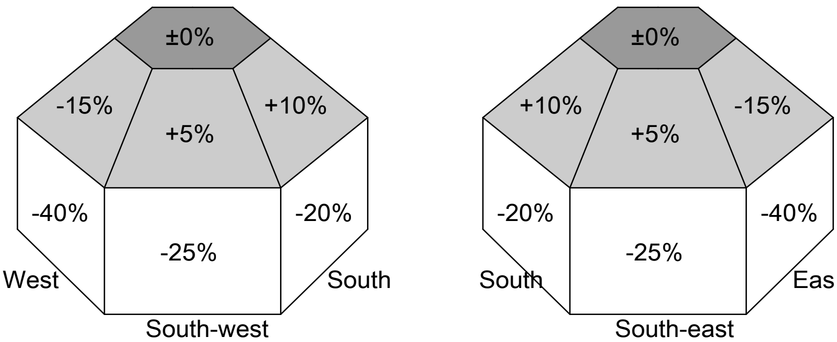
1.3 Orientation, inclination and shading of the receiver surface

Inclination of the receiver surface

The yield of a solar thermal system varies depending on the inclination and orientation of the collector area. If the receiver surface is angled, the angle of incidence changes, as does the irradiance, and consequently the amount of energy. This is greatest when the radiation hits the receiver surface at right angles. In our latitudes, this case never arises relative to the horizontal. Consequently, the inclination of the receiver surface can optimise the yield. In Germany, a receiver surface angled 35° receives approx. 12 % more energy when oriented towards the south (compared with a horizontal position).

Orientation of the receiver surface

An additional factor for calculating the amount of energy that can be expected is the orientation of the receiver surface. In the northern hemisphere, an orientation towards south is ideal. The following figure shows the interaction of orientation and inclination. Relative to the horizontal, greater or lesser yields result. A range for optimum yield of a solar thermal system can be defined between south-east and south-west and at angles of inclination between 25 and 70°. Greater deviations, for example, for installation on walls, can be compensated for by a correspondingly larger collector area.



Avoiding shading of the receiver surface

Looking at the installation of a collector facing south, we recommend that the area between south-east and south-west is kept free of shading (at an angle towards the horizon of up to 20°). It should be remembered that the system is to operate for longer than 20 years, and that during this time, for example, trees would grow substantially.

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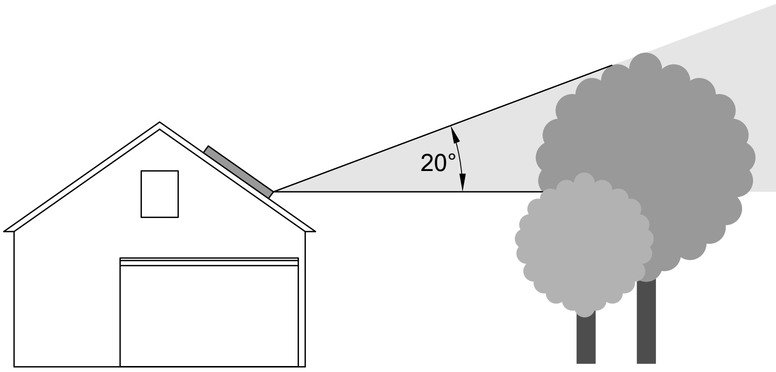
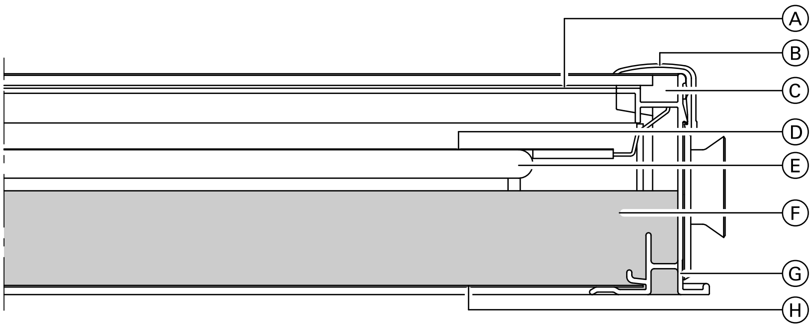

20°

2

2.1 Product description

The selectively coated absorber of the Vitosol 100-F, type SV1A/SH1A ensures a high level of absorption of the available insolation. The copper pipe shaped like a meander ensures an even heat transfer at the absorber.
The collector casing features heat-resistant thermal insulation and a cover made from low ferrous solar glass.
Flexible connection pipes sealed with O-rings provide a secure parallel connection of up to 12 collectors.

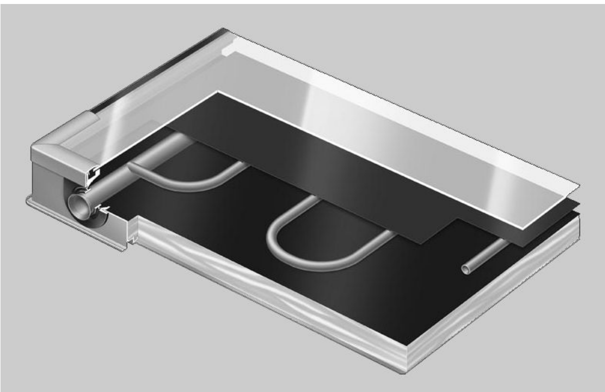
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is mounted in a sensor well set in the solar circuit flow.
The Vitosol 100-F, type SV1B/SH1B with a special absorber coating is designed for coastal regions (see chapter "Specification").



Ⓐ Solar glass cover, 3.2 mm
Ⓑ Cover bracket made from aluminium
Ⓒ Pane seal
Ⓓ Absorber
Ⓔ Meander-shaped copper pipe
Ⓕ Thermal insulation made from mineral fibre
Ⓖ Aluminium frame
Ⓗ Steel bottom plate with an aluminium-zinc coating

Benefits

- Powerful, attractively priced flat-plate collector.
- Absorber designed as meander layout with integral headers. Up to 12 collectors can be linked in parallel.
- Universal application for above roof and freestanding installation — either in vertical (type SV) or horizontal (type SH) orientation. Type SH is suitable for installation on walls.
- High efficiency through selectively coated absorber and cover made from low ferrous solar glass.
- Permanently sealed and highly stable through all-round folded aluminium frame and seamless pane seal.
- Puncture-proof and corrosion-resistant back panel made from zinc-plated sheet steel.
- Easy to assemble Viessmann fixing system with statically-tested and corrosion-resistant components made from stainless steel and aluminium – standard for all Viessmann collectors.
- Quick and reliable collector connection through flexible corrugated stainless steel pipe push-fit connectors.



Delivered condition

The Vitosol 100-F is delivered fully assembled ready to connect.

2.2 Specification

Vitosol 100-F is available with 2 different absorber coatings. Type SV1B/SH1B has a special absorber coating that allows these collectors to be used in coastal regions.

Distance to the coast:
- up to 100 m:

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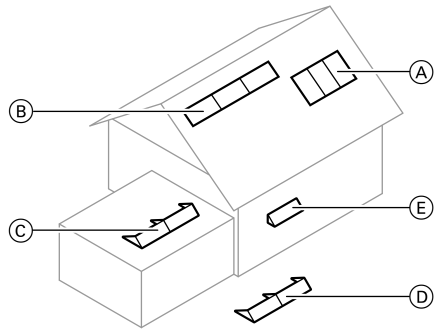
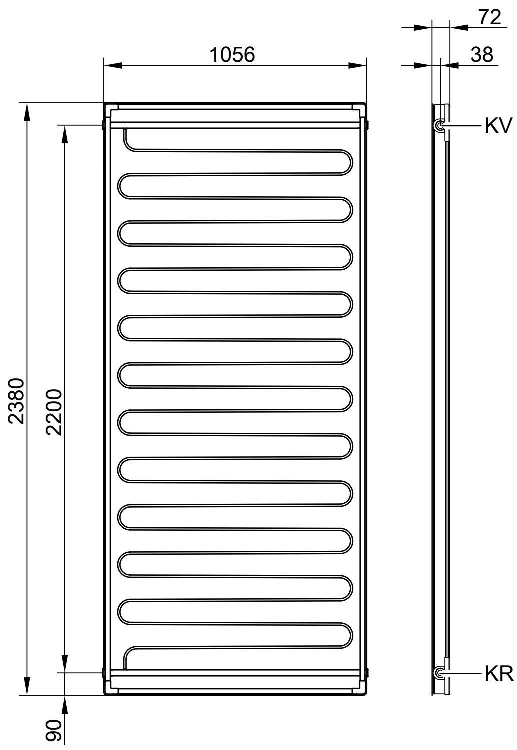
only use type SV1B/SH1B
- between 100 and 1000 m:
  type SV1B/SH1B is recommended

Note
Viessmann accepts no liability if type SV1A/SH1A is used in such regions.

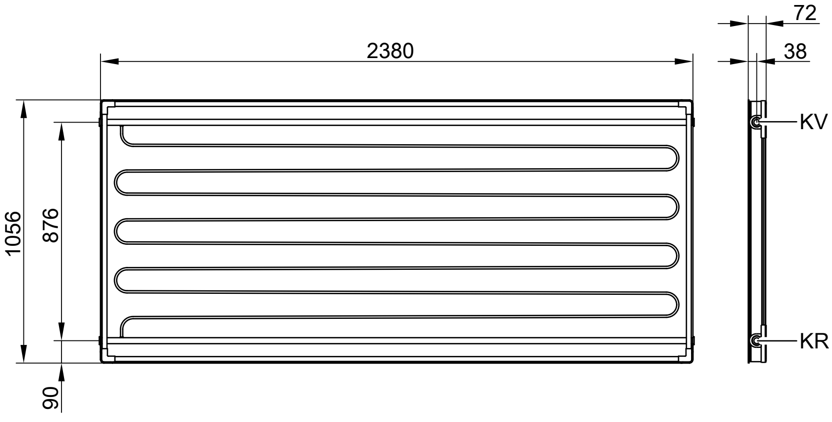
Type		SV1A	SH1A	SV1B	SH1B
Gross area (required when applying for subsidies)	m^2				2.51
Absorber area	m^2				2.32
Aperture area	m^2				2.33
Installation position (see following diagram)		Ⓐ (above roof), Ⓒ, Ⓓ	Ⓑ(above roof), Ⓒ, Ⓓ, Ⓔ	Ⓐ (above roof), Ⓒ, Ⓓ	Ⓑ (above roof), Ⓒ, Ⓓ, Ⓔ
Clearance between collectors	mm				21
Dimensions					
Width	mm	1056	2380	1056	2380
Height	mm	2380	1056	2380	1056
Depth	mm	72	72	72	72
The following values apply to the absorber area:					
– **Optical efficiency**	%		76		75.4
– **Heat loss factor k_1**	$W/(m^2 \cdot K)$		4.14		4.15
– **Heat loss factor k_2**	$W/(m^2 \cdot K^2)$		0.0108		0.0114
Thermal capacity	$kJ/(m^2 \cdot K)$		4.7		4.5
Weight	kg		41.5		43.9
Liquid content (heat transfer medium)	litre	1.48	2.33	1.67	2.33
Permiss. operating pressure (see chapter "Solar expansion vessel")	bar/MPa				6/0.6
Max. stagnation temperature	°C		200		196
Steam output					
– Favourable installation position	W/m^2				60
– Unfavourable installation position	W/m^2				100
Connection	Ø mm				22





Type SV1A/SV1B

KR Collector return (inlet)
KV Collector flow (outlet)



Type SH1A/SH1B

KR Collector return (inlet)
KV Collector flow (outlet)

2.3 Approved quality

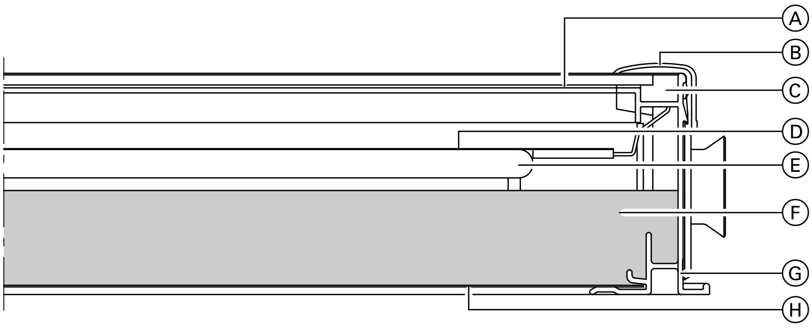
The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

3.1 Product description

The selectively coated absorber of the Vitosol 200-F, type SVE/SHE ensures a high level of absorption of the available insolation. The copper pipe shaped like a meander ensures an even heat transfer at the absorber.
The collector casing features heat-resistant thermal insulation and a cover made from low ferrous solar glass with anti-reflective coating on the inside.

Flexible connection pipes sealed with O-rings provide a secure parallel connection of up to 15 collectors.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is mounted in a sensor well set in the solar circuit flow.



Ⓐ Solar glass cover with anti-reflective coating on the inside, 3.2 mm
Ⓑ Cover bracket made from aluminium
Ⓒ Pane seal
Ⓓ Absorber
Ⓔ Meander-shaped copper pipe
Ⓕ Thermal insulation made from mineral fibre
Ⓖ Aluminium frame
Ⓗ Steel bottom plate with an aluminium-zinc coating

Benefits

- Powerful, attractively priced flat-plate collector
- Absorber designed as meander layout with integral headers. Up to 15 collectors can be linked in parallel.
- Universal application for above roof and freestanding installation — either in vertical (type SV) or horizontal (type SH) orientation. Type SH is suitable for installation on walls.
- High efficiency through selectively coated absorber and cover made from low ferrous solar glass with anti-reflective coating on the inside of the glass
- Long-lasting impermeability and high stability thanks to all-round folded aluminium frame and seamless pane seal
- Puncture-proof and corrosion-resistant back panel made from zinc-plated sheet steel
- Easy to assemble Viessmann fixing system with statically-tested and corrosion-resistant components made from stainless steel and aluminium – standard for all Viessmann collectors
- Quick and reliable collector connection with flexible corrugated stainless steel pipe push-fit connectors

Delivered condition

The Vitosol 200-F is delivered fully assembled ready to connect.

3.2 Specification

Note
Viessmann accepts no liability for collectors installed in coastal regions. Maintain a minimum distance from the coast of 1000 m.

<table>
<tr><th>Type</th><th></th><th>SVE</th><th>SHE</th></tr>
<tr><td>Gross area
(required when applying for subsidies)</td><td>m²</td><td colspan="2">2.51</td></tr>
<tr><td>Absorber area</td><td>m²</td><td colspan="2">2.32</td></tr>
<tr><td>Aperture area</td><td>m²</td><td colspan="2">2.33</td></tr>
<tr><td>Installation position (see following diagram)</td><td></td><td>Ⓐ (above roof), Ⓒ, Ⓓ</td><td>Ⓑ (above roof), Ⓒ, Ⓓ, Ⓔ</td></tr>
<tr><td>Dimensions</td><td></td><td></td><td></td></tr>
<tr><td>Width</td><td>mm</td><td>1056</td><td>2380</td></tr>
<tr><td>Height</td><td>mm</td><td>2380</td><td>1056</td></tr>
<tr><td>Depth</td><td>mm</td><td>72</td><td>72</td></tr>
<tr><td>The following values apply to the absorber area:</td><td></td><td colspan="2"></td></tr>
<tr><td>– Optical efficiency</td><td>%</td><td colspan="2">82.7</td></tr>
<tr><td>– Heat loss factor k_1</td><td>W/(m² · K)</td><td colspan="2">3.721</td></tr>
<tr><td>– Heat loss factor k_2</td><td>W/(m² · K²)</td><td colspan="2">0.019</td></tr>
<tr><td>Thermal capacity</td><td>kJ/(m² · K)</td><td colspan="2">6.0</td></tr>
<tr><td>Weight</td><td>kg</td><td colspan="2">41</td></tr>
<tr><td>Liquid content
(heat transfer medium)</td><td>litres</td><td>2.68</td><td>1.83</td></tr>
<tr><td>Permiss. operating pressure</td><td>bar/MPa</td><td colspan="2">6/0.6</td></tr>
<tr><td>Max. stagnation temperature</td><td>°C</td><td colspan="2">209</td></tr>
<tr><td>Steam output</td><td></td><td></td><td></td></tr>
<tr><td>– Favourable installation position</td><td>W/m²</td><td colspan="2">60</td></tr>
<tr><td>– Unfavourable installation position</td><td>W/m²</td><td colspan="2">100</td></tr>
<tr><td>Connection</td><td>Ø mm</td><td colspan="2">22</td></tr>
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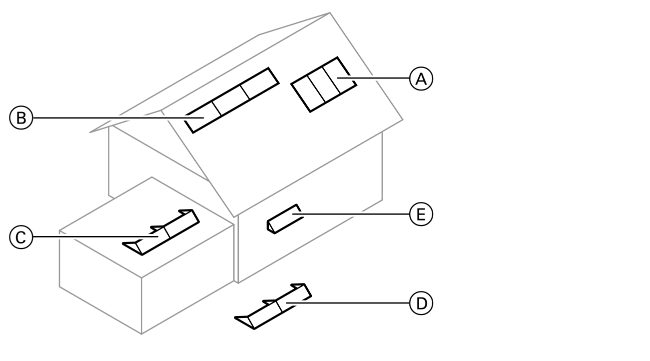

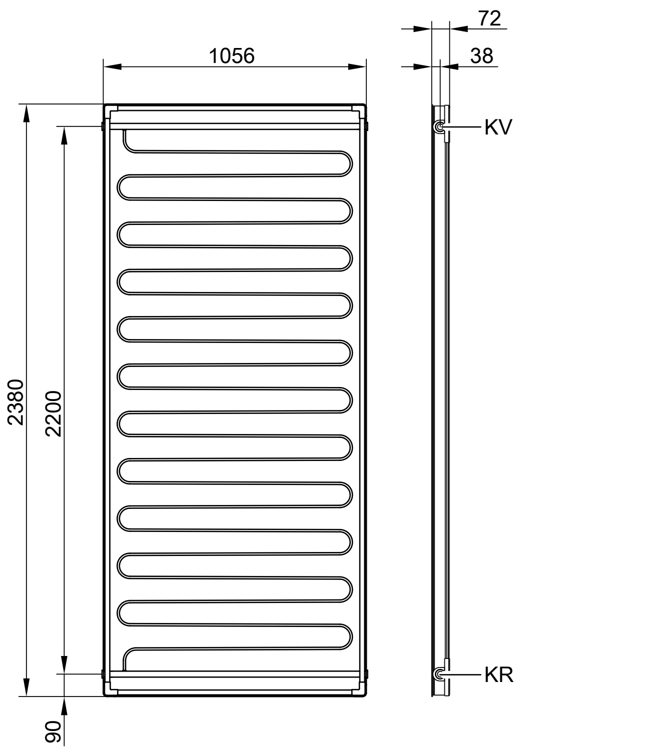

Type SVE

KR Collector return (inlet)
KV Collector flow (outlet)

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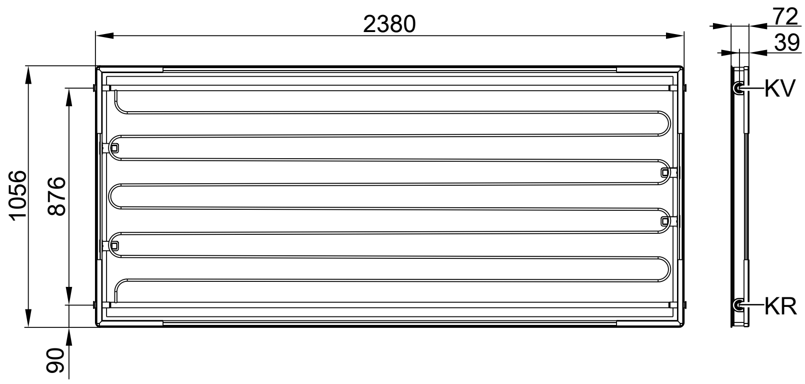


Type SHE

KR Collector return (inlet)
KV Collector flow (outlet)

3.3 Approved quality

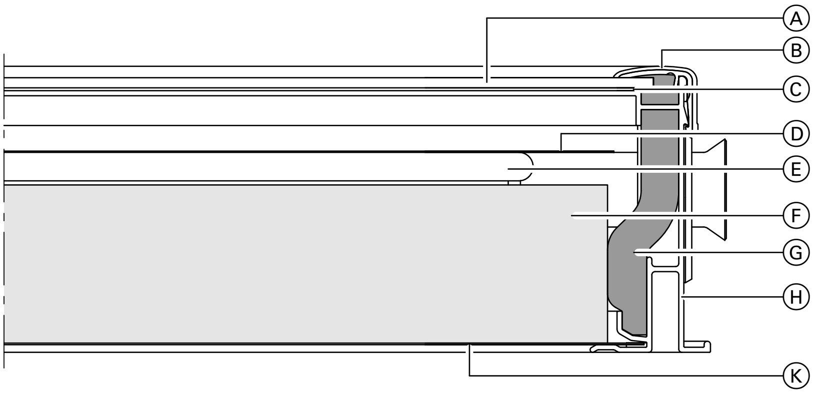
The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

4.1 Product description

The main component of the Vitosol 200-F, type SV2C/SH2C is the highly selectively coated absorber. It ensures a high absorption of insolation and low emission of thermal radiation. A meander-shaped copper pipe through which the heat transfer medium flows is part of the absorber.
The heat transfer medium absorbs the absorber heat through the copper pipe. The absorber is encased in a highly insulated collector housing that minimises the heat losses of the collector.
The high-grade thermal insulation provides temperature stability and is non-outgassing. The collector is covered with a solar glass panel. The glass has a very low iron content, thereby reducing reflection losses.

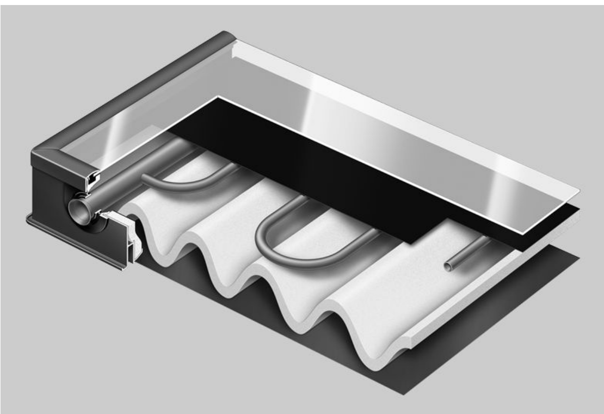
Up to 12 collectors can be combined together to create a single collector array. For this purpose, the standard delivery includes flexible connection pipes with O-rings.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is mounted in a sensor well set in the solar circuit flow.
The Vitosol 200-F, type SV2D with a special absorber coating is designed for coastal regions (see chapter "Specification").



Ⓐ Solar glass cover, 3.2 mm
Ⓑ Aluminium cover strip in dark blue
Ⓒ Pane seal
Ⓓ Absorber
Ⓔ Meander-shaped copper pipe
Ⓕ Melamine epoxy foam insulation
Ⓖ Melamine epoxy foam insulation
Ⓗ Aluminium frame in dark blue
Ⓚ Steel bottom plate with an aluminium-zinc coating

Benefits

- Powerful flat-plate collector with a highly selectively coated absorber.
- Absorber designed as meander layout with integral headers. Up to 12 collectors can be linked in parallel.
- Universal application for above roof and freestanding installation — either in vertical (type SV) or horizontal (type SH) orientation. Type SH is suitable for installation on walls.
- Attractive collector design; frame in dark blue. Upon request, the frame is also available in any RAL colour.
- The selectively coated absorber, the highly effective thermal insulation and the cover made from low ferrous solar glass ensure a high solar yield.
- Long-lasting impermeability and high stability thanks to all-round folded aluminium frame and seamless pane seal.
- Puncture-proof and corrosion-resistant back panel.
- Easy to assemble Viessmann fixing system with statically-tested and corrosion-resistant components made from stainless steel and aluminium – standard for all Viessmann collectors.
- Quick and reliable collector connection through flexible corrugated stainless steel pipe push-fit connectors.



Delivered condition

The Vitosol 200-F is delivered fully assembled ready to connect.

Viessmann offers complete solar heating systems with Vitosol 200-F (packs) for DHW heating and/or central heating backup (see pack pricelist).

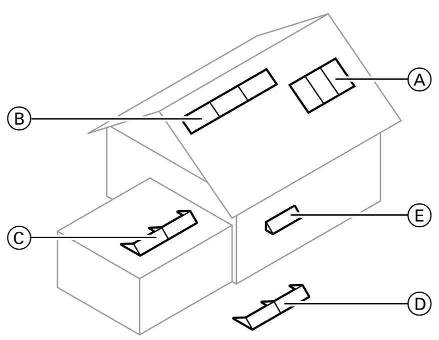
4.2 Specification

Vitosol 200-F, type SV is available with 2 different absorber coatings. Type SV2D has a special absorber coating that allows these collectors to be used in coastal regions.

Distance to the coast:
- up to 100 m:
  only use type SV2D
- between 100 and 1000 m:
  use of type SV2D is recommended

Note
Viessmann accepts no liability if type SV2C/SH2C is used in these regions.

<table>
<tr><th>Type</th><th></th><th>SV2C</th><th>SH2C</th><th>SV2D</th></tr>
<tr><td>Gross area
(required when applying for subsidies)</td><td>m²</td><td colspan="3">2.51</td></tr>
<tr><td>Absorber area</td><td>m²</td><td colspan="3">2.32</td></tr>
<tr><td>Aperture area</td><td>m²</td><td colspan="3">2.33</td></tr>
<tr><td>Installation position (see following diagram)</td><td></td><td>Ⓐ (above roof and roof integration), Ⓒ, Ⓓ</td><td>Ⓑ (above roof and roof integration), Ⓒ, Ⓓ, Ⓔ</td><td>Ⓐ (above roof and roof integration), Ⓒ, Ⓓ</td></tr>
<tr><td>Clearance between collectors</td><td>mm</td><td colspan="3">21</td></tr>
<tr><td>Dimensions
Width
Height
Depth</td><td>
mm
mm
mm</td><td>
1056
2380
90</td><td>
2380
1056
90</td><td>
1056
2380
90</td></tr>
<tr><td>The following values apply to the absorber area:
– Optical efficiency
– Heat loss factor k₁
– Heat loss factor k₂</td><td>
%
W/(m² · K)
W/(m² · K²)</td><td colspan="2">
82.4
3.792
0.021</td><td>
81.8
3.538
0.023</td></tr>
<tr><td>Thermal capacity</td><td>kJ/(m² · K)</td><td colspan="2">5.0</td><td>4.6</td></tr>
<tr><td>Weight</td><td>kg</td><td colspan="3">41</td></tr>
<tr><td>Liquid content
(heat transfer medium)</td><td>litres</td><td>1.83</td><td>2.48</td><td>1.83</td></tr>
<tr><td>Permiss. operating pressure
(see chapter "Solar expansion vessel")</td><td>bar/MPa</td><td colspan="3">6/0.6</td></tr>
<tr><td>Max. stagnation temperature</td><td>°C</td><td colspan="2">186</td><td>185</td></tr>
<tr><td>Steam output
– Favourable installation position
– Unfavourable installation position</td><td>
W/m²
W/m²</td><td colspan="3">
60
100</td></tr>
<tr><td>Connection</td><td>Ø mm</td><td colspan="3">22</td></tr>
</table>



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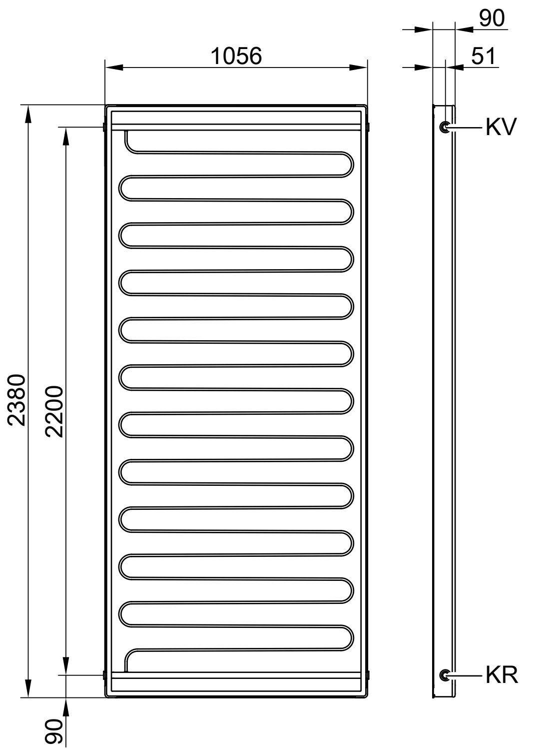
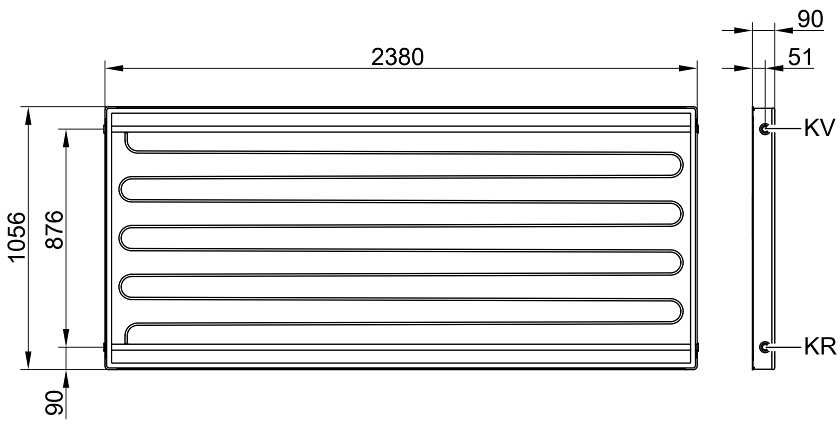


Type SV2C/SV2D

KR Collector return (inlet)
KV Collector flow (outlet)



Type SH2C

KR Collector return (inlet)
KV Collector flow (outlet)

4.3 Approved quality

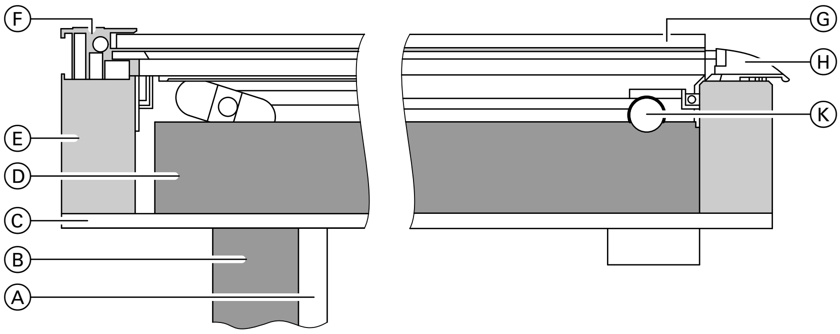
The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE CE designation according to current EC Directives.

5.1 Product description

The main component of the Vitosol 200-F, type 5DIA, is the absorber designed with a selective coating. It ensures a high absorption of insolation and low emission of thermal radiation. A copper pipe through which the heat transfer medium flows is fitted to the absorber.
The heat transfer medium absorbs the absorber heat through the copper pipe. The absorber is encased in a highly insulated collector housing that minimises the thermal losses of the collector.
The high-grade thermal insulation provides temperature stability and is free from gas emissions. The collector is covered with a solar glass panel. The glass has a very low iron content, thereby reducing reflection losses.

At the back of the collector are flexible, thermally insulated flow and return pipes as well as the sensor well for the collector temperature sensor.
Vitosol 200-F, type 5DIA, designed for roof integration.



Ⓐ Conduit for sensor lead
Ⓑ Flexible connecting pipe with thermal insulation
Ⓒ MDF board
Ⓓ Thermal insulation
Ⓔ Reinforcing frame
Ⓕ Rubber seal
Ⓖ Solar glass cover
Ⓗ Cover strip
Ⓚ Absorber

Benefits

- Large area flat-plate collector with selective coating.
- High efficiency through highly selectively coated absorber, integral piping and highly effective insulation.
- Absorber area: 4.75 m^2
- Quick installation due to the flashing frame fitted onto the collector for roof integration, flexible connection lines and lifting eyes.

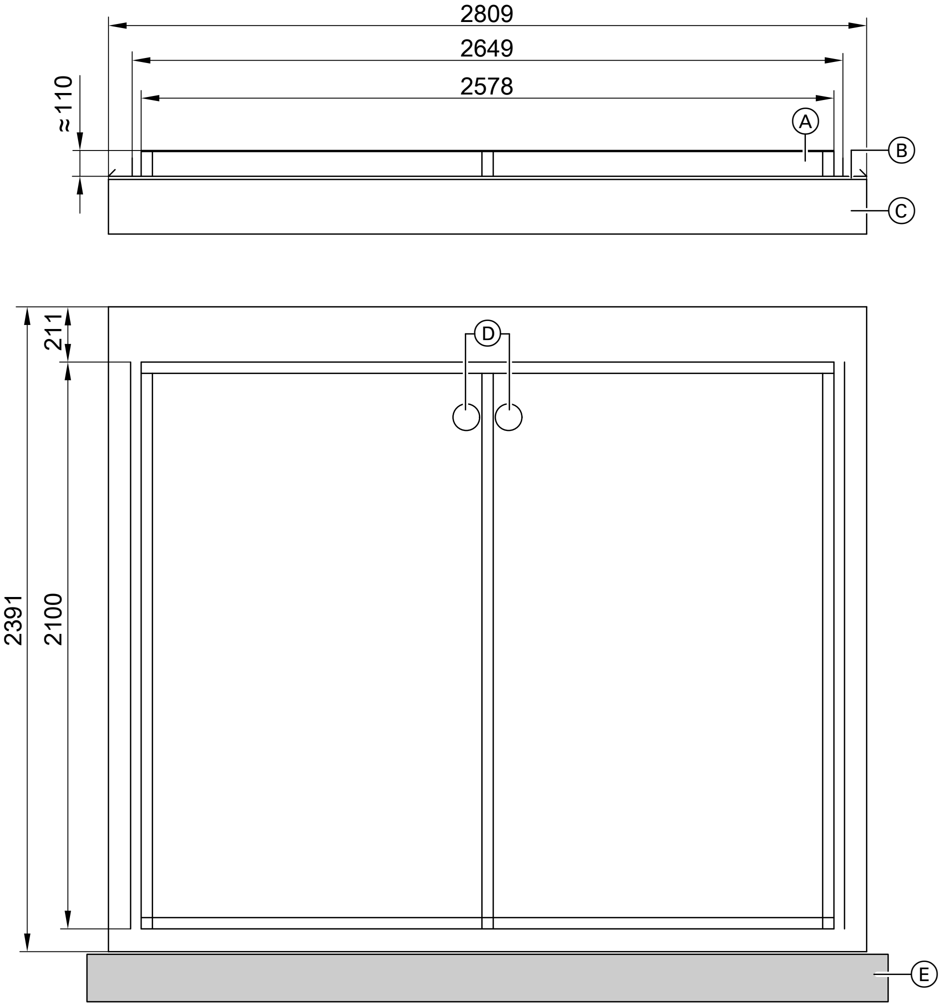
Delivered condition

The collector is delivered on a transport pallet, complete with mounting timbers, flashing frame, connecting pipes and lifting eyes.

5.2 Specification

Specification

Gross area	m^2	5.41
Absorber area	m^2	4.75
Aperture area	m^2	4.92
Dimensions		
Width	mm	2578
Height	mm	2100
Depth	mm	109
Optical efficiency	%	78.5
Heat loss factor k_1	$W/(m^2 \cdot K)$	4.10
Heat loss factor k_2	$W/(m^2 \cdot K^2)$	0.0065
Thermal capacity	$kJ/(m^2 \cdot K)$	6.4
Weight	kg	105
Liquid content (heat transfer medium)	litre	4.2
Permiss. operating pressure	bar/MPa	6/0.6
Max. stagnation temperature	°C	220
Connection	Ø mm	22
Requirements of base structure and fixings		with sufficient ballast to counteract prevailing wind forces



Ⓐ Collector
Ⓑ Flashing frame
Ⓒ Transport frame
Ⓓ Hydraulic connections
Ⓔ Aluminium apron

5.3 Approved quality

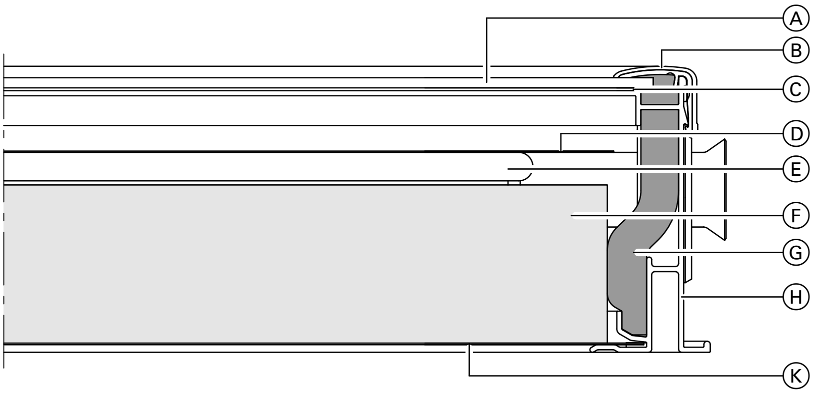
The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

6.1 Product description

The main component of the Vitosol 300-F, type SV3C/SH3C, is the highly selectively coated absorber and the cover with an anti-reflex glass pane. This cover significantly improves the optical efficiency of the collector. The absorber ensures high absorption of insolation and low emissions of thermal radiation. A meander-shaped copper pipe through which the heat transfer medium flows is part of the absorber. The heat transfer medium absorbs the absorber heat through the copper pipe. The absorber is encased in a highly insulated collector housing that minimises the heat losses of the collector.
The high-grade thermal insulation is resistant to temperature, releases no gas and is optimised for the demands made of a high performance collector.

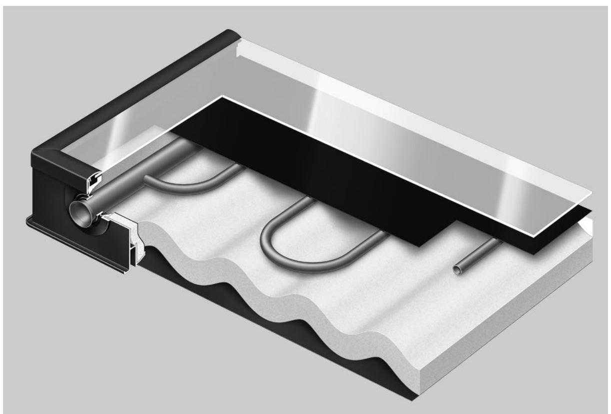
Up to 12 collectors can be combined together to create a single collector array. For this purpose, the standard delivery includes flexible connection pipes with O-rings.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is mounted in a sensor well set in the solar circuit flow.



Ⓐ Solar glass cover with anti-reflective coating on both sides, 3.2 mm
Ⓑ Aluminium cover strip in dark blue
Ⓒ Pane seal
Ⓓ Absorber
Ⓔ Meander-shaped copper pipe
Ⓕ Melamine epoxy foam insulation
Ⓖ Melamine epoxy foam insulation
Ⓗ Aluminium frame in dark blue
Ⓚ Steel bottom plate with an aluminium-zinc coating

Benefits

- High performance flat-plate collector with anti-reflex glass.
- Attractive collector design; frame in dark blue. Upon request, the frame is also available in any RAL colour.
- Absorber designed as meander layout with integral headers. Up to 12 collectors can be linked in parallel.
- Universal application for above roof and freestanding installation — either in vertical (type SV) or horizontal (type SH) orientation. Type SH is suitable for installation on walls.
- High efficiency through highly selectively coated absorber and cover made from translucent anti-reflex glass.
- Long-lasting impermeability and high stability thanks to all-round folded aluminium frame and seamless pane seal.
- Puncture-proof and corrosion-resistant back panel made from zinc-plated sheet steel.
- Easy to assemble Viessmann fixing system with statically-tested and corrosion-resistant components made from stainless steel and aluminium – standard for all Viessmann collectors.
- Quick and reliable collector connection through flexible corrugated stainless steel pipe push-fit connectors.



Delivered condition

The Vitosol 300-F is delivered fully assembled ready to connect.

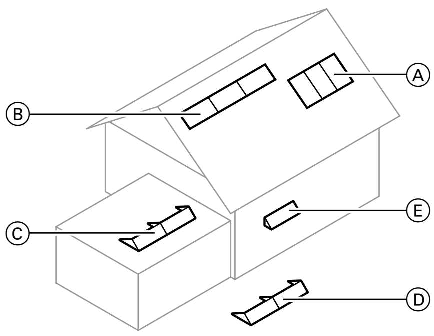
Viessmann offers complete solar thermal systems with Vitosol 300-F (packs) for DHW heating and/or central heating backup (on request).

6.2 Specification

For locations between 100 and 1000 m from the coast we **recommend** the Vitosol 200-F, type SV2D.
In close proximity to the coast (up to 100 m), **always** install the Vitosol 200-F, type SV2D.
Vitosol 200-F, type SV2D has a special absorber coating that allows these collectors to be used in coastal regions.

Note
Viessmann accepts no liability if type SV3C/SH3C is used in these regions.

Type		**SV3C**	**SH3C**
Gross area (required when applying for subsidies)	m^2		2.51
Absorber area	m^2		2.32
Aperture area	m^2		2.33
Installation position (see following diagram)		Ⓐ (above roof and roof integration), Ⓒ, Ⓓ	Ⓑ (above roof and roof integration), Ⓒ, Ⓓ, Ⓔ
Clearance between collectors	mm		21
Dimensions			
Width	mm	1056	2380
Height	mm	2380	1056
Depth	mm	90	90
The following values apply to the absorber area:			
– **Optical efficiency**	%		86.3
– **Heat loss factor k_1**	$W/(m^2 \cdot K)$		3.143
– **Heat loss factor k_2**	$W/(m^2 \cdot K^2)$		0.023
Thermal capacity	$kJ/(m^2 \cdot K)$	5.0	5.0
Weight	kg		41
Liquid content (heat transfer medium)	litres	1.83	2.48
Permiss. operating pressure (see chapter "Solar expansion vessel")	bar/MPa		6/0.6
Max. stagnation temperature	°C		206
Steam output			
– Favourable installation position	W/m^2		60
– Unfavourable installation position	W/m^2		100
Connection	Ø mm		22



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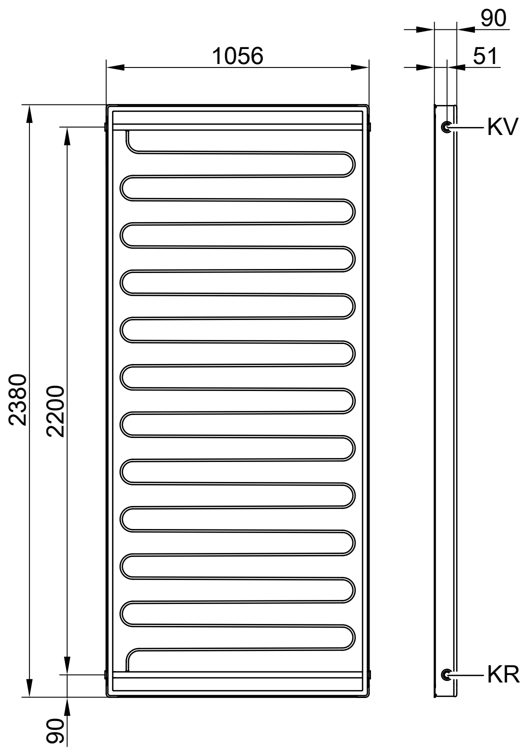
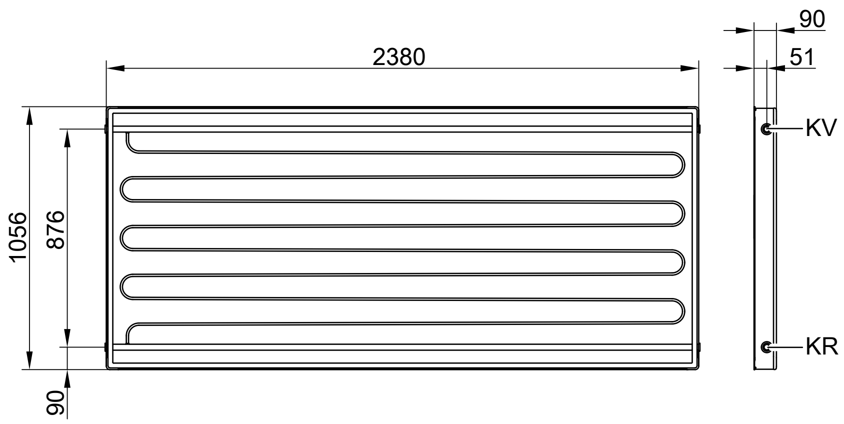


Type SV3C

KR Collector return (inlet)
KV Collector flow (outlet)



Type SH3C

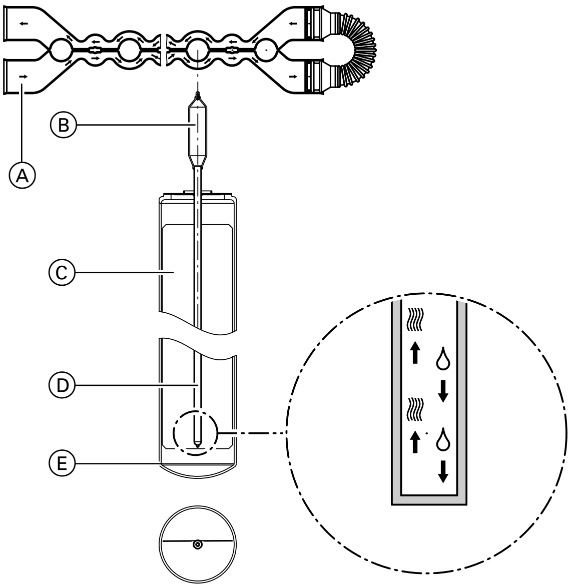
KR Collector return (inlet)
KV Collector flow (outlet)

6.3 Approved quality

The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

7.1 Product description



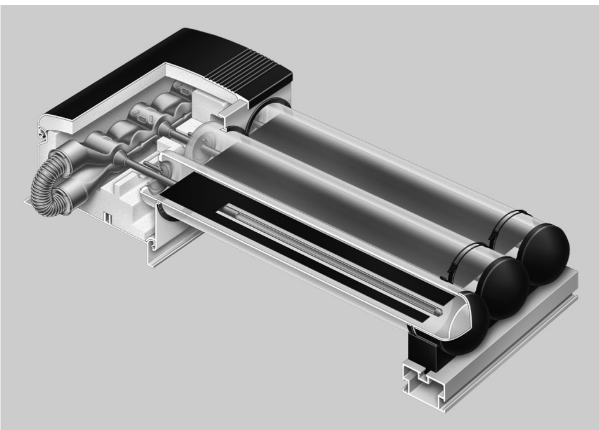
Ⓐ Stainless steel twin pipe heat exchanger
Ⓑ Condenser
Ⓒ Absorber
Ⓓ Heat pipe
Ⓔ Evacuated glass tube

The Vitosol 200-T vacuum tube collector, type SP2A is available in the following versions:
- 1.26 m^2 with 10 vacuum tubes
- 1.51 m^2 with 12 vacuum tubes
- 3.03 m^2 with 24 vacuum tubes

The Vitosol 200-T, type SP2A can be installed on pitched roofs, flat roofs, on walls or as a freestanding collector.
On pitched roofs the collectors may be positioned in line (vacuum tubes at right angles to the roof ridge) or across (vacuum tubes parallel to the roof ridge).
A highly selectively coated metal absorber is incorporated inside each vacuum tube. It ensures high absorption of insolation and low emissions of thermal radiation.
A heat pipe filled with an evaporation liquid is arranged on the absorber. The heat pipe is connected to the condenser. The condenser is fitted inside a Duotec stainless steel twin pipe heat exchanger.
This involves a so-called "dry connection", i.e. the vacuum tubes can be rotated or replaced even when the installation is filled and under pressure.
The heat is transferred from the absorber to the heat pipe. This causes the liquid to evaporate. The vapour rises into the condenser. The heat is transferred to the passing heat transfer medium by the twin pipe heat exchanger containing the condenser. This causes the steam to condense. The condensate returns back down into the heat pipe and the process repeats.
The angle of inclination must be greater than zero to guarantee circulation of the evaporator liquid in the heat exchanger.
The vacuum tubes can be rotated to precisely align the absorber with the sun. The vacuum tubes can be rotated through 25° without increasing shade on the absorber surface.
Up to 15 m^2 absorber area can be connected to form one collector array. For this purpose, the standard delivery includes flexible connection pipes with O-rings. The connection pipes are cladded with a thermally insulated covering.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is installed in a sensor mount on the flow pipe in the header casing of the collector.

Benefits

- Highly efficient vacuum tube collector based on the heat pipe principle for high operational reliability
- Universal application through vertical or horizontal installation in any location, either on rooftops, walls or for freestanding installation
- Special balcony module (1.26 m^2 absorber area) for installation on balcony railings or walls
- The absorber surface with highly selective coating integrated into the vacuum tubes is not susceptible to contamination
- Efficient heat transfer through fully encapsulated condensers and Duotec stainless steel twin pipe heat exchanger
- Vacuum tubes can be rotated for optimum alignment with the sun, thereby maximising the energy utilisation
- Dry connection, meaning vacuum tubes can be inserted or changed while the system is full
- Highly effective thermal insulation for minimised heat losses from the header casing
- Easy installation through the Viessmann assembly and connection systems



Delivered condition

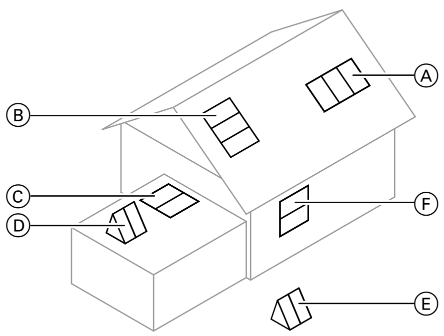
Packed in separate boxes:

1.26 m²	10 vacuum tubes per packing unit Header casing with mounting rails
1.51 m²/3.03 m²	12 vacuum tubes per packing unit Header casing with mounting rails

Viessmann offers complete solar thermal systems with Vitosol 200-T (packs) for DHW heating and/or central heating backup (see pack pricelist).

7.2 Specification

Type SP2A		**1.26 m²**	**1.51 m²**	**3.03 m²**
Number of tubes		10	12	24
Gross area (required when applying for subsidies)	m²	1.98	2.36	4.62
Absorber area	m²	1.26	1.51	3.03
Aperture area	m²	1.33	1.60	3.19
Installation position (see following diagram)		Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ, Ⓕ		
Clearance between collectors	mm	—	88.5	88.5
Dimensions				
Width a	mm	885	1053	2061
Height b	mm	2241	2241	2241
Depth c	mm	150	150	150
The following values apply to the absorber area:				
– **Optical efficiency**	%	78.5	80.1	80.1
– **Heat loss factor k_1**	W/(m² · K)	1.522	1.443	1.103
– **Heat loss factor k_2**	W/(m² · K²)	0.007	0.002	0.007
Thermal capacity	kJ/(m² · K)	6.08	5.97	5.73
Weight	kg	33	39	79
Liquid content **(heat transfer medium)**	litres	0.75	0.87	1.55
Permiss. operating pressure	bar/MPa	6/0.6		
Max. stagnation temperature	°C	264		
Steam output	W/m²	100		
Connection	Ø mm	22		



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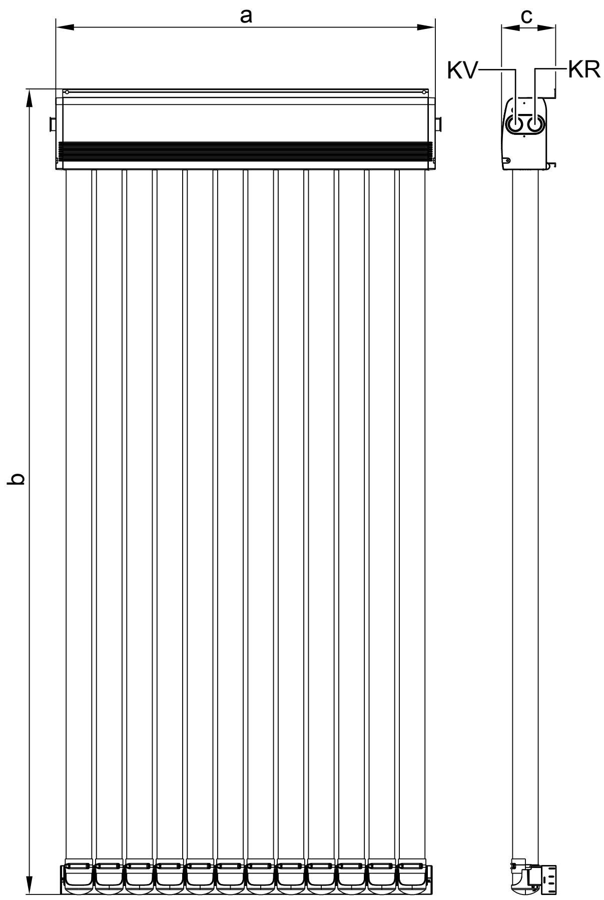


KR Collector return (inlet)
KV Collector flow (outlet)

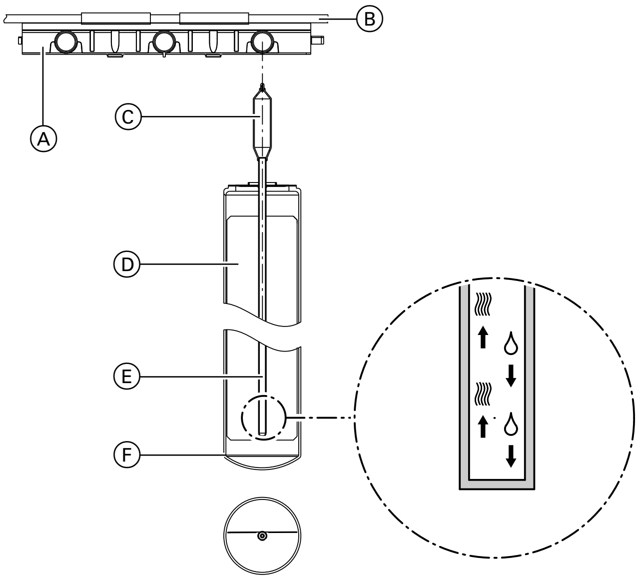
7.3 Approved quality

The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

Vitosol 200-T, type SPE

8.1 Product description



Ⓐ Heat exchanger block made from aluminium and copper
Ⓑ Copper manifold
Ⓒ Condenser
Ⓓ Absorber
Ⓔ Heat pipe
Ⓕ Evacuated glass tube

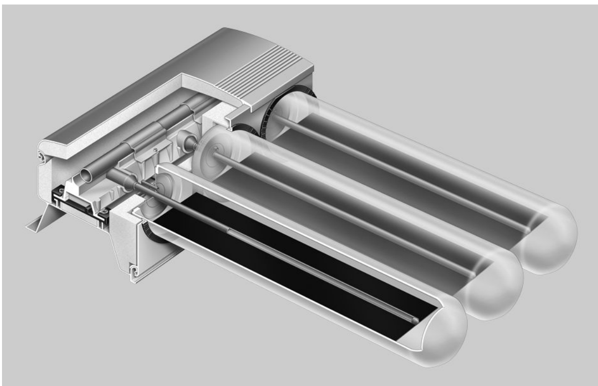
The Vitosol 200-T, type SPE vacuum tube collector is available in the following versions:

- 1.63 m^2 with 9 vacuum tubes
- 3.26 m^2 with 18 vacuum tubes

The Vitosol 200-T, type SPE can be installed on pitched roofs, flat roofs or as a freestanding collector.
On pitched roofs the collectors may be positioned in line (vacuum tubes at right angles to the roof ridge) or across (vacuum tubes parallel to the roof ridge).
A highly selectively coated metal absorber is incorporated inside each vacuum tube. It ensures high absorption of insolation and low emissions of thermal radiation.
A heat pipe filled with an evaporation liquid is arranged on the absorber. The heat pipe is connected to the condenser. The condenser is located inside a heat exchanger designed as a block made from aluminium and copper.
This involves a so-called "dry connection", i.e. the vacuum tubes can be rotated or replaced even when the installation is filled and under pressure.
The heat is transferred from the absorber to the heat pipe. This causes the liquid to evaporate. The vapour rises into the condenser. Heat is transferred by the heat exchanger with its copper manifold, inside which lies the condenser, to the heat transfer medium streaming past. This causes the steam to condense. The condensate returns back down into the heat pipe and the process repeats.
The angle of inclination must be greater than zero to guarantee circulation of the evaporator liquid in the heat exchanger.
The vacuum tubes can be rotated to precisely align the absorber with the sun. The vacuum tubes can be rotated through 45° without increasing shade on the absorber surface.
Up to 20 m^2 absorber area can be connected to form one collector array. For this purpose, the standard delivery includes flexible connection pipes with O-rings.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is installed in a sensor mount on the manifold in the header casing of the collector.

Benefits

- Highly efficient vacuum tube collector based on the heat pipe principle for high operational reliability
- The absorber surface with highly selective coating integrated into the vacuum tubes is not susceptible to contamination
- Efficient heat transfer through fully encapsulated condensers and heat exchanger
- Vacuum tubes can be rotated for optimum alignment with the sun, thereby maximising the energy utilisation
- Dry connection, meaning tubes can be inserted or changed while the system is full
- Highly effective thermal insulation for minimised heat losses from the header casing
- Easy installation through the Viessmann assembly and connection systems



Delivered condition

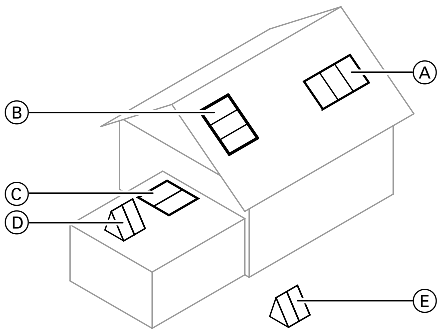
Packed in separate boxes:

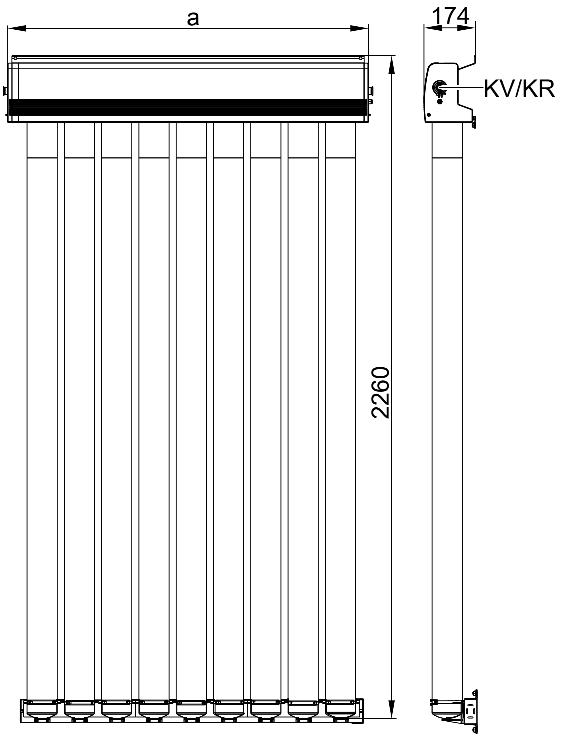
- 9 vacuum tubes per packing unit
- Header casing with mounting rails

Viessmann offers complete solar thermal systems with Vitosol 200-T (packs) for DHW heating and/or central heating backup (see pack pricelist).

8.2 Specification

Type SPE		**1.63 m²**	**3.26 m²**
Number of tubes		9	18
Gross area (required when applying for subsidies)	m²	2.66	5.39
Absorber area	m²	1.63	3.26
Aperture area	m²	1.73	3.46
Installation position (see following diagram)		Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ	
Clearance between collectors	mm	44	44
Dimensions			
Width	mm	1220	2390
Height	mm	2260	2260
Depth	mm	174	174
The following values apply to the absorber area:			
– **Optical efficiency**	%	70.1	72.5
– **Heat loss factor k_1**	W/(m² · K)	1.41	1.46
– **Heat loss factor k_2**	W/(m² · K²)	0.0078	0.0044
Thermal capacity	kJ/(m² · K)	5.2	
Weight	kg	63	113
Liquid content (heat transfer medium)	litres	0.40	0.92
Permiss. operating pressure	bar/MPa	6/0.6	
Max. stagnation temperature	°C	269	
Steam output	W/m²	100	
Connection	Ø mm	22	





KR Collector return (inlet)
KV Collector flow (outlet)

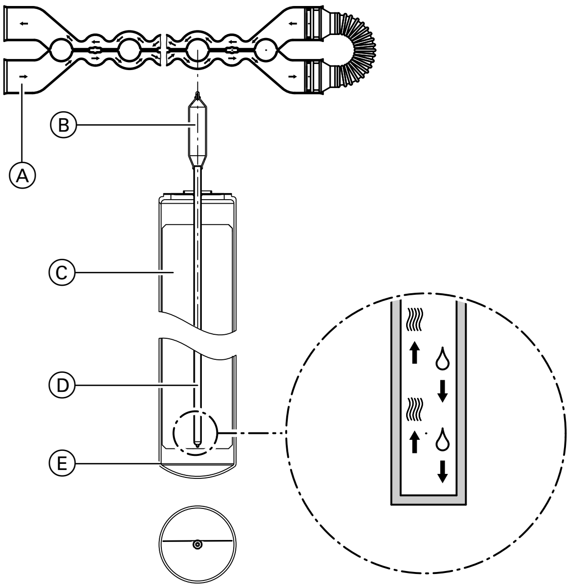
8.3 Approved quality

The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

5822 440 GB

9.1 Product description



Ⓐ Copper twin pipe heat exchanger
Ⓑ Condenser
Ⓒ Absorber
Ⓓ Heat pipe
Ⓔ Evacuated glass tube

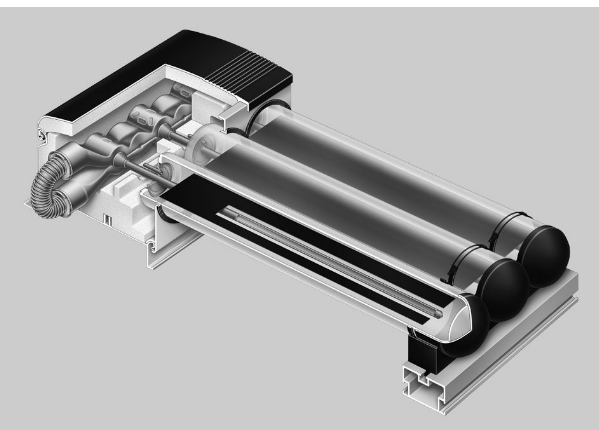
The Vitosol 300-T vacuum tube collector is available in the following versions:

- 1.51 m^2 with 12 vacuum tubes
- 3.03 m^2 with 24 vacuum tubes

The Vitosol 300-T can be installed on pitched roofs or freestanding on flat roofs.
A highly selectively coated copper absorber is integrated into each vacuum tube. It ensures high absorption of insolation and low emissions of thermal radiation.
A heat pipe filled with an evaporation liquid is arranged on the absorber. The heat pipe is connected to the condenser. The condenser is fitted inside a Duotec copper twin pipe heat exchanger.
This involves a so-called "dry connection", i.e. the vacuum tubes can be rotated or replaced even when the installation is filled and under pressure.
The heat is transferred from the absorber to the heat pipe. This causes the liquid to evaporate. The vapour rises into the condenser. The heat is transferred to the passing heat transfer medium by the twin pipe heat exchanger containing the condenser. This causes the steam to condense. The condensate returns back down into the heat pipe and the process repeats.
The angle of inclination must be at least 25° to guarantee circulation of the evaporator liquid in the heat exchanger.
The vacuum tubes can be rotated to precisely align the absorber with the sun. The vacuum tubes can be rotated through 25° without increasing shade on the absorber surface.
Up to 15 m^2 absorber area can be connected to form one collector array. For this purpose, the standard delivery includes flexible connection pipes with O-rings. The connection pipes are cladded with a thermally insulated covering.
A connection set with locking ring fittings enables the collector array to be readily connected to the solar circuit pipework. The collector temperature sensor is installed in a sensor mount on the flow pipe in the header casing of the collector.

Benefits

- Highly efficient vacuum tube collector with anti-reflective coating based on the heat pipe principle with temperature-dependent shutdown of vacuum tubes for high operational reliability
- The absorber surface with highly selective coating integrated into the vacuum tubes is not susceptible to contamination
- Efficient heat transfer through fully encapsulated condensers and Duotec copper twin pipe heat exchanger
- Vacuum tubes can be rotated for optimum alignment with the sun, thereby maximising the energy utilisation
- Dry connection, meaning tubes can be inserted or changed while the system is full
- Highly effective thermal insulation for minimised heat losses from the header casing
- Easy installation through the Viessmann assembly and connection systems



Delivered condition

Packed in separate boxes:
- 12 vacuum tubes per packing unit
- Header casing with mounting rails

Viessmann offers complete solar thermal systems with Vitosol 300-T (packs) for DHW heating and/or central heating backup (on request).

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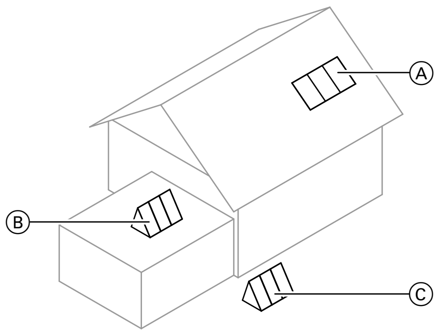
9.2 Specification

Type SP3B		1.51 m²	3.03 m²
Number of tubes		12	24
Gross area (required when applying for subsidies)	m^2	2.36	4.62
Absorber area	m^2	1.51	3.03
Aperture area	m^2	1.60	3.19
Installation position (see following diagram)		Ⓐ, Ⓑ, Ⓒ	
Clearance between collectors	mm	89	89
Dimensions			
Width a	mm	1053	2061
Height b	mm	2241	2241
Depth c	mm	150	150
The following values apply to the absorber area:			
– **Optical efficiency**	%	81.4	81.3
– **Heat loss factor k_1**	$W/(m^2 \cdot K)$	1.331	0.998
– **Heat loss factor k_2**	$W/(m^2 \cdot K^2)$	0.006	0.007
Thermal capacity	$kJ/(m^2 \cdot K)$	5.97	5.73
Weight	kg	39	79
Liquid content (heat transfer medium)	litres	0.87	1.55
Permiss. operating pressure (see chapter "Solar expansion vessel")	bar/MPa	6/0.6	
Max. stagnation temperature	°C	146	
Steam output	W/m^2	100	
Connection	Ø mm	22	



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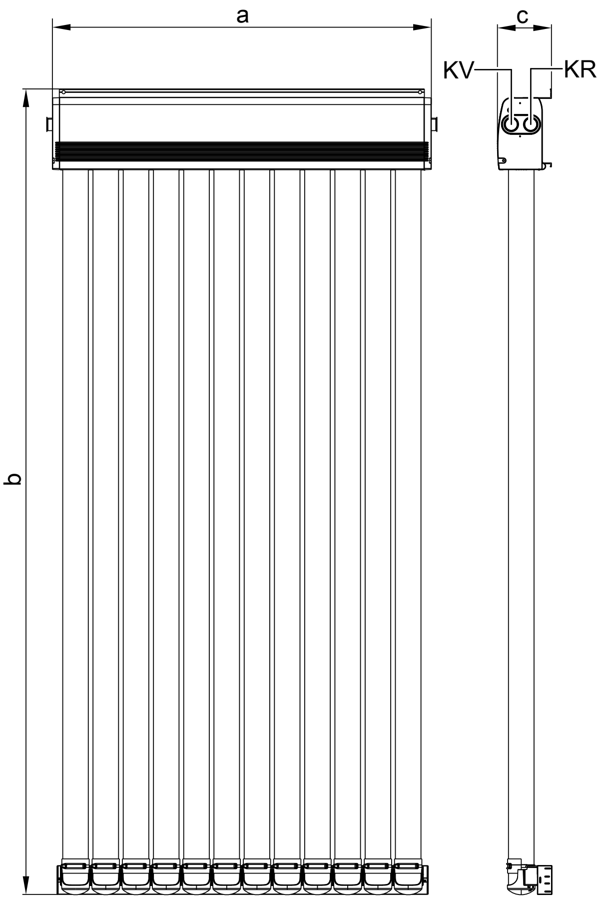


KR Collector return (inlet)
KV Collector flow (outlet)

9.3 Approved quality

The collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73.
Tested in accordance with Solar KEYMARK and EN 12975.

CE designation according to current EC Directives.

Solar control units

Solar control module, type SM1	Vitosolic 100	Vitosolic 200
Function extension inside a casing for wall mounting – Electronic temperature differential control for dual mode DHW heating and central heating backup from solar collectors in conjunction with a boiler – Control and display via the boiler control unit	Electronic temperature differential controller for systems with dual mode DHW heating with solar collectors and boilers	Electronic temperature differential controller for up to four consumers for the following systems with solar collectors and boilers: – Dual mode DHW heating with dual mode DHW cylinders or several cylinders – Dual mode DHW and swimming pool heating – Dual mode DHW heating and central heating backup – Industrial/commercial heating systems

10.1 Solar control module, type SM1, part no. 7429 073

Specification

Functions
- With output statement and diagnostic system
- Operation and display via the Vitotronic control unit
- Heating of 2 consumers via a collector array
- 2nd temperature differential control
- Thermostat function for reheating or utilising excess heat
- Solar circuit pump speed control via pulse pack control or solar circuit pump with PWM input (make: Grundfos)
- DHW cylinder reheating by the heat source is suppressed subject to solar yield.
- Suppression of reheating for central heating by the heat source in the case of central heating backup
- Heat-up of the solar preheating stage (with DHW cylinders from 400 l capacity)

To implement the following functions, also order immersion temperature sensor, part no. 7438 702:
- For DHW circulation diversion in systems with 2 DHW cylinders
- For return changeover between the heat source and the heating water buffer cylinder
- For heating additional consumers

Design

The solar control module contains:
- PCB
- Terminals:
  - 4 sensors
  - Solar circuit pump
  - KM BUS
  - Power supply (on-site ON/OFF switch)
- PWM output for switching the solar circuit pump
- 1 relay for switching one pump or one valve

Collector temperature sensor
For connection inside the appliance

On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm^2 (copper)
- Never route this lead immediately next to 230 V/400 V cables

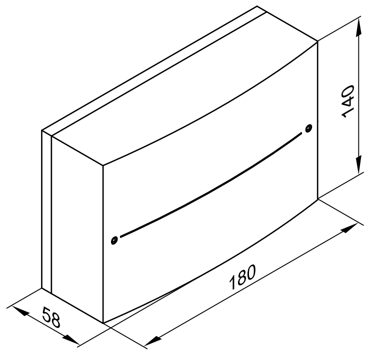
Cable length	2.5 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 20 kΩ at 25 °C
Permissible ambient temperature	
– Operation	−20 to +200 °C
– Storage and transport	−20 to +70 °C

Cylinder temperature sensor
For connection inside the appliance
On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm^2 (copper)
- Never route this lead immediately next to 230/400 V cables

Cable length	3.75 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +90 °C
– Storage and transport	−20 to +70 °C

For systems with Viessmann DHW cylinders, the cylinder temperature sensor is installed in the threaded elbow (standard delivery or accessory for the respective DHW cylinder) in the heating water return.

Specification



Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
Safety category	I
IP rating	IP 20 to EN 60529; ensure through design/installation
Mode of operation	Type 1B to EN 60730-1
Permissible ambient temperature	
– Operation	0 to +40 °C use in the living space or boiler room (standard ambient conditions)
– Storage and transport	−20 to +65 °C
Rated relay output breaking capacity	
– Semi-conductor relay 1	1 (1) A, 230 V~
– Relay 2	1 (1) A, 230 V~
– Total	Max. 2 A

Delivered condition

- Solar control module, type SM1
- Cylinder temperature sensor
- Collector temperature sensor

Tested quality

CE designation according to current EC Directives

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10.2 Vitosolic 100, type SD1, part no. Z007 387

Specification

Construction
The control unit comprises:
- PCB
- LCD
- Selector keys
- Connection terminals
  - – Sensors
  - – Solar circuit pump
  - – KM BUS
  - – Power supply (on-site ON/OFF switch)
- PWM output for controlling the solar circuit pump
- Relay for actuating pumps and valves

The standard delivery includes collector temperature sensor and cylinder temperature sensor.

Collector temperature sensor
For connection inside the appliance.
On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm² (copper)
- Never route this lead immediately next to 230/400 V cables

Lead length	2.5 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 20 kΩ at 25 °C
Permissible ambient temperature	
– during operation	−20 to +200 °C
– during storage and transport	−20 to +70 °C

Cylinder temperature sensor
For connection inside the appliance.
On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm² (copper)
- Never route this lead immediately next to 230/400 V cables

Lead length	3.75 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– during operation	0 to +90 °C
– during storage and transport	−20 to +70 °C

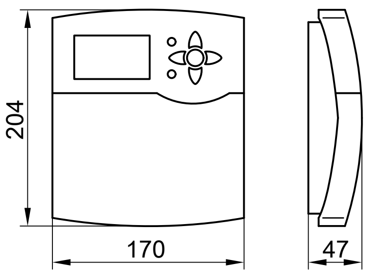
For systems with Viessmann DHW cylinders, the cylinder temperature sensor is installed in the threaded elbow (see chapter "Specification" of the relevant DHW cylinder and chapter "Installation accessories") in the heating water return.

Functions
- Switching the solar circuit pump for DHW and/or swimming pool heating
- Electronic limiter for the temperature in the DHW cylinder (safety shutdown at 90 °C)
- Collector safety shutdown

Information regarding auxiliary function for DHW heating and suppression of reheating by the boiler
Systems with Vitotronic control units with KM BUS offer optional suppression of reheating by the boiler ***and*** *auxiliary function for DHW heating.*
Systems with other Viessmann control units only offer optional suppression of reheating by the boiler.

For further functions, see chapter "Functions".

Specification



Rated voltage	230 V ~
Rated frequency	50 Hz
Rated current	4 A
Power consumption	2 W (in standby mode 0.7 W)
Safety category	II
IP rating	IP 20 to EN 60529; ensure through design/installation
Function	Type 1B to EN 60730-1
Permiss. ambient temperature	
– during operation	0 to +40 °C for use in the living space or boiler room (standard ambient conditions)
– during storage and transport	−20 to +65 °C
Rated relay output breaking capacity	
– Semi-conductor relay 1	0.8 A
– Relay 2	4(2) A, 230 V~
– Total	max. 4 A

Delivered condition

- Vitosolic 100, type SD1
- Cylinder temperature sensor
- Collector temperature sensor

Tested quality

CE CE designation according to current EC Directives

10.3 Vitosolic 200, type SD4, part no. Z007 388

Specification

Construction
The control unit comprises:
- PCB
- LCD
- Selector keys
- Terminals:
  - Sensors
  - Solar cell
  - Pumps
  - Pulse counter input for connection of flow meters
  - KM BUS
  - Central fault message facility
  - V BUS for large display
  - Power supply (on-site ON/OFF switch)
- PWM outputs for controlling the solar circuit pumps
- Relay for actuating the pumps and valves
- Available languages:
  - German
  - Bulgarian
  - Czech
  - Danish
  - English
  - Spanish
  - Estonian
  - French
  - Croatian
  - Italian
  - Latvian
  - Lithuanian
  - Hungarian
  - Dutch (Flemish)
  - Polish
  - Russian
  - Romanian
  - Slovenian
  - Finnish
  - Serbian
  - Swedish
  - Turkish
  - Slovakian

The standard delivery includes collector temperature sensor, cylinder temperature sensor and temperature sensor (swimming pool water/heating water buffer cylinder).

Collector temperature sensor
For connection inside the appliance.
On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm^2 (copper)
- Never route this lead immediately next to 230/400 V cables

Cable length	2.5 m
IP rating	IP 32 to EN 60529, ensure through design/installation
Sensor type	Viessmann NTC 20 kΩ at 25 °C
Permissible ambient temperature	
– During operation	−20 to +200 °C
– During storage and transport	−20 to +70 °C

Cylinder temperature sensor or temperature sensor (swimming pool water/heating water buffer cylinder)
For connection inside the appliance.
On-site extension of the connecting lead:
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm^2 (copper)
- Never route this lead immediately next to 230/400 V cables

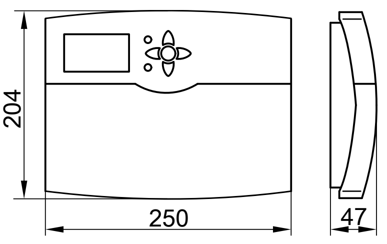
Cable length	3.75 m
IP rating	IP 32 to EN 60529, ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– During operation	0 to +90 °C
– During storage and transport	−20 to +70 °C

For systems with Viessmann DHW cylinders, the cylinder temperature sensor is installed in the threaded elbow (see chapter "Specification" of the relevant DHW cylinder and chapter "Installation accessories") in the heating water return.
When a temperature sensor (swimming pool) is used to record the swimming pool water temperature, the stainless steel sensor well (accessories) can be installed directly into the swimming pool return.

Functions
- Switching the solar circuit pumps for DHW and/or swimming pool heating or other consumers
- Electronic limiter for the temperature in the DHW cylinder (safety shutdown at 90 °C)
- Collector safety shutdown
- DHW **and** swimming pool heating:
  DHW heating can be set as a priority. When the swimming pool water is heated (consumer with the lower set temperature), the circulation pump will be switched OFF in accordance with a timer, to establish whether the DHW cylinder (consumer with the higher set temperature) can be reheated. The system continues to heat the swimming pool water, if the DHW cylinder is being heated or if the temperature of the heat transfer medium is insufficient to heat it up.
- DHW heating **and** central heating with a heating water buffer cylinder:
  The buffer cylinder water is heated by solar energy. The DHW water is heated by the buffer cylinder water. When the temperature inside the heating water buffer cylinder exceeds the heating return temperature by the set value, a 3-way valve is actuated and the heating return water is routed via the heating water buffer cylinder to the boiler to raise the return temperature.

For further functions, see chapter "Functions".

Specification



Rated voltage	230 V ~
Rated frequency	50 Hz
Rated current	6 A
Power consumption	6 W (in standby mode 0.9 W)
Safety category	II
IP rating	IP 20 to EN 60529, ensure through design/installation
Mode of operation	Type 1B to EN 60730-1

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Permissible ambient temperature	
– During operation	0 to +40 °C use in the living space or boiler room (standard ambient conditions)
– During storage and transport	−20 to +65 °C

Rated relay output breaking capacity	
– Semi-conductor relay 1 to 6	0.8 A
– Relay 7	4(2) A, 230 V~
– Total	max. 6 A

Delivered condition

- Vitosolic 200, type SD4
- Collector temperature sensor
- 2 temperature sensors

Tested quality

CE CE designation according to current EC Directives

10.4 Functions

Allocation to solar control units

Function	Solar control module	Vitosolic 100	Vitosolic 200
Cylinder temperature limit	x	x	x
Collector cooling function	—	x	x
Return cooling function	—	x	x
Collector emergency stop	x	x	x
Minimum collector temperature limit	x	x	x
Interval function	x	x	x
Cooling function	—	—	x
Frost protection function	x	x	x
Thermostat function	x	x	x
Speed regulation with wave packet control/PWM output control	x	x	x
Heat statement	x	x	x
Suppression of reheating by the boiler			
– DHW cylinder	x	x	x
– Central heating backup	x	—	—
Additional function for DHW heating	x	x	x
External heat exchanger	x	x	x
Bypass function	—	—	x
Parallel relay	—	—	x
Cylinder 2 (to 4) ON	—	—	x
Cylinder heating	—	—	x
Cylinder priority control	—	—	x
Utilisation of excess heat	—	—	x
Cyclical heating	x	x	x
Fault notification via relay output	—	—	x
Relay kick	x	—	x
SD card	—	—	x

Cylinder temperature limit

The solar circuit pump will be switched OFF if the set cylinder temperature is exceeded.

Collector cooling function with Vitosolic 100 and 200

The solar circuit pump will be switched OFF if the set cylinder temperature is reached. The solar circuit pump will be switched on long enough to enable this temperature to fall by 5 K if the collector temperature rises to the selected maximum collector temperature. The cylinder temperature can then rise further, but only up to 95 °C.

Reverse cooling function with Vitosolic 100 and 200

This function is only sensible if the collector cooling function has been enabled. If the set cylinder temperature is reached, the solar circuit pump will be started to prevent the collector from overheating. In the evening, the pump will run for as long as required to cool the DHW cylinder down to the set cylinder temperature via the collector and the pipework.

Information regarding the collector cooling and reverse cooling functions
Ensure the intrinsic safety of the solar thermal system, even if the collector temperature continues to rise after the system has reached all limit temperatures, by accurately sizing the diaphragm expansion vessel. Where stagnation occurs or for collector temperatures that rise further, the solar circuit pump will be blocked or stopped (emergency collector shutdown) to avoid thermal overloading of the connected components.

Collector emergency stop

In order to protect the system components, the solar circuit pump is switched off if the adjustable collector limit temperature is exceeded.

Minimum collector temperature limit

The collector array will be blocked if the minimum collector temperature is not achieved.

Interval function

Activate the interval function in systems where the collector temperature sensor is not in an ideal location to prevent a time delay in capturing the collector temperature.

Cooling function in Vitosolic 200 (only in systems with one consumer)

Function for dispersing excess heat. When the set cylinder temperature and start temperature differential are reached, the solar circuit pump and relay R3 are switched on and then off when the actual temperature falls below that of the stop temperature differential.

Frost protection

Viessmann collectors are filled with Viessmann heat transfer medium. This function does not have to be enabled.
Activate only when using water as heat transfer medium.

- Solar control module
  With a collector temperature below +5 ºC, the solar circuit pump will be started to avoid damage to the collectors. The pump will be stopped when a temperature of +7 ºC has been reached.
- Vitosolic 100 and Vitosolic 200
  With a collector temperature below +4 ºC, the solar circuit pump will be started to avoid damage to the collectors. The pump will be stopped when a temperature of +5 ºC has been reached.

Thermostat function with solar control module and Vitosolic 100

The thermostat function can be used independent of the solar operation.

Different effects can be achieved by determining the thermostat start and stop temperatures:
- Start temperature < stop temperature:
  e.g. reheating
- Start temperature > stop temperature:
  e.g. utilisation of excess heat

Start temperature (40 ºC) and stop temperature (45 ºC) can be changed.
Start temperature setting range: 0 to 89.5 ºC
Stop temperature setting range: 0.5 to 90 ºC

Vitosolic 200 thermostat function, ΔT control and time switches

If relays are not assigned standard functions, they can be used, for example, for function blocks 1 to 3. Within a function block, there are 4 functions that can be combined as required.
- 2 thermostat functions
- Differential temperature control
- Time switch with 3 periods that can be enabled

The functions within a function block are linked so that the conditions for all enabled functions must be met.

Thermostat function

Different effects can be achieved by determining the thermostat start and stop temperatures:
- Start temperature < stop temperature:
  e.g. reheating
- Start temperature > stop temperature:
  e.g. utilisation of excess heat

Start temperature (40 ºC) and stop temperature (45 ºC) can be changed.
Setting range for the start and stop temperatures: −40 to 250 ºC

ΔT controls
The corresponding relay switches ON if the start temperature differential is exceeded and OFF if the stop temperature is not achieved.

Time switch
The corresponding relay switches ON at the start-up time and OFF at the shutdown time. (3 time frames may be enabled).

Speed control with solar control module

The speed control is disabled in the delivered condition. It can only be enabled for relay output R1.

Possible pumps:
- Standard solar pumps with and without their own speed control
- High efficiency pumps
- Pumps with PWM input (only use solar pumps), e.g. Grundfos pumps

Note
We recommend operating the solar circuit pump at max. output while the solar thermal system is being vented.

Vitosolic 100 speed control

The speed control is disabled in the delivered condition. It can only be enabled for relay output R1.

Possible pumps:
- Standard solar pumps with and without their own speed control
- High efficiency pumps
- Pumps with PWM input (only use solar pumps), e.g. Wilo or Grundfos pumps

Note
We recommend operating the solar circuit pump at max. output while the solar thermal system is being vented.

Vitosolic 200 speed control

The speed control is disabled in the delivered condition. It can only be enabled for relay outputs R1 to R4.

Possible pumps:
- Standard solar pumps with and without their own speed control
- High efficiency pumps
- Pumps with PWM input (only use solar pumps), e.g. Wilo or Grundfos pumps

Note
We recommend operating the solar circuit pump at max. output while the solar thermal system is being vented.

Heat statement with solar control module and Vitosolic 100

When determining thermal yields, the difference between the collector and cylinder temperature, the set throughput, the type of heat transfer medium and the operating time of the solar circuit pump are taken into account.

Vitosolic 200 heat statement

The statement can be produced with or without the volumeter.
- Without volumeter
  through the temperature differential between the heat meter flow and the heat meter return temperature sensor and the selected throughput
- With volumeter (heat meter, accessory for the Vitosolic 200)
  through the temperature differential between the heat meter flow and the heat meter return temperature sensor and the throughput captured by the flow meter

Existing sensors can be used, without affecting their function in the relevant system scheme.

Suppression of DHW cylinder reheating by the boiler with solar control module

DHW cylinder reheating by the boiler is suppressed in two stages. While the DHW cylinder is being heated by solar energy, the set cylinder temperature is reduced. After the solar circuit pump has been switched off, suppression remains active for a certain time.
If solar heating is uninterrupted (> 2 h), reheating by the boiler only occurs when the temperature falls below the 3rd set DHW temperature, as set at the boiler control unit (at coding address "67") (setting range 10 to 95 ºC). This value must be **below** the first set DHW temperature.
The DHW cylinder will only be heated by the boiler, if this set value cannot be achieved by the solar thermal system.

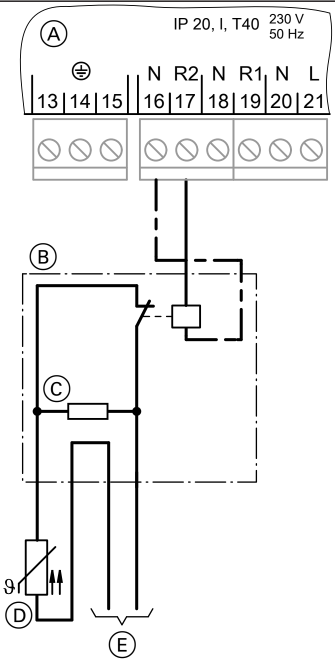
Suppression of DHW cylinder reheating by boiler with the Vitosolic 100

Systems with Vitotronic control units and KM BUS
Control units from the current Viessmann product range are equipped with the necessary software. When retrofitting an existing system, the boiler control unit may have to be equipped with a PCB (see Viessmann pricelist).
Reheating of the DHW cylinder by the boiler will be suppressed by the solar control unit if the DHW cylinder is being heated.
Coding address "67" in the boiler control unit defaults a third set DHW temperature (setting range 10 to 95 ºC). This value must be **below** the first set DHW temperature.
The DHW cylinder will only be heated by the boiler (solar circuit pump runs) if this set value is not achieved by the solar thermal system.

Systems with additional Viessmann control units
Reheating of the DHW cylinder by the boiler will be suppressed by the solar control unit if the DHW cylinder is being heated. A resistor simulates an actual DHW temperature that is approx. 10 K higher.
The DHW cylinder will only be heated by the boiler (solar circuit pump runs) if the set DHW temperature value is not achieved by the solar thermal system.

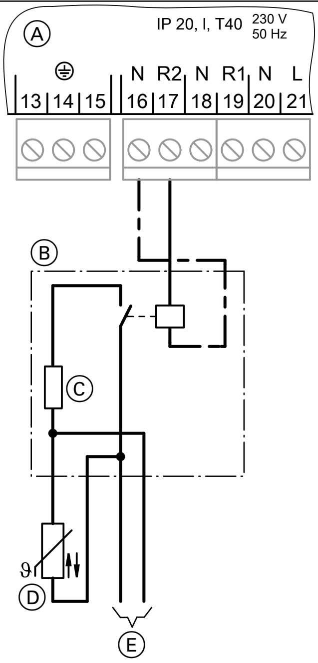
Cylinder temperature sensor of the boiler control unit

PTC



Ⓒ Resistor 20 Ω, 0.25 W (on site)

NTC



Ⓒ Resistor 10 kΩ, 0.25 W (on site)

Ⓐ Solar control unit wiring chamber
Ⓑ Contactor relay, part no. 7814 681
Ⓓ Cylinder temperature sensor of the boiler control unit
Ⓔ To the boiler control unit; connection for cylinder temperature sensor

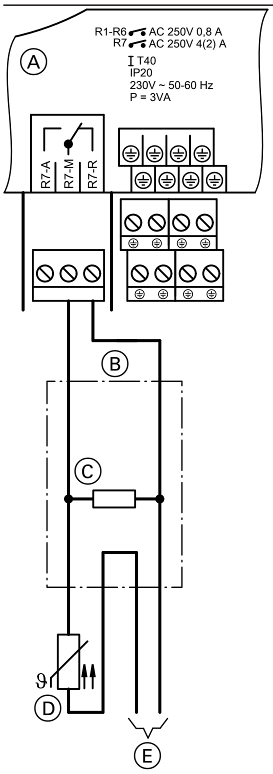
Suppression of DHW cylinder reheating by boiler with the Vitosolic 200

Systems with Vitotronic control units and KM BUS
Control units from the current Viessmann product range are equipped with the necessary software. When retrofitting an existing system, the boiler control unit may have to be equipped with a PCB (see Viessmann pricelist).
Reheating of the DHW cylinder by the boiler will be suppressed by the solar control unit if the DHW cylinder (consumer 1) is being heated.
In the boiler control unit, coding address "67" defaults a third set DHW temperature (setting range: 10 to 95 ºC). This value must be **below** the first set DHW temperature. The DHW cylinder will only be heated by the boiler, if the set DHW temperature cannot be achieved by the solar thermal system.

Systems with additional Viessmann control units
Reheating of the DHW cylinder by the boiler will be suppressed by the solar control unit if the DHW cylinder (consumer 1) is being heated. A resistor simulates an actual DHW temperature that is 10 K higher. The DHW cylinder will only be heated by the boiler, if the set DHW temperature cannot be achieved by the solar thermal system.

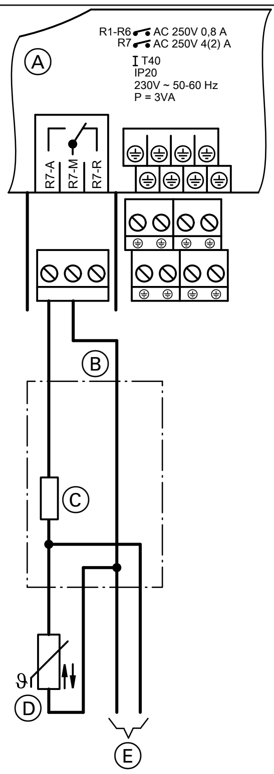
Cylinder temperature sensor of the boiler control unit

PTC



Ⓒ Resistor 20 Ω, 0.25 W (on site)

NTC



Ⓒ Resistor 10 kΩ, 0.25 W (on site)

Ⓐ Solar control unit wiring chamber
Ⓑ Junction box (on site)
Ⓓ Cylinder temperature sensor of the boiler control unit
Ⓔ To the boiler control unit; connection for cylinder temperature sensor

Suppression of reheating by the boiler with central heating backup, with solar control module

If a sufficiently high temperature is available in the multi-mode heating water buffer cylinder to heat the heating circuits, reheating is suppressed.

Auxiliary function for DHW heating with solar control module

For detailed information see chapter "Auxiliary function for DHW heating".

Enabling the auxiliary function for DHW heating must be encoded at the boiler control unit. The solar preheat stage can be heated up at the selectable times.

Boiler control unit settings:
- The set DHW temperature 2 must be encoded
- The DHW phase 4 for DHW heating must be enabled

Via a KM BUS, this signal will be transferred to the Vitosolic 100, and the transfer pump will be started.

Auxiliary function for DHW heating with Vitosolic 100

For detailed information see chapter "Auxiliary function for DHW heating".
Only possible in conjunction with Vitotronic control units with KM BUS.
Control units from the current Viessmann product range are equipped with the necessary software. When retrofitting an existing system, the boiler control unit may have to be equipped with a PCB (see Viessmann pricelist).

Boiler control unit settings:
- The set DHW temperature 2 must be encoded
- The DHW phase 4 for DHW heating must be enabled

Via a KM BUS, this signal will be transferred to the Vitosolic 100, and the transfer pump will be started.

Auxiliary function for DHW heating with Vitosolic 200

For detailed information see chapter "Auxiliary function for DHW heating".

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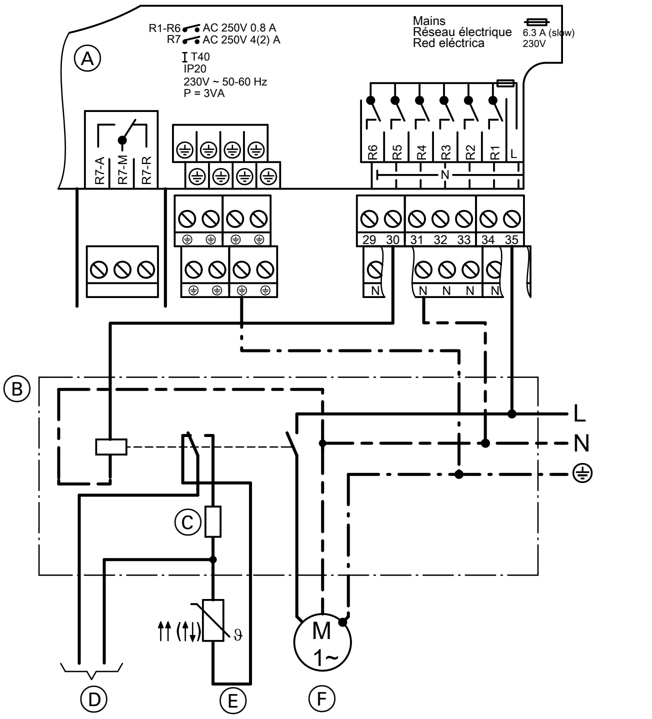
Systems with Vitotronic control units and KM BUS
Control units from the current product range are equipped with the necessary software. When retrofitting an existing system, the boiler control unit may have to be equipped with a PCB (see Viessmann pricelist).
Boiler control unit settings

- Set DHW temperature 2 must be encoded
- DHW phase 4 for DHW heating must be enabled

This signal is then relayed via the KM BUS to the solar control unit.
The transfer pump starts at an adjustable time if the DHW cylinder has not reached 60 ºC at least once per day.

Systems with additional Viessmann control units



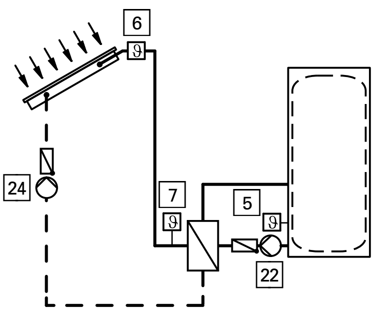
Ⓐ Wiring chamber of the solar control unit
Ⓑ Contactor relay

Ⓒ Resistor (on site) for
PTC: 560 Ω
NTC: 8.2 kΩ
(subject to the type of boiler control unit)
Ⓓ To the boiler control unit; connection for cylinder temperature sensor
Ⓔ Cylinder temperature sensor of the boiler control unit
Ⓕ Transfer pump

The transfer pump starts at an adjustable time if the DHW cylinder has not reached 60 ºC at least once per day.
A resistor simulates a DHW temperature of approx. 35 ºC.
The transfer pump is connected to relay output R3 or R5, irrespective of which relays are already assigned standard functions.

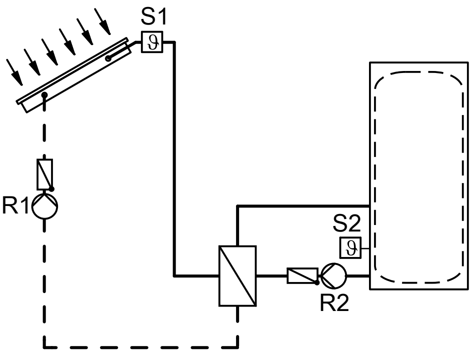
10

External heat exchanger with solar control module



The DHW cylinder is heated via the heat exchanger. The secondary pump [22] starts in parallel with solar circuit pump [24].
If an additional temperature sensor [7] is used, secondary pump [22] starts when solar circuit pump [24] is running and the required temperature differential between sensors [5] and [7] is given.

External heat exchanger with Vitosolic 100



The DHW cylinder is heated via the heat exchanger. Secondary pump R2 starts in parallel with solar circuit pump R1.

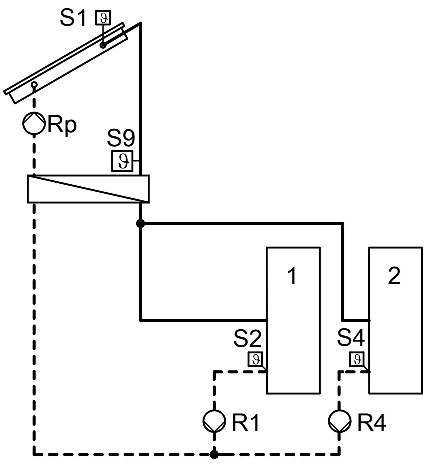
External heat exchanger with Vitosolic 200

In systems with several consumers, either an individual consumer **or** all consumers can be heated via the external heat exchanger.

The consumers will be heated up to the selected set temperature (delivered condition 60 °C).

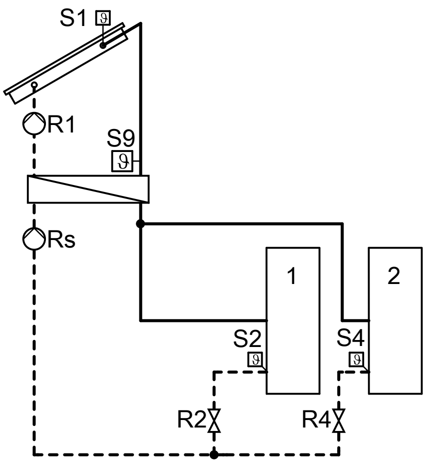
External heat exchanger for all consumers

Heat exchanger relay switches the solar circuit pump (primary pump R_p)



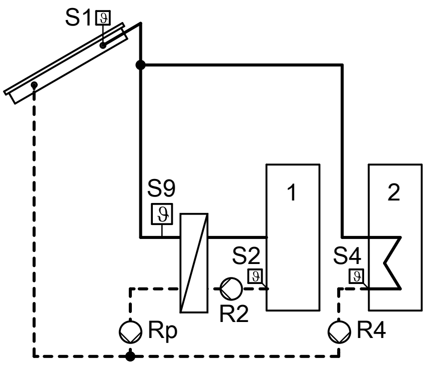
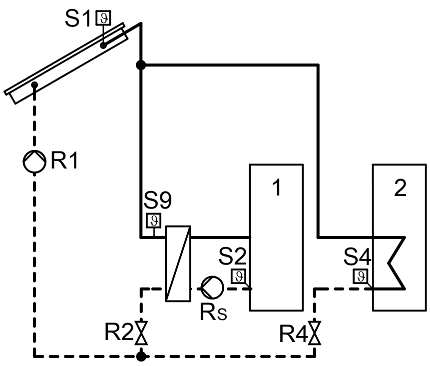
- When the start temperature differential **"ΔTon"** between collector temperature sensor S1 and cylinder temperature sensor S2 or S4 is exceeded, the solar circuit pump (primary pump R_p) is switched on.
- When the start temperature differential **"HE ΔTon"** between heat exchanger sensor S9 and cylinder temperature sensor S2 or S4 is exceeded, the relevant circulation pump R1 or R4 is switched on to heat the consumers.

Heat exchanger relay switches the secondary pump R_s



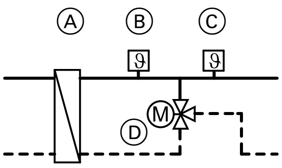
- When the start temperature differential **"ΔTon"** between collector temperature sensor S1 and cylinder temperature sensor S2 or S4 is exceeded, solar circuit pump R1 is switched on and the relevant valve R2 or R4 is opened to heat the consumers.
- When the start temperature differential **"HE ΔTon"** between heat exchanger sensor S9 and cylinder temperature sensor S2 or S4 is exceeded, secondary pump R_s is switched on.

External heat exchanger for one consumer

Heat exchanger relay switches the solar circuit pump (primary pump R_p)	**Heat exchanger relay switches the secondary pump R_s**
	
– When the start temperature differential **"ΔTon"** between collector temperature sensor S1 and cylinder temperature sensor S2 or S4 is exceeded, the solar circuit pump (primary pump R_p) or circulation pump R4 is switched on. – When the start temperature differential **"HE ΔTon"** between heat exchanger sensor S9 and cylinder temperature sensor S2 is exceeded, circulation pump R2 is switched on to heat consumer 1.	– When the start temperature differential **"ΔTon"** between collector temperature sensor S1 and cylinder temperature sensor S2 or S4 is exceeded, solar circuit pump R1 is switched on and the relevant valve R2 or R4 is opened to heat the consumers. – When the start temperature differential **"HE ΔTon"** between heat exchanger sensor S9 and cylinder temperature sensor S2 is exceeded, secondary pump R_s is switched on to heat consumer 1.

External heat exchanger in large solar thermal systems

In large solar thermal systems with long solar lines in areas without frost protection, a 3-way valve for frost protection of the plate heat exchanger must be installed. This prevents the flow of cold heat transfer medium into the plate heat exchanger, potentially causing it to freeze up.

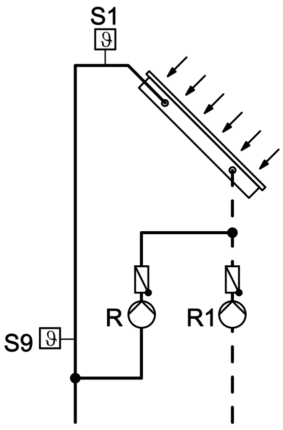


Ⓐ Plate heat exchanger
Ⓑ Temperature sensor
Ⓒ Frost stat
Ⓓ 3-way valve

Bypass circuits to Vitosolic 200

To improve the start-up characteristics of the system or for systems with several collector arrays, we recommend operation with a bypass circuit.

Bypass circuit with collector temperature sensor and bypass sensor

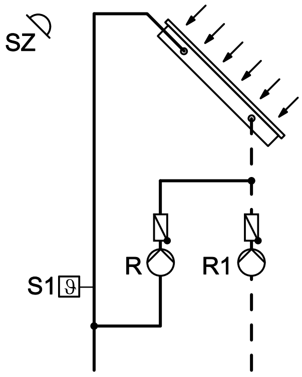


R1 Solar circuit pump
R Bypass pump (subject to scheme)
S1 Collector temperature sensor
S9 Bypass sensor

The Vitosolic 200 captures the collector temperature via the collector temperature sensor. If the set temperature differential between the collector temperature sensor and the cylinder temperature sensor is exceeded, the bypass pump is switched on.
The solar circuit pump is started and the bypass pump is stopped if the temperature differential between the bypass sensor and the cylinder temperature sensor is exceeded by 2.5 K.

Note
The pump of the Solar-Divicon is used as a bypass pump and the pump for the solar pump assembly is used as a solar circuit pump.

Bypass circuit with solar cell and collector temperature sensor



SZ Solar cell
R1 Solar circuit pump
R Bypass pump (subject to scheme)
S1 Collector temperature sensor

The solar control unit records the radiation intensity via the solar cell. The bypass pump is started if the set insolation threshold is exceeded. The bypass pump is switched off and the solar circuit pump is switched on if the set temperature differential between the collector temperature sensor and cylinder temperature sensor is exceeded.
The bypass pump will also be stopped if the insolation level falls below the selected switching threshold (shutdown delay approx. 2.5 min).

Note
The pump of the Solar-Divicon is used as a bypass pump and the pump for the solar pump assembly is used as a solar circuit pump.

Parallel relay with Vitosolic 200

With this function, a further relay will be switched (subject to the system scheme) in addition to the relay that switches the circulation pump of a solar consumer, e.g. to control a diverter valve.

Cylinder 2 (to 4) on with Vitosolic 200

In systems with several consumers.
With this function, consumers can be excluded from solar heating.

Any break or short circuit of the cylinder temperature sensor **is then no longer** reported.

Cylinder heating with Vitosolic 200

This function heats a consumer within a certain range. This range is determined by the sensor positions.

Cylinder priority control with Vitosolic 200

In systems with several consumers.

It is possible to determine the order for heating the consumers.

Utilisation of excess heat with Vitosolic 200

In systems with several consumers.

A consumer can be selected to be heated only once all other consumers have reached their set value. The selected consumer will not be heated in cyclical operation.

Cyclical heating

In systems with several consumers.

If the consumer cannot be heated with priority, the next consumer in line will be heated for an adjustable cycle time. After this time has expired, the solar control unit checks the rise of the collector temperature during the adjustable cyclical pause. As soon as the start conditions for the consumer with priority have been met, that consumer will be heated again. Otherwise, the next-in-line consumers will continue to be heated.

Relay kick with solar control module

If the pumps and valves have been switched off for 24 hours, they are started for approx. 10 s to prevent them seizing up.

Relay kick with Vitosolic 200

If the pumps and valves have been switched off for 24 h, they are started for approx. 10 s to prevent them seizing up.

SD module with Vitosolic 200

SD module to be provided on site with a memory capacity ≤ 2 GB and file system FAT16

Note
Never use SD-HD modules.

The SD module is inserted into the Vitosolic 200.
- To record the operating values of the solar thermal system.
- Saving the values to the module in a text file. This may, for example, be opened in a tabular calculation program. The values can therefore also be visualised.

10.5 Accessories

Allocation to solar control units

	Part no.	Solar control module	Vitosolic 100	Vitosolic 200
Contactor relay	7814 681	—	x	x
Immersion temperature sensor	7438 702	x	—	—
Immersion temperature sensor	7426 247	—	x	x
Collector temperature sensor	7831 913	—	—	x
Stainless steel sensor well	7819 693	x	x	x
Heat meter		—		
– Heat meter 06	7418 206	—	—	x
– Heat meter 15	7418 207	—	—	x
– Heat meter 25	7418 208	—	—	x
– Heat meter 35	7418 209	—	—	x
– Heat meter 60	7418 210	—	—	x
Solar cell	7408 877	—	—	x
Large display	7438 325	—	—	x
High limit safety cut-out	Z001 889	x	x	x
Temperature controller as temperature limiter (maximum limit)	Z001 887	—	—	x
Temperature controller	7151 989	x	x	x
Temperature controller	7151 988	x	x	x

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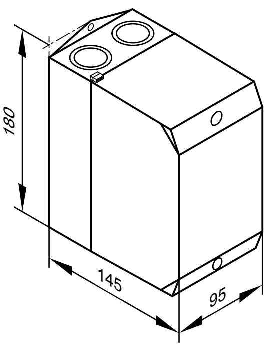
Contactor relay

Part no. 7814 681
- Contactor in small enclosure
- With 4 N/C and 4 N/O contacts
- With terminal strips for earth conductors

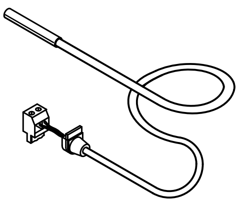


Specification

Coil voltage	230 V~/50 Hz
Rated current (I_{th})	AC1 16 A
	AC3 9 A

Immersion temperature sensor

Part no. 7438 702
To capture the temperature in a sensor well.



- For DHW circulation diversion in systems with 2 DHW cylinders.
- For return changeover between the boiler and the heating water buffer cylinder.
- For heating additional consumers.

Specification

Cable length	5.8 m, fully wired
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– Operation	0 to +90 °C
– Storage and transport	−20 to +70 °C

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Immersion temperature sensor

Part no. 7426 247
For installation in the DHW cylinder, heating water buffer cylinder, combi cylinder.
- For DHW circulation diversion in systems with 2 DHW cylinders.
- for return changeover between the boiler and the heating water buffer cylinder
- for heating additional consumers.
- For a heat statement (return temperature is captured).

On-site extension of the connecting lead:
- 2-core lead, length max. 60 m with a cross-section of 1.5 mm^2 (copper)
- Never route this lead immediately next to 230/400 V cables

Specification

Lead length	3.8 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– during operation	0 to +90°C
– during storage and transport	−20 to +70 °C

Collector temperature sensor

Part no. 7831 913
Immersion temperature sensor for installation in the solar collector.
- For systems with two collector arrays.
- For a heat statement (flow temperature is captured).

On-site extension of the connecting lead:
- 2-core lead, length max. 60 m with a cross-section of 1.5 mm^2 (copper).
- Never route this lead immediately next to 230/400 V cables.

Specification

Lead length	2.5 m
IP rating	IP 32 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 20 kΩ, at 25 °C
Permissible ambient temperature	
– during operation	−20 to +200 °C
– during storage and transport	−20 to +70 °C

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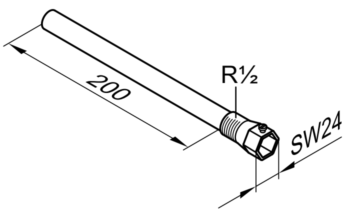
Stainless steel sensor well

Part no. 7819 693



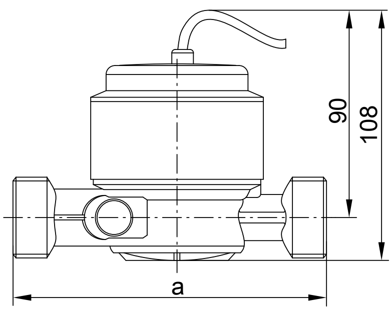
For temperature controllers and temperature sensors.
Part of the standard delivery of the Viessmann DHW cylinders.

Heat meter

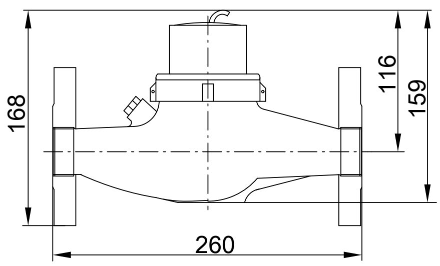
Components:
- 2 sensor wells
- Flow meter with connection fitting to capture the flow rate of water:glycol mixtures (Viessmann heat transfer medium "Tyfocor LS" with 45 % glycol volume ratio):

Heat meter

06 **Part no. 7418 206**
15 **Part no. 7418 207**
25 **Part no. 7418 208**



35 **Part no. 7418 209**
60 **Part no. 7418 210**



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Specification

Permissible ambient temperature

– During operation	0 to +40 °C
– During storage and transport	−20 to +70 °C
Setting range for glycol volume ratio	0 to 70 %

Flow meter		06	15	25	35	60
Dimension a in mm		110	110	130	—	—
Pulse rate	l/imp.	1	10	25	25	25
Internal diameter	DN	15	15	20	25	32
Connection thread at the meter	R	¾	¾	1	1¼	1½
Connection thread at the fitting	R	½	½	¾	1	1¼
Max. operating pressure	bar	16	16	16	16	16
Max. operating temperature	°C	120	120	120	130	130
Sensor wells G½ x	mm	45	45	60	60	60
The following details refer to the water flow rate. If glycol mixtures are used, the different viscosities will result in deviations.						
Nominal flow rate	m^3/h	0.6	1.5	2.5	3.5	6.0
Peak flow rate	m^3/h	1.2	3	5	7	12
Cut point ±3 %	l/h	48	120	200	280	480
Lowest flow rate (horizontal installation)	l/h	12	30	50	70	120
Lowest flow rate (vertical installation)	l/h	24	60	100	—	—
Pressure drop at approx. ⅔ of the nominal flow rate	bar	0.1	0.1	0.1	0.1	0.1

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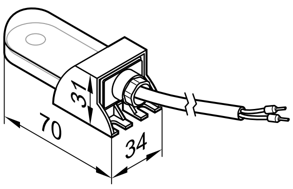
Solar cell

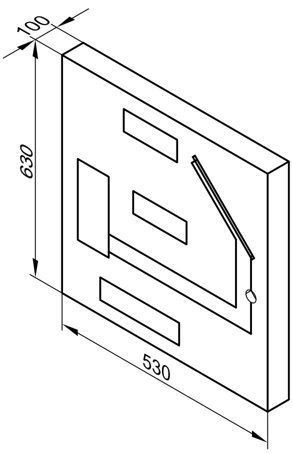
Part no. 7408 877



The solar cell captures the intensity of the sun and communicates this to the solar control unit. The bypass pump will be switched ON if the insolation exceeds the set switching threshold.
With connecting cable, 2.3 m long.
On-site extension of the connecting lead:
2-core lead, length max. 35 m with a cross-section of 1.5 mm^2 (copper).

Large display

Part no. 7438 325
To visualise the collector and cylinder temperatures as well as the energy yield.



With power supply unit plug.

Specification

Power supply	9 V– plug power supply unit 230 V~, 50 to 60 Hz
Power consumption	max. 12 VA
BUS connection	V BUS
IP rating	IP 30 (in dry rooms)
Permissible ambient temperature during operation, storage and transport	0 to 40 °C

High limit safety cut-out

Part no. Z001 889

- With a thermostatically controlled system.
- With stainless steel sensor well R½ x 200 mm.
- With setting scale and reset button in the casing.
- Required if less than 40 litres cylinder capacity is available per m^2 absorber area. This reliably prevents temperatures above 95 °C in the DHW cylinder.

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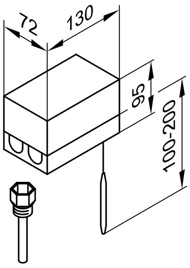
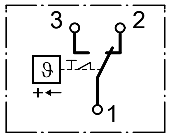


Specification

Connection	3-core lead with a cross-section of 1.5 mm^2
IP rating	IP 41 to EN 60529
Switching point	120 (110, 100, 95) °C
Switching differential	max. 11 K
Breaking capacity	6(1.5) A, 250 V~
Switching function	with rising temperature from 2 to 3

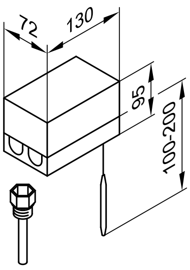


DIN reg. no.	DIN STB 1169

Temperature controller as temperature limiter (maximum limit)

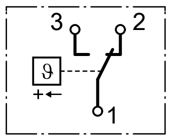
Part no. Z001 887
With stainless steel sensor well R½ x 200 mm.

With setting scale in the casing.



Specification

Connection	3-core lead with a cross-section of 1.5 mm^2
Setting range	30 to 80 °C
Switching differential	max. 11 K
Breaking capacity	6(1.5) A 250 V~
Switching function	with rising temperature from 2 to 3



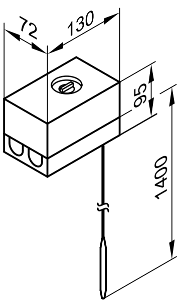
DIN reg. no.	DIN TR 1168

Temperature controller

Part no. 7151 989

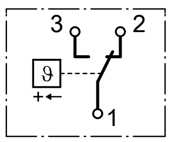
Suitable for:
- Vitocell 100-B
- Vitocell 100-V
- Vitocell 340-M
- Vitocell 360-M

- With a thermostatically controlled system.
- With selector on the outside of the casing.
- Without sensor well
  The sensor well is part of the standard delivery of Viessmann DHW cylinders.
- With top-hat rail to be mounted to the DHW cylinder or the wall.



Specification

Connection	3-core lead with a cross-section of 1.5 mm^2
IP rating	IP 41 to EN 60529
Setting range	30 to 60 °C, adjustable up to 110 °C
Switching differential	max. 11 K
Breaking capacity	6(1.5) A 250 V~
Switching function	with rising temperature from 2 to 3



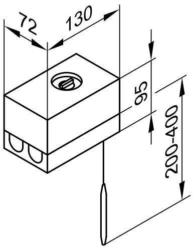
DIN reg. no.	DIN TR 1168

Temperature controller

Part no. 7151 988

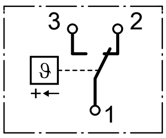
Suitable for:
- Vitocell 300-B
- Vitocell 300-V, type EVI

- With a thermostatically controlled system.
- With selector on the outside of the casing.
- Without sensor well
  Suitable for sensor well, part no.7819 693
  The sensor well is part of the standard delivery of Viessmann DHW cylinders.



Specification

Connection	3-core lead with a cross-section of 1.5 mm^2
IP rating	IP 41 to EN 60529
Setting range	30 to 60 °C, adjustable up to 110 °C
Switching differential	max. 11 K
Breaking capacity	6(1.5) A 250 V~
Switching function	with rising temperature from 2 to 3



DIN reg. no.	DIN TR 1168

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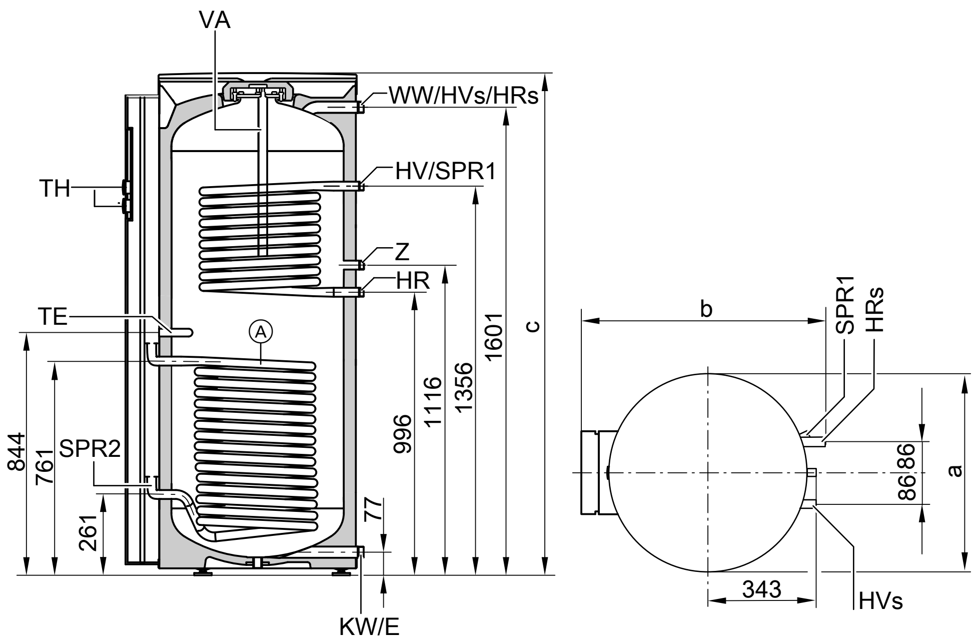
11.1 Vitocell 100-U, type CVUA

For DHW heating in conjunction with boilers and solar collectors.

Suitable for the following systems:
- DHW temperature up to **95 °C**
- Heating water flow temperature up to **160 °C**
- Solar flow temperature up to **110 °C**
- Operating pressure **on the heating water side** up to **10 bar (1.0 MPa)**
- Operating pressure **on the solar side** up to **10 bar (1.0 MPa)**
- Operating pressure **on the DHW side** up to **10 bar (1.0 MPa)**

Cylinder capacity		**l**	**300**
DIN register no.			0266/07-13MC/E
Continuous output, upper indirect coil For DHW heating from **10 to 45 °C** and a **heating water** flow temperature of … at the heating water flow rate stated below	90 °C	kW l/h	31 761
	80 °C	kW l/h	26 638
	70 °C	kW l/h	20 491
	60 °C	kW l/h	15 368
	50 °C	kW l/h	11 270
Continuous output, upper indirect coil For DHW heating from **10 to 60 °C** and a **heating water** flow temperature of … at the heating water flow rate stated below	90 °C	kW l/h	23 395
	80 °C	kW l/h	20 344
	70 °C	kW l/h	15 258
Heating water flow rate for the stated continuous outputs		m^3/h	3.0
Draw-off rate		l/min	15
Drawable water volume Without reheating Cylinder volume heated to 60 °C Water at t = 60 °C (constant)		l	110
Thermal insulation			Rigid PUR foam
Standby heat loss q_{BS} (standard parameter)		kWh/24 h	1.00
Standby capacity V_{aux}		l	127
Solar capacity V_{sol}		l	173
Dimensions (incl. thermal insulation) Length a (∅) Total width b Height c Height when tilted		 mm mm mm mm	 631 780 1705 1790
Weight incl. thermal insulation		kg	179
Total weight in operation		kg	481
Heating water content – Upper indirect coil – Lower indirect coil		 l l	 6 10
Heating surface – Upper indirect coil – Lower indirect coil		 m^2 m^2	 0.9 1.5
Connections (male thread) Heating water flow and return Cold water, DHW DHW circulation		 R R R	 1 1 1

Information regarding continuous output of the upper indirect coil
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

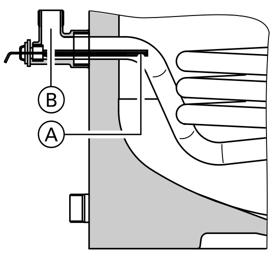


Ⓐ Lower indirect coil (solar thermal system)
The connections HV_s and HR_s are located on the top of the DHW cylinder

E	Drain
HR	Heating water return
HR_s	Heating water return, solar thermal system
HV	Heating water flow
HV_s	Heating water flow, solar thermal system
KW	Cold water
SPR1	Cylinder temperature sensor of the cylinder temperature controller
SPR2	Cylinder temperature sensor of the solar thermal system
TE	Sensor well for lower thermometer
TH	Thermometer
VA	Protective magnesium anode
WW	DHW
Z	DHW circulation

Dimension	mm
a	631
b	780
c	1705

Cylinder temperature sensor for solar operation



Arrangement of cylinder temperature sensor in the heating water return HR_s

Ⓐ Cylinder temperature sensor (standard delivery of solar control unit)
Ⓑ Threaded elbow with sensor well (standard delivery)

Performance factor N_L

To DIN 4708.
Upper indirect coil.
Cylinder storage temperature T_{cyl} = cold water inlet temperature +50 K $_{+5\ K/-0\ K}$.

Performance factor N_L at heating water flow temperature	
90 °C	1.6
80 °C	1.5
70 °C	1.4

Information regarding performance factor N_L

The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values
- *T_{cyl} = 60 °C → 1.0 × N_L*
- *T_{cyl} = 55 °C → 0.75 × N_L*
- *T_{cyl} = 50 °C → 0.55 × N_L*
- *T_{cyl} = 45 °C → 0.3 × N_L*

Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C.

Peak output (l/10 min) at a heating water flow temperature of	
90 °C	173
80 °C	168
70 °C	164

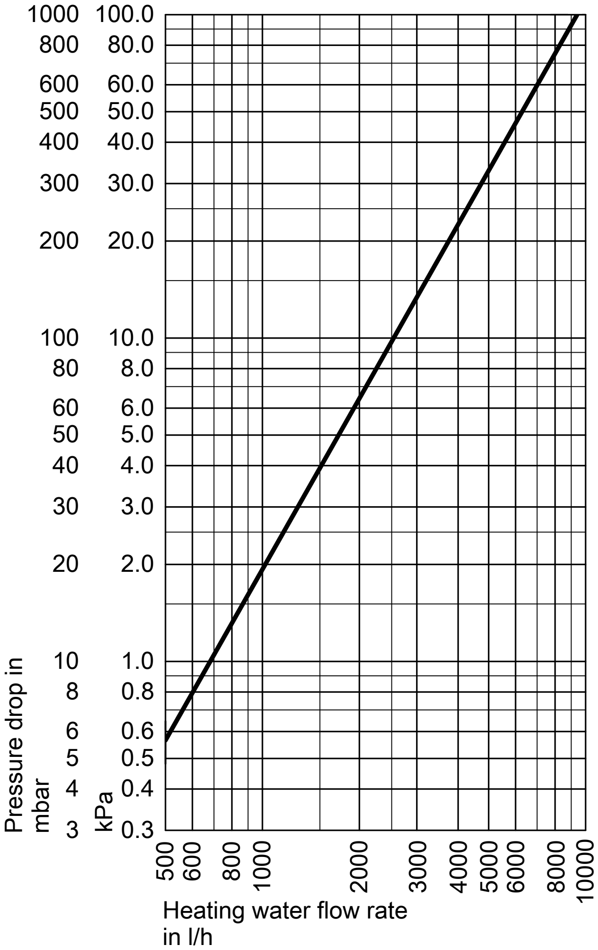
Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

Max. draw-off rate (l/min) at heating water flow temperature	
90 °C	17
80 °C	17
70 °C	16

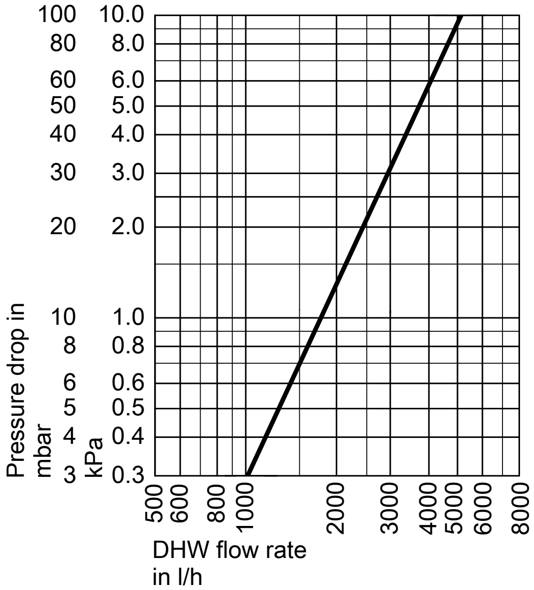
Heat-up time
The specified heat-up times will be achieved subject to the maximum continuous output of the DHW cylinder being made available at the relevant heating water flow temperature and when DHW is heated from 10 to 60 °C.

Heat-up time (min.) at heating water flow temperature	
90 °C	16
80 °C	22
70 °C	30

Pressure drops



Pressure drop on the heating water side, upper indirect coil



Pressure drop on the DHW side

11

5822 440 GB

11.2 Vitocell 100-B, type CVB

For DHW heating in conjunction with boilers and solar collectors for dual mode operation.

Suitable for the following systems:
- DHW temperatures up to **95 °C**
- Heating water flow temperature up to **160 °C**
- Solar flow temperature up to **160 °C**
- Operating pressure **on the heating water side** up to **10 bar (1.0 MPa)**
- Operating pressure **on the solar side** up to **10 bar (1.0 MPa)**
- Operating pressure **on the DHW side** up to **10 bar (1.0 MPa)**

Cylinder capacity		**l**	**300**		**400**		**500**	
Indirect coil			**upper**	**lower**	**upper**	**lower**	**upper**	**lower**
DIN register no.			9W242/11-13 MC/E					
Continuous output for DHW heating from **10 to 45 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	31	53	42	63	47	70
		l/h	761	1302	1032	1548	1154	1720
	80 °C	kW	26	44	33	52	40	58
		l/h	638	1081	811	1278	982	1425
	70 °C	kW	20	33	25	39	30	45
		l/h	491	811	614	958	737	1106
	60 °C	kW	15	23	17	27	22	32
		l/h	368	565	418	663	540	786
	50 °C	kW	11	18	10	13	16	24
		l/h	270	442	246	319	393	589
Continuous output for DHW heating from **10 to 60 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	23	45	36	56	36	53
		l/h	395	774	619	963	619	911
	80 °C	kW	20	34	27	42	30	44
		l/h	344	584	464	722	516	756
	70 °C	kW	15	23	18	29	22	33
		l/h	258	395	310	499	378	567
Heating water flow rate for the stated continuous outputs		m^3/h	3.0		3.0		3.0	
Max. connectable heat pump output at 55 °C heating water flow temperatures and 45 °C DHW temperatures for the specified heating water flow rate (both internal indirect coils connected in series)		kW	8		8		10	
Standby heat loss q_{BS} (standard parameter)		kWh/ 24 h	1.00		1.08		1.30	
Standby capacity V_{aux}		l	127		167		231	
Solar capacity V_{sol}		l	173		233		269	
Dimensions								
Length a (∅)	– Incl. thermal insulation	mm	633		859		859	
	– Excl. thermal insulation	mm	–		650		650	
Total width b	– Incl. thermal insulation	mm	705		923		923	
	– Excl. thermal insulation	mm	–		881		881	
Height c	– Incl. thermal insulation	mm	1746		1624		1948	
	– Excl. thermal insulation	mm	–		1518		1844	
Height when tilted	– Incl. thermal insulation	mm	1792		–		–	
	– Excl. thermal insulation	mm	–		1550		1860	
Weight incl. thermal insulation		kg	160		167		205	
Total weight in operation with immersion heater		kg	462		569		707	
Heating water content		l	6	10	6.5	10.5	9	12.5
Heating surface		m^2	0.9	1.5	1.0	1.5	1.4	1.9
Connections								
Indirect coils (male thread)		R	1		1		1	
Cold water, DHW (male thread)		R	1		1¼		1¼	
DHW circulation (male thread)		R	1		1		1	
Immersion heater (female thread)		Rp	1½		1½		1½	

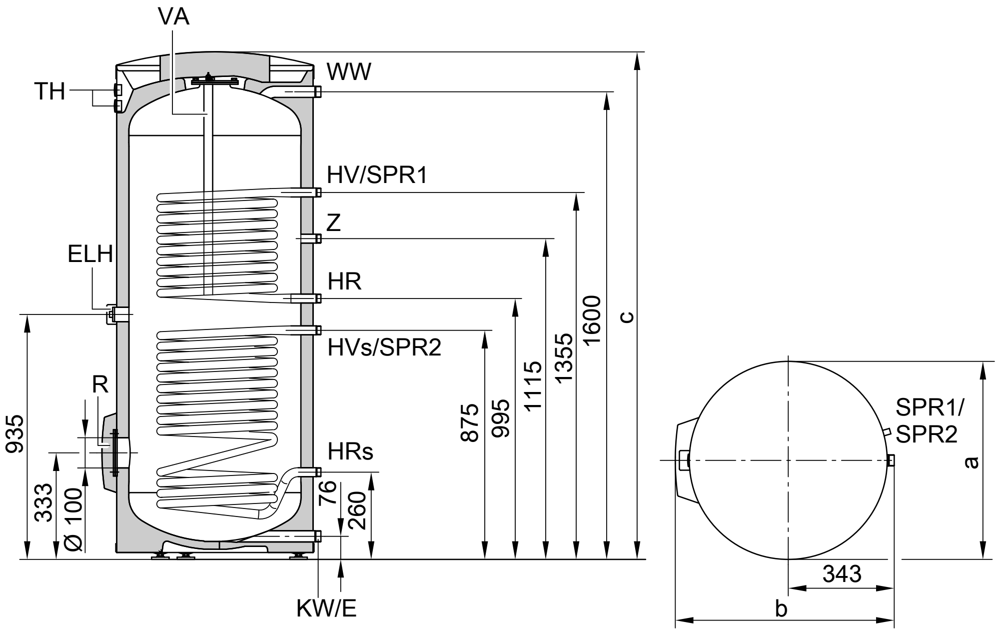
Information regarding the upper indirect coil
The upper indirect coil is intended to be connected to a heat generator.

Information regarding the lower indirect coil
The lower indirect coil is designed for connection to solar collectors. To install the cylinder temperature sensor, use the threaded elbow with sensor well provided in the standard delivery.

Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

The Vitocell 100-B with **300 and 400 l capacity** is also available in white.

300 l capacity

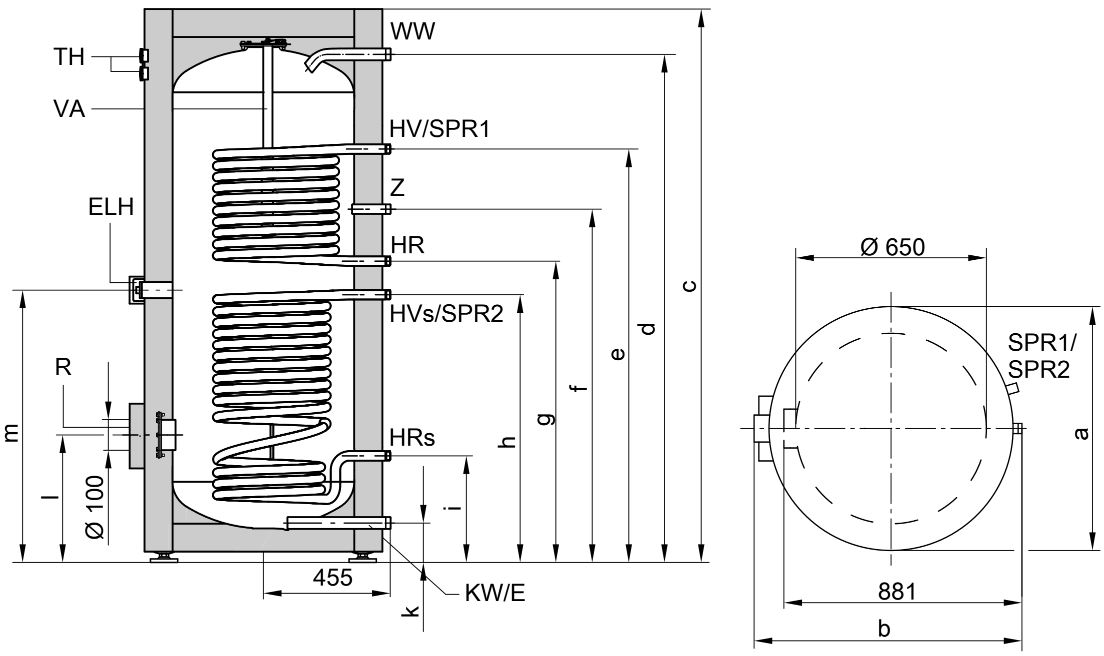


E Drain
ELH Immersion heater
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
KW Cold water
R Inspection and cleaning aperture with flange cover (also suitable for installation of an immersion heater)
SPR1 Cylinder temperature sensor of the cylinder temperature controller
SPR2 Temperature sensors/thermometer
TH Thermometer (accessories)
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity	**l**	**300**
a	mm	633
b	mm	705
c	mm	1746

5822 440 GB

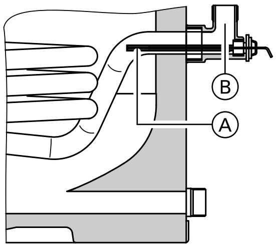
400 and 500 l capacity



E	Drain
ELH	Immersion heater
HR	Heating water return
HR_s	Heating water return, solar thermal system
HV	Heating water flow
HV_s	Heating water flow, solar thermal system
KW	Cold water
R	Inspection and cleaning aperture with flange cover (also suitable for installation of an immersion heater)
SPR1	Cylinder temperature sensor of the cylinder temperature controller
SPR2	Temperature sensors/thermometer
TH	Thermometer (accessories)
VA	Protective magnesium anode
WW	DHW
Z	DHW circulation

Cylinder capacity	l	400	500
a	mm	859	859
b	mm	923	923
c	mm	1624	1948
d	mm	1458	1784
e	mm	1204	1444
f	mm	1044	1230
g	mm	924	1044
h	mm	804	924
i	mm	349	349
k	mm	107	107
l	mm	422	422
m	mm	864	984

Cylinder temperature sensor for solar operation



Arrangement of cylinder temperature sensor in the heating water return HR_s

Ⓐ Cylinder temperature sensor (standard delivery of solar control unit)
Ⓑ Threaded elbow with sensor well (standard delivery)

Performance factor N_L
To DIN 4708.
Upper indirect coil.
Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\,K/-0\,K}$

Cylinder capacity l	300	400	500
Performance factor N_L at heating water flow temperature			
90 °C	1.6	3.0	6.0
80 °C	1.5	3.0	6.0
70 °C	1.4	2.5	5.0

Information regarding performance factor N_L
The performance factor N_L depends on the cylinder storage temperature Tcyl.

Standard values
- *T_{cyl} = 60 °C → 1.0 × N_L*
- *T_{cyl} = 55 °C → 0.75 × N_L*
- *T_{cyl} = 50 °C → 0.55 × N_L*
- *T_{cyl} = 45 °C → 0.3 × N_L*

Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C.

Cylinder capacity l	300	400	500
Peak output (l/10 min) at heating water flow temperature			
90 °C	173	230	319
80 °C	168	230	319
70 °C	164	210	299

Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

Cylinder capacity l	300	400	500
Max. draw-off rate (l/min) at heating water flow temperature			
90 °C	17	23	32
80 °C	17	23	32
70 °C	16	21	30

Drawable water volume
Cylinder content heated to 60 °C.
Without reheating.

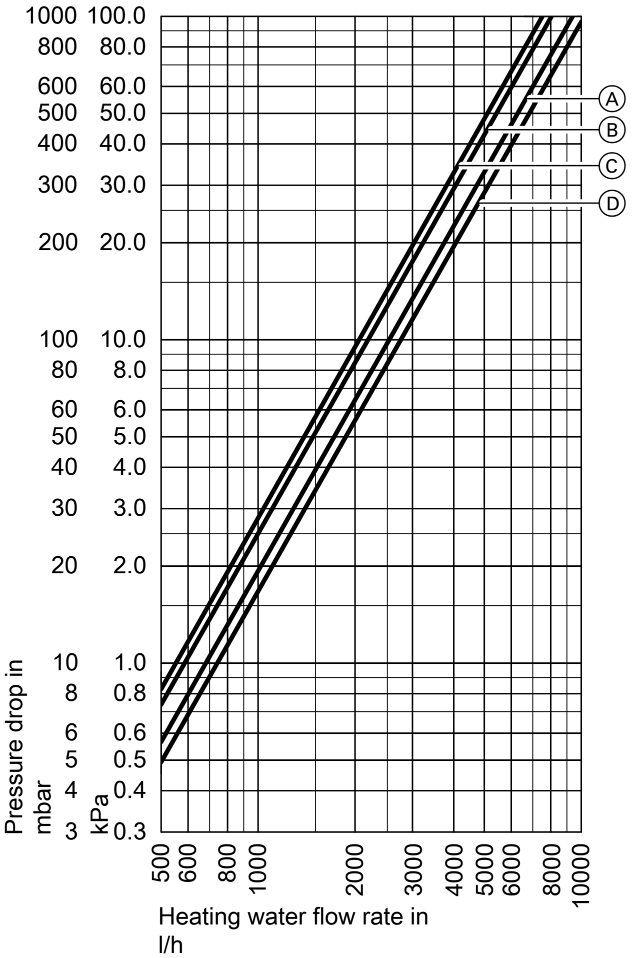
Cylinder capacity	l	300	400	500
Draw-off rate	l/min	15	15	15
Drawable water volume Water at t = 60 °C (constant)	l	110	120	220

Heat-up time

The heat-up times specified will be achieved if the max. continuous output of the DHW cylinder is made available at the respective heating water flow temperature and when heating DHW from 10 to 60 °C.

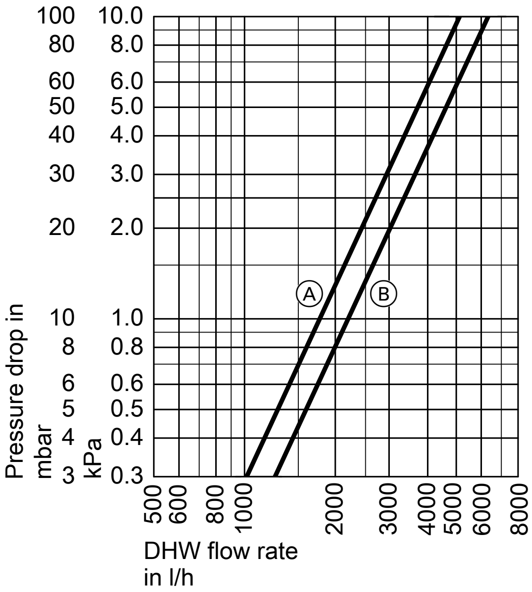
Cylinder capacity l	300	400	500
Heat-up time (min.) at heating water flow temperature			
90 °C	16	17	19
80 °C	22	23	24
70 °C	30	36	37

Pressure drops



Pressure drop on the heating water side

Ⓐ Cylinder capacity 300 l (upper indirect coil)
Ⓑ Cylinder capacity 300 l (lower indirect coil)
Cylinder capacity 400 and 500 l (upper indirect coil)
Ⓒ Cylinder capacity 500 l (lower indirect coil)
Ⓓ Cylinder capacity 400 l (lower indirect coil)



Pressure drop on the DHW side

Ⓐ Cylinder capacity 300 l
Ⓑ Cylinder capacity 400 and 500 l

11

5822 440 GB

11.3 Vitocell 100-V, type CVS

For DHW heating in conjunction with solar collectors and an electric immersion heater.

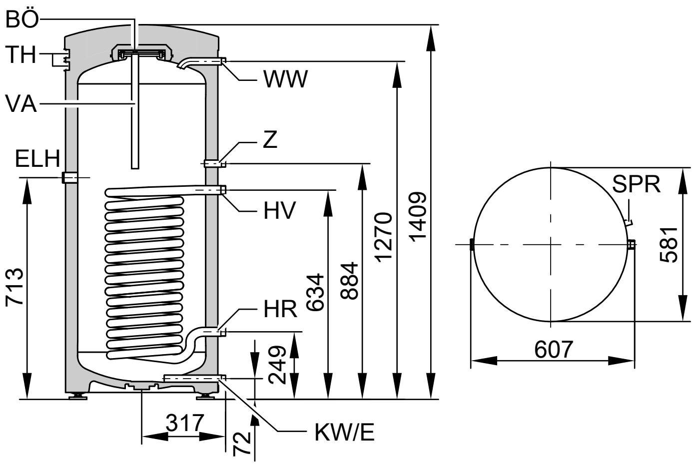
Suitable for the following systems:
- Flow temperature of heat transfer medium up to **160 °C**
- Operating pressure on the **solar side** up to **10 bar**
- DHW temperature up to **95 °C**
- Operating pressure on the **DHW side** up to **10 bar**

Cylinder capacity		**l**	**200**	**300**	**390**
Continuous output (total) for DHW heating from **10 to 45 °C** and a **heating transfer medium** flow temperature of ... at the heat transfer medium throughput stated below	90 °C	kW	40	53	63
		l/h	982	1302	1548
	80 °C	kW	32	44	52
		l/h	786	1081	1278
	70 °C	kW	25	33	39
		l/h	614	811	958
	60 °C	kW	17	23	27
		l/h	417	565	663
	50 °C	kW	9	18	13
		l/h	221	442	319
Continuous output (total) for DHW heating from **10 to 60°C** and a **heating transfer medium** flow temperature of ... at the heat transfer medium throughput stated below	90 °C	kW	36	45	56
		l/h	619	774	963
	80 °C	kW	28	34	42
		l/h	482	584	722
	70 °C	kW	19	23	29
		l/h	327	395	499
Heat transfer medium throughput for the stated continuous outputs		m^3/h	3.0	3.0	3.0
Standby heat loss (standard parameter) q_{BS} at 45 K temperature differential		kWh/24h	1.10	1.13	1.27
Volume standby proportion V_{aux}		l	107	144	193
Volume solar proportion V_{sol}		l	93	156	197
Dimensions					
Length (∅)					
– Incl. thermal insulation		mm	581	633	859
– Excl. thermal insulation		mm	—	—	650
Width		mm	607	660	881
Height					
– Incl. thermal insulation		mm	1409	1746	1624
– Excl. thermal insulation		mm	—	—	1518
Height when tilted					
– Incl. thermal insulation		mm	1460	1792	—
– Excl. thermal insulation		mm	—	—	1550
Weight DHW cylinder with thermal insulation		kg	97	144	151
Content, heat transfer medium		l	5.5	10.0	10.5
Heat transfer surface		m^2	1.0	1.5	1.5
Connections					
Heating water flow and return (solar)		R	1	1	1
Cold water, DHW		R	¾	1	1¼
DHW circulation		R	¾	1	1
Immersion heater		R	1½	1½	1½

Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

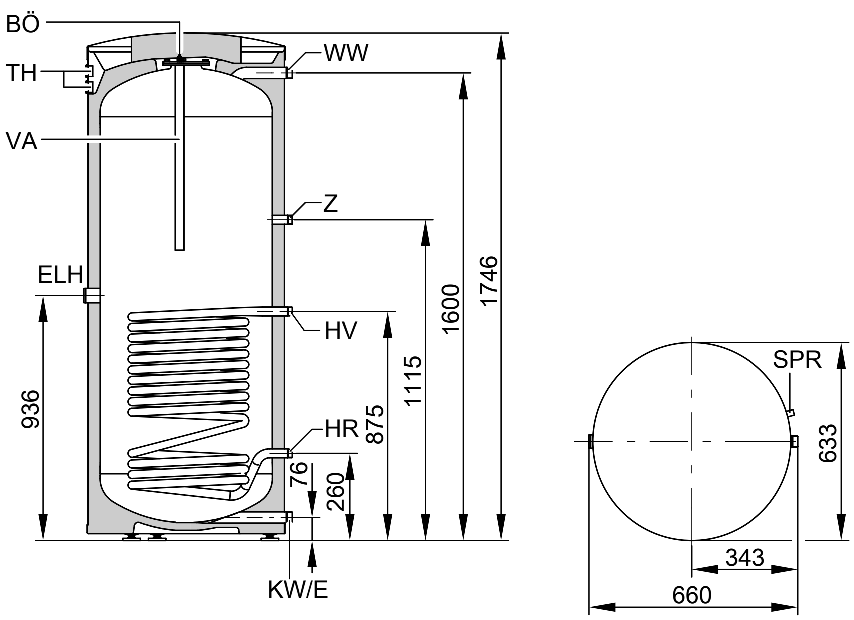
Information regarding immersion heater
Only for use with soft to medium hard drinking water up to 14° dH (average hardness level, up to 2.5 mol/m^3).

200 l capacity



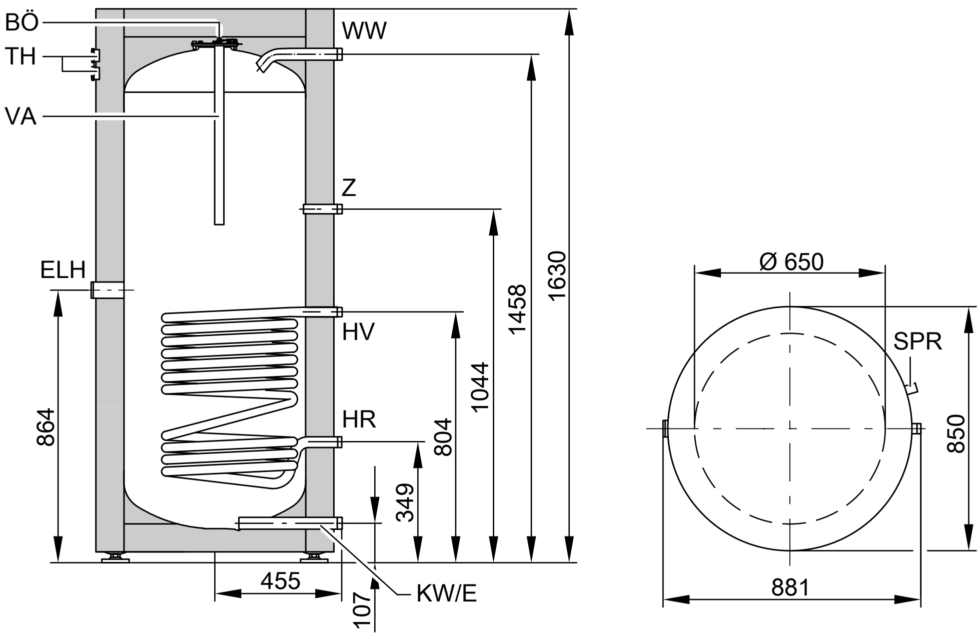
BÖ	Inspection and cleaning aperture	TH	Thermometer (accessory)
E	Drain	VA	Protective magnesium anode
ELH	Connection, electric immersion heater	WW	DHW
HR	Heating water return, solar thermal system	Z	DHW circulation
HV	Heating water flow, solar thermal system		
KW	Cold water		
SPR	Sensor well for cylinder temperature sensor or control thermostat and a second thermometer sensor (at the same height as connector HV)		

300 l capacity



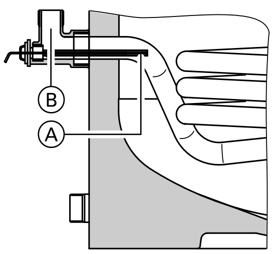
BÖ	Inspection and cleaning aperture	TH	Thermometer (accessory)
E	Drain	VA	Protective magnesium anode
ELH	Connection, electric immersion heater	WW	DHW
HR	Heating water return, solar thermal system	Z	DHW circulation
HV	Heating water flow, solar thermal system		
KW	Cold water		
SPR	Sensor well for cylinder temperature sensor or control thermostat and a second thermometer sensor (at the same height as connector HV)		

390 l capacity



BÖ	Inspection and cleaning aperture
E	Drain
ELH	Connection, electric immersion heater
HR	Heating water return, solar thermal system
HV	Heating water flow, solar thermal system
KW	Cold water
SPR	Sensor well for cylinder temperature sensor or control thermostat and a second thermometer sensor (at the same height as connector HV)
TH	Thermometer (accessory)
VA	Protective magnesium anode
WW	DHW
Z	DHW circulation

Cylinder temperature sensor for solar operation



Arrangement of the cylinder temperature sensor in the heating water return HR

Ⓐ Cylinder temperature sensor (standard delivery of solar control unit)
Ⓑ Threaded elbow with sensor well (accessory)

Performance factor N_L
To DIN 4708.
Cylinder storage temperature T_{cyl} = cold water inlet temperature +50 K +5 K/-0 K

Cylinder capacity l	200	300	390
Performance factor N_L at heat transfer medium flow temperature			
90 °C	4.0	9.7	15.0
80 °C	3.7	9.3	15.0
70 °C	3.5	8.7	11.5

5822 440 GB

Information regarding performance factor N_L

The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values
- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

Note

*For multi cylinder banks, the performance factor N_L **cannot** be determined through multiplication of the performance factor N_L of the individual cylinders by the number of cylinders.*

Peak output (over 10 minutes)

Relative to the performance factor N_L.
DHW heating from 10 to 45°C.

Cylinder capacity	**l**	**200**	**300**	**390**
Peak output (l/10 min) **at heat transfer medium flow temperature**				
90 °C		262	401	512
80 °C		252	399	512
70 °C		246	385	445

Note

*For multi cylinder banks, the peak output **cannot** be determined through multiplication of the peak output of the individual cylinders by the number of cylinders.*

Max. draw-off rate (over 10 minutes)

Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45°C.

Cylinder capacity	**l**	**200**	**300**	**390**
Max. draw-off rate (l/min) **at heat transfer medium flow temperature**				
90 °C		26	41	51.2
80 °C		25	40	51.2
70 °C		25	39	44.5

Note

*For multi cylinder banks, the maximum draw-off rate **cannot** be determined through multiplication of the maximum draw-off rate of the individual cylinders by the number of cylinders.*

Drawable water volume

Cylinder volume heated to 60°C.
Without reheating.

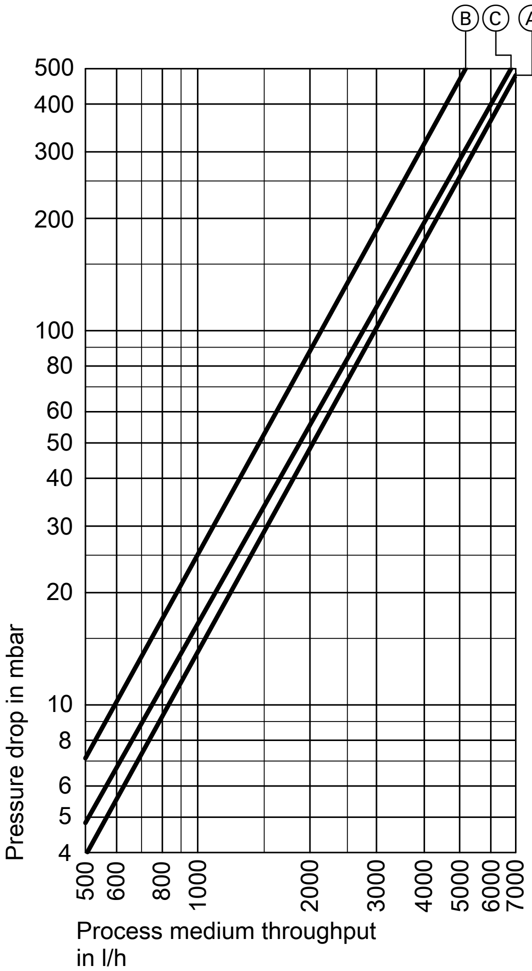
Cylinder capacity	**l**	**200**	**300**	**390**
Draw-off rate	l/min	10	15	10
Drawable water volume Water with t = 60 °C (constant)	l	195	290	330

Heat-up time

The heat-up times specified will be achieved subject to the maximum continuous output of the DHW cylinder being made available at the relevant flow temperature and when DHW is heated from 10 to 60 °C.

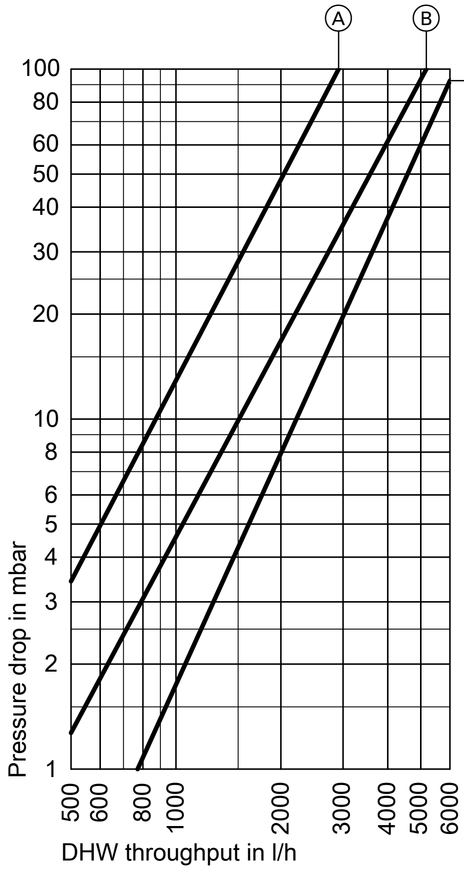
Cylinder capacity	**l**	**200**	**300**	**390**
Heat-up time (min) **at heat transfer medium flow temperature**				
90 °C		19	23	27
80 °C		24	31	36
70 °C		37	45	55

Pressure drops



Pressure drop on the solar side

Ⓐ Cylinder capacity 200 l
Ⓑ Cylinder capacity 300 l
Ⓒ Cylinder capacity 390 l



Pressure drop on the DHW side

Ⓐ Cylinder capacity 200 l
Ⓑ Cylinder capacity 300 l
Ⓒ Cylinder capacity 390 l

11

5822 440 GB

11.4 Vitocell 100-V, type CVW

For DHW heating in conjunction with heat pumps up to 16 kW and solar collectors; also suitable for boilers and district heating systems.

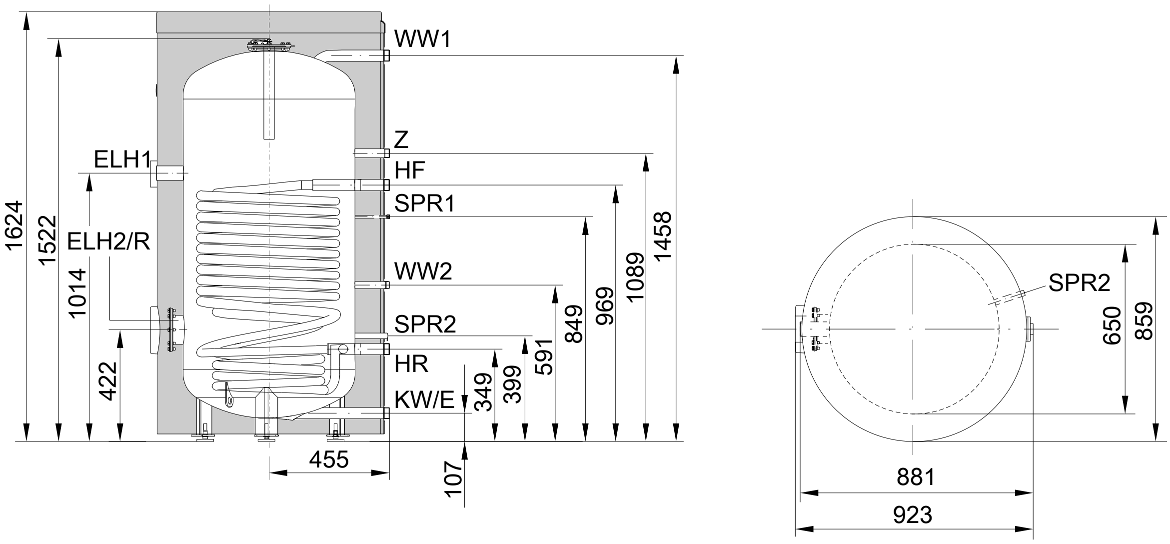
Suitable for the following system characteristics:
- DHW temperature up to **95 °C**
- Heating water flow temperature up to **110 °C**
- Solar flow temperature up to **140 °C**
- Operating pressure on the **heating water side** up to **10 bar (1.0 MPa)**
- Operating pressure on the **solar side** up to **10 bar (1.0 MPa)**
- Operating pressure on the **DHW side** up to **10 bar (1.0 MPa)**

Cylinder capacity			l	**390**
DIN register no.				9W173-13MC/E
Continuous output For DHW heating from **10 to 45 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below		90 °C	kW l/h	109 2678
		80 °C	kW l/h	87 2138
		70 °C	kW l/h	77 1892
		60 °C	kW l/h	48 1179
		50 °C	kW l/h	26 639
Continuous output For DHW heating from **10 to 60 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below		90 °C	kW l/h	98 1686
		80 °C	kW l/h	78 1342
		70 °C	kW l/h	54 929
Heating water flow rate for the stated continuous outputs			m^3/h	3.0
Draw-off rate			l/min	15
Drawable water volume Without reheating – Cylinder content heated to 45 °C, water at t = 45 °C (constant) – Cylinder content heated to 55 °C, water at t = 55 °C (constant)			 l l	 280 280
Heat-up time For connection of a heat pump with 16 kW rated heating output and a heating water flow temperature of 55 **or** 65 °C – For DHW heating from 10 to 45 °C – For DHW heating from 10 to 55 °C			 min min	 60 77
Max. connectable heat pump output At 65 °C heating water flow and 55 °C DHW temperature and the specified heating water flow rate			kW	16
Max. aperture area that can be connected to the solar heat exchanger set (accessories) – Vitosol-F – Vitosol-T			 m^2 m^2	 11.5 6
Performance factor N_L in conjunction with a heat pump Cylinder storage temperature		 45 °C 50 °C		 2.4 3.0
Standby heat loss q_{BS}			kWh/24 h	2.5
Dimensions				
Length (∅)	– Incl. thermal insulation		mm	859
	– Excl. thermal insulation		mm	650
Total width	– Incl. thermal insulation		mm	923
	– Excl. thermal insulation		mm	881
Height	– Incl. thermal insulation		mm	1624
	– Excl. thermal insulation		mm	1522
Height when tilted	– Excl. thermal insulation		mm	1550
Weight incl. thermal insulation			kg	190
Total weight in operation incl. immersion heater			kg	582
Heating water content			l	27
Heating surface			m^2	4.1
Connections				
Heating water flow and return (male thread)			R	1¼
Cold water, DHW (male thread)			R	1¼
Solar heat exchanger set (male thread)			R	¾

Cylinder capacity	l	390
DHW circulation (male thread)	R	1
Immersion heater (female thread)	Rp	1½

Information regarding continuous output

When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.



11

E Drain
ELH1 Connector for immersion heater
ELH2 Flanged aperture for immersion heater
HR Heating water return
HV Heating water flow
KW Cold water
R Inspection and cleaning aperture with flange cover
SPR1 Cylinder temperature sensor of the cylinder temperature controller
SPR2 Temperature sensor of the solar heat exchanger set
WW1 DHW
WW2 Hot water from the solar heat exchanger set
Z DHW circulation

Performance factor N_L

According to DIN 4708, without return temperature limit.
Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5 K/–0 K}$

Performance factor N_L at heating water flow temperature	
90 °C	16.5
80 °C	15.5
70 °C	12.0

Information regarding performance factor N_L

The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values

- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

Peak output (over 10 minutes)

Relative to the performance factor N_L.
DHW heating from 10 to 45 °C without return temperature limit.

Peak output (l/10 min) at a heating water flow temperature of	
90 °C	540
80 °C	521
70 °C	455

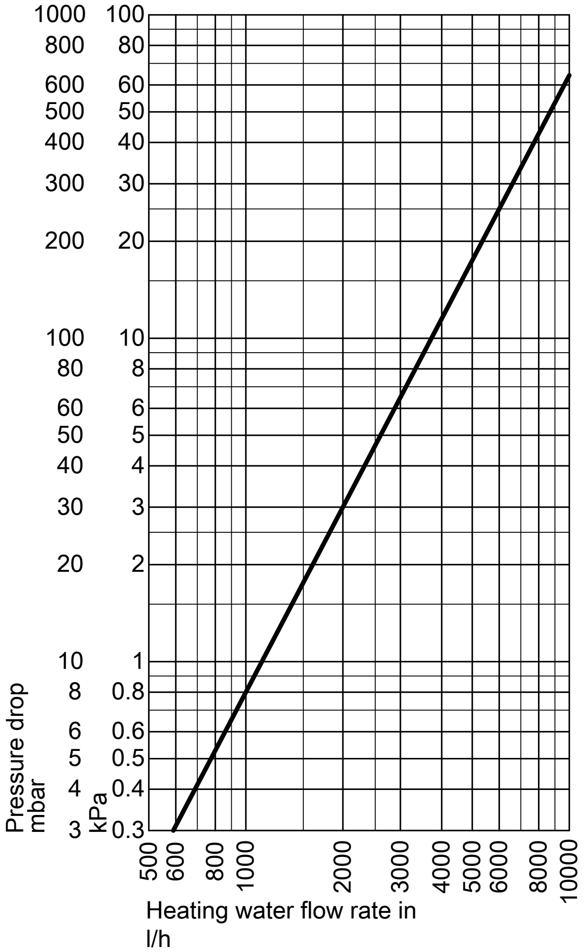
Max. draw-off rate (over 10 minutes)

Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

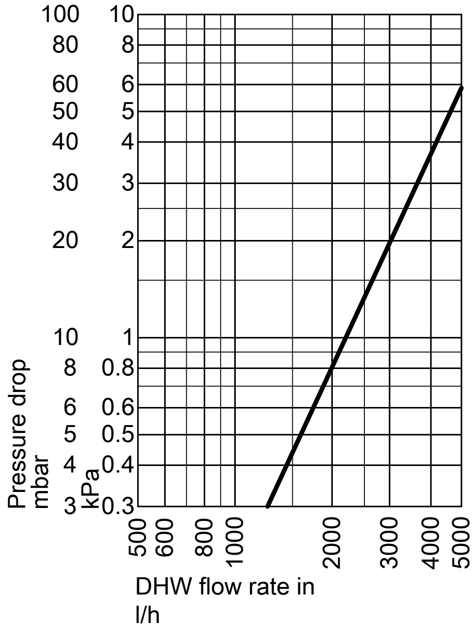
Max. draw-off rate (l/min) at heating water flow temperature	
90 °C	54
80 °C	52
70 °C	46

5822 440 GB

Pressure drops



Pressure drop on the heating water side

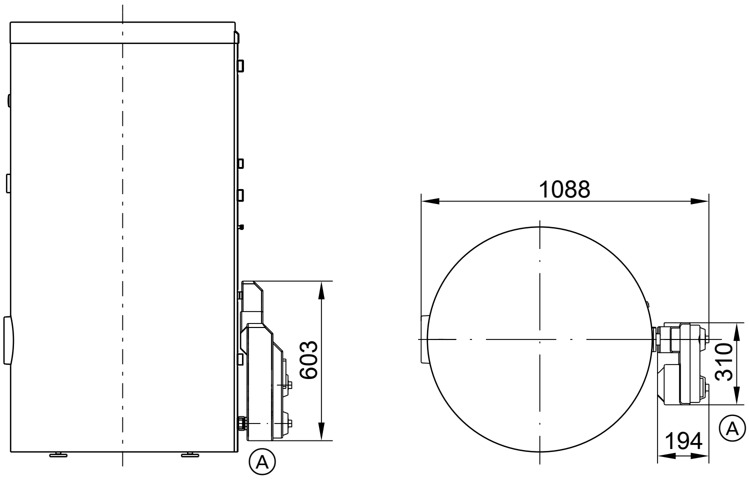


Pressure drop on the DHW side

Solar internal indirect coil set

Part no. 7186 663
For the connection of solar collectors to the DHW cylinder. Suitable for systems to DIN 4753. Total water hardness of up to 20 °dH (3.6 mol/m^3).

Permissible temperatures	
Solar side	140 °C
Heating water side	110 °C
DHW side	
– for boiler operation	95 °C
– for solar operation	60 °C
Permissible operating pressure Solar side, heating and DHW side	10 bar
Test pressure Solar side, heating and DHW side	13 bar
Minimum wall clearance For the installation of the solar heat exchanger set	350 mm



Ⓐ Solar heat exchanger set

5822 440 GB

11.5 Vitocell 300-B, type EVB

For DHW heating in conjunction with boilers and solar collectors for dual mode operation.

Suitable for the following systems:
- DHW temperature up to **95 °C**
- Heating water flow temperature up to **200 °C**
- Solar flow temperature up to **200 °C**
- Operating pressure **on the heating water side** up to **25 bar (2.5 MPa)**
- Operating pressure **on the solar side** up to **25 bar (2.5 MPa)**
- Operating pressure **on the DHW side** up to **10 bar (1.0 MPa)**

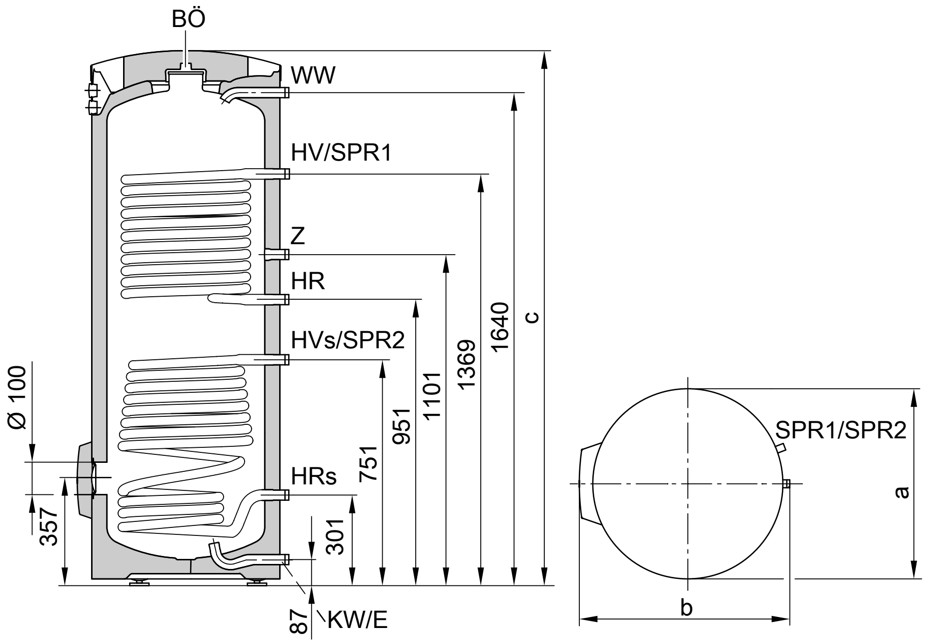
Cylinder capacity		l	**300**		**500**	
Indirect coil			**upper**	**lower**	**upper**	**lower**
DIN registration number			0100/08-10MC			
Continuous output For DHW heating from **10 to 45 °C** and a **heating water** flow temperature of … at the heating water flow rate stated below	90 °C	kW	80	93	80	96
		l/h	1965	2285	1965	2358
	80 °C	kW	64	72	64	73
		l/h	1572	1769	1572	1793
	70 °C	kW	45	52	45	56
		l/h	1106	1277	1106	1376
	60 °C	kW	28	30	28	37
		l/h	688	737	688	909
	50 °C	kW	15	15	15	18
		l/h	368	368	368	442
Continuous output For DHW heating from **10 to 60 °C** and a **heating water** flow temperature of … at the heating water flow rate stated below	90 °C	kW	74	82	74	81
		l/h	1273	1410	1273	1393
	80 °C	kW	54	59	54	62
		l/h	929	1014	929	1066
	70 °C	kW	35	41	35	43
		l/h	602	705	602	739
Heating water flow rate for the stated continuous flow rates		m^3/h	5.0	5.0	5.0	5.0
Max. connectable heat pump output At a heating water flow temperature of 55 °C and a DHW temperature of 45 °C For the specified heating water flow rate (both indirect coils connected in series)		kW		12		15
Standby heat loss q_{BS} (standard parameter)		kWh/24 h		1.17		1.37
Standby capacity V_{aux}		l		149		245
Solar capacity V_{sol}		l		151		255
Dimensions						
Length a (Ø)	– Incl. thermal insulation	mm		633		925
	– Excl. thermal insulation	mm		–		715
Width b	– Incl. thermal insulation	mm		704		975
	– Excl. thermal insulation	mm		–		914
Height c	– Incl. thermal insulation	mm		1779		1738
	– Excl. thermal insulation	mm		–		1667
Height when tilted	– Incl. thermal insulation	mm		1821		–
	– Excl. thermal insulation	mm		–		1690
Weight incl. thermal insulation		kg		114		125
Heating water content		l	11	11	11	15
Heating surface		m^2	1.50	1.50	1.45	1.90
Connections (male thread)						
Indirect coils		R		1		1¼
Cold water, DHW		R		1		1¼
DHW circulation		R		1		1¼

Information regarding the upper indirect coil
The upper indirect coil is intended to be connected to a heat generator.

Information regarding the lower indirect coil
The lower indirect coil is designed for connection to solar collectors. To install the cylinder temperature sensor, use the threaded elbow with sensor well provided in the standard delivery.

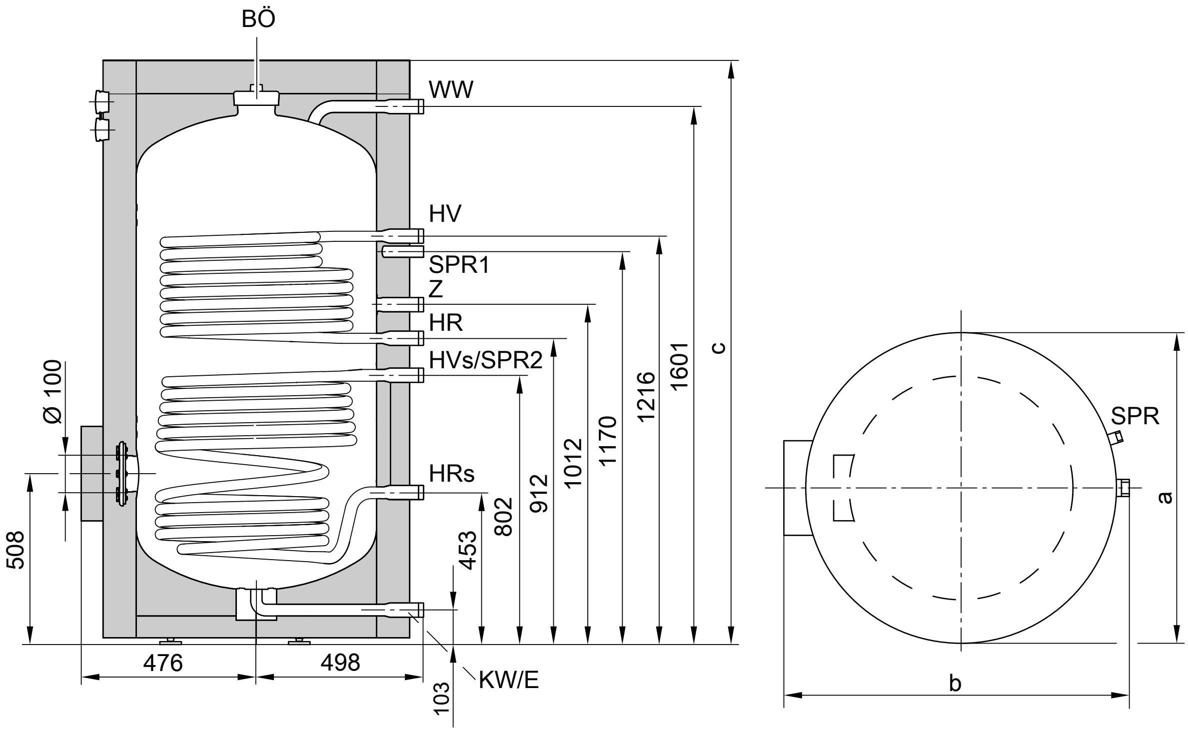
Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

300 l capacity



BÖ	Inspection and cleaning aperture	KW	Cold water
E	Drain outlet	SPR1	Cylinder temperature sensor of the cylinder temperature controller
HR	Heating water return	SPR2	Temperature sensors/thermometer
HR_s	Heating water return, solar thermal system	WW	DHW
HV	Heating water flow	Z	DHW circulation
HV_s	Heating water flow, solar thermal system		

500 l capacity

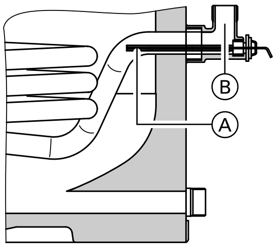


BÖ	Inspection and cleaning aperture	HV	Heating water flow
E	Drain outlet	HV_s	Heating water flow, solar thermal system
HR	Heating water return	KW	Cold water
HR_s	Heating water return, solar thermal system		

5822 440 GB

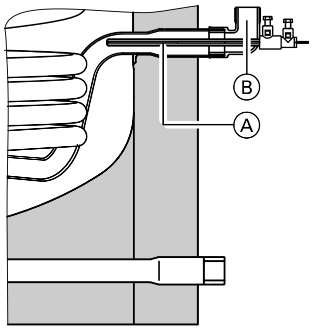
SPR1 Cylinder temperature sensor of the cylinder temperature controller
SPR2 Temperature sensors/thermometer
WW DHW
Z DHW circulation

Cylinder temperature sensor for solar operation



Cylinder capacity 300 l, positioning of cylinder temperature sensor in the heating water return HR_s

Ⓐ Cylinder temperature sensor (standard delivery of solar control unit)
Ⓑ Threaded elbow with sensor well (standard delivery)



Cylinder capacity 500 l, positioning of cylinder temperature sensor in the heating water return HR_s

Ⓐ Cylinder temperature sensor (standard delivery of solar control unit)
Ⓑ Threaded elbow with sensor well (standard delivery)

11

Performance factor N_L
To DIN 4708.
Upper indirect coil.

Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\ K/–0\ K}$K

Cylinder capacity	l	300	500
Performance factor N_L at heating water flow temperature			
90 °C		4.0	6.8
80 °C		3.5	6.8
70 °C		2.0	5.6

Information regarding performance factor N_L
The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values
- *T_{cyl} = 60 °C → 1.0 × N_L*
- *T_{cyl} = 55 °C → 0.75 × N_L*
- *T_{cyl} = 50 °C → 0.55 × N_L*
- *T_{cyl} = 45 °C → 0.3 × N_L*

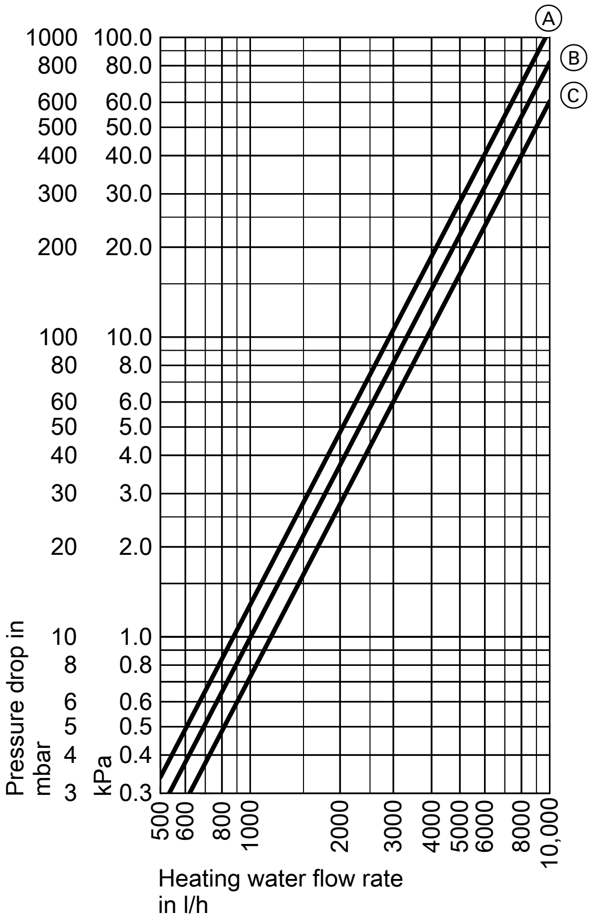
Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C.

Cylinder capacity	l	300	500
Peak output (l/10 min) at heating water flow temperature			
90 °C		260	340
80 °C		250	340
70 °C		190	310

Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

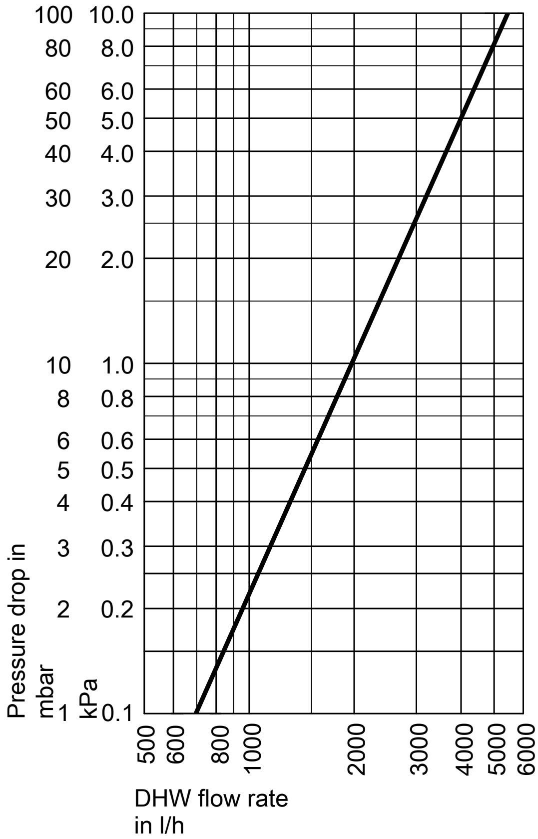
Cylinder capacity	l	300	500
Max. draw-off rate (l/min) at heating water flow temperature			
90 °C		26	34
80 °C		25	34
70 °C		19	31

Pressure drops



Pressure drop on the heating water side

Ⓐ Cylinder capacity 500 l (lower indirect coil)
Ⓑ Cylinder capacity 300 l (lower indirect coil)
Ⓒ Cylinder capacity 300 and 500 l (upper indirect coil)



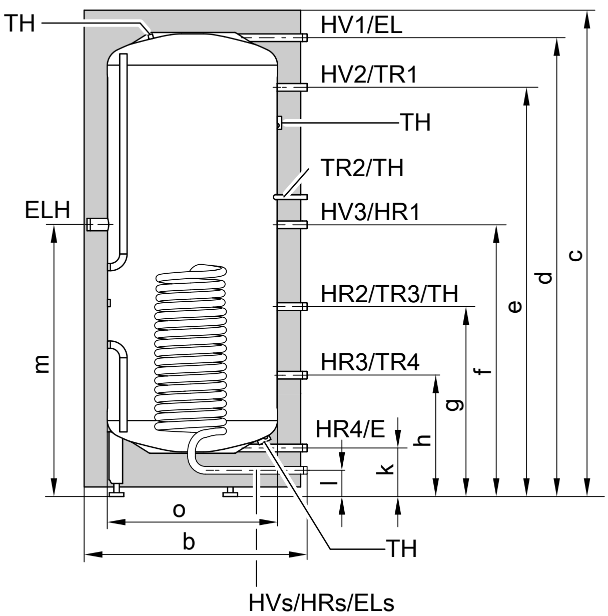
Pressure drop on the DHW side

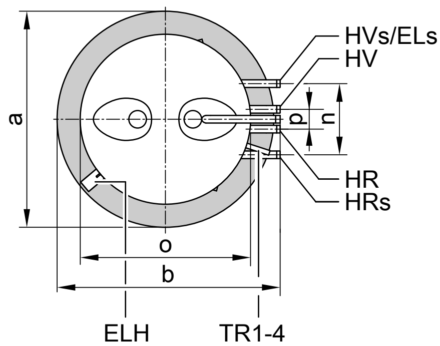
11.6 Vitocell 140-E, type SEI and Vitocell 160-E, type SES

For storing heating water in conjunction with solar collectors, heat pumps and solid fuel boilers.

Suitable for the following systems:
- Heating water flow temperature up to **110 °C**
- Solar flow temperature up to **140 °C**
- Operating pressure **on the heating water side** up to **3 bar (0.3 MPa)**
- Operating pressure **on the solar side** up to **10 bar (1.0 MPa)**

			Vitocell 140-E		Vitocell 160-E	
Cylinder capacity		**l**	**750**	**950**	**750**	**950**
DIN register no.				0264/07E		0265/07E
Solar indirect coil capacity		l	12	14	12	14
Dimensions						
Length (∅)						
– Incl. thermal insulation	a	mm	1004	1004	1004	1004
– Excl. thermal insulation		mm	790	790	790	790
Width	b	mm	1059	1059	1059	1059
Height						
– Incl. thermal insulation	c	mm	1895	2195	1895	2195
– Excl. thermal insulation		mm	1814	2120	1814	2120
Height when tilted						
– Excl. thermal insulation and adjustable feet		mm	1890	2195	1890	2195
Weight						
– Incl. thermal insulation		kg	174	199	183	210
– Excl. thermal insulation		kg	152	174	161	185
Connections (male thread)						
Heating water flow and return		R	2	2	2	2
Heating water flow and return (solar)		G	1	1	1	1
Solar indirect coil						
Heating surface		m^2	1.8	2.1	1.8	2.1
Standby heat loss q_{BS} (standard parameter)		kWh/24 h	1.63	1.67	1.63	1.67
Standby capacity V_{aux}		l	380	453	380	453
Solar capacity V_{sol}		l	370	497	370	497





Vitocell 140-E (type SEIA, 750 and 950 litres capacity)

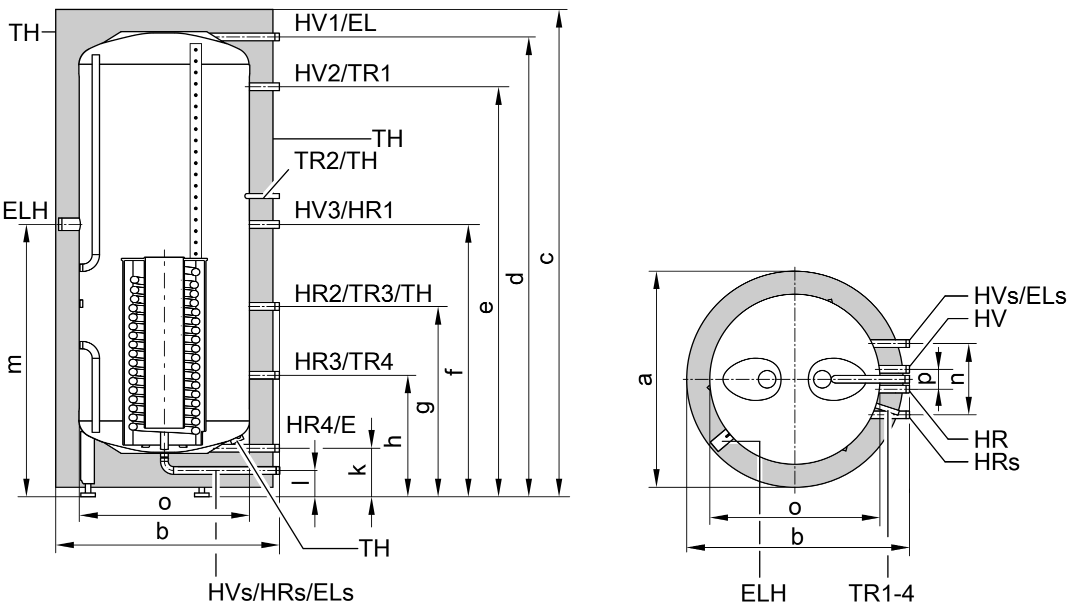
E Drain
EL Air vent valve
EL_s Solar indirect coil, air vent valve

5822 440 GB

ELH Immersion heater (female connection Rp 1½)
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
TH Retainer for thermometer sensor or additional sensor
TR Temperature sensor or temperature controller

Dimensions Vitocell 140-E

Cylinder capacity		l	750	950
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1777	2083
	e	mm	1547	1853
	f	mm	967	1119
	g	mm	676	752
	h	mm	386	386
	k	mm	155	155
	l	mm	75	75
	m	mm	991	1181
	n	mm	370	370
Length (∅) excl. thermal insulation	o	mm	790	790
	p	mm	140	140



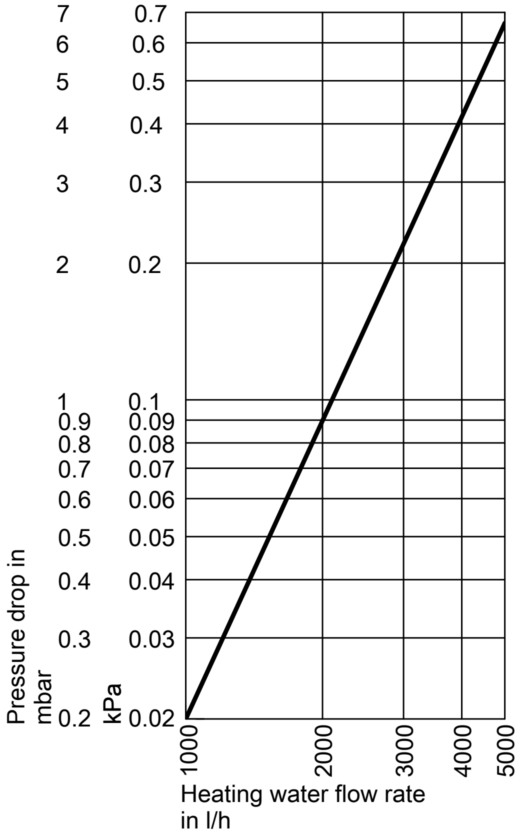
Vitocell 160-E (type SESA, 750 and 950 litres capacity)

E Drain
EL Air vent valve
EL_s Solar indirect coil, air vent valve
ELH Immersion heater (female connection Rp 1½)
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
TH Retainer for thermometer sensor or additional sensor
TR Temperature sensor or temperature controller

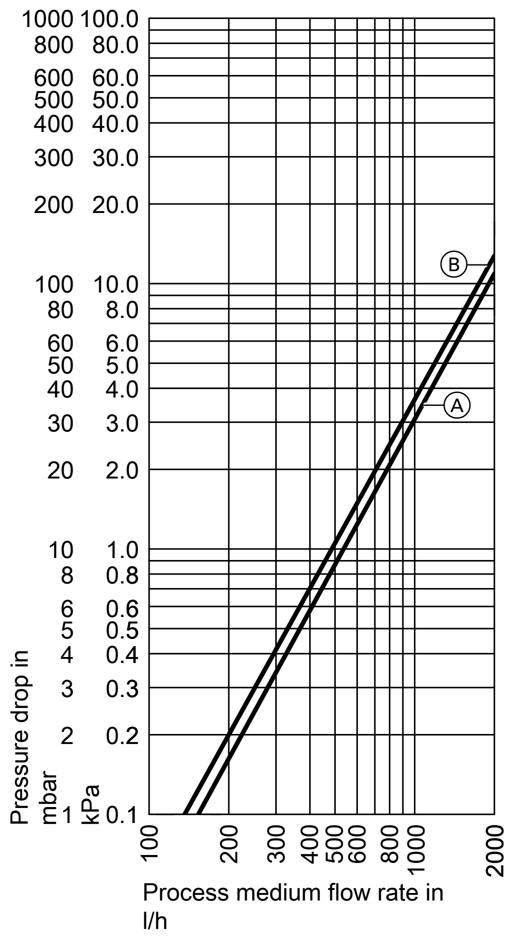
Dimensions Vitocell 160-E

Cylinder capacity		l	750	950
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1777	2083
	e	mm	1547	1853
	f	mm	967	1119
	g	mm	676	752
	h	mm	386	386
	k	mm	155	155
	l	mm	75	75
	m	mm	991	1181
	n	mm	370	370
Length (∅) excl. thermal insulation	o	mm	790	790
	p	mm	140	140

Pressure drops



Pressure drop on the heating water side



Pressure drop on the solar side

Ⓐ Cylinder capacity 750 l
Ⓑ Cylinder capacity 950 l

11.7 Vitocell 340-M, type SVK and Vitocell 360-M, type SVS

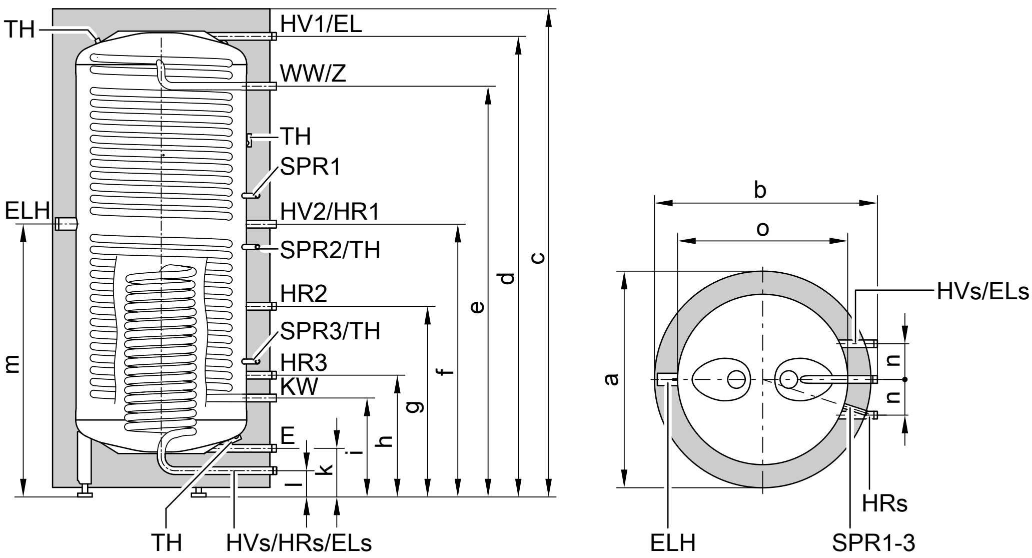
For storing heating water and heating DHW in conjunction with solar collectors, heat pumps and solid fuel boilers

Suitable for the following systems:
- DHW temperatures up to **95 °C**
- Heating water flow temperature up to **110 °C**
- Solar flow temperature up to **140 °C**
- Operating pressure **on the heating water side** up to **3 bar (0.3 MPa)**
- Operating pressure on the **solar side** up to **10 bar (1.0 MPa)**
- Operating pressure **on the DHW side** up to **10 bar (1.0 MPa)**
- Total water hardness of up to **20 °dH (3.6 mol/m³)**

Cylinder capacity		**l**	**750**	**950**
Heating water content		l	708	906
DHW capacity		l	30	30
Solar indirect coil capacity		l	12	14
DIN registration number				
– Vitocell 340-M			9W262-10MC/E	
– Vitocell 360-M			9W263-10MC/E	
Dimensions				
Length (∅)				
– Incl. thermal insulation	a	mm	1004	1004
– Excl. thermal insulation	o	mm	790	790
Width	b	mm	1059	1059
Height				
– Incl. thermal insulation	c	mm	1895	2195
– Excl. thermal insulation		mm	1815	2120
Height when tilted				
– Excl. thermal insulation and adjustable feet		mm	1890	2165
Weight of Vitocell 340-M				
– Incl. thermal insulation		kg	214	239
– Excl. thermal insulation		kg	192	214
Weight of Vitocell 360-M				
– Incl. thermal insulation		kg	223	248
– Excl. thermal insulation		kg	201	223
Connections (male thread)				
Heating water flow and return		R	1¼	1¼
Cold water, DHW		R	1	1
Heating water flow and return (solar)		G	1	1
Drain		R	1¼	1¼
Solar indirect coil				
Heating surface		m²	1.8	2.1
DHW indirect coil				
Heating surface		m²	6.7	6.7
Standby heat loss q_{BS} at 45 K temperature differential (standard parameter)		kWh/24 h	1.49	1.61
Standby capacity V_{aux}		l	346	435
Solar capacity V_{sol}		l	404	515

5822 440 GB

Vitocell 340-M, type SVKA

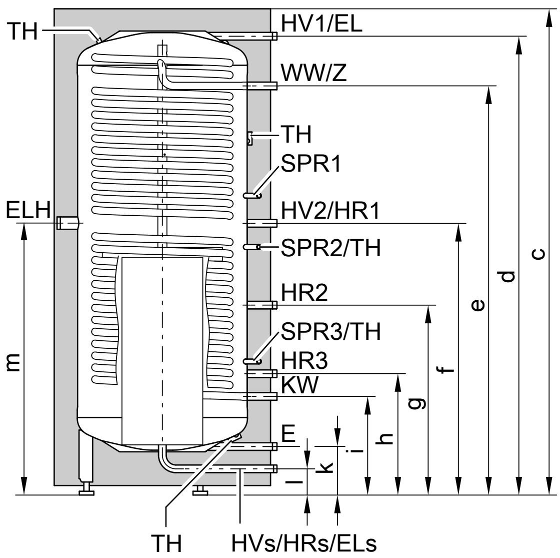


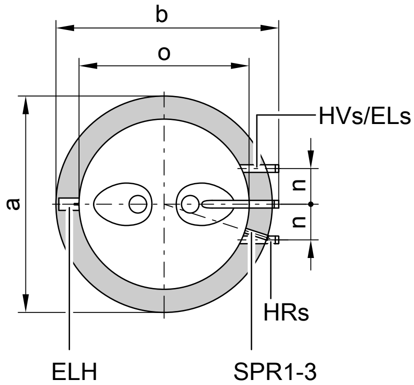
E Drain
EL Air vent valve
EL_s Solar indirect coil, air vent valve
ELH Immersion heater (female connection Rp 1½)
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
KW Cold water
TH Retainer for thermometer sensor or additional sensor
SPR Temperature sensor or temperature controller
WW DHW
Z DHW circulation (threaded DHW circulation fitting, accessories)

Dimensions

Cylinder capacity		l	750	950
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1787	2093
	e	mm	1558	1863
	f	mm	1038	1158
	g	mm	850	850
	h	mm	483	483
	i	mm	383	383
	k	mm	145	145
	l	mm	75	75
	m	mm	1000	1135
	n	mm	185	185
Length excl. thermal insulation	o	mm	790	790

Vitocell 360-M, type SVSA





E	Drain
EL	Air vent valve
EL_s	Solar indirect coil, air vent valve
ELH	Immersion heater (female connection Rp 1½)
HR	Heating water return
HR_s	Heating water return, solar thermal system
HV	Heating water flow
HV_s	Heating water flow, solar thermal system
KW	Cold water
TH	Retainer for thermometer sensor or additional sensor
SPR	Temperature sensor or temperature controller
WW	DHW
Z	DHW circulation (threaded DHW circulation fitting, accessories)

Dimensions

Cylinder capacity		l	750	950
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1787	2093
	e	mm	1558	1863
	f	mm	1038	1158
	g	mm	850	850
	h	mm	483	483
	i	mm	383	383
	k	mm	145	145
	l	mm	75	75
	m	mm	1000	1135
	n	mm	185	185
Length excl. thermal insulation	o	mm	790	790

Continuous output

Continuous output	kW	15	22	33
for DHW heating from **10 to 45 °C** and a **heating water** flow temperature of 70 °C at the heating water throughput stated below (tested at HV_1/HR_1)	l/h	368	540	810
Heating water flow rate for the stated continuous outputs	l/h	252	378	610
Continuous output	kW	15	22	33
for DHW heating from **10 to 60 °C** and a **heating water** flow temperature of 70 °C at the heating water throughput stated below (tested at HV_1/HR_1)	l/h	258	378	567
Heating water flow rate for the stated continuous outputs	l/h	281	457	836

Information regarding continuous output

When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ the continuous output.

Performance factor N_L
To DIN 4708.
Cylinder storage temperature T_{cyl} = cold water inlet temperature +50 K $^{+5\ K/-0\ K}$ and 70 °C heating water flow temperature

Performance factor N_L subject to the heating output delivered by the boiler (Q_D)		
Cylinder capacity l	**750**	**950**
Q_D in kW	**N_L performance factor**	
15	2.00	3.00
18	2.25	3.20
22	2.50	3.50
27	2.75	4.00
33	3.00	4.60

Information regarding performance factor
The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values
- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C and 70 °C heating water flow temperature

Peak output (l/10 min) subject to the heating output delivered by the boiler (Q_D)		
Cylinder capacity l	**750**	**950**
Q_D in kW	**Peak output**	
15	190	230
18	200	236
22	210	246
27	220	262
33	230	280

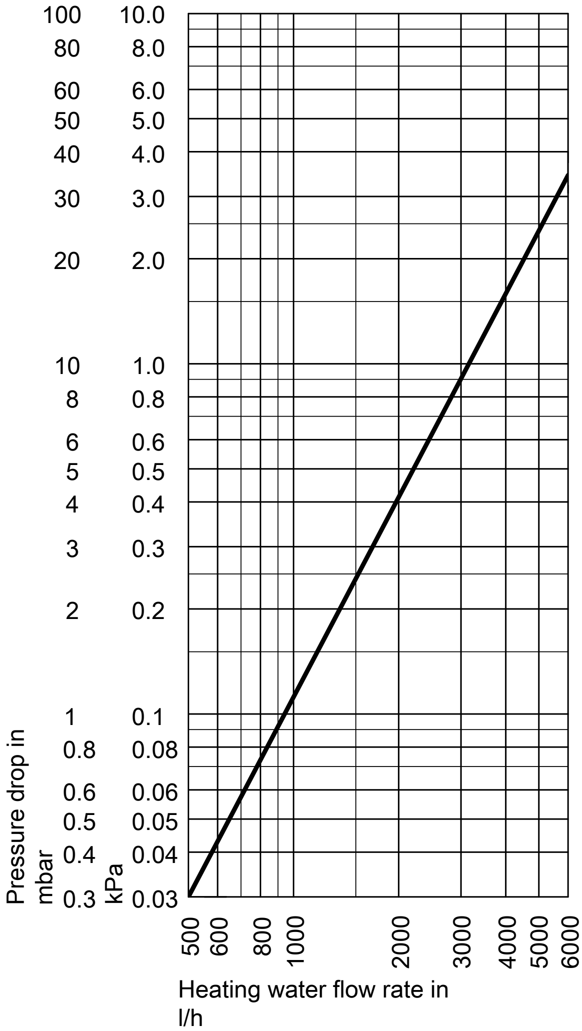
Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C and 70 °C heating water flow temperature.

Max. draw-off rate (l/min) subject to the heating output delivered by the boiler (Q_D)		
Cylinder capacity l	**750**	**950**
Q_D in kW	**Max. draw-off rate**	
15	19.0	23.0
18	20.0	23.6
22	21.0	24.6
27	22.0	26.2
33	23.0	28.0

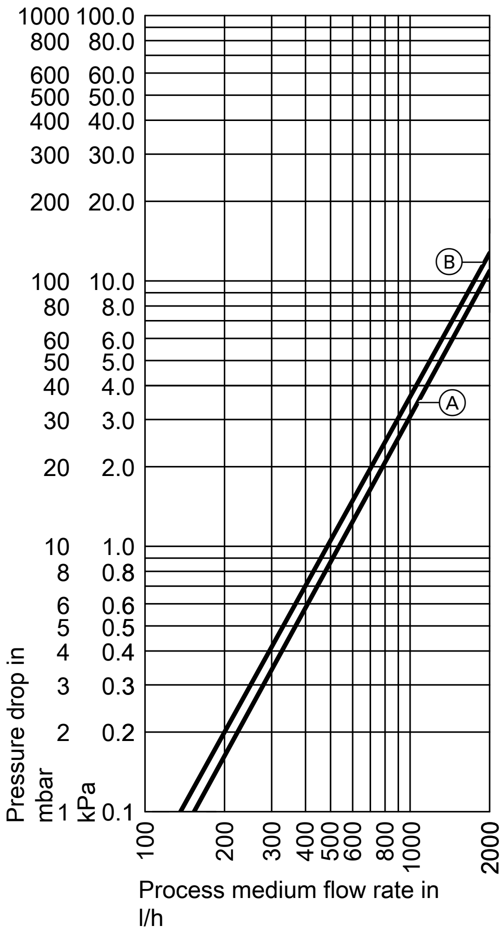
Drawable water volume
Cylinder content heated to 60 °C.
Without reheating.

Draw-off rate l/min	**10**	**20**
Drawable water volume Water with t = 45 °C (mixed temperature)		
750 l	255	190
950 l	331	249

Pressure drops

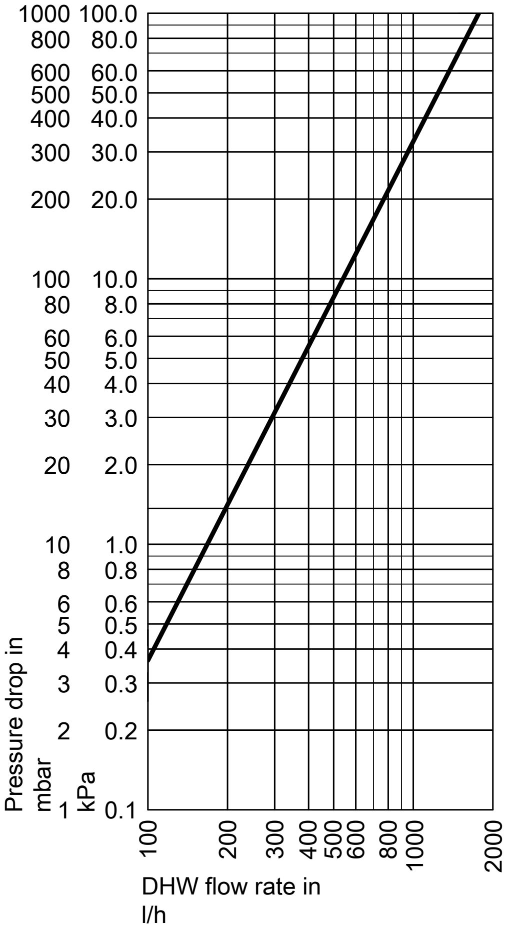


Pressure drop on the heating water side



Pressure drop on the solar side

Ⓐ Cylinder capacity 750 l
Ⓑ Cylinder capacity 950 l



Pressure drop on the DHW side 750/950 l

11.8 Vitocell 100-V, type CVA

For DHW heating in conjunction with boilers and district heating systems, as option with electric heater as accessory for DHW cylinders with 300 and 500 l capacity.

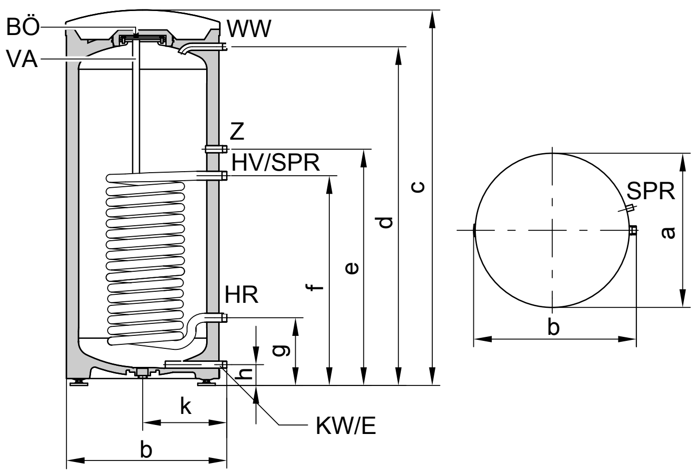
Suitable for the following systems:
- DHW temperatures up to **95 °C**
- Heating water flow temperature up to **160 °C**
- Operating pressure on the **heating water side** up to **25 bar (2.5 MPa)**
- Operating pressure on the **DHW side** up to **10 bar (1.0 MPa)**

Cylinder capacity		l	160	200	300	500	750	1000
DIN registration number			9W241/11–13 MC/E					
Continuous output for DHW heating from **10 to 45 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	40	40	53	70	123	136
		l/h	982	982	1302	1720	3022	3341
	80 °C	kW	32	32	44	58	99	111
		l/h	786	786	1081	1425	2432	2725
	70 °C	kW	25	25	33	45	75	86
		l/h	614	614	811	1106	1843	2113
	60 °C	kW	17	17	23	32	53	59
		l/h	417	417	565	786	1302	1450
	50 °C	kW	9	9	18	24	28	33
		l/h	221	221	442	589	688	810
Continuous output for DHW heating from **10 to 60 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	36	36	45	53	102	121
		l/h	619	619	774	911	1754	2081
	80 °C	kW	28	28	34	44	77	91
		l/h	482	482	584	756	1324	1565
	70 °C	kW	19	19	23	33	53	61
		l/h	327	327	395	567	912	1050
Heating water flow rate for the stated continuous outputs		m^3/h	3.0	3.0	3.0	3.0	5.0	5.0
Standby heat loss q_{BS} at a temp. differential of 45 K (actual values to DIN 4753-8).		kWh/ 24 h	1.50	1.70	2.20	2.50	3.50	3.90
Dimensions								
Length (∅)								
– Incl. thermal insulation	a	mm	581	581	633	859	960	1060
– Excl. thermal insulation		mm	—	—	—	650	750	850
Width								
– Incl. thermal insulation	b	mm	608	608	705	923	1045	1145
– Excl. thermal insulation		mm	—	—	—	837	947	1047
Height								
– Incl. thermal insulation	c	mm	1189	1409	1746	1948	2106	2166
– Excl. thermal insulation		mm	—	—	—	1844	2005	2060
Height when tilted								
– Incl. thermal insulation		mm	1260	1460	1792	—	—	—
– Excl. thermal insulation		mm	—	—	—	1860	2050	2100
Installation height		mm	—	—	—	2045	2190	2250
Weight incl. thermal insulation		kg	86	97	151	181	295	367
Heating water content		l	5.5	5.5	10.0	12.5	24.5	26.8
Heating surface		m^2	1.0	1.0	1.5	1.9	3.7	4.0
Connections (male thread)								
Heating water flow and return		R	1	1	1	1	1¼	1¼
Cold water, DHW		R	¾	¾	1	1¼	1¼	1¼
DHW circulation		R	¾	¾	1	1	1¼	1¼

Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

5822 440 GB

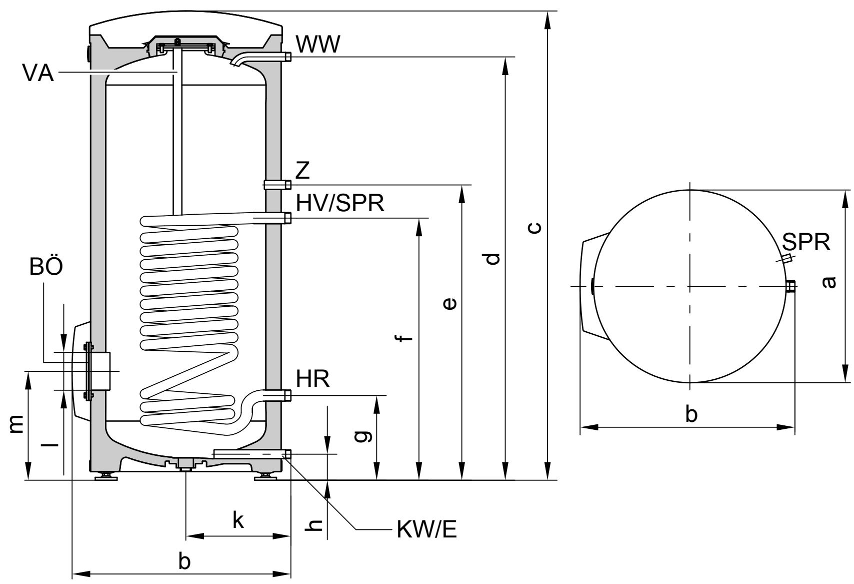
160 and 200 l capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	160	200
Length (∅)	a	mm	581	581
Width	b	mm	608	608
Height	c	mm	1189	1409
	d	mm	1050	1270
	e	mm	884	884
	f	mm	634	634
	g	mm	249	249
	h	mm	72	72
	k	mm	317	317

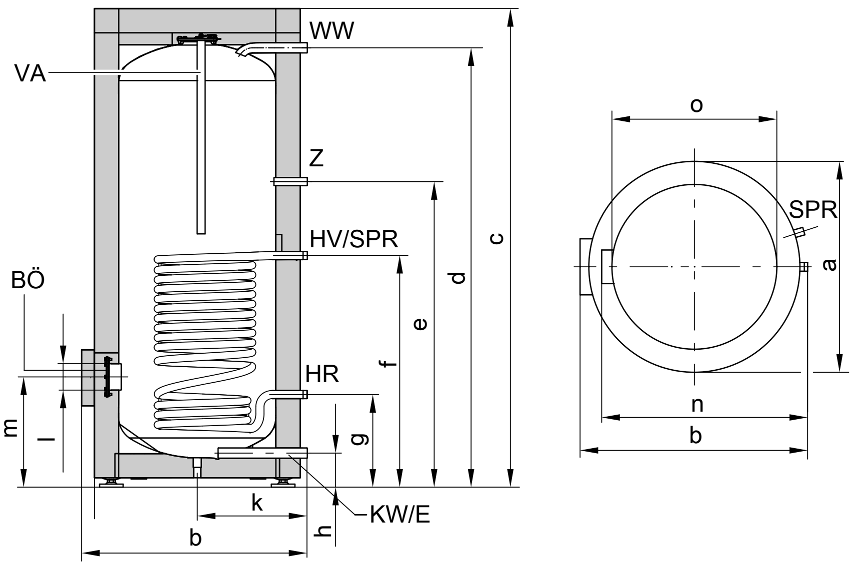
300 l capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	300
Length (∅)	a	mm	633
Width	b	mm	705
Height	c	mm	1746
	d	mm	1600
	e	mm	1115
	f	mm	875
	g	mm	260
	h	mm	76
	k	mm	343
	l	mm	∅ 100
	m	mm	333

500 l capacity

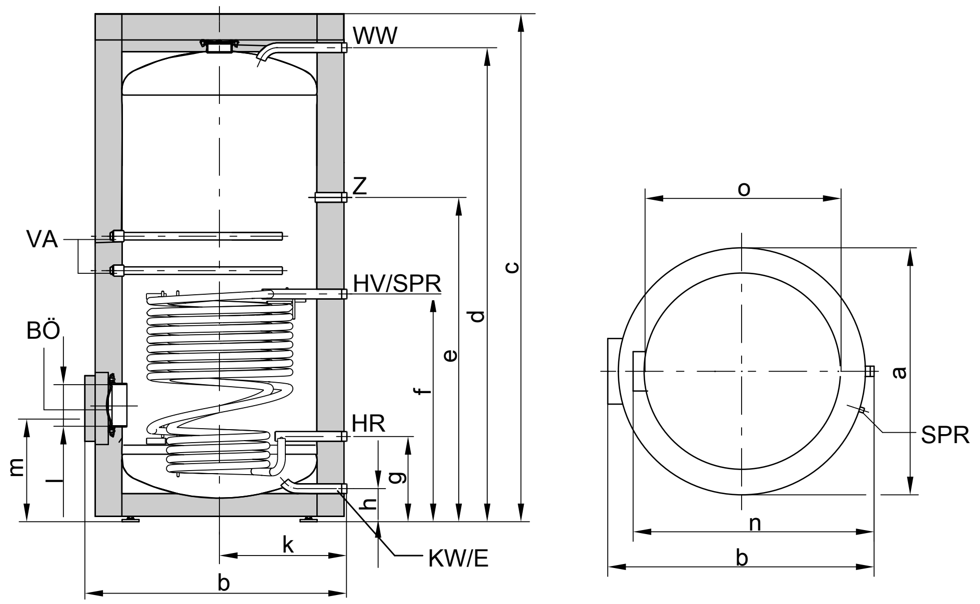


BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	500
Length (∅)	a	mm	859
Width	b	mm	923
Height	c	mm	1948
	d	mm	1784
	e	mm	1230
	f	mm	924
	g	mm	349
	h	mm	107
	k	mm	455
	l	mm	∅ 100
	m	mm	422
	n	mm	837
Excl. thermal insulation	o	mm	∅ 650

5822 440 GB

750 and 1000 l capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	750	1000
Length (∅)	a	mm	960	1060
Width	b	mm	1045	1145
Height	c	mm	2106	2166
	d	mm	1923	2025
	e	mm	1327	1373
	f	mm	901	952
	g	mm	321	332
	h	mm	104	104
	k	mm	505	555
	l	mm	∅ 180	∅ 180
	m	mm	457	468
	n	mm	947	1047
Excl. thermal insulation	o	mm	∅ 750	∅ 850

Performance factor N_L

To DIN 4708.

Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\ K/-0\ K}$

Cylinder capacity l	160	200	300	500	750	1000
Performance factor N_L at heating water flow temperature						
90 °C	2.5	4.0	9.7	21.0	40.0	45.0
80 °C	2.4	3.7	9.3	19.0	34.0	43.0
70 °C	2.2	3.5	8.7	16.5	26.5	40.0

Information regarding performance factor N_L

The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values

- *T_{cyl} = 60 °C → 1.0 × N_L*
- *T_{cyl} = 55 °C → 0.75 × N_L*
- *T_{cyl} = 50 °C → 0.55 × N_L*
- *T_{cyl} = 45 °C → 0.3 × N_L*

Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C.

Cylinder capacity	l	160	200	300	500	750	1000
Peak output (l/10 min) at heating water flow temperature							
90 °C		210	262	407	618	898	962
80 °C		207	252	399	583	814	939
70 °C		199	246	385	540	704	898

Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

Cylinder capacity	l	160	200	300	500	750	1000
Max. draw-off rate (l/min) at heating water flow temperature							
90 °C		21	26	41	62	90	96
80 °C		21	25	40	58	81	94
70 °C		20	25	39	54	70	90

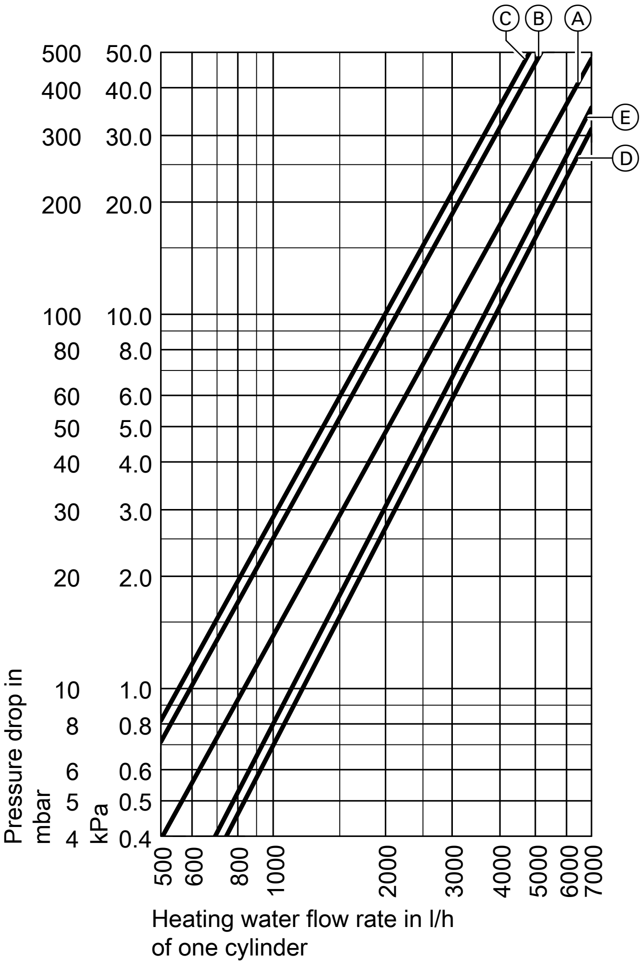
Drawable water volume
Cylinder content heated to 60 °C.
Without reheating.

Cylinder capacity	l	160	200	300	500	750	1000
Draw-off rate	l/min	10	10	15	15	20	20
Drawable water volume Water at t = 60 °C (constant)	l	120	145	240	420	615	835

Heat-up time
The heat-up times will be achieved when the maximum continuous output of the DHW cylinder is made available at the relevant heating water flow temperature and when DHW is heated from 10 to 60 °C.

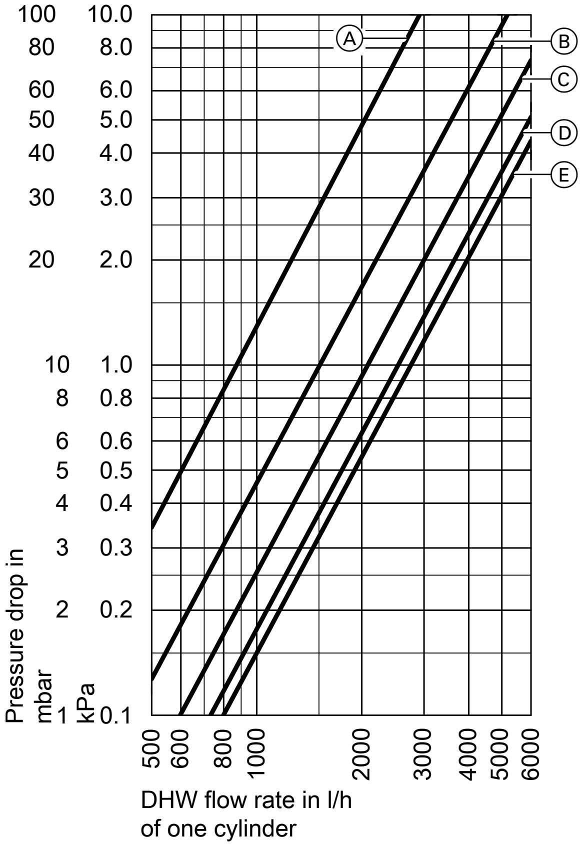
Cylinder capacity	l	160	200	300	500	750	1000
Heat-up time (min.) at heating water flow temperature							
90 °C		19	19	23	28	24	36
80 °C		24	24	31	36	33	46
70 °C		34	37	45	50	47	71

Pressure drops



Pressure drop on the heating water side

- Ⓐ Cylinder capacity 160 and 200 l
- Ⓑ Cylinder capacity 300 l
- Ⓒ Cylinder capacity 500 l
- Ⓓ Cylinder capacity 750 l
- Ⓔ Cylinder capacity 1000 l



Pressure drop on the DHW side

- Ⓐ Cylinder capacity 160 and 200 l
- Ⓑ Cylinder capacity 300 l
- Ⓒ Cylinder capacity 500 l
- Ⓓ Cylinder capacity 750 l
- Ⓔ Cylinder capacity 1000 l

11.9 Vitocell 300-V, type EVI

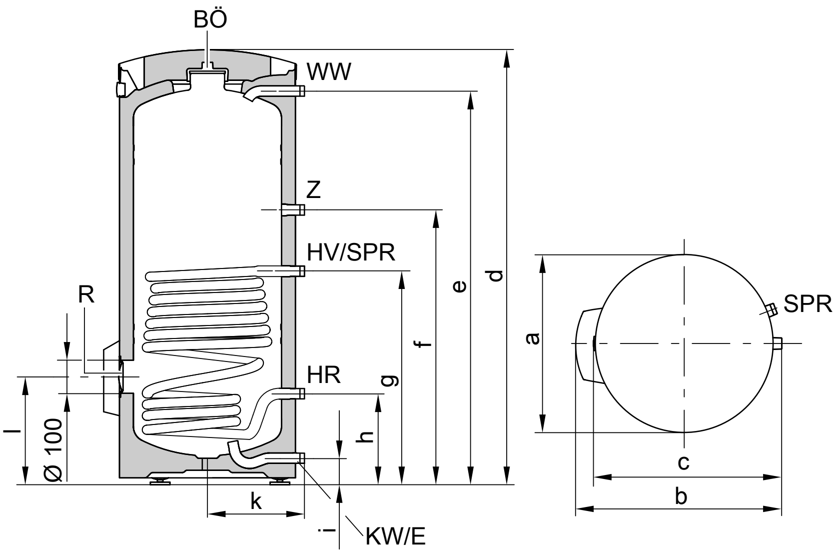
For DHW heating in conjunction with boilers and district heating systems, optionally with electric heater as accessory.

Suitable for the following systems:
- DHW temperatures up to **95 °C**
- Heating water flow temperature up to **200 °C**
- Operating pressure on the **heating water side** up to **25 bar (2.5 MPa)**
- Operating pressure on the **DHW side** up to **10 bar (1.0 MPa)**

Cylinder capacity		**l**	**200**	**300**	**500**
DIN registration number				9W71-10 MC/E	
Continuous output for DHW heating from **10 to 45 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	71	93	96
		l/h	1745	2285	2358
	80 °C	kW	56	72	73
		l/h	1376	1769	1793
	70 °C	kW	44	52	56
		l/h	1081	1277	1376
	60 °C	kW	24	30	37
		l/h	590	737	909
	50 °C	kW	13	15	18
		l/h	319	368	442
Continuous output for DHW heating from **10 to 60 °C** and a **heating water** flow temperature of ... at the heating water flow rate stated below	90 °C	kW	63	82	81
		l/h	1084	1410	1393
	80 °C	kW	48	59	62
		l/h	826	1014	1066
	70 °C	kW	29	41	43
		l/h	499	705	739
Heating water flow rate for the stated continuous outputs		m^3/h	5.0	5.0	6.5
Standby heat loss q_{BS} at a temp. differential of 45 K (actual values to DIN 4753-8)		kWh/24 h	1.70	2.10	2.40
Dimensions					
Length (Ø) a					
– Incl. thermal insulation		mm	581	633	925
– Excl. thermal insulation		mm	–	–	715
Width b					
– Incl. thermal insulation		mm	649	704	975
– Excl. thermal insulation		mm	–	–	914
Height d					
– Incl. thermal insulation		mm	1420	1779	1738
– Excl. thermal insulation		mm	–	–	1667
Height when tilted					
– Incl. thermal insulation		mm	1471	1821	–
– Excl. thermal insulation		mm	–	–	1690
Weight incl. thermal insulation		kg	76	100	111
Heating water content		l	10	11	15
Heating surface		m^2	1.3	1.5	1.9
Connections (male thread)					
Heating water flow and return		R	1	1	1¼
Cold water, DHW		R	1	1	1¼
DHW circulation		R	1	1	1¼

Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output ≥ continuous output.

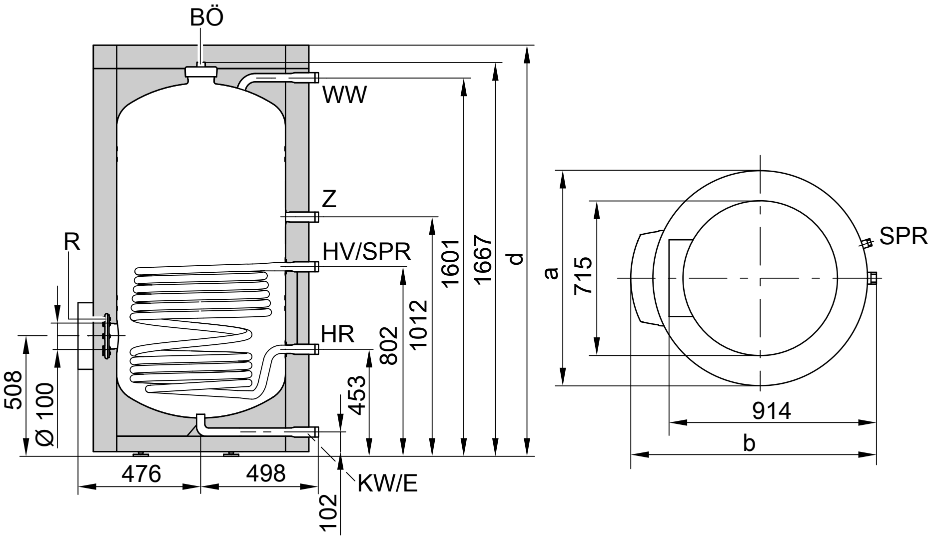
200 and 300 litre capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
R Additional cleaning aperture and/or immersion heater
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat (connector R 1 with reducer to R ½ for sensor well)
WW DHW
Z DHW circulation

Cylinder capacity	l	200	300
a	mm	581	633
b	mm	649	704
c	mm	614	665
d	mm	1420	1779
e	mm	1286	1640
f	mm	897	951
g	mm	697	751
h	mm	297	301
i	mm	87	87
k	mm	317	343
l	mm	353	357

500 l capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
R Additional cleaning aperture and immersion heater
SPR Cylinder temperature sensor of the cylinder temperature controller and thermostat (connector R 1 with reducer to R ½ for sensor well)
WW DHW
Z DHW circulation

Cylinder capacity	l	500
a	mm	925
b	mm	975
d	mm	1738

Performance factor N_L

To DIN 4708.

Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5 K/-0 K}$

Cylinder capacity	l	200	300	500
Performance factor N_L at heating water flow temperature				
90 °C		6.8	13.0	21.5
80 °C		6.0	10.0	21.5
70 °C		3.1	8.3	18.0

Information regarding performance factor N_L

The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values

- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

Peak output (over 10 minutes)

Relative to the performance factor N_L.

DHW heating from 10 to 45 °C.

Cylinder capacity	l	200	300	500
Peak output (l/10 min) at heating water flow temperature				
90 °C		340	475	627
80 °C		319	414	627
70 °C		233	375	566

Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

Cylinder capacity	l	200	300	500
Max. draw-off rate (l/min) at heating water flow temperature				
90 °C		34	48	63
80 °C		32	42	63
70 °C		23	38	57

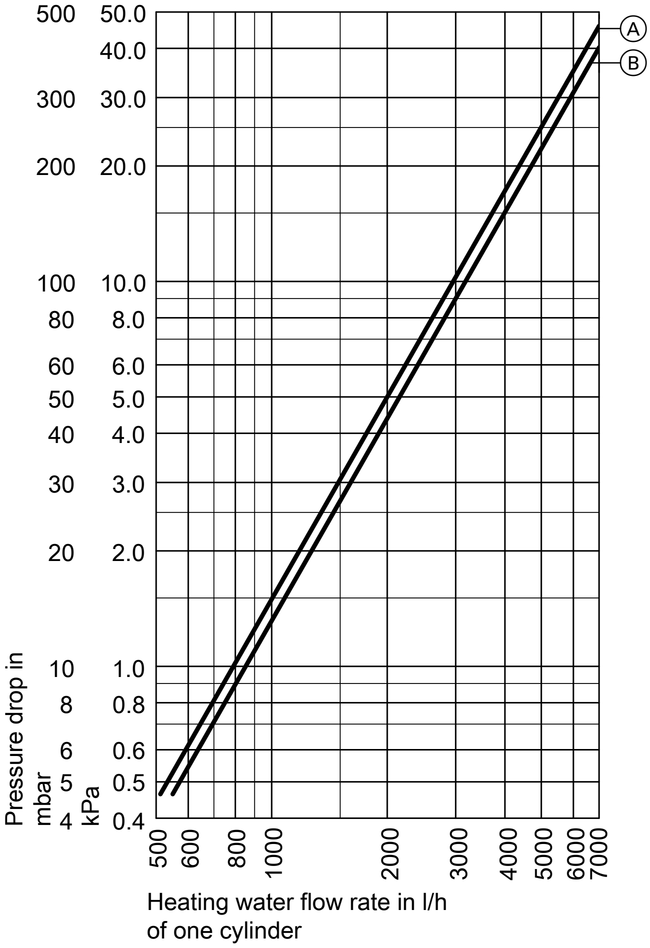
Drawable water volume
Cylinder content heated to 60 °C.
Without reheating.

Cylinder capacity	l	200	300	500
Draw-off rate	l/min	10	15	15
Drawable water volume Water at t = 60 °C (constant)	l	139	272	460

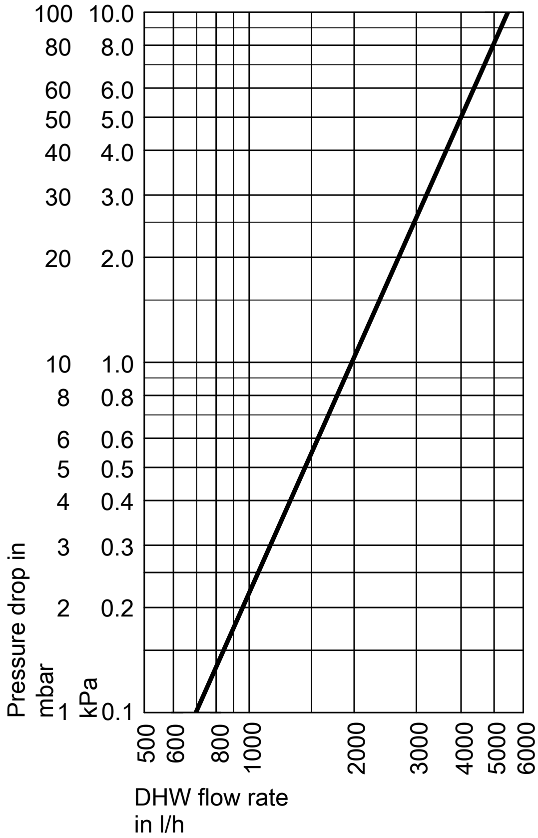
Heat-up time
The heat-up times specified will be achieved if the max. continuous output of the DHW cylinder is made available at the respective heating water flow temperature and when heating DHW from 10 to 60 °C.

Cylinder capacity	l	200	300	500
Heat-up time (min.) at heating water flow temperature				
90 °C		14.4	15.5	20.0
80 °C		15.0	21.5	24.0
70 °C		23.5	32.5	35.0

Pressure drops



Pressure drop on the heating water side



Pressure drop on the DHW side

Ⓐ Cylinder capacity 300 and 500 l
Ⓑ Cylinder capacity 200 l

12.1 Solar-Divicon and solar pump assembly

Versions

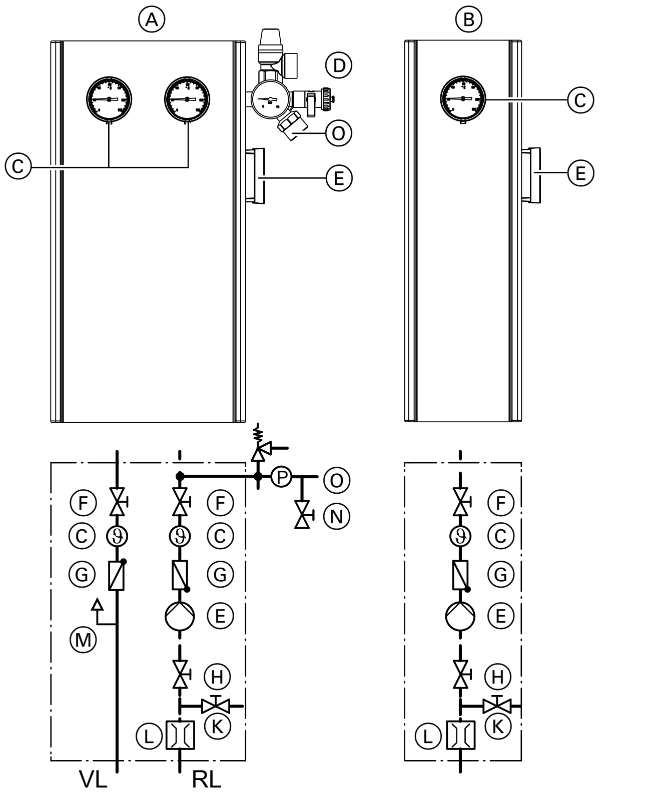
See also chapter "Sizing the circulation pump".
A Solar-Divicon and a solar pump assembly are required for systems with a second pump circuit or with a bypass circuit.

Note
The Solar-Divicon, type PS10, can be fitted to Vitocell 140-E/160-E and Vitocell 340-M/360-M by means of a connection set. See separate datasheet.

Version	Part no. for type			
	PS10	PS20	P10	P20
– HE circulation pump with PWM control – Without solar control unit	Z012 020	Z012 027	Z012 022	Z012 028
– HE circulation pump with PWM control – Solar control module, type SM1	Z012 016	—	—	—
– HE circulation pump with PWM control – Vitosolic 100, type SD1	Z012 018	—	—	—
– Multi stage circulation pump – Without solar control unit	Z012 021	—	Z012 023	—
– Multi stage circulation pump – Solar control module, type SM1	Z012 017	—	—	—
– Multi stage circulation pump – Vitosolic 100, type SD1	Z012 019	—	—	—

Design

Solar-Divicon and solar pump assembly are prefitted and tested for tightness with the following components:

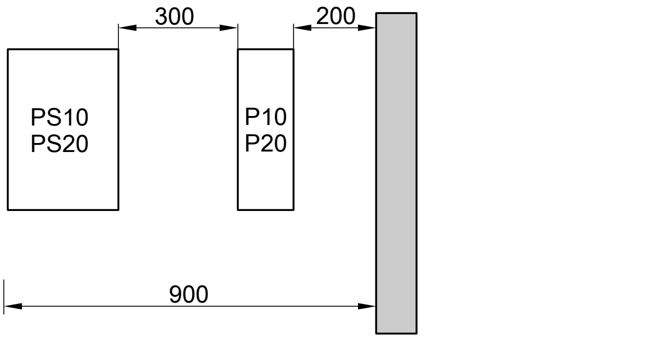


Ⓐ Solar-Divicon
Ⓑ Solar pump assembly
Ⓒ Thermometer
Ⓓ Safety assembly
Ⓔ Circulation pump
Ⓕ Shut-off valves
Ⓖ Non-return valves
Ⓗ Shut-off valve
Ⓚ Drain valve
Ⓛ Flow indicator
Ⓜ Air separator
Ⓝ Fill valve
Ⓞ Expansion vessel connection

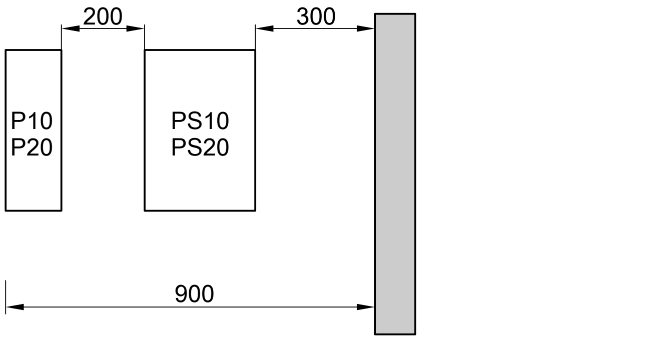
RL Return
VL Flow

Clearances

Solar pump assembly to the right of the Solar-Divicon

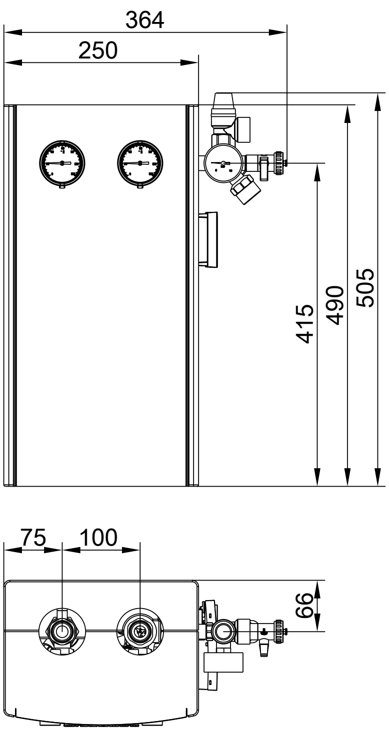


Solar pump assembly to the left of the Solar-Divicon

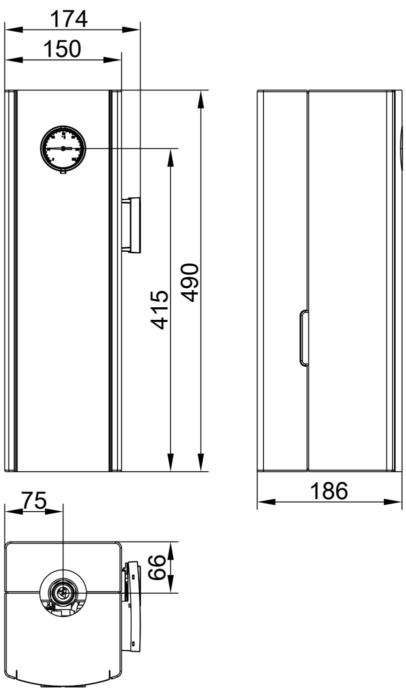


Specification

Type		PS10, P10	PS10, P10	PS20, P20
Wilo circulation pump		ST15/6ECO	PARA 15/7.0	PARA 15/7.5
		Multi stage circulation pump	High efficiency circulation pump	
Rated voltage	V~	230	230	230
Power consumption				
– Output stage I	W	36	—	—
– Output stage II	W	43	—	—
– Output stage III	W	49	—	—
– Min.	W	—	3	3
– Max.	W	—	45	73
Flow indicator	l/min	1 to 13	1 to 13	5 to 35
Safety valve (solar)	bar/MPa	6/0.6	6	6/0.6
Max. operating temperature	°C	120	120	120
Max. operating pressure	bar/MPa	6/0.6	6/0.6	6/0.6
Connections (locking ring fitting/double O-ring)				
– Solar circuit	mm	22	22	22
– Expansion vessel	mm	22	22	22



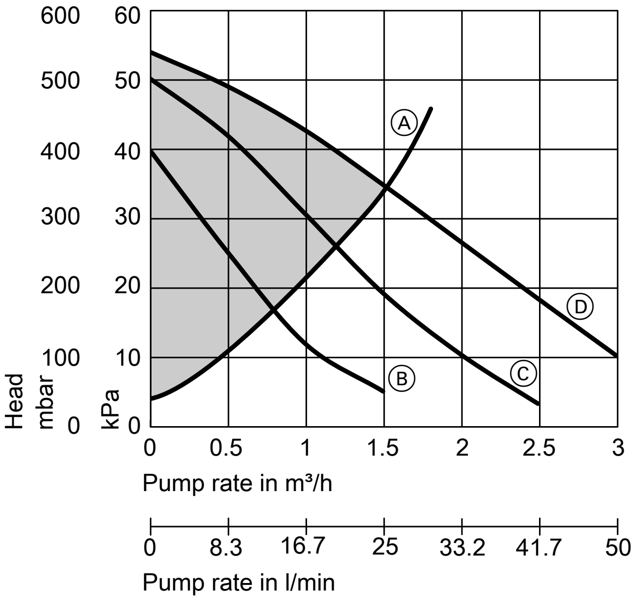
Solar-Divicon



Solar pump assembly

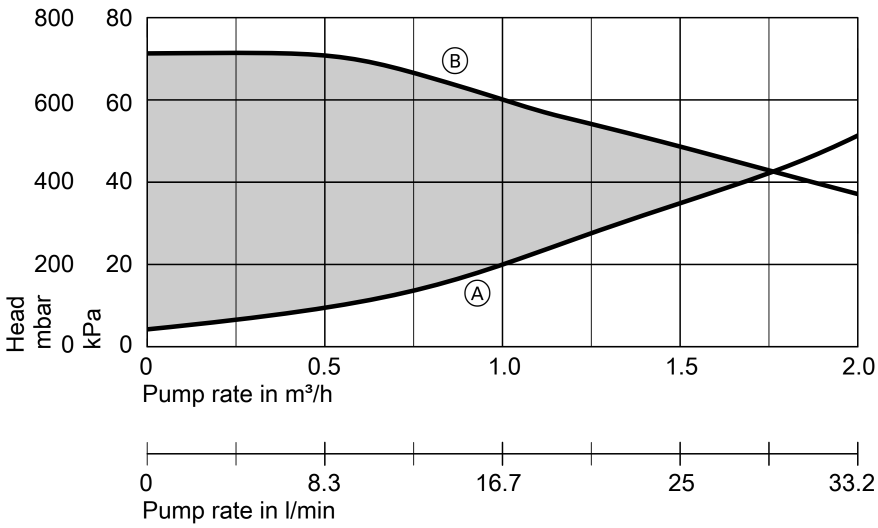
5822 440 GB

Pump curves



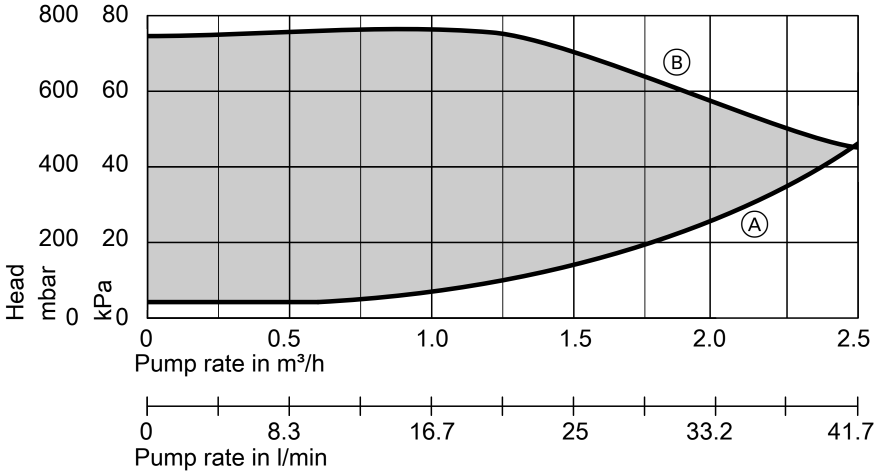
3-stage circulation pump, type PS10 and P10

Ⓐ Pressure drop curve
Ⓑ Head at output stage I
Ⓒ Head at output stage II
Ⓓ Head at output stage III



High efficiency circulation pump, type PS10 and P10

Ⓐ Pressure drop curve
Ⓑ Max. head

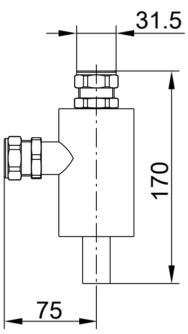


High efficiency circulation pump, type PS20 and P20

Ⓐ Pressure drop curve
Ⓑ Max. head

12.2 Connecting tee

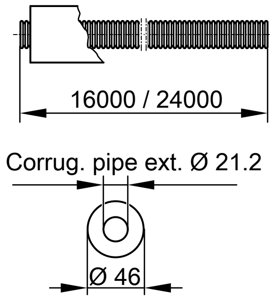
Part no. 7172 731



For connecting the expansion vessel or stagnation cooler in the Solar-Divicon flow line.
With locking ring fitting and double O-ring 22 mm.

12.3 Connecting line

Part no. 7143 745



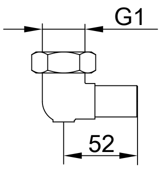
For the connection between Solar-Divicon and the solar cylinder.
Stainless steel corrugated pipe with thermal insulation and protective foil.

12.4 Installation kit for connection line

Only required in conjunction with the connection line, part no. 7143 745.

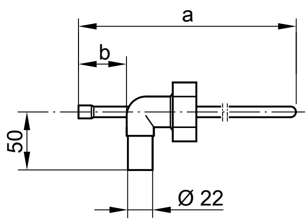
Part no.	DHW cylinder	a mm	b mm
7373 476	Vitocell 300-B, 500 l	272	40
7373 475	Vitocell 100-B, 300 l Vitocell-300-B, 300 l	190	42
7373 474	Vitocell 100-B, 400 and 500 l	272	72
7373 473	Vitocell 140/160-E Vitocell 340/360-M	—	—

Part no. 7373 473



Components:
- 2 threaded elbows
- Gaskets
- 2 locking ring fittings
- 8 pipe sleeves

Part no. 7373 474 to 476

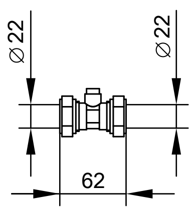


Components:
- 2 threaded elbows (1 elbow with sensor well, 1 elbow without sensor well)
- Gaskets
- 2 locking ring fittings
- 8 pipe sleeves

Note
*When using installation kits, the threaded elbow (standard delivery of DHW cylinder) for the installation of the cylinder temperature sensor is **not** required.*

12.5 Manual air vent valve

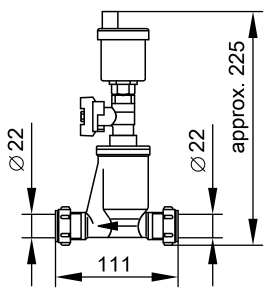
Part no. 7316 263



Locking ring fitting with air vent valve.
For installation at the highest point of the system.

12.6 Air separator

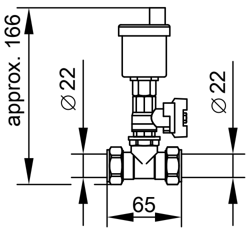
Part no. 7316 049



Installation in the flow pipe of the solar circuit, preferably upstream of the inlet into the DHW cylinder.

12.7 Quick-acting air vent valve (with tee)

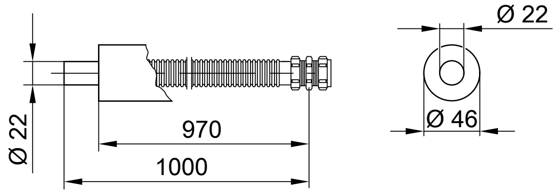
Part no. 7316 789



Install at the highest point of the system.
With shut-off valve and locking ring fitting.

12.8 Connecting line

Part no. 7316 252

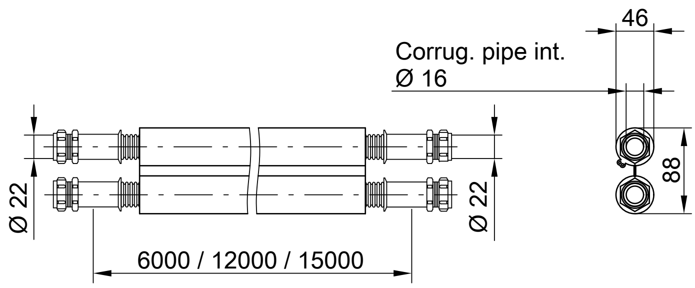


Stainless steel corrugated pipe with thermal insulation and locking ring fitting.

12.9 Solar flow and return line

Stainless steel corrugated pipes with thermal insulation and protective foil, locking ring fittings and sensor lead:

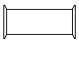
- 6 m long
  Part no. 7373 477
- 12 m long
  Part no. 7373 478
- 15 m long
  Part no. 7419 567



12.10 Connection accessories for residual lengths of solar flow and return lines

Connecting kit

Part no. 7817 370



For extending the connecting lines:

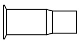
- 2 pipe sleeves
- 8 O-rings
- 4 support rings
- 4 profile clips

Connection set

Part no. 7817 368

5822 440 GB

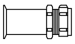
12



For joining the connection lines to the pipework of the solar thermal system:
- 2 pipe sleeves
- 4 O-rings
- 2 support rings
- 2 profile clips

Connection set with locking ring fitting

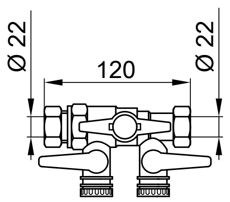
Part no. 7817 369



For joining the connection lines to the pipework of the solar thermal system:
- 2 pipe sleeves with locking ring fitting
- 4 O-rings
- 2 support rings
- 2 profile clips

12.11 Fill valve

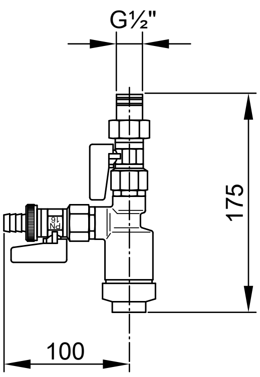
Part no. 7316 261



For flushing, filling and draining the system.
With locking ring fitting.

12.12 Manual solar fill pump

Part no. 7188 624

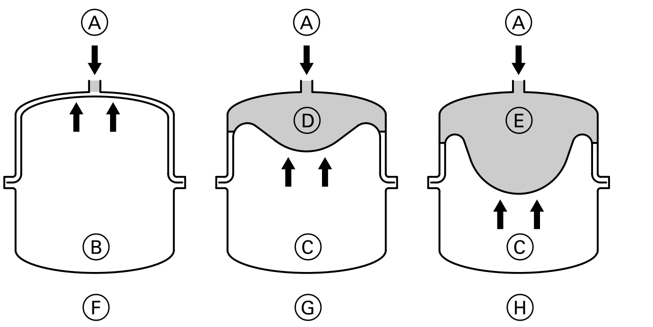


For topping-up and raising the pressure.

12.13 Solar expansion vessel

Layout and function

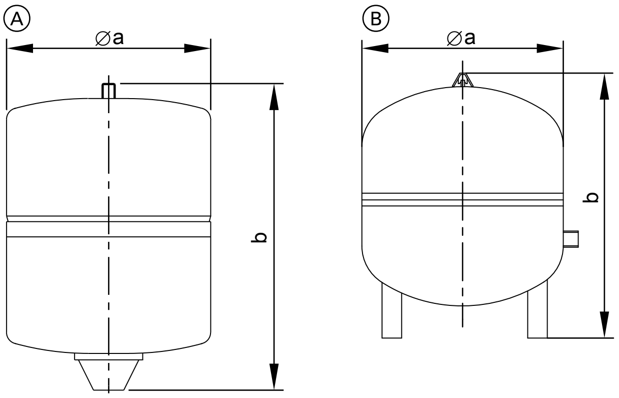
With shut-off valve and fixings.



Ⓐ Heat transfer medium
Ⓑ Nitrogen charge
Ⓒ Nitrogen buffer
Ⓓ Minimum safety seal 3 l
Ⓔ Safety seal
Ⓕ Delivered condition (pre-charge pressure 3 bar, 0.3 MPa)
Ⓖ Solar thermal system charged without heat effecting the system
Ⓗ At maximum pressure and the highest heat transfer medium temperature

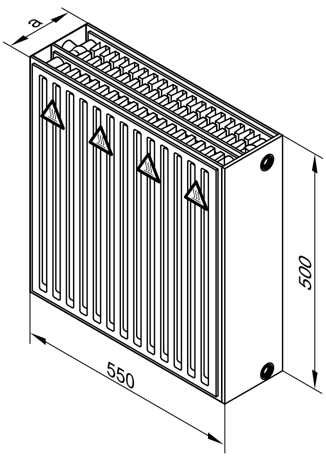
A solar expansion vessel is a sealed unvented vessel where the gas space (nitrogen charge) is separated from the space containing liquid (heat transfer medium) by a diaphragm; the pre-charge pressure is subject to the system height.

Specification



Expansion vessel	Part no.	Capacity l	Ø a mm	b mm	Connection	Weight kg
Ⓐ	7248 241	18	280	370	R¾	7.5
	7248 242	25	280	490	R¾	9.1
	7248 243	40	354	520	R¾	9.9
Ⓑ	7248 244	50	409	505	R1	12.3
	7248 245	80	480	566	R1	18.4

12.14 Stagnation cooler



To protect the system components from excess temperatures in the event of stagnation.
With a plate without any flow as contact protection.

- Type 21:
  - a = 105 mm
  - Output at 75/65 °C: 482 W
  - Cooling capacity at 140/80 °C: 964 W

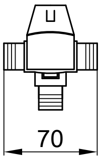
  Part no. Z007 429
- Type 33:
  - a = 160 mm
  - Output at 75/65 °C: 834 W
  - Cooling capacity at 140/80 °C: 1668 W

  Part no. Z007 430

For detailed information, see chapter "Safety equipment".

12.15 Automatic thermostatic mixing valve

Part no. 7438 940



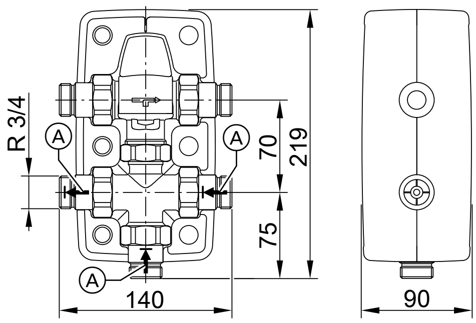
For limiting the DHW outlet temperature in DHW heating systems without DHW circulation pipe.

Specification

Connections	G	1
Temperature range	°C	35 to 60 °C
Max. temperature of the medium	°C	95
Operating pressure	bar/MPa	10/1.0

12.16 Thermostatic DHW circulation set

Part no. ZK01 284



Ⓐ Non-return valve

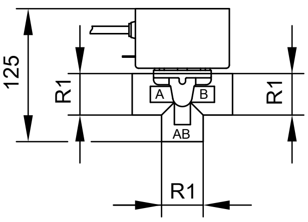
For limiting the DHW outlet temperature in DHW heating systems with DHW circulation pipe.
- Thermostatic mixing valve with bypass line
- Integral non-return valves
- Removable thermal insulation shells

Specification

Connections	R	¾
Weight	kg	1.45
Temperature range	°C	35 to 60
Max. temperature of the medium	°C	95
Operating pressure	bar MPa	10 1

12.17 Three-way diverter valve

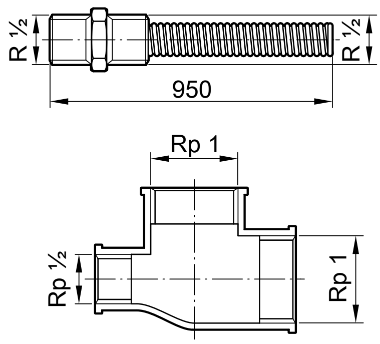
Part no. 7814 924



For systems with central heating backup. With servomotor.

12.18 Threaded DHW circulation fitting

Part no. 7198 542



For connecting a DHW circulation line to the DHW connection of the Vitocell 340-M and 360-M.

Design information regarding installation

13.1 Snow load and wind load zones

The collectors and the fixing system must be designed in such a way that they can withstand any snow and wind loads that may occur.
EN 1991, 3/2003 and 4/2005, differentiates between various snow and wind load zones for every country in Europe.

13.2 Distance from the edge of the roof

Observe the following for installation on pitched roofs:

- If the distance from the top edge of the collector array to the ridge of the roof is greater than 1 m, we recommend installing a snow guard.

  Note
  If structural verification is required in the case of roof integration with flashing frame and side flashing, observe the deviation on *page 127.*

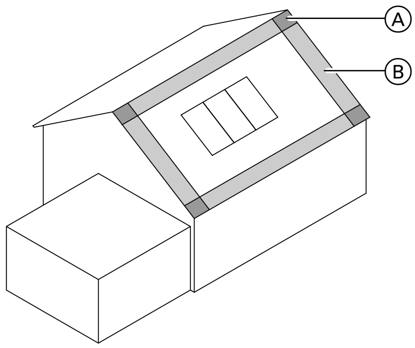
- Never install collectors close to roof overhangs where snow is likely to slide off. If necessary, install a snow guard.

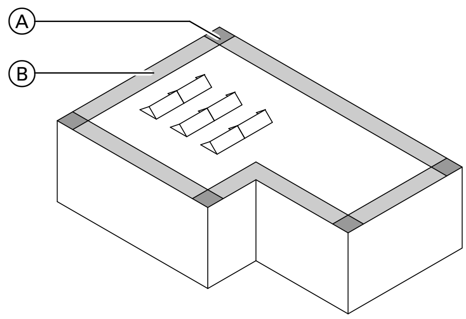
  Note
  The additional loads due to accumulated snow on collectors or snow guards must be taken into account in the structural calculations for the building.

Certain parts of the roof are subject to special requirements:

- Corner area Ⓐ: limited on two sides by the end of the roof
- Edge area Ⓑ: limited on one side by the end of the roof

See the figures below.





The minimum width (**1 m**) of corner and edge areas must be calculated in accordance with DIN 1055 and must be observed.
Allow for increased wind turbulence in these areas.

Note
*For the calculation of clearances on flat roofs, the Viessmann "SOL-STAT" calculation program is available at **www.viessmann.com**.*

Note
Snow and wind load information in this technical guide rules out installation of collectors in the corner and edge areas described.

13.3 Routing pipework

During the design phase, ensure the pipes are installed descending from the collector. This ensures better steam expulsion characteristics in the solar thermal system as a whole in the event of stagnation. The thermal load exerted on all system components is reduced (see page 152).

13.4 Equipotential bonding/lightning protection of the solar thermal system

Connect the solar circuit pipework with an electrical conductor in the lower part of the building in accordance with VDE [or local] regulations. The integration of the collector system into a new or existing lightning protection facility or the provision of local earthing must only be carried out by **authorised personnel**, who should take the site conditions into account.

13.5 Thermal insulation

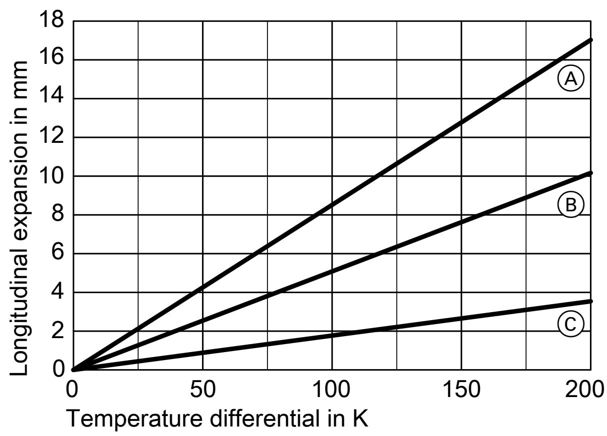
- The thermal insulation material provided must withstand the operating temperatures to be expected and must be permanently protected against the influence of moisture. Some open pore insulation material that can be subjected to high thermal loads cannot provide reliable protection against moisture produced by condensation. The high temperature versions of close-cell insulating hoses, on the other hand, offer adequate protection against moisture, but have a loading temperature of max. approx. 170 °C. However, the connections at the collector can be subjected to temperatures up to 200 °C (flat-plate collector); for vacuum tube collectors these temperatures can be substantially higher. At temperatures of over 170 °C, the insulation material becomes brittle. However, the brittle zone is limited to a few millimetres directly at the pipe. This overload only occurs for a short period and does not pose any further risk to other components.
- The thermal insulation of the solar lines routed outdoors must be protected against pecking damage from birds and gnawing by small animals, as well as against UV radiation. A cover protecting the insulation against damage by small animals (e.g. metal sheath) generally also provides adequate UV protection.

13.6 Solar lines

- Use stainless steel pipe or commercially available copper pipe and bronze fittings.
- Metal seals (conical or locking rings and compression fittings) are suitable for solar lines. Should alternative seals be used, such as flat gaskets, their manufacturer must give an assurance of their adequate resistance to glycol, pressure and temperature.
- Never use:
  – Teflon (inadequate glycol resistance)
  – Hemp connections (insufficiently gas-tight)
- Generally, copper lines in solar circuits are brazed or joined by press fittings. Soft solder could be weakened, particularly near the collectors, due to the maximum temperatures that may occur there. Metal seal connections, locking ring fittings or Viessmann plug-in connections with double O-rings are the most suitable.
- All components to be used must be resistant to the heat transfer medium.

  Note
  Fill solar thermal systems only with Viessmann "Tyfocor LS" heat transfer medium.

- Take high temperature differentials in the solar circuit into consideration when routing and securing pipes.
  At pipe sections that may be subject to steam loads, temperature differentials of up to 200 K can be expected, otherwise 120 K can be expected.



Ⓐ 5 m pipe length
Ⓑ 3 m pipe length
Ⓒ 1 m pipe length

- Route the solar connection lines through a suitable roof outlet (ventilation tile).

13

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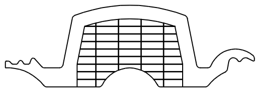
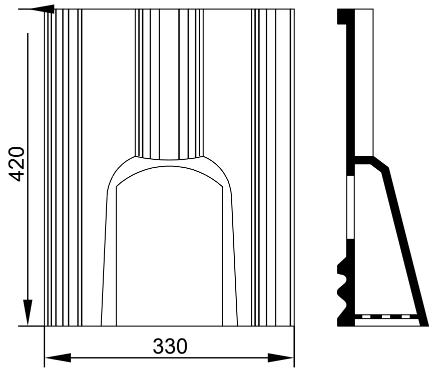




Roof tile type	Ventilation cross-section in cm^2
Double Roman tile	32
Double-S	30
Taunus tile	27
Harz tile	27

13.7 Collector fixing

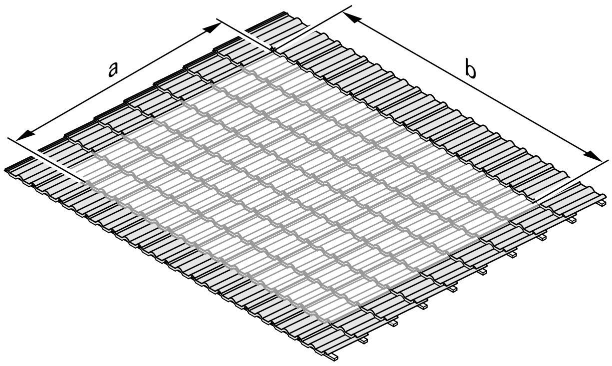
Due to the many varieties available, solar collectors can be installed in almost all types of building, both in new build and modernisation projects. As required, they can be installed on pitched roofs, flat roofs and on walls, as well as freestanding on the ground or integrated into the roof surface.

Viessmann offers universal fixing systems to simplify installation. These fixing systems are suitable for virtually any form of roof and roof cover as well as for installation on flat roofs and walls.

Above roof installation

In above roof systems, the collectors and the roof frame are connected. At each fixing point, a rafter hook, rafter flange or rafter anchor penetrates the water-carrying level below the collector. This requires a completely rain-proof and safe anchorage. The fixing points, and therefore also any possible defects, are no longer visible post installation. Maintain the minimum clearances from the roof edge in accordance with DIN 1055 (see page 108).

Required roof area



Add dimension b for each additional collector.

For collector installation, vertical pipes, dimensions of roof area requirement, see table. For the installation version with horizontal pipes, interchange dimensions a and b.

Collector	Vitosol-F		Vitosol 200-T, type SPE		Vitosol 200-T, type SP2A Vitosol 300-T, type SP3B	
	SV	SH	1.63 m^2	3.26 m^2	1.51 m^2	3.03 m^2
a in mm	2380	1056	2500	2500	2240	2240
b in mm	1056 + 16	2380 + 16	1470 + 44	2640 + 44	1053 + 89	2061 + 89

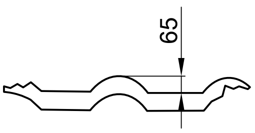
13

5822 440 GB

Roof integration

The collector replaces the roof tiles. It lies statically securely on the roof frame. An additional membrane is fitted below the collector to protect against the ingress of water and snow.

Roof tiles
- Minimum roof pitch 15°
- Standard roof pitch ≥30°
- Fitting roof substrates
  - Less than the standard roof pitch by 6 to 10°: substrate safe from the ingress of rain
  - Less than the standard roof pitch by more than 10°: water-tight substrate
- We can only recommend roof integration for tiled roofs, which meet the following conditions:



Note
Discuss the installation with a roofing contractor first, if flat tiles are used, such as Tegalit or similar.

- Allow for at least 3 rows of tiles from the roof ridge down to safeguard adequate ventilation below the roof.

Plain tiled roof cover
- Minimum roof pitch 20°
- Standard roof pitch
  - Double cover: ≥30°
  - Single cover with split tiles: ≥40°
- Fitting roof substrates
  - Less than the standard roof pitch by 6 to 10°: substrate safe from the ingress of rain
  - Less than the standard roof pitch by more than 10°: water-tight substrate
- Allow for at least 3 rows of tiles from the roof ridge down to safeguard adequate ventilation below the roof.

Slate roof cover
- Minimum roof pitch 20°
- Standard roof pitch
  - Historic cover [Germany]: ≥25°
  - Historic double cover [Germany]: ≥22°
  - Fish scale cover: ≥25°
  - German cover: ≥25°
  - Rectangular double cover: ≥22°
  - Diamond cover: ≥30°
- Fitting roof substrates
  - Less than the standard roof pitch by max. 10°: water-tight substrate
  - Less than the standard roof pitch by more than 10° is not permissible

Barrel roof tile cover
- Minimum roof pitch 15°
- Standard roof pitch ≥40°
- Fitting roof substrates
  - Less than the standard roof pitch by 6 to 10°: substrate safe from the ingress of rain
  - Less than the standard roof pitch by more than 10°: water-tight substrate

Flat roof installation

During installation of the collectors (freestanding or lying flat), the minimum clearances from the edge of the roof in accordance with the standard must be observed (see page 108). If the roof size necessitates a split array, ensure that sections of the same size are created. The collectors can be secured on any solid substructure or on concrete slabs.

Note
On pitched roofs with a low angle of inclination, the collector supports can be secured to the rafter anchors (see page 112) with the mounting rails.
Check the structural condition of the roof.

When installing collectors on concrete slabs, secure them with additional ballast against slippage, tipping and lifting.

Slippage is the movement of the collectors on the roof surface due to wind, because of insufficient friction between the roof surface and the collector fixing system. Collectors can be secured by guy ropes or by being fixed to other roof structures.

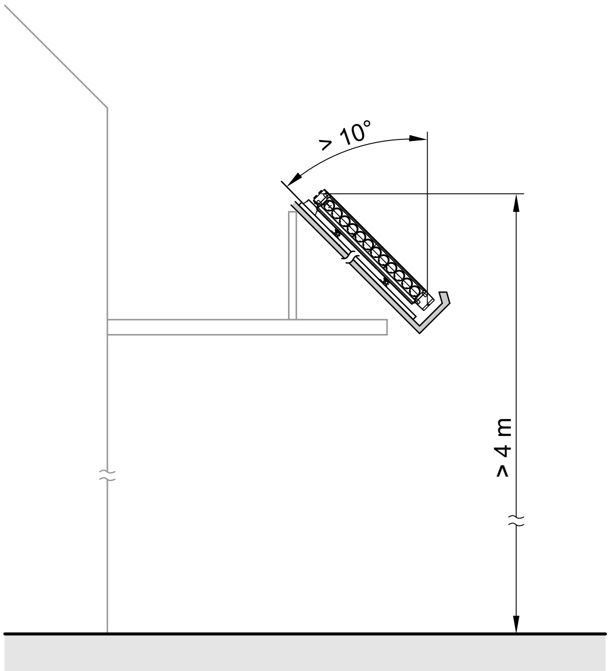
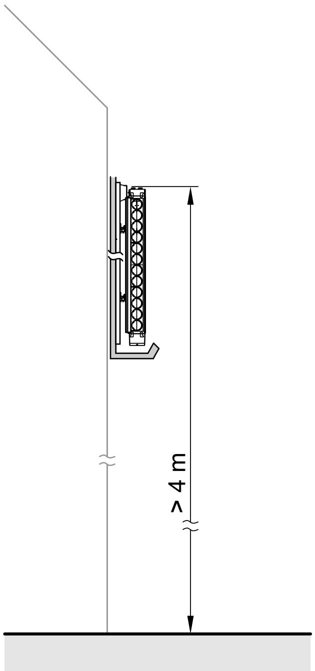
Ballast and max. load on the substructure
Calculations to DIN 1055-4, 3/2005 and DIN 1055-5, 7/2005.

Note
The Viessmann "SOLSTAT" calculation program is available at ***www.viessmann.com*** *to assist with calculations.*

Installation on façades

Technical Building Regulations
For the rules regarding the implementation of solar thermal systems, see the list of Building Regulations (LTB) [Germany] or local regulations.

This combines the technical rules of all Federal States [Germany] for the use of linear supported glazing (TRLV) issued by the Deutsches Institut für Bautechnik (DIBT). This includes flat-plate and tube collectors. These concern primarily the protection of pedestrian and traffic areas against falling glass.

Overhead glazing	Vertical glazing
Glazing with an angle of inclination greater than 10° – No additional safety measures to protect against falling glass parts are required for flat-plate and tube collectors with an angle of inclination greater than 10°.	Glazing with an angle of inclination smaller than 10° – The TRLV does not apply to vertical glazing with an upper edge higher than max. 4 m above a traffic area. No additional safety measures to protect against falling glass parts are required for flat-plate and tube collectors with an angle of inclination less than 10°. – For vertical glazing with an upper edge higher than 4 m above a traffic area, suitable measures must be taken to effectively prevent glass from falling (e.g. netting or trays below; see the following diagrams).
	

Design information regarding installation on pitched roofs — above roof installation

14.1 Above roof installation with rafter anchors

General information

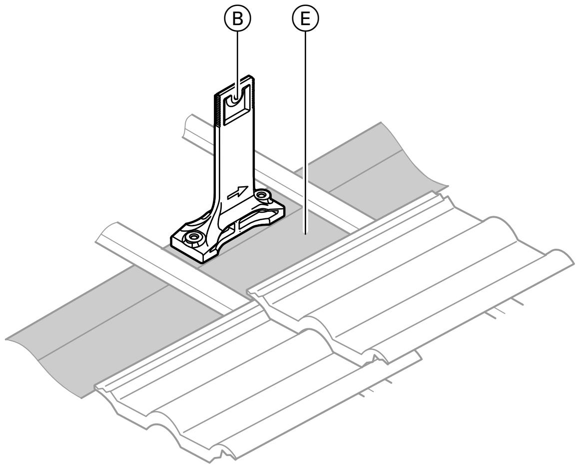
Observe the information on securing collectors on page 110.

- This fixing system can be used universally for all standard roof covers and is designed for wind speeds of up to 150 km/h and the following snow loads:
  Vitosol-F, type SV: up to 4.80 kN/m²
  Vitosol-F, type SH: up to 2.55 kN/m²
  Vitosol-T: up to 2.55 kN/m²

Information on Vitosol-F, type SV
For snow loads of up to 2.55 kN/m², each collector is secured on 2 mounting rails, while for snow loads of 4.80 kN/m², a third rail is required. The rails are the same for all snow and wind loads.

- The fixing system comprises rafter anchors, mounting rails, clamping brackets, screws and seals.
- Guarantees a permanently safe application of force to the roof structure. This reliably prevents tile breakages. In regions with higher snow loads, we always recommend this fixing system.
- Two versions of the rafter anchors are available:
  – Rafter anchor, low tile, 195 mm high
  – Rafter anchor, high tile, 235 mm high
- To enable the mounting rails to be secured to the rafter anchors, maintain a clearance of **max. 100 mm** between the top edge of the rafters or counter battens and the top edge of the roof tiles.
- For above roof insulation, secure the rafter anchors on site. For this, the screws must reach **at least 120 mm** into the load bearing wood structure to ensure sufficient load bearing capacity.
- Any unevenness in the roof can be compensated for by adjusting the rafter anchors.

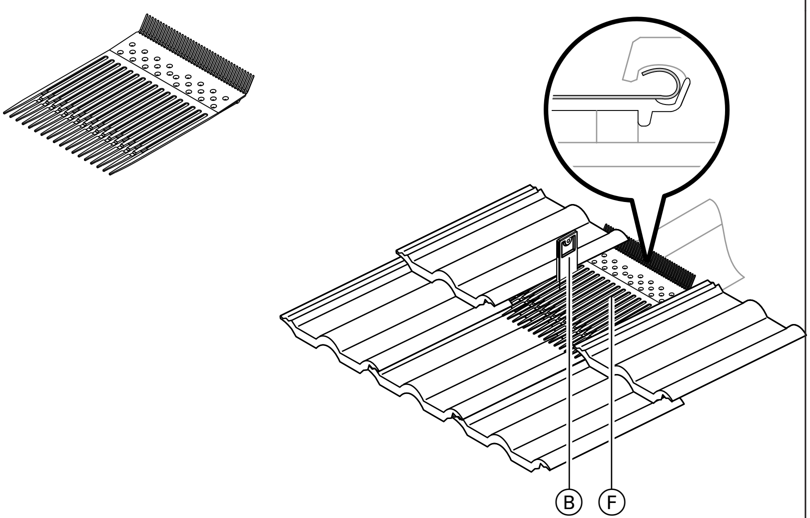
Criteria for selecting the fixing system:
- Snow load
- Rafter spacing
- Roof with or without counter battens (various screw lengths)



Ⓑ Rafter anchor
Ⓔ Rafter

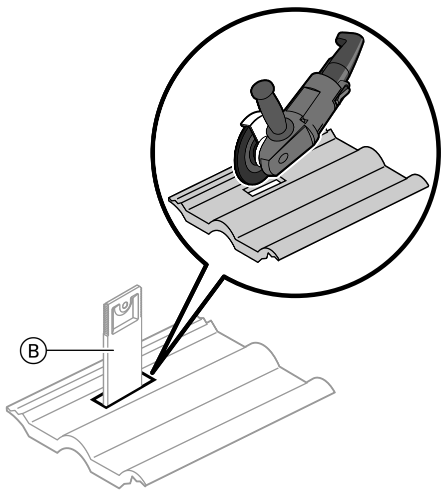
For tiled roofs Viessmann offers 2 mounting options:

Using a plastic replacement tile



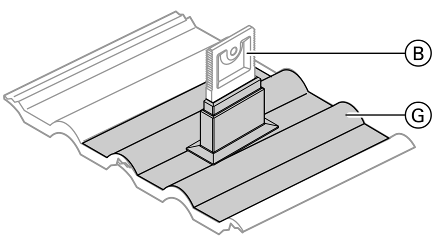
Ⓑ Rafter anchor
Ⓕ Plastic replacement tile

Trimming the roof tile with an angle grinder



Ⓑ Rafter anchor

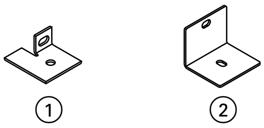
Affixed seal



Ⓑ Rafter anchor
Ⓖ Seal (fully affixed)

Above roof installation with mounting brackets e.g. on sheet steel roofs
The fixing system comprises mounting brackets, mounting rails, clamping brackets and screws.

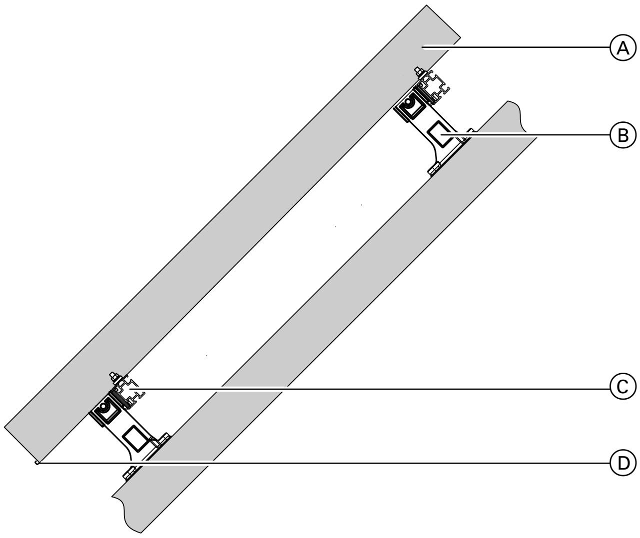
The mounting brackets are secured with screws to the on-site support elements (matched to the individual sheet steel roof).
Mounting rails are fitted directly to the mounting brackets.



1. Vitosol-T, for vertical installation
2. Vitosol-T, for horizontal installation
   Vitosol-F, for vertical and horizontal installation

Vitosol-F flat-plate collectors

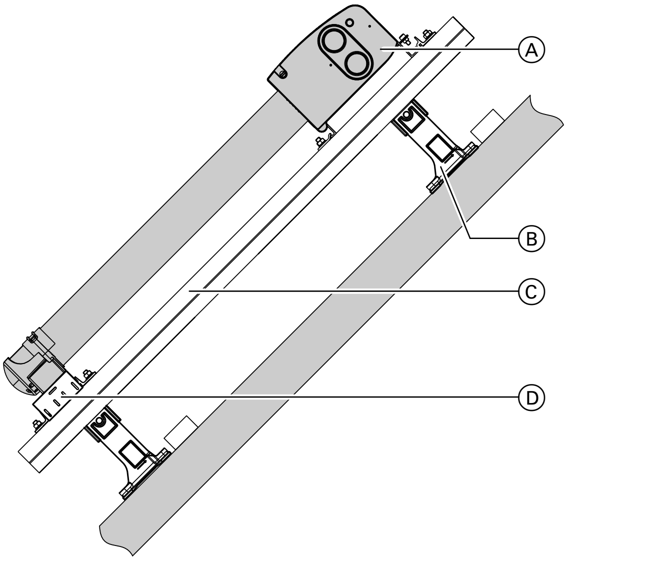
Vertical and horizontal installation



Ⓐ Collector
Ⓑ Rafter anchor
Ⓒ Mounting rail
Ⓓ Mounting plate

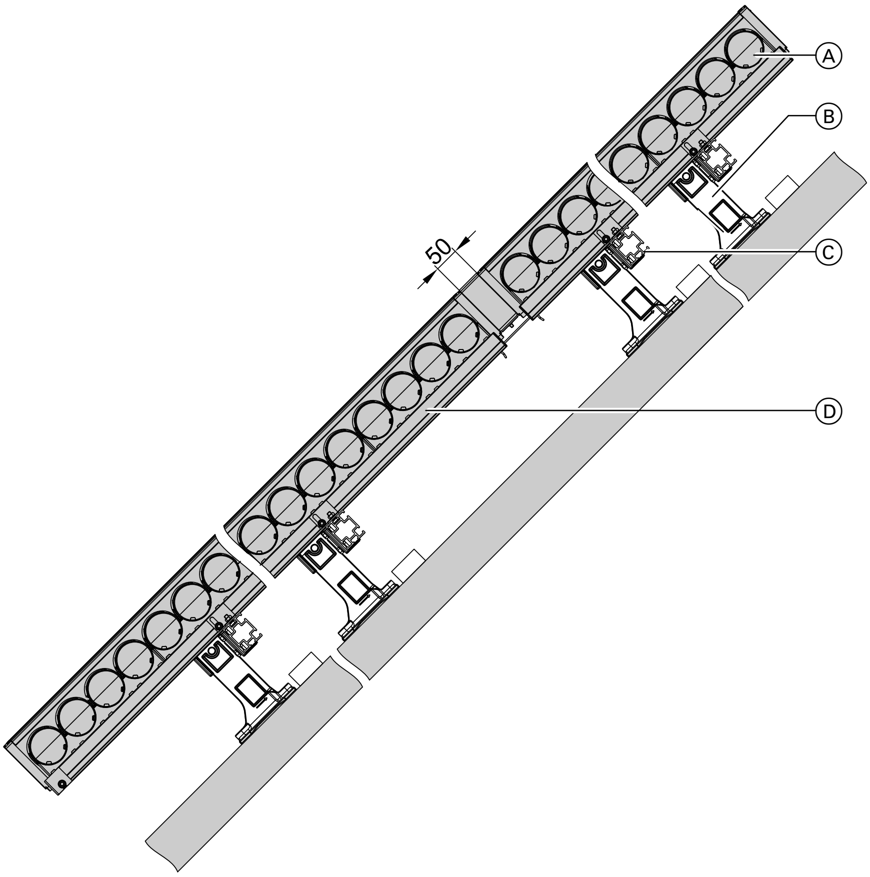
Vitosol 200-T vacuum tube collectors, type SP2A and Vitosol 300-T, type SP3B

Vertical installation



Ⓐ Collector
Ⓑ Rafter anchor
Ⓒ Mounting rail
Ⓓ Tube retainer

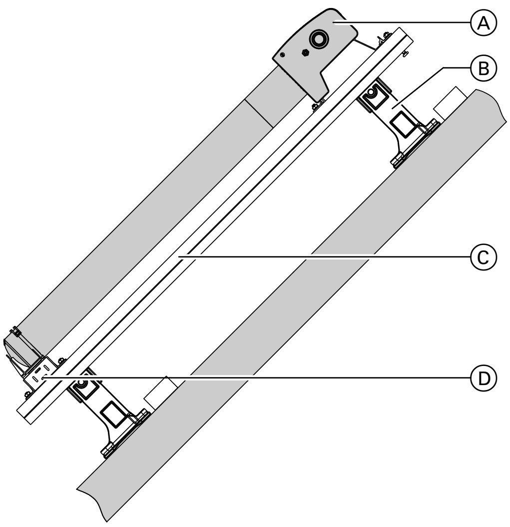
Horizontal installation (only Vitosol 200-T, type SP2A)



Ⓐ Collector
Ⓑ Rafter anchor
Ⓒ Mounting rail
Ⓓ Tube retainer

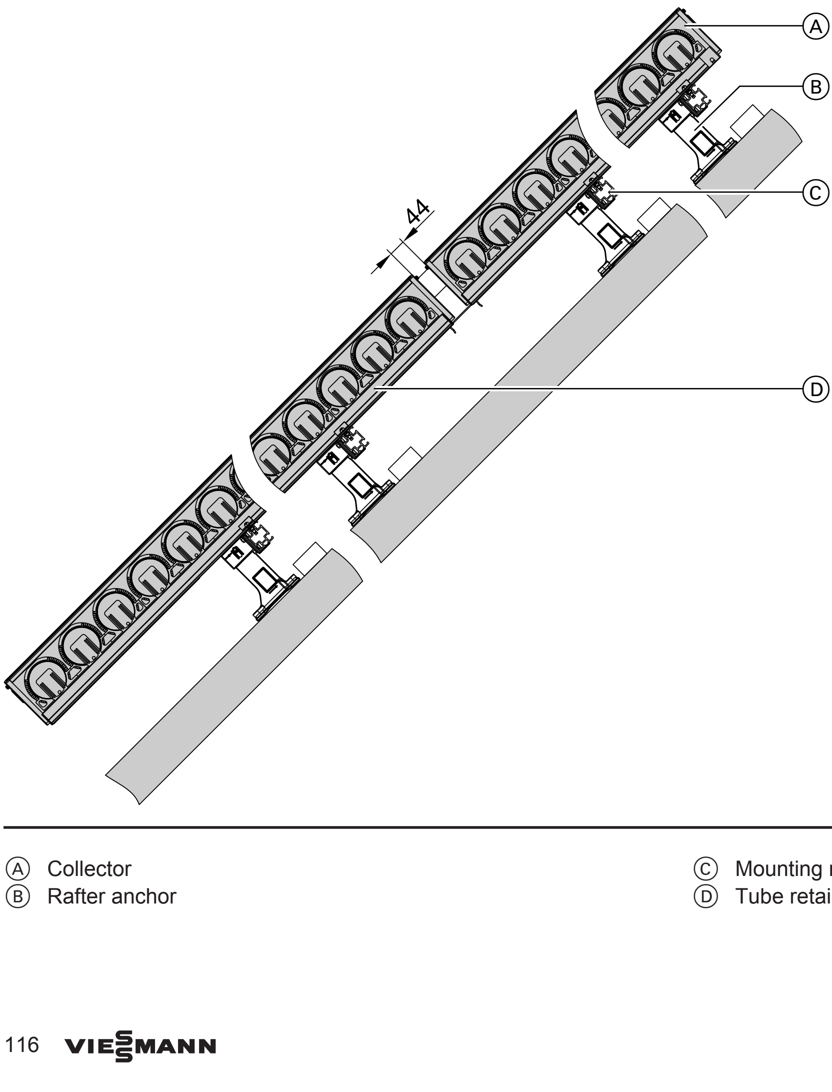
Vitosol 200-T vacuum tube collectors, type SPE

Vertical installation



Ⓐ Collector
Ⓑ Rafter anchor
Ⓒ Mounting rail
Ⓓ Tube retainer

Horizontal installation



Ⓐ Collector
Ⓑ Rafter anchor
Ⓒ Mounting rail
Ⓓ Tube retainer

Support on pitched roofs

(For rafter anchors in conjunction with collector supports from the flat roof installation range, see page 128.)
On pitched roofs with a low angle of inclination, the collector supports can be secured to the rafter anchors with the mounting rails.

Check the structural condition of the roof.

14.2 Above roof installation with rafter hooks

General information

Observe the information on securing collectors on page 110.

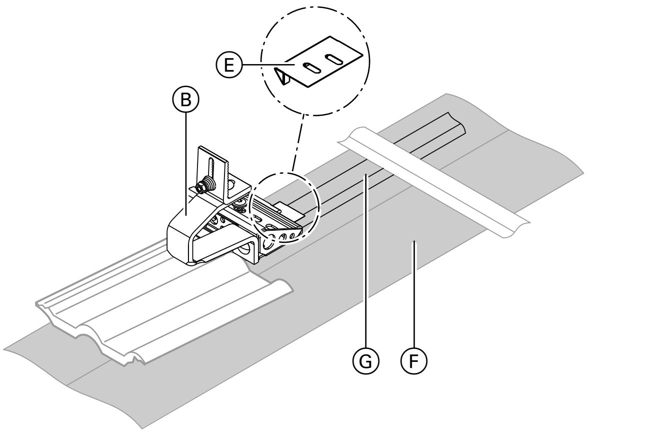
- This mounting system is suitable for **standard roof tiles** (except Harz tiles and double-S tiles). It is designed for wind speeds up to 150 km/h and snow loads up to 1.25 kN/m^2.
- The fixing system comprises rafter hooks, mounting rails, clamping brackets and screws.
- Guarantees a permanently safe application of force to the roof structure. This reliably prevents tile breakages.
- For above roof insulation, secure the rafter hooks on site. For this, the screws must reach **at least 80 mm** into the load bearing wood structure to ensure sufficient load bearing capacity.
- Any unevenness in the roof can be compensated for by adjusting the rafter hooks.

Criteria for selecting the fixing system:

- Snow load
- Roof with or without counter battens

Rafter hook

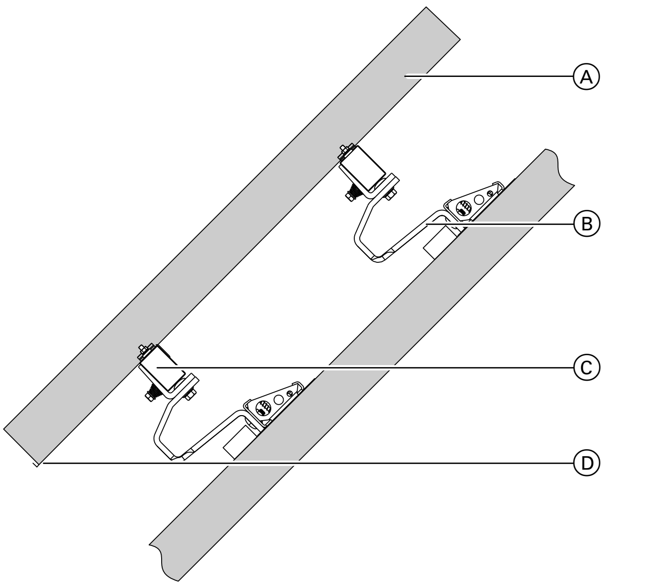
- Rafter hooks are fully zinc-plated at high temperature to protect against corrosion (galvanised, 70 µm coating thickness).
- Rafter hooks are mounted directly on the rafters on roofs **without counter battens**.
- On roofs **with counter battens** the rafter hook is secured directly to the counter batten with a support bracket.



Ⓑ Rafter hook
Ⓔ Support bracket
Ⓕ Rafter
Ⓖ Counter batten

Vitosol-F flat-plate collectors

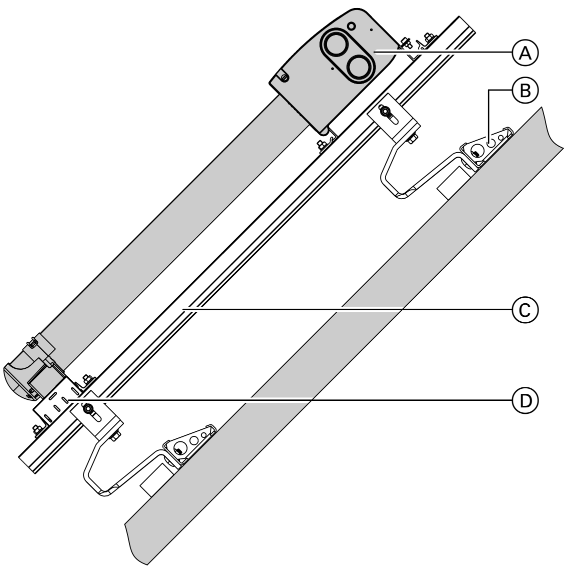
Vertical and horizontal installation



Ⓐ Collector
Ⓑ Rafter hook
Ⓒ Mounting rail
Ⓓ Mounting plate

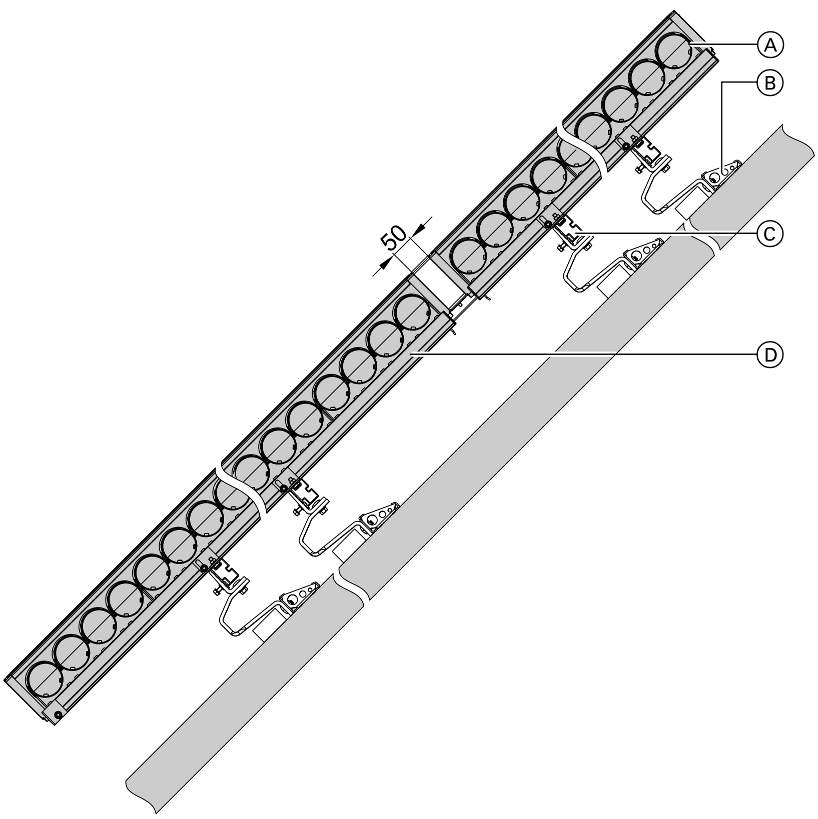
Vitosol 200-T vacuum tube collectors, type SP2A and Vitosol 300-T, type SP3B

Vertical installation



Ⓐ Collector
Ⓑ Rafter hook
Ⓒ Mounting rail
Ⓓ Tube retainer

Horizontal installation (only Vitosol 200-T, type SP2A)



Ⓐ Collector
Ⓑ Rafter hook
Ⓒ Mounting rail
Ⓓ Tube retainer

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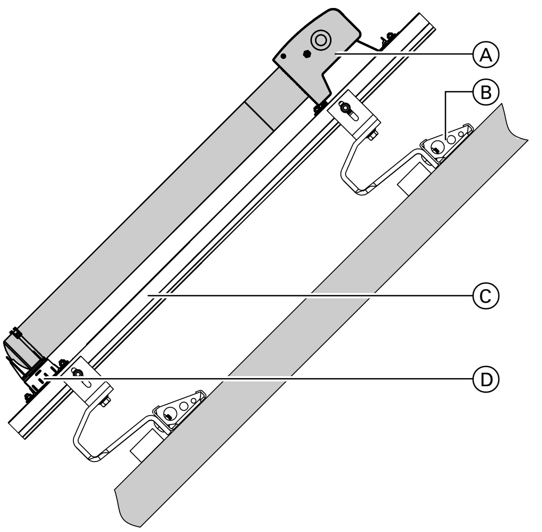
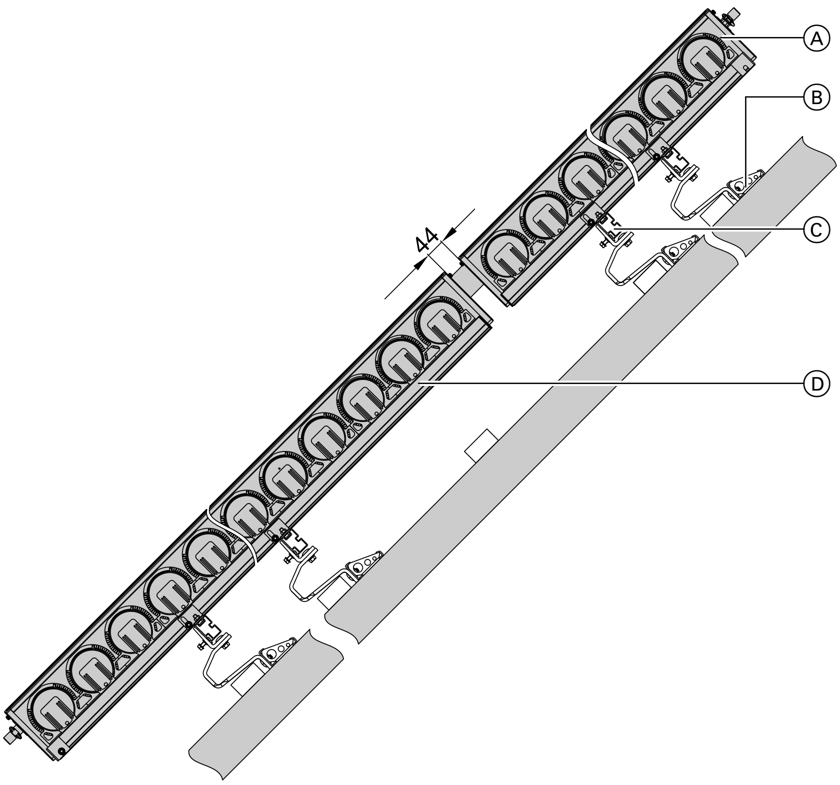
Vitosol 200-T vacuum tube collectors, type SPE

Vertical installation



Ⓐ Collector
Ⓑ Rafter hook
Ⓒ Mounting rail
Ⓓ Tube retainer

Horizontal installation



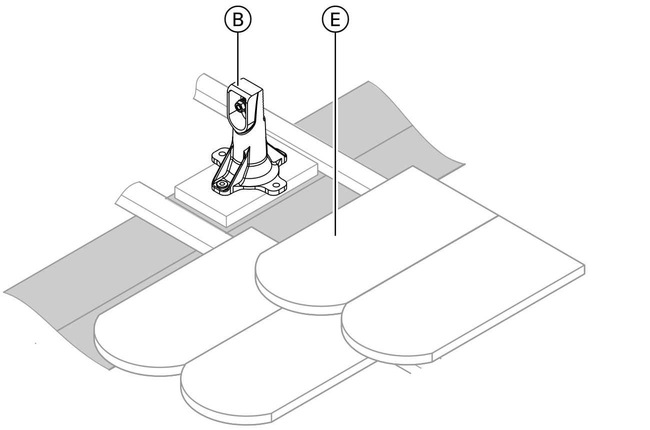
Ⓐ Collector
Ⓑ Rafter hook
Ⓒ Mounting rail
Ⓓ Tube retainer

14.3 Above roof installation with rafter flanges

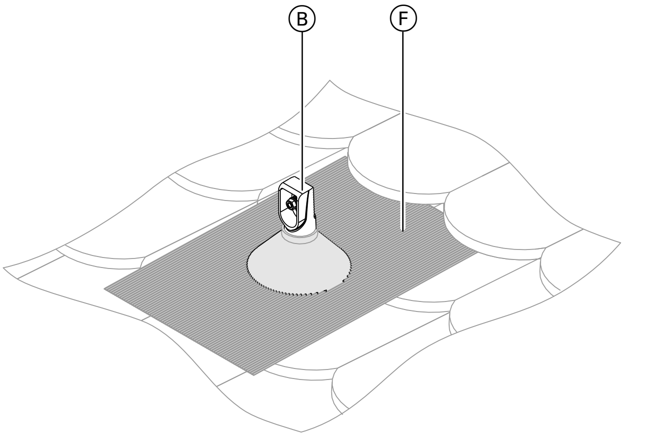
General information

- This mounting system is suitable for **plain tiles** and **slate tiles**. It is designed for wind speeds up to 150 km/h and snow loads up to 1.25 kN/m^2.
- The mounting system comprises rafter flanges, mounting rails, clamping brackets and screws.
- The rafter flanges can be directly secured to the rafters, the battens or counter battens, or to the timber shell.
- Guarantees a permanently safe application of force to the roof structure. This reliably prevents tile breakages.
- In conjunction with above roof insulation, secure the rafter flanges on site.
  For this, the screws must reach **at least 80 mm** into the load bearing wood structure to ensure sufficient load bearing capacity.
- Any unevenness in the roof can be compensated for by adjusting the rafter flanges.

Criteria for selecting the fixing system:
- Roof cover
- Snow load



Ⓑ Rafter flange
Ⓔ Rafter



Ⓑ Rafter flange
Ⓕ Seal (fully affixed)

14

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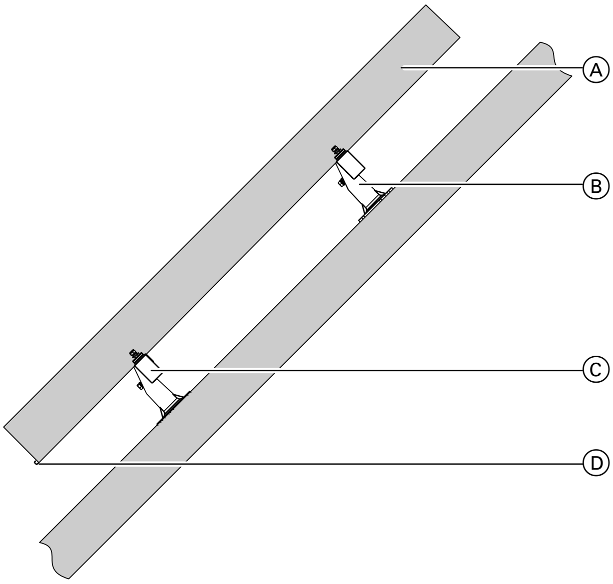
Vitosol-F flat-plate collectors

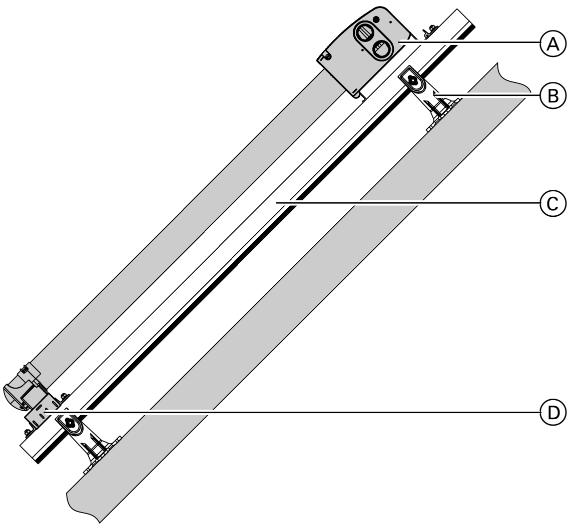
Vertical and horizontal installation



Ⓐ Collector
Ⓑ Rafter flange
Ⓒ Mounting rail
Ⓓ Mounting plate

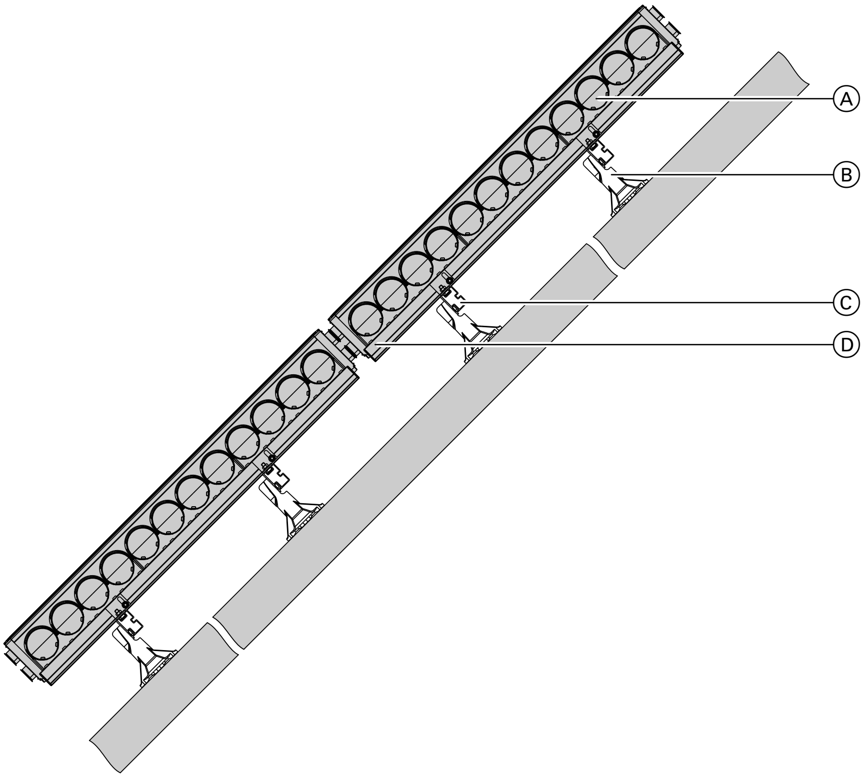
Vitosol 200-T vacuum tube collectors, type SP2A and Vitosol 300-T, type SP3B

Vertical installation



Ⓐ Collector
Ⓑ Rafter flange
Ⓒ Mounting rail
Ⓓ Tube retainer

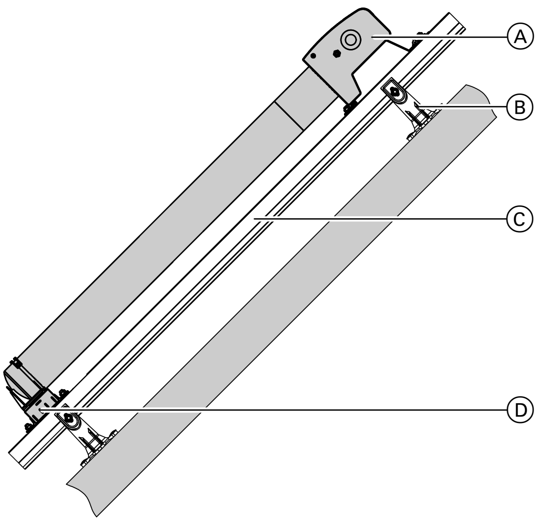
Horizontal installation (only Vitosol 200-T, type SP2A)



Ⓐ Collector
Ⓑ Rafter flange
Ⓒ Mounting rail
Ⓓ Tube retainer

Vitosol 200-T vacuum tube collectors, type SPE

Vertical installation



Ⓐ Collector
Ⓑ Rafter flange
Ⓒ Mounting rail
Ⓓ Tube retainer

14

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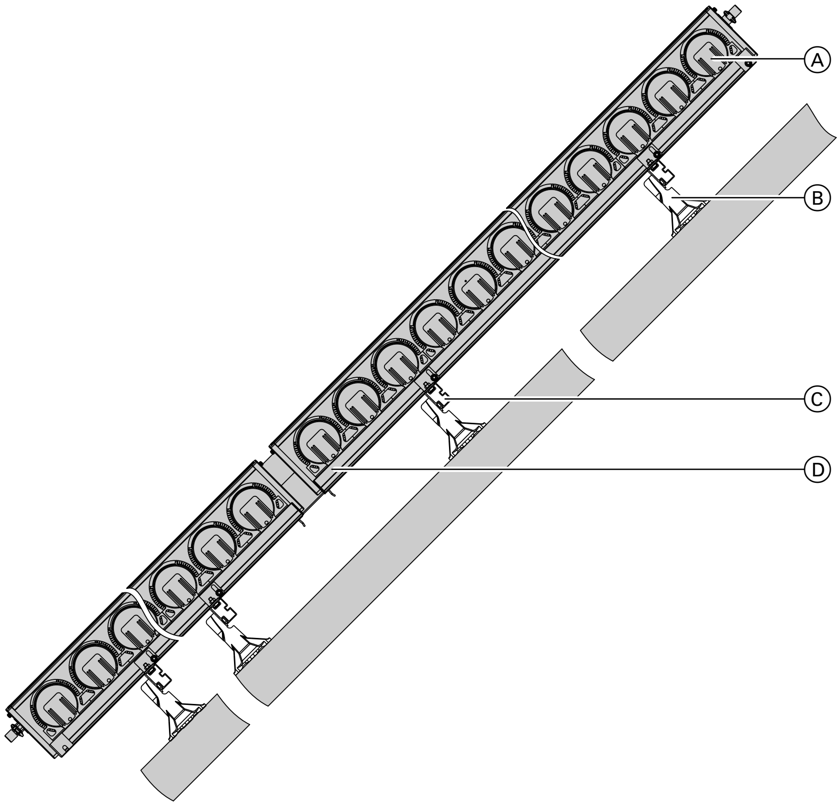
Horizontal installation

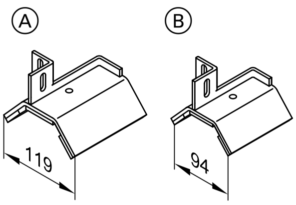


Ⓐ Collector
Ⓑ Rafter flange
Ⓒ Mounting rail
Ⓓ Tube retainer

14.4 Above roof installation for corrugated sheet roofs

Observe the information on securing collectors on page 110.

- This mounting system is suitable for corrugated sheet roofs.
- The mounting system comprises mounting hooks, mounting rails, clamping brackets and screws.
- The loads are transmitted to the roof structure via a number ways, including the mounting hooks and the roof cover. As these elements can vary greatly, damage may occur when loads are applied.
  We therefore recommend providing safety measures on site to ensure the tightness of the roof.



Ⓐ Mounting hook for corrugated sheet profiles 5 and 6
Ⓑ Mounting hook for corrugated sheet profile 8

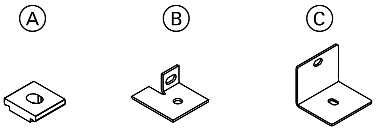
14.5 Above roof installation for sheet metal roofs

General information

Observe the information on securing collectors on page 110.
The fixing system comprises mounting brackets, mounting rails, clamping brackets and screws.

The mounting brackets are secured with screws to the on-site support elements (matched to the individual sheet steel roof).

Mounting rails are fitted directly to the mounting brackets.



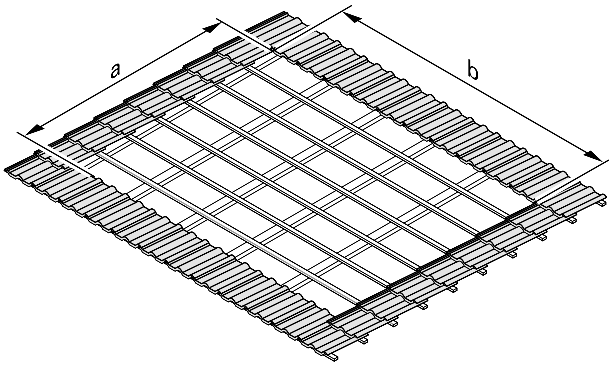
Ⓐ Vitosol-F, for vertical and horizontal installation
Ⓑ Vitosol-T, for vertical installation
Ⓒ Vitosol-T, for horizontal installation

Design information regarding installation on pitched roofs — roof integration

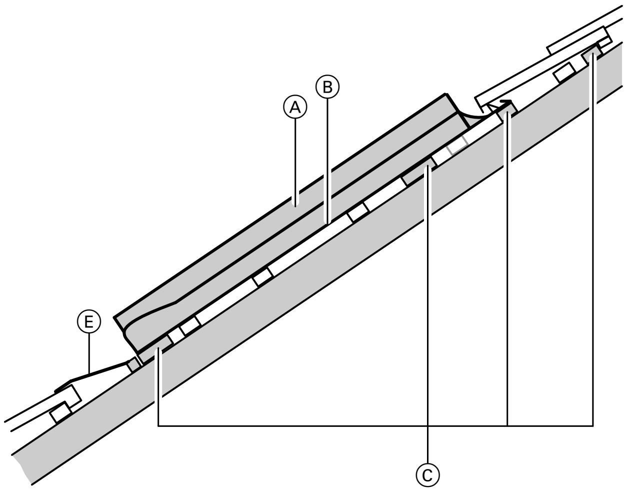
15.1 Roof integration with flashing frame

Observe the information on securing collectors on page 111.
The Vitosol 200-F flat-plate collector, **type 5DIA** is designed for this type of installation.

This fixing system is only offered for **roof tiled roofs**.
If several collectors are installed above each other, maintain a clearance of 2 to 3 rows of tiles between the collector rows.



Required roof area: a = 3000 mm, b = 4000 mm



Ⓐ Collector
Ⓑ Flashing frame
Ⓒ Timber
Ⓔ Aluminium apron (water drainage)

15.2 Roof integration with flashing frame and side flashing

Observe the information on securing collectors on page 111.
Vitosol 200-F and 300-F flat-plate collectors, **type SH and SV** are designed for this type of installation.

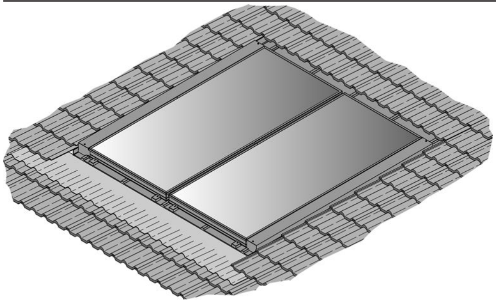
Note
*Type SH is not designed for the installation of only **one** collector.*

This roof integration is designed for roof covers with roof tiles, plain tiles and slate:
- For roof pitches from 15 to 20° and 20 to 65°.
- One or two rows of collectors.
  More than two rows above one another on request.

Installation versions

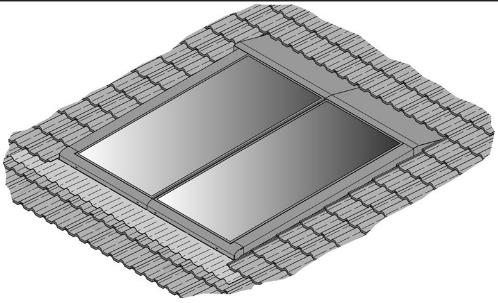
Standard version Ⓐ	Design version Ⓑ
For tiled roofs	For covers with plain tiles and slate

Standard version Ⓐ



Pack with side flashing (left and right).

Design version Ⓑ



Pack with side flashing (left and right) and flashing for the top and bottom collector rows.

Benefits:
– This version is particularly suitable for roofs with a pitch greater than 20°.
  Prevents snow piling up above the collectors (snow can slide off more easily).
– The solar lines can be routed through the roof space below the upper flashing panels.

The fixing systems are designed for the roof pitches and types given in the following table (versions Ⓐ and Ⓑ, see previous diagrams):

Type	**SV**		**SH**	
Roof pitch	**15 to 20°**	**20 to 65°**	**15 to 20°**	**20 to 65°**
Tiled roof cover	Ⓐ	Ⓐ, Ⓑ	—	Ⓐ, Ⓑ
Slate	—	Ⓑ	—	Ⓑ
Plain tile	—	Ⓑ	—	Ⓑ

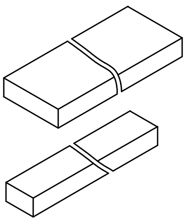
Timber pack with and without fixing screws

Conditions for structural verification:
- Max. snow load of 2.55 kN/m^2, wind speeds up to 150 km/h and maximum gap between rafters of 800 mm.
- Screws 8 x 120 Assy Plus VG with DIBT approval for threaded width in rafters of 60 mm.
- Timber 40 x 120 mm; use two screws per rafter.

Timber pack

Viessmann provides this pack if the load-bearing capacity of the existing battens is insufficient.

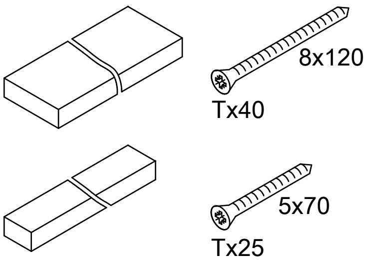
Components:
– Timber 40 x 120 mm/40 x 60 mm, NH S10 ÜH-TS



Structural verification pack

Viessmann provides this pack for structural verification extending into the roof structure.
– Structural verification is carried out under the following conditions:
– Max. snow load 2.55 kN/m^2
– Wind speeds up to 150 km/h
– Max. rafter centres 800 mm

Components:
– Timber 40 x 120 mm/40 x 60 mm, NH S10 ÜH-TS
– Screws 8 x 120 mm with DIBT approval for extended structural verification right into the roof structure



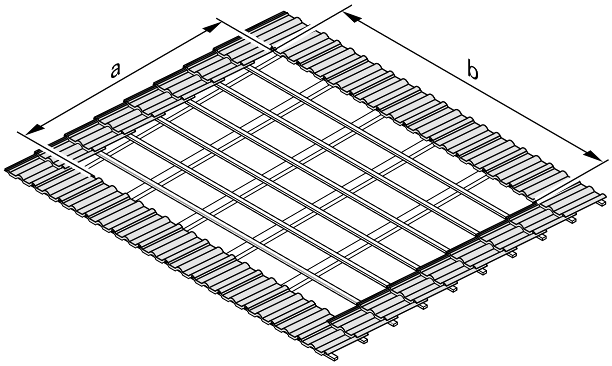
Number and length of the timbers in the packs

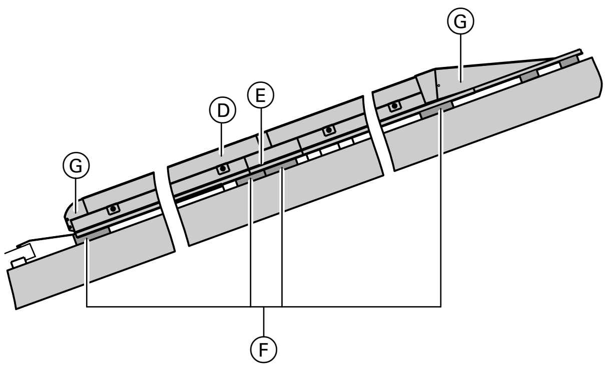
Type SV, single row (if installing two rows, double the relevant number)

Number of collectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**12**
Length of timber 40 x 120 mm	**Number of timbers**										
1500 mm	2	—	2	—	2	—	2	—	2	—	—
2600 mm	—	2	2	4	4	6	6	8	8	10	12
Length of timber 40 x 60 mm											
1500 mm	5	—	5	—	5	—	5	—	5	—	—
2600 mm	—	5	5	10	10	15	15	20	20	25	30

Type SH
All the timbers are **3000 mm** long.
- Single row installation:
  Two timbers per collector of each version
- Double row installation:
  Double the relevant number.

Required roof area





Standard version Ⓐ

Type	**SV**		**SH**	
Collector installation	**Single row**	**Double row**	**Single row**	**Double row**
a in mm	2980	5380	1650	2730
b in mm	1650 + 1080 for each additional collector		5250 + 2400 for each additional collector	

Design version Ⓑ

Type	**SV**		**SH**	
Collector installation	**Single row**	**Double row**	**Single row**	**Double row**
a in mm	3390	5790	1990	3070
b in mm	1650 + 1080 for each additional collector		5360 + 2400 for each additional collector	

Ⓓ Collector with side flashing
Ⓔ Flashing frame
Ⓕ Timber 120 x 40 mm
Ⓖ Top and bottom flashing from the design version Ⓑ (see page 124)

Routing solar lines through the roof

For routing the solar lines through the roof, Viessmann offers special side panels Ⓒ (side panels with EPDM entries). These vary depending on the version of hydraulic connections to be used (see the following diagrams). Specify the version when ordering.

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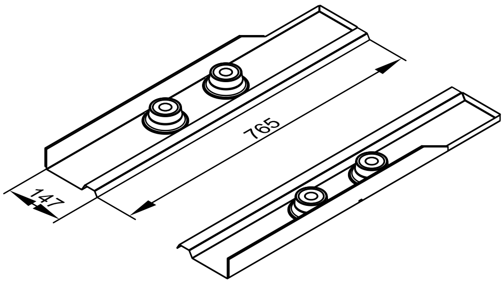
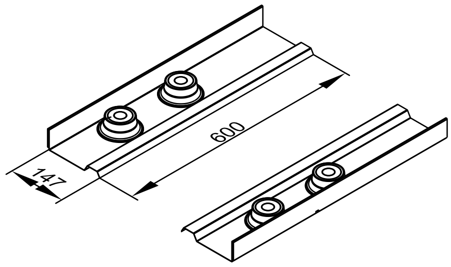
Design information regarding installation on pitched roofs — roof integration (cont.)

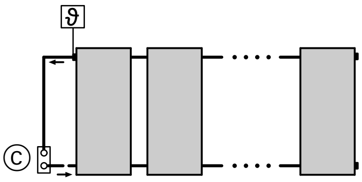
Side panels left top/right top	Side panels left bottom/right bottom
	

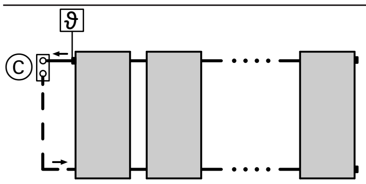
This panel is **required** in conjunction with standard version Ⓐ (see page 124) (see the following installation examples).

In conjunction with design version Ⓑ (see page 124), we recommend routing the solar lines through the roof below the top flashing panels.

Installation examples (connections may be made on the right or left side)

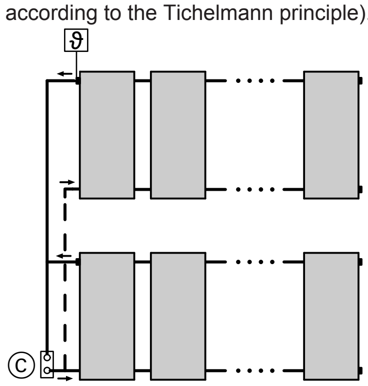
Collectors installed in a single row

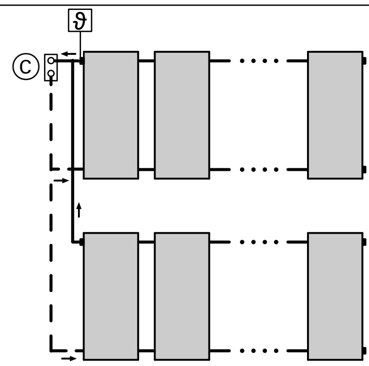




Collectors installed in a double row

With the following connection versions, an even flow is not ensured (not according to the Tichelmann principle).





Further installation options on request.

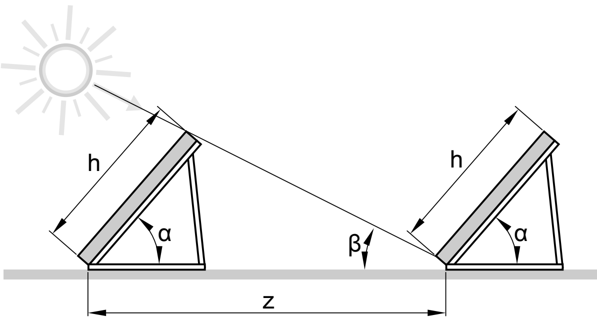
Installation of snow guards

If the values shown in the table are exceeded, a snow guard is required.

Type	**SV**			**SH**		
Snow load in kN/m²	**0.75**	**1.25**	**2.55**	**0.75**	**1.25**	**2.55**
Roof pitch	**Distance between top edge of collector array and roof ridge in m**					
15°	18.8	10.3	3.8	8.3	4.5	1.7
30°	9.8	4.9	1.2	4.3	2.2	always
45°	8.2	3.9	0.7	3.6	1.7	always
65°	9.8	4.9	1.2	4.3	2.2	always

16.1 Determining the collector row clearance z

At sunrise and sunset (when the sun is very low), shading cannot be avoided when collectors are arranged behind one another. To keep the reduction in yield within acceptable parameters, observe specific row clearances (dimension z) in accordance with VDI guideline 6002-1. When the sun is at its highest on the shortest day of the year (21/12), the rows at the back should be free of shading.
The angle of the sun β (at midday) on 21/12 must be used to calculate the row clearance.
In Germany, this angle lies between 11.5° (Flensburg) and 19.5° (Konstanz), subject to latitude.



$$\frac{z}{h} = \frac{\sin(180° - (\alpha + \beta))}{\sin\beta}$$

z = Distance between collector rows
h = Collector height (for dimensions see chapter "Specification" for the relevant collector)
α = Angle of collector inclination
β = Angle of the sun

Example:
Würzburg is approximately located on latitude 50° north.
In the northern hemisphere, this value is deducted from a fixed angle of 66.5°:
Angle β = 66.5° − 50° = 16.5°

Example with Vitosol-F, type SH
h = 1056 mm
α = 45°
β = 16.5°

$$z = \frac{h \cdot \sin(180° - (\alpha+\beta))}{\sin\beta}$$

$$z = \frac{1056\ \text{mm} \cdot \sin(180° - 61.5°)}{\sin 16.5°}$$

z = 3268 mm

α	Clearance between collector rows z in mm			
	Vitosol-F		Vitosol 200-T, type SP2A Vitosol 300-T, type SP3B	Vitosol 200-T, type SPE
	Type SV	Type SH		
Flensburg				
25°	6890	3060	6686	—
30°	7630	5715	7448	7511
35°	8370	3720	8154	—
45°	9600	4260	9373	9453
50°	10100	4490	9878	—
60°	10890	4830	10660	10750
Kassel				
25°	5830	2590	5446	—
30°	6385	2845	5981	6032
35°	6940	3100	6471	—
45°	7840	3480	7299	7360
50°	8190	3640	7631	—
60°	8720	3870	8119	8187
Munich				
25°	5160	2290	4862	—
30°	5595	2485	5290	5772
35°	6030	2680	5677	—
45°	6710	2980	6321	6993
50°	6980	3100	6571	—
60°	7350	3260	6921	7737

16.2 Vitosol-F flat-plate collectors (on supports)

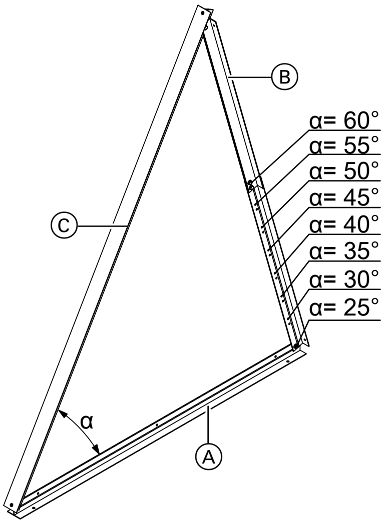
Observe the information on securing collectors on page 111.

Viessmann offers two collector supports for fixing the collectors:
- With a **variable angle of inclination** (snow loads up to 2.55 kN/m^2, wind speeds up to 150 km/h):
  The collector supports are pre-assembled. They consist of the base rail, collector support and adjustable support with holes for adjusting the angle of inclination (see the following chapter).
- With **fixed angles of inclination** of 30°, 45° and 60° (snow loads up to 1.5 kN/m^2, wind speeds up to 150 km/h):
  Collector supports with footplates (see from page 131).
  For this version the angle of inclination is calculated from the distance between the footplates.

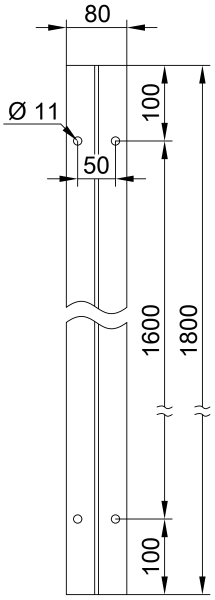
Cross braces are required for 1 to 6 collectors connected side by side to secure the support.

Collector supports with variable angle of inclination

Type SV — angle of inclination α 25 to 60°

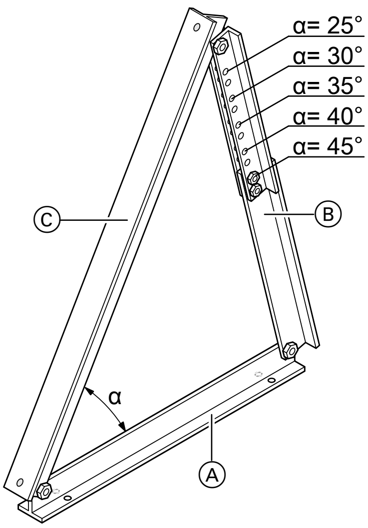


Ⓐ Base rail
Ⓑ Adjustable support
Ⓒ Collector support

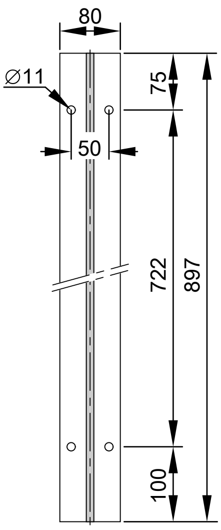


Base rail hole dimensions

Type SH — angle of inclination α 25 to 45°



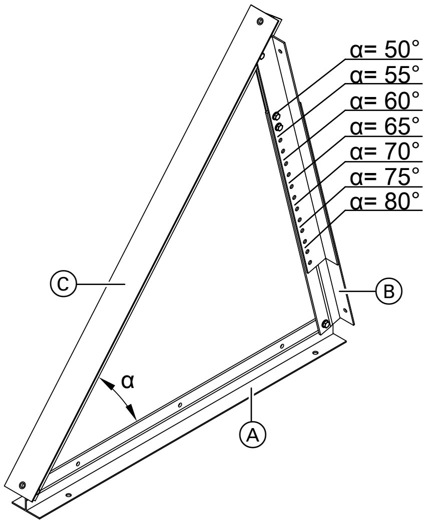
Ⓐ Base rail
Ⓑ Adjustable support
Ⓒ Collector support



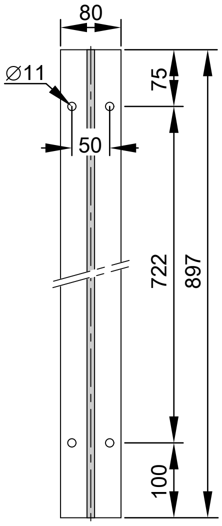
Base rail hole dimensions

Design information on flat roof installation (cont.)

Type SH — angle of inclination α 50 to 80°

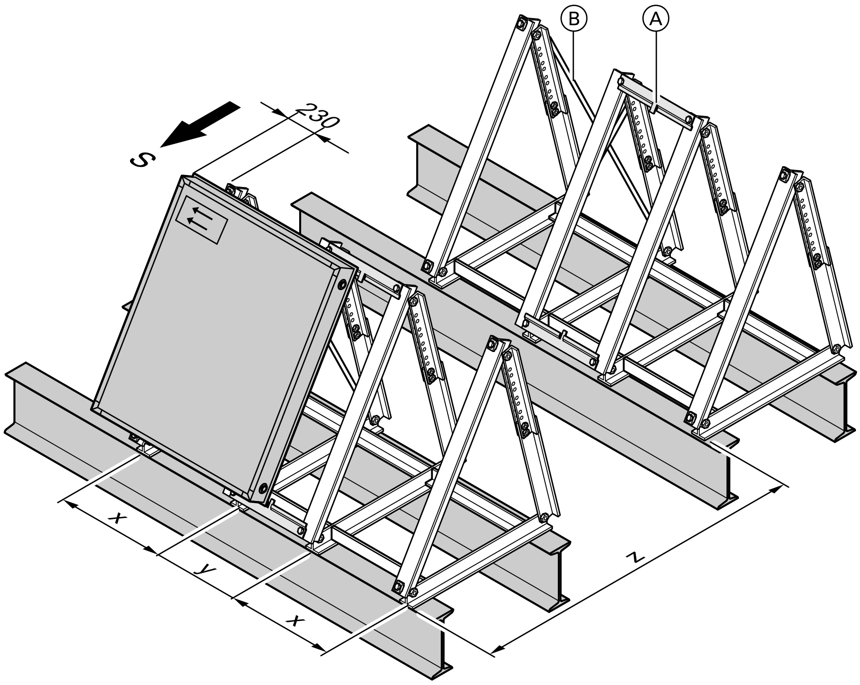


Ⓐ Base rail
Ⓑ Adjustable support
Ⓒ Collector support



Base rail hole dimensions

Type SV and SH — installation on an on-site substructure, e.g. steel beams



Ⓐ Joining plate
Ⓑ Cross brace

Type	SV	SH
x in mm	595	1920
y in mm	481	481
z in mm	See page 128.	See page 128.

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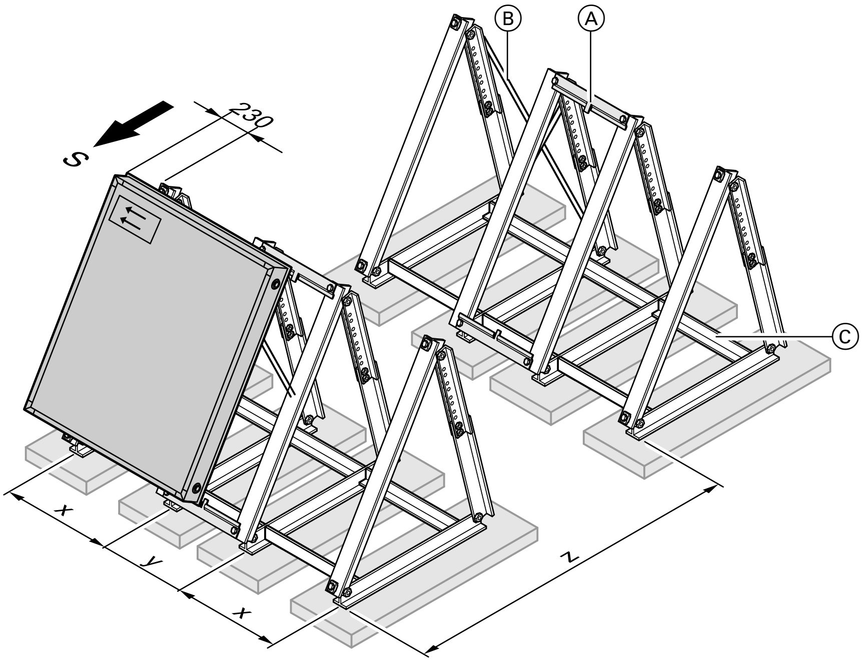
Type SV and SH — installation on concrete slabs

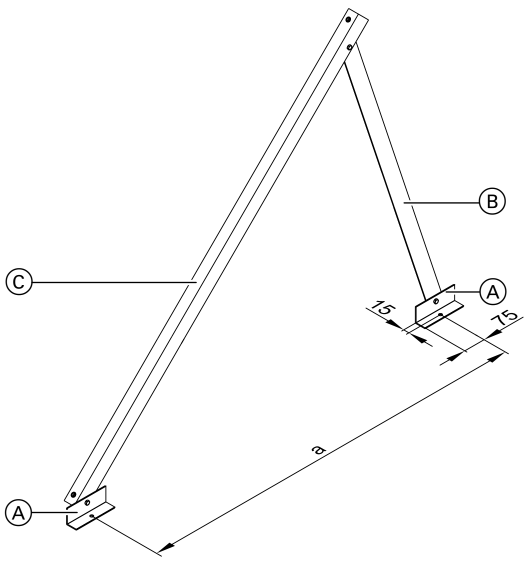


Ⓐ Joining plate
Ⓑ Cross brace
Ⓒ Support rail (only on roofs with gravel ballast layer)

Type	SV	SH
x in mm	595	1920
y in mm	481	481
z in mm	See page 128.	See page 128.

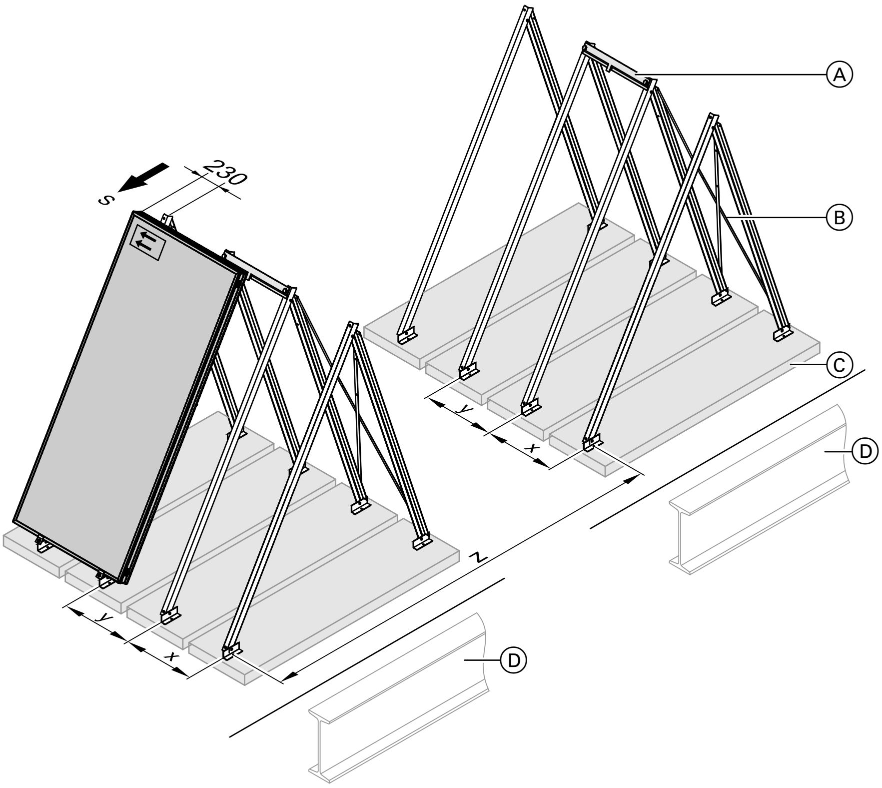
Collector supports with fixed angle of inclination

Type SV and SH



Ⓐ Footplates
Ⓑ Adjustable support
Ⓒ Collector support

Type	SV			SH		
Angle of inclination	30°	45°	60°	30°	45°	60°
a in mm	2413	2200	1838	998	910	760



Ⓐ Joining plate
Ⓑ Cross brace
Ⓒ Concrete slabs (on site)
or
Ⓓ On-site substructure, e.g. steel beams (on site)

Type	SV	SH
x in mm	597	1921
y in mm	480	480
z in mm	See page 128.	See page 128.

16.3 Vitosol 200-T and Vitosol 300-T vacuum tube collectors (on supports)

Observe the information on securing collectors on page 111.

Viessmann offers two collector supports for fixing the collectors:

- With **variable angles of inclination** of 25 to 50° (snow loads up to 2.55 kN/m^2, wind speeds up to 150 km/h):
  The collector supports are pre-assembled. They consist of the base rail, collector support and adjustable support with holes for adjusting the angle of inclination (see the following chapter).
- With a **fixed angle of inclination** (snow loads up to 1.5 kN/m^2, wind speeds up to 150 km/h):
  Collector supports with mounting feet (see from page 134).
  For this version the angle of inclination is calculated from the distance between the mounting feet.

Cross braces are required for 1 to 6 collectors connected side by side to secure the support.

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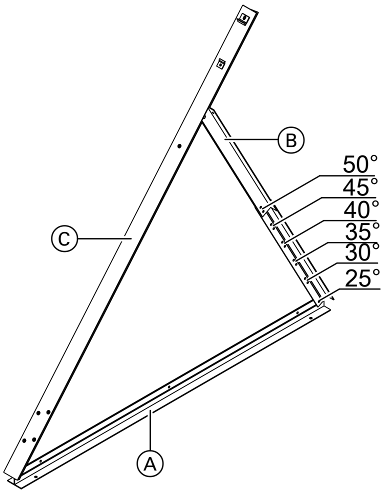
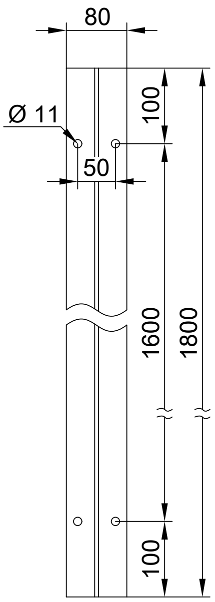
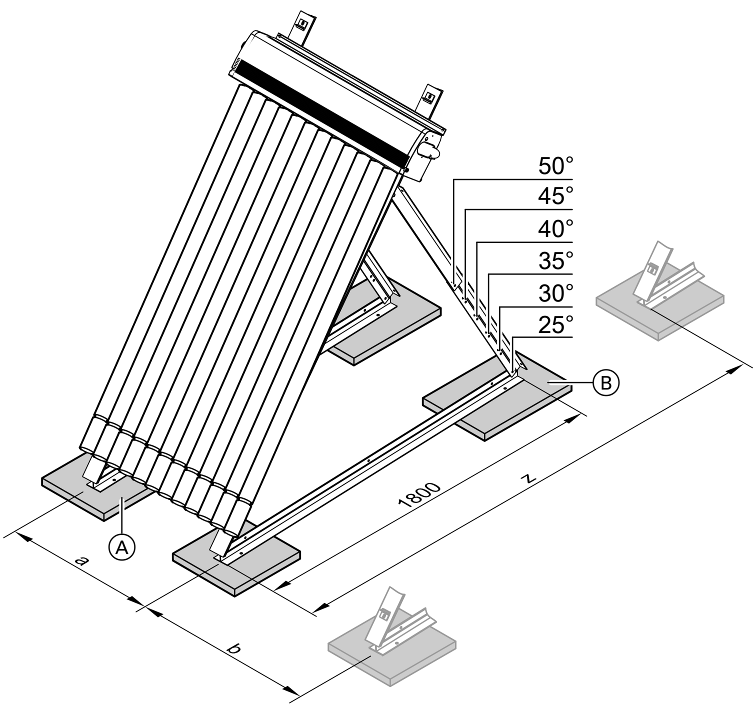
Collector supports with variable angle of inclination



Ⓐ Base rail
Ⓑ Adjustable support
Ⓒ Collector support



Base rail hole dimensions



For calculating distance z between collector rows, see page 128.

Ⓐ Support slab A
Ⓑ Support slab B

Vitosol 200-T, type SP2A, Vitosol 300-T, type SP3B

Combination	a mm	b mm
1.51 m²/1.51 m²	505/505	595
1.51 m²/3.03 m²	505/1010	850
3.03 m²/3.03 m²	1010/1010	1100

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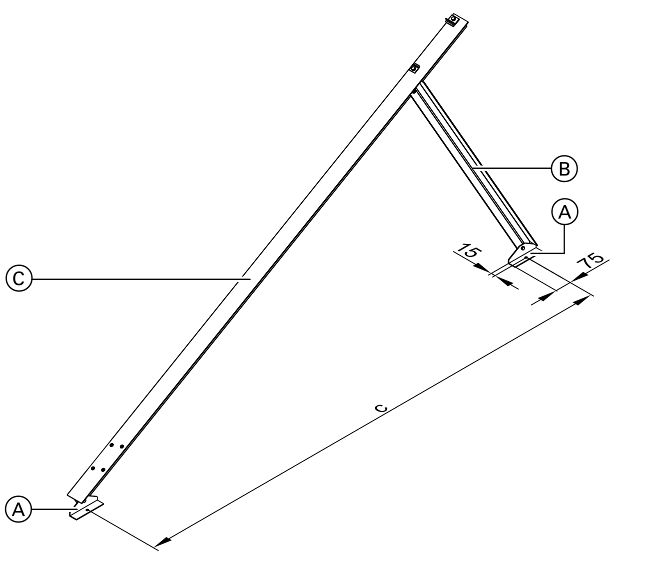
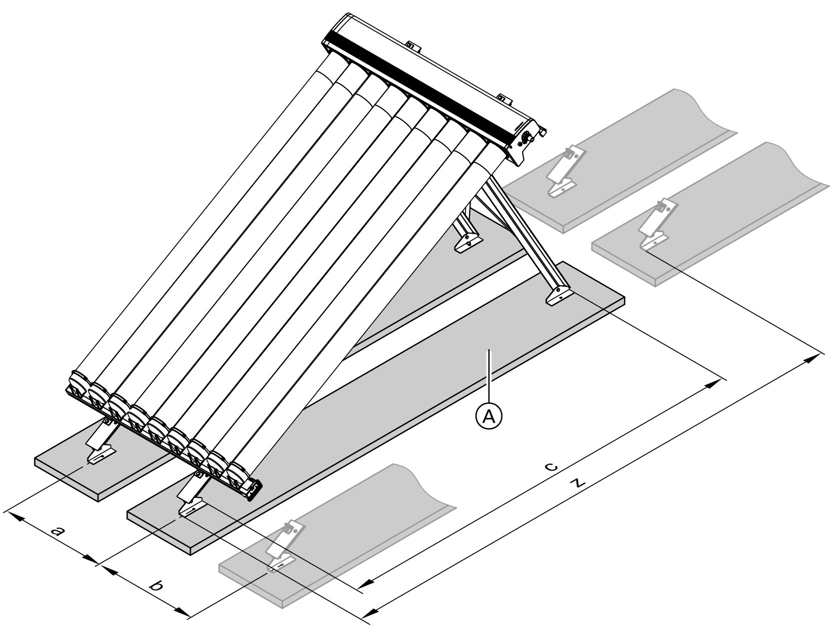
Collector supports with fixed angle of inclination



Angle of inclination	30°	45°	60°
c in mm	2413	2200	1838

Ⓐ Mounting foot
Ⓑ Adjustable support
Ⓒ Collector support



For calculating distance z between collector rows, see page 128.

Ⓐ Support slabs

Vitosol 200-T, type SPE

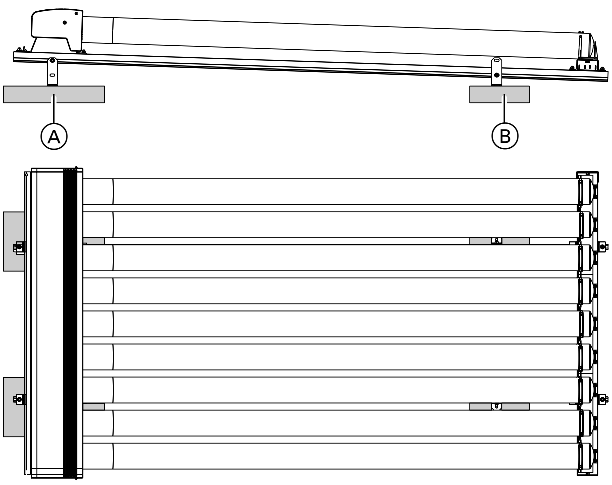
Combination	a mm	b mm
1.63 m^2/1.63 m^2	600/600	655
1.63 m^2/3.26 m^2	600/1200	947
3.26 m^2/3.26 m^2	1200/1200	1231

Vitosol 200-T, type SP2A, Vitosol 300-T, type SP3B

Combination	a mm	b mm
1.51 m^2/1.51 m^2	505/505	595
1.51 m^2/3.03 m^2	505/1010	850
3.03 m^2/3.03 m^2	1010/1010	1100

16.4 Vitosol 200-T vacuum tube collectors, type SP2A and type SPE (horizontal)

Observe the information on securing collectors on page 111.



Ⓐ Support slab A
Ⓑ Support slab B

- Type SP2A
  The yield can be optimised by rotating the vacuum tubes 25° to the horizontal.
- Type SPE
  The yield can be optimised by rotating the vacuum tubes 45° to the horizontal.

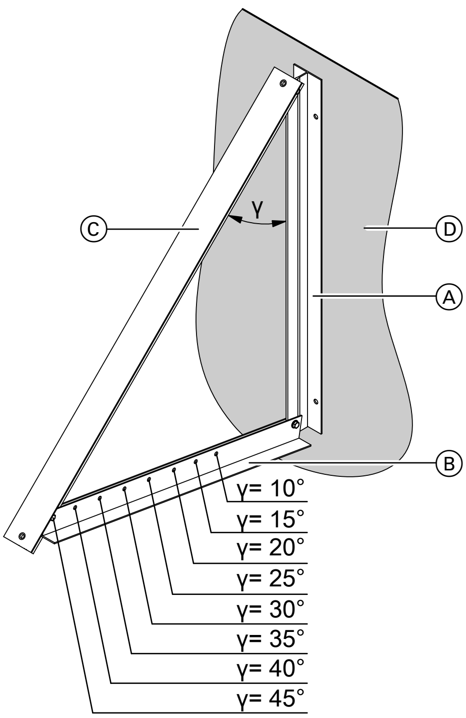
Design information for wall installation

17.1 Vitosol-F flat-plate collectors, type SH

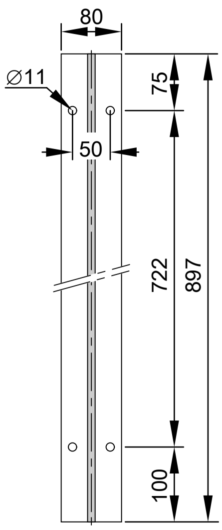
Observe the information on securing collectors on page 111.
The collector supports are pre-assembled. They consist of a base rail, a collector support and adjustable supports. The adjustable supports contain holes for adjusting the angle of inclination.

The fixing materials, e.g. screws, are to be provided on site.

Collector supports – angle γ 10 to 45°



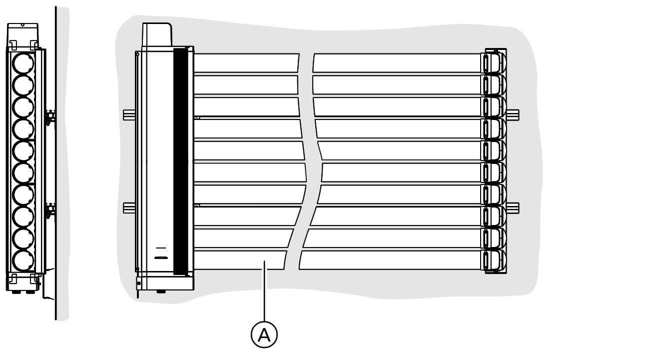
Ⓐ Base rail
Ⓑ Adjustable support
Ⓒ Collector support
Ⓓ Wall



Base rail hole dimensions

17.2 Vitosol 200-T vacuum tube collectors, type SP2A

Observe the information on securing collectors on page 111.



Ⓐ Wall or balcony

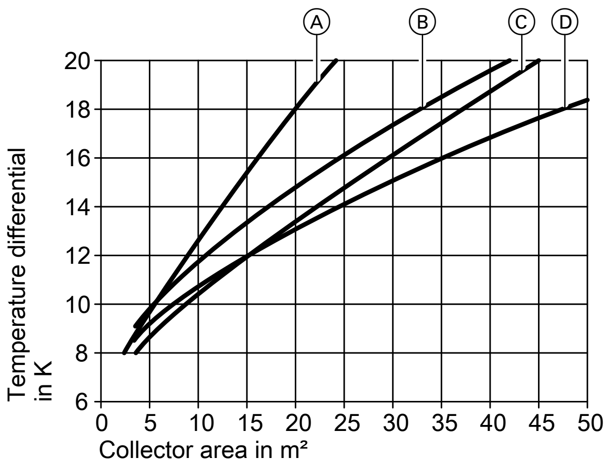
For installation on balconies a special balcony module sized 1.26 m^2 is available.

The yield can be optimised by rotating the individual tubes through 25°.
Establish the hydraulic connection from below.

Information regarding design and operation

18.1 Sizing the solar thermal system

All sizing recommended below relates to German climatic conditions and common utilisation profiles in the home. These profiles are stored in the Viessmann "ESOP" calculation program and correspond to the suggestions of VDI 6002-1 for apartment buildings.
Under these prerequisites, a design output of 600 W/m^2 is assumed for all heat exchangers. The maximum yield of a solar thermal system is assumed to be approx. 4 kWh/(m^2d). This value fluctuates depending on the product and location. To enable this heat yield to be transferred to the cylinder system, a ratio of approx. 50 l cylinder volume per m^2 aperture area is determined for all conventional designs. This ratio may change in relation to the system (subject to solar coverage and utilisation profiles). In this case, a system simulation is unavoidable.
Irrespective of the capacity, in relation to the transferable output, only a limited number of collectors can be connected to the various cylinders.
The transfer rate of the internal indirect coils depends on the temperature differential between the collector and cylinder temperatures.



Flow rate 25 l/(hm^2)

Ⓐ Vitocell 100-B, 300 l
Surface area, indirect coil 1.5 m^2
Ⓑ Vitocell-M/Vitocell-E, 750 l
Surface area, indirect coil 1.8 m^2
Ⓒ Vitocell 100-B, 500 l
Surface area, indirect coil 1.9 m^2
Ⓓ Vitocell-M/Vitocell-E, 950 l
Surface area, indirect coil 2.1 m^2

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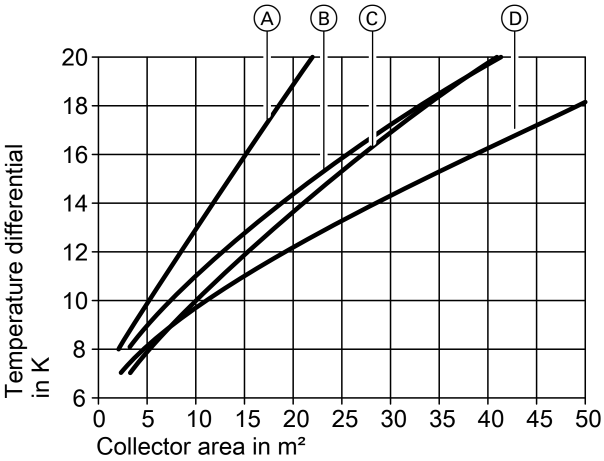


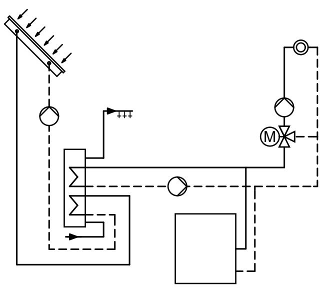
Flow rate 40 l/(hm²)

Ⓐ Vitocell 100-B, 300 l
Surface area, indirect coil 1.5 m²
Ⓑ Vitocell-M/Vitocell-E, 750 l
Surface area, indirect coil 1.8 m²
Ⓒ Vitocell 100-B, 500 l
Surface area, indirect coil 1.9 m²
Ⓓ Vitocell-M/Vitocell-E, 950 l
Surface area, indirect coil 2.1 m²

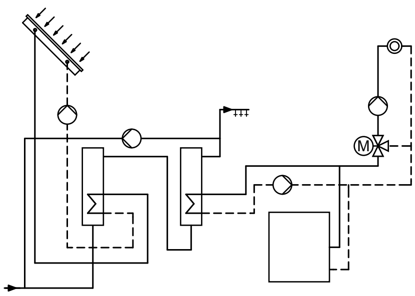
System for heating DHW

DHW heating in detached houses can be realised either with one dual mode DHW cylinder or with two mono mode DHW cylinders (for retrofitting an existing system).

Examples
For further detailed examples, see the "System examples" manual.



System with a dual mode DHW cylinder



System with two mono mode DHW cylinders

The basis for sizing a solar thermal system for DHW heating is the DHW demand.
Viessmann packs are sized for a solar coverage of approx. 60 %. The cylinder capacity must be greater than the daily DHW demand, taking the required DHW temperature into account.
To achieve solar coverage of approx. 60 %, the collector system must be sized so that the entire cylinder capacity can be heated on a single sunny day (5 hours of full sunshine) to at least 60 °C. This would allow for a subsequent day with poor insolation to be bridged.

Occupants	Daily DHW demand in l (60 °C)	Cylinder capacity in l		Collector	
		Dual mode	Mono mode	Number Vitosol-F SV/SH	Surface area Vitosol-T
2	60				
3	90	250/300	160		1 x 3.03 m²
4	120			2	
5	150	300/400	200		1 x 3.03 m²
6	180	400		3	1 x 1.51 m²
8	240				2 x 3.03 m²
10	300		300	4	
12	360	500		5	2 x 3.03 m² 1 x 1.51 m²
15	450		500	6	3 x 3.03 m²

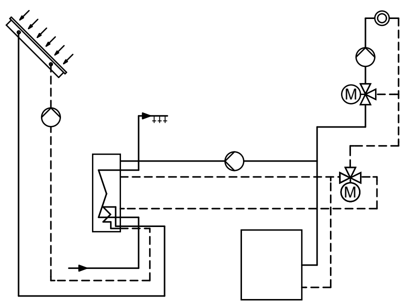
The details in the table apply under the following conditions:

- SW, S or SE orientation
- Roof pitches from 25 to 55°

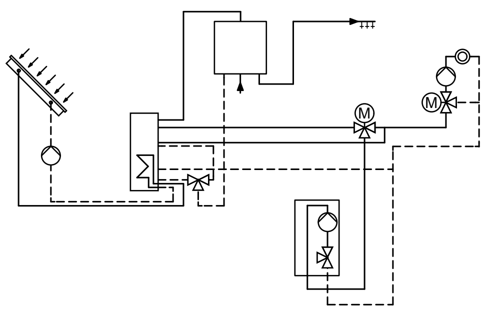
System for DHW heating and central heating backup

Systems for central heating backup can be designed with very simple hydraulic connections by using a heating water buffer cylinder with integral DHW heating, e.g. Vitocell 340-M or Vitocell 360-M. A Vitocell 140-E or 160-E heating water buffer cylinder, combined with a dual mode DHW cylinder or Vitotrans 353, can be used as an alternative. The Vitotrans 353 generates DHW in accordance with the instantaneous water heater principle, enabling high draw-off rates to be achieved. Static DHW volumes are reduced to a minimum.
The stratification system inside the Vitocell 360-M and Vitocell 160-E optimises the heating of the buffer cylinder. The water inside the buffer cylinder that is heated by solar energy is channelled by a heating lance directly into the upper area of the buffer cylinder. Consequently, DHW is made available more rapidly.

Examples
For further detailed examples, see the "System examples" manual.

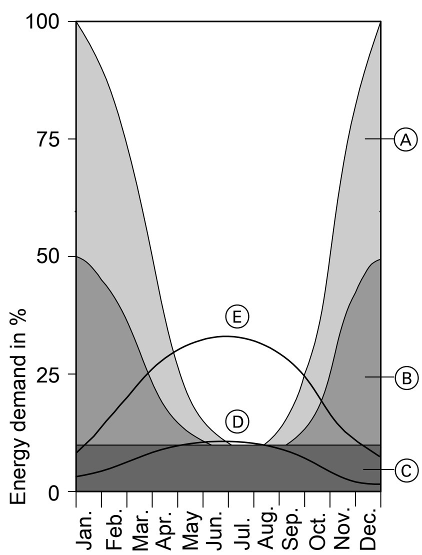


System with Vitocell-M heating water buffer cylinder



System with Vitocell-E heating water buffer cylinder and Vitotrans 353

For sizing a system for DHW heating and central heating backup, the seasonal efficiency of the entire heating system must be taken into consideration. The summer heat demand is always decisive. This is a combination of the heat demand for DHW heating and other project-specific consumers. The collector area must be sized for this demand. The calculated collector area is multiplied by a factor of 2 to 2.5. The result is the range within which the collector area should be for solar central heating backup. The precise determination is then made taking into consideration the building conditions and the planning of an operationally reliable collector array.



Ⓐ Central heating demand for a house (built in approx. 1984 or later)
Ⓑ Central heating demand for a low energy house
Ⓒ DHW demand
Ⓓ Solar yield at 5 m² absorber area
Ⓔ Solar yield at 15 m² absorber area

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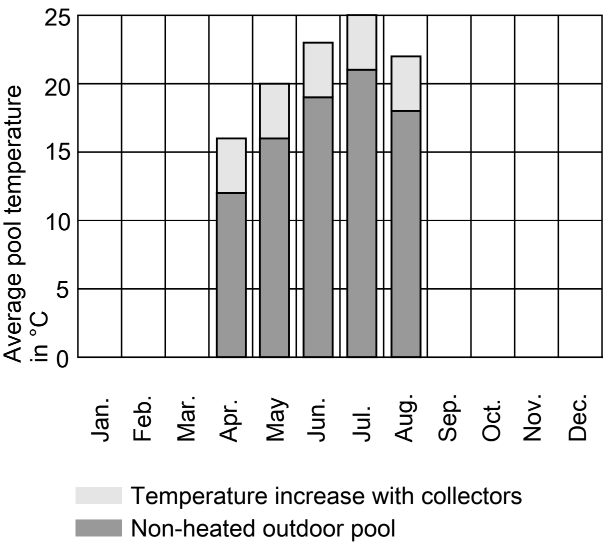
Occupants	Daily DHW demand in l (60 °C)	Buffer cylinder capacity in l	Collector	
			No. of Vitosol-F	Area of Vitosol-T, type SP2A/SP3B
2	60	750	4 x SV 4 x SH	2 x 3.03 m^2
3	90			
4	120	750/950		
5	150			2 x 3.03 m^2 1 x 1.51 m^2
6	180			
7	210	950	6 x SV 6 x SH	3 x 3.03 m^2
8	240			

For low energy houses (heat demand less than 50 kWh/(m^2 p.a.)), solar coverage of up to 35 %, relative to the total energy demand, incl. DHW heating, can be achieved according to this sizing. For buildings with a higher heat demand, the coverage is lower.

The Viessmann calculating program "ESOP" can be used for the exact calculation.

Swimming pool heating system – heat exchanger and collector

Outdoor pools
In central Europe, outdoor pools are mainly used between May and September. Your energy consumption depends primarily on the leakage rate, evaporation, loss (water must be replenished cold) and transmission heat loss. By using a cover, the evaporation and consequently the energy demand of the pool can be reduced to a minimum. The largest energy input comes directly from the sun, which shines onto the pool surface. Therefore the pool has a "natural" base temperature that can be shown in the following diagram as an average pool temperature over the operating time.
A solar thermal system does not alter this typical temperature pattern. The solar application leads to a definite increase in the base temperature. Subject to the ratio between the pool surface and the absorber area, a different temperature increase can be reached.

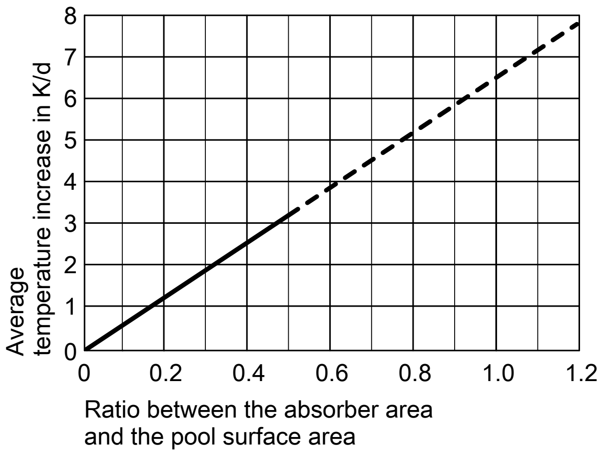


Typical temperature curve of an outdoor pool (average monthly values)

Location: Würzburg
Pool surface area: 40 m^2
Depth: 1.5 m
Position: Sheltered and covered at night

The following diagram shows what average temperature increase can be achieved with which ratio of absorber area to pool surface. This ratio is independent of the collector type used due to the comparably low collector temperatures and the operating period (summer).

Note
Heating and maintaining the pool temperature at a higher set temperature using a conventional heating system does not alter this ratio. However, the pool will be heated up much more quickly.



Indoor pools
Indoor pools generally have a higher target temperature than outdoor pools and are used throughout the year. If, over the course of the year, a constant pool temperature is required, indoor pools must be heated in dual mode. To avoid sizing errors, the energy demand of the pool must be measured. For this, suspend reheating for 48 hours and determine the temperature at the beginning and end of the test period. The daily energy demand can therefore be calculated from the temperature differential and the capacity of the pool. For new projects, the heat demand of the swimming pool must be calculated.
On a summer's day (clear skies), a collector system used to heat a swimming pool in central Europe produces energy of approx. 4.5 kWh/m^2 absorber area.

Calculation example for Vitosol 200-F
Pool surface area: 36 m^2
Average pool depth: 1.5 m
Pool capacity: 54 m^3
Temperature loss over 2 days: 2 K
Daily energy demand: 54 m^3 · 1 K · 1.16 (kWh/K · m^3) = 62.6 kWh
Collector area: 62.6 kWh: 4.5 kWh/m^2 = 13.9 m^2
This corresponds to 6 collectors.

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For a first approximation (cost estimate), an average temperature loss of 1 K/day can be used. With an average pool depth of 1.5 m, an energy demand of approx. 1.74 kWh/(d·m² pool surface area) is required to maintain the set temperature. It is therefore sensible to use an absorber area of approx. 0.4 m² per m² of pool surface.

Under the following conditions, never exceed the max. absorber area stated in the table:
- Design output of 600 W/m²
- Max. temperature differential between the swimming pool water (heat exchanger flow) and the solar circuit return 10 K

Vitotrans 200, type WTT	Part no.	3003 453	3003 454	3003 455	3003 456	3003 457
Max. connectable absorber area Vitosol	m²	28	42	70	116	163

18.2 Solar thermal system operating modes

Flow rate in the collector array

Collector systems can be operated with different specific flow rates. The unit for this is the flow rate in l/(hm²). The reference variable is the absorber area. At the same collector output, a higher flow rate means a lower temperature spread in the collector circuit; a lower flow rate means a higher temperature spread.
With a high temperature spread, the average collector temperature increases, i.e. the efficiency of the collectors drops. On the other hand, where the flow rates are lower, less energy is required to operate the pumps and the pipework can be sized smaller.

Operating modes:
- **Low flow operation**
  Operation with flow rates up to approx. 30 l/(hm²)
- **High flow operation**
  Operation with flow rates greater than 30 l/(hm²)
- **Matched flow operation**
  Operation with variable flow rates

All operating modes are possible with Viessmann collectors.

Which operating mode is the right one?

The specific flow rate must be high enough to ensure a reliable and even flow through the entire array. The optimum flow rate (relative to the current cylinder temperatures and the current insolation level) in systems with a Viessmann solar control unit will adjust itself automatically in matched flow operation. Single array systems with Vitosol-F or Vitosol-T can be operated without problems down to approx. 50 % of the specific flow rate.

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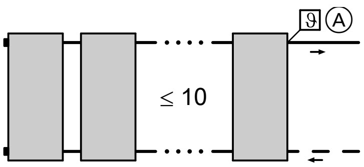
Example:
4.6 m² absorber area

Required flow rate: 25 l/(hm²)
This results in the following: 115 l/h, i.e. approx. 1.9 l/min
This value should be reached at 100 % pump rate. An adjustment can be made at the output stage of the pump. The positive primary energetic effect is lost if the required collector flow rate is achieved through a higher pressure drop (= higher power consumption). Choose the pump stage that lies above the required value. The flow rate is automatically reduced via the control unit through a lower current supply to the solar circuit pump.

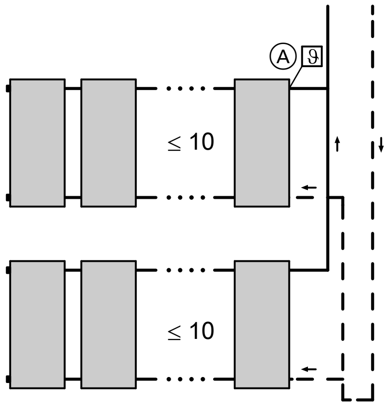
18.3 Installation examples Vitosol-F, type SV and SH

Take ventilation into consideration when designing the collector arrays (see chapter "Ventilation" on page 151).

High-flow operation — single-sided connection



Ⓐ Collector temperature sensor in the flow line



Ⓐ Collector temperature sensor in the flow line

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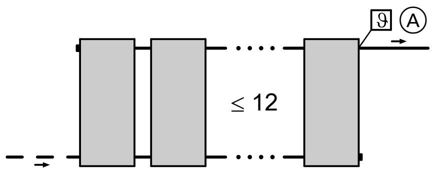
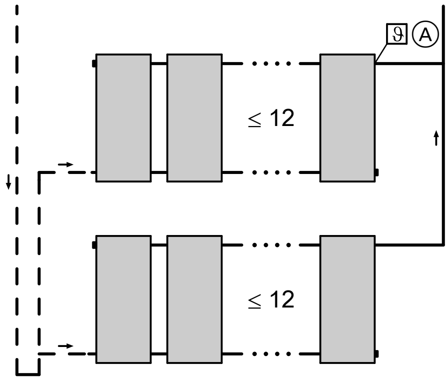
High-flow operation — connection on alternate sides

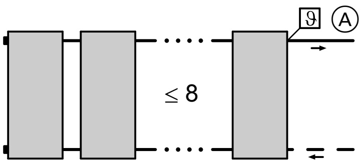


Ⓐ Collector temperature sensor in the flow line



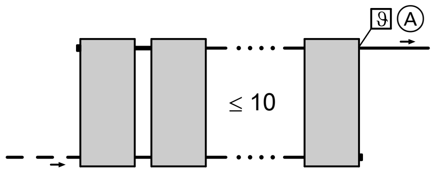
Ⓐ Collector temperature sensor in the flow line

Low-flow operation — single-sided connection



Ⓐ Collector temperature sensor in the flow line

Low-flow operation — connection on alternate sides



Ⓐ Collector temperature sensor in the flow line

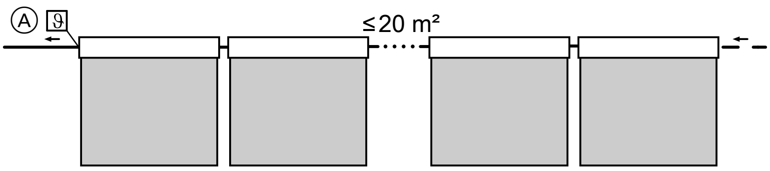
18.4 Installation examples Vitosol 200-T, type SPE

Take ventilation into consideration when designing the collector arrays (see chapter "Ventilation" on page 151).

Note
Max. 20 m² *absorber area can be connected in series to form a single array.*

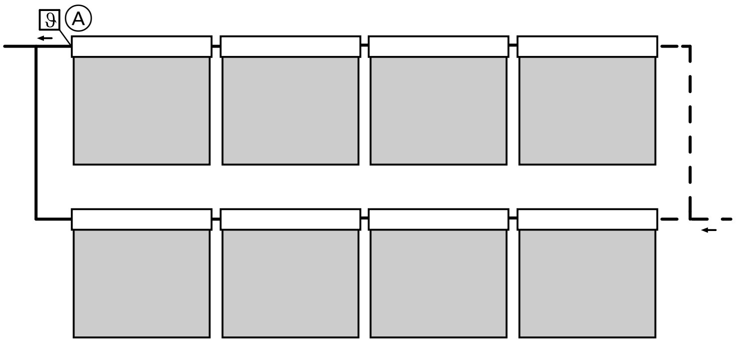
Vertical installation on pitched roofs, installation on supports or horizontal installation

Single row installation; connection from the left or right



Ⓐ Collector temperature sensor

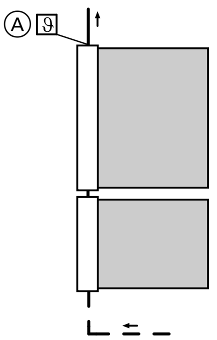
Installation in several rows, connection from the left or right



Ⓐ Collector temperature sensor

Horizontal installation on a pitched roof

1 collector array



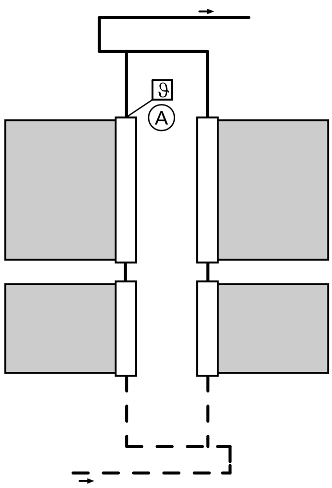
With this type of connection, the "Relay kick" function on the Vitosolic 200 must be enabled.

Ⓐ Collector temperature sensor

For this type of installation, ensure the following minimum flow rates in the collector array (section):

4 m²	35 l/(hm²)
5 m²	30 l/(hm²)
≥6 m²	25 l/(hm²)
3 m²	45 l/(hm²)
< 2 m²	65 l/(hm²)

2 or more collector arrays (≥ 4 m²)



With this type of connection, the **"Relay kick"** function on the Vitosolic 200 must be enabled.

Ⓐ Collector temperature sensor

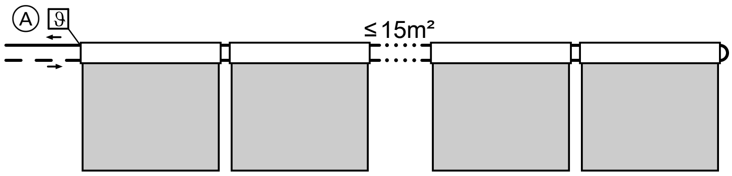
18.5 Installation examples Vitosol 200-T, type SP2A

Take ventilation into consideration when designing the collector arrays (see chapter "Ventilation" on page 151).

Note
Max. 15 m² *absorber area can be connected in series to form a single array.*

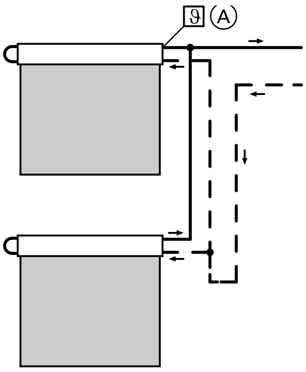
Vertical installation on pitched roofs, installation on supports or horizontal installation

Connection to the left

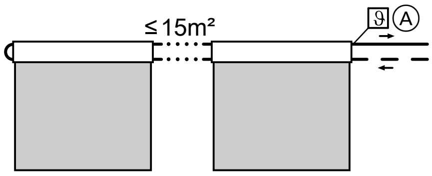


Ⓐ Collector temperature sensor in the flow line

Connection to the right



Ⓐ Collector temperature sensor in the flow line

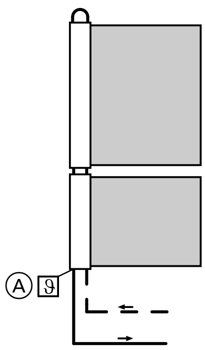


Ⓐ Collector temperature sensor in the flow line

Horizontal installation on pitched roofs and on walls

Single sided connection from below (preferred version)

1 collector array



With this connection, the **"Relay kick"** function on the Vitosolic 200 must be enabled (see chapter "Functions" in the "Solar control units" section).

Ⓐ Collector temperature sensor in the flow line

With this installation, the following minimum flow rates in the (partial) collector array must be ensured:

1.26 m² 110 l/(hm²)
1.51 m² 90 l/(hm²)
3.03 m² 45 l/(hm²)
4.54 m² 30 l/(hm²)
≥6.06 m² 25 l/(hm²)

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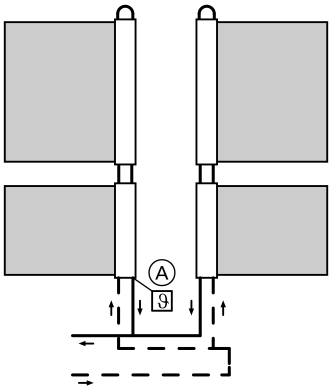
2 or more collector arrays (≥ 4 m²)



With this connection, the **"Relay kick"** function on the Vitosolic 200 must be enabled (see chapter "Functions" in the "Solar control units" section).

Ⓐ Collector temperature sensor in the flow line

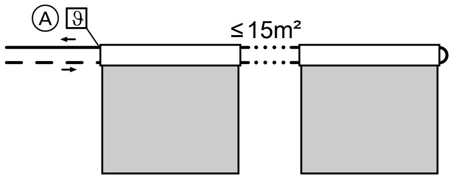
18.6 Installation examples Vitosol 300-T, type SP3B

Take ventilation into consideration when designing the collector arrays (see chapter "Ventilation" on page 151).

Note
***Max. 15 m²** collector area can be linked up to form a single array.*

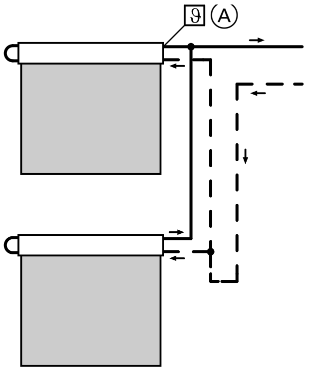
Vertical installation on pitched roofs and installation on supports

Connection to the left

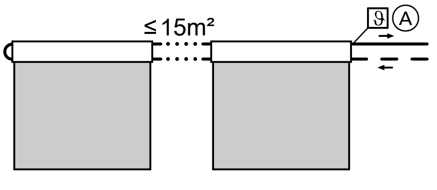


Ⓐ Collector temperature sensor in the flow line

Connection to the right



Ⓐ Collector temperature sensor in the flow line



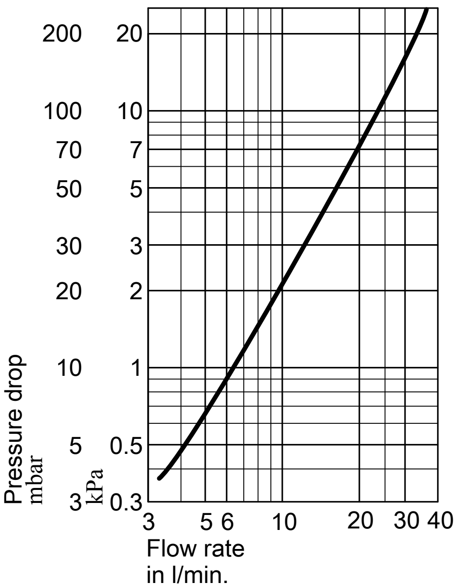
Ⓐ Collector temperature sensor in the flow line

18.7 Pressure drop of the solar thermal system

- The specific flow rate for the collectors is determined by the type of collector and the intended method of operation of the collector array. The way the collectors are linked determines the pressure drop of the collector array.
- The overall flow rate for the solar thermal system results from multiplying the specific flow rate by the absorber area. Assuming a required flow velocity of between 0.4 and 0.7 m/s (see page 148), the pipework dimension is then determined.
- Once the pipework dimension has been determined, the pressure drop for the pipework (in mbar/m) is then calculated.
- External heat exchangers must be calculated as well and should not exceed a pressure drop of 100 mbar/10 kP. For smooth tube internal indirect coils, the pressure drop is much lower and can be ignored in solar thermal systems with a collector area of up to 20 m^2.
- The pressure drop of further solar circuit components can be seen from the technical documentation and is included in the overall calculation.
- When calculating the pressure drop, take into account the fact that the heat transfer medium has a different viscosity to pure water. The hydraulic characteristics become more similar as the temperature of the media increases. At low temperatures around freezing, the high viscosity of the heat transfer medium may result in a pump rate some 50 % higher than for pure water. With a medium temperature above approx. 50 °C (controlled operation of solar thermal systems), the difference in viscosity is only minor.

Pressure drop of the solar flow and return lines

Per m pipe length, corrugated stainless steel pipe DN 16, relative to water, corresponds to Tyfocor LS at approx. 60 °C



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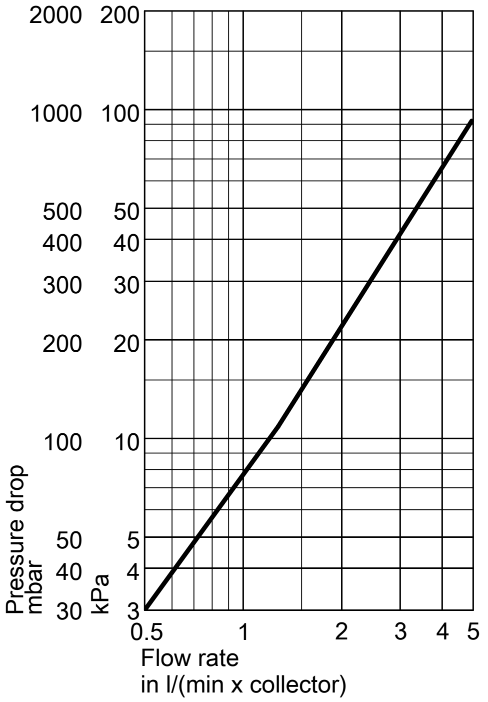
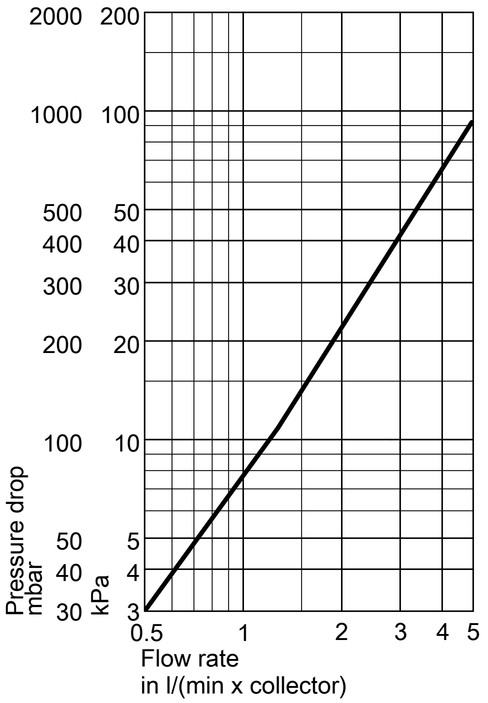
Pressure drop of Vitosol 200-F, type SV and SH

Relative to water, corresponds to Tyfocor LS at approx. 60 °C



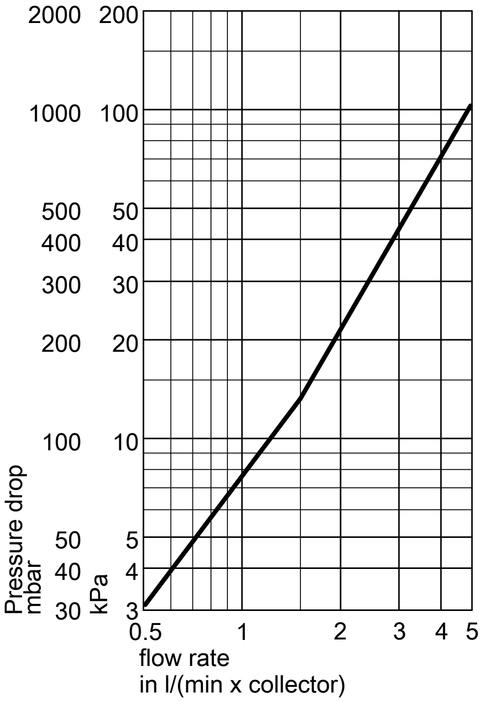
Pressure drop of Vitosol 100-F, type SV and SH

Relative to water, corresponds to Tyfocor LS at approx. 60 °C



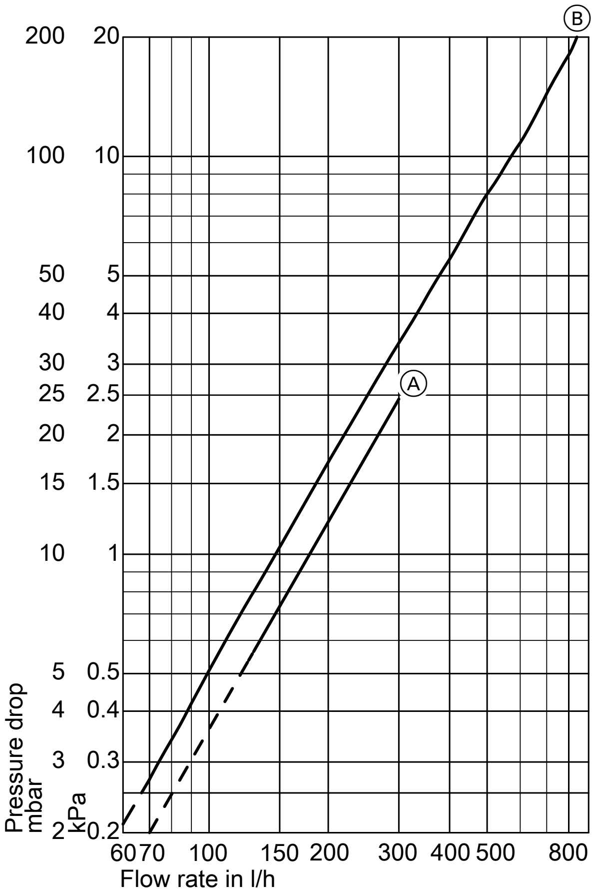
Pressure drop of Vitosol 300-F, type SV and SH

Relative to water, corresponds to Tyfocor LS at approx. 60 °C



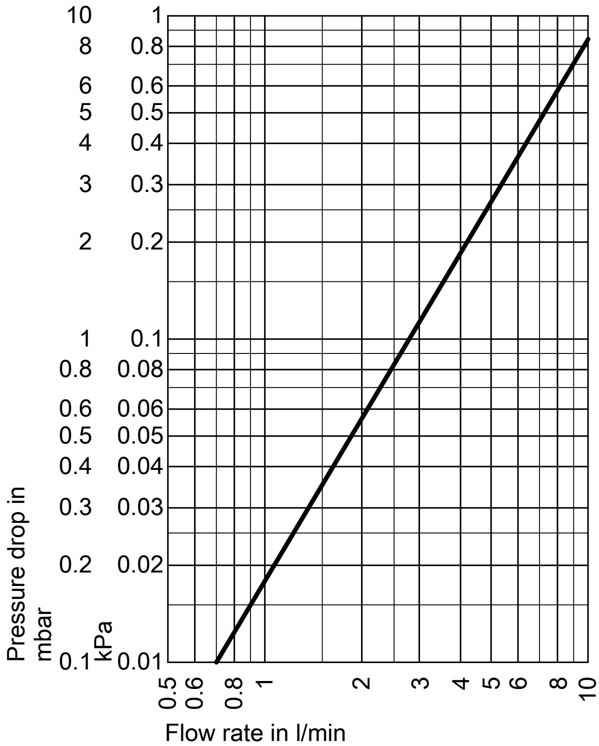
Pressure drop of Vitosol 200-T and Vitosol 300-T

Relative to water, corresponds to Tyfocor LS at approx. 60 °C



Pressure drop of Vitosol 200-T, type SP2A and Vitosol 300-T, type SP3B

Ⓐ 1.26/1.51 m²
Ⓑ 3.03 m²



Pressure drop of Vitosol 200-T, type SPE

18.8 Flow velocity and pressure drop

Flow velocity

To minimise the pressure drop through the solar thermal system pipework, the flow velocity in the copper pipe should not exceed 1 m/s. In accordance with VDI 6002-1, we recommend flow velocities of between **0.4 and 0.7 m/s**. At these flow velocities, a pressure drop of between 1 and 2,5 mbar/m/0.1 and 0.25 kPa/m pipe length will result.

Note
A higher flow velocity results in a higher pressure drop. A substantially lower velocity will make venting harder.

The air that collects at the collector must be routed downwards through the solar flow line to the air vent valve. For the installation of collectors, we recommend sizing the pipes as for a normal heating system according to flow rate and velocity (see the following table).
Subject to the flow rate and pipe dimension, different flow velocities result.

Flow rate (total collector area)		Flow velocity in m/s						
		Pipe dimension						
l/h	l/min	DN 10	DN 13	DN 16	DN20	DN25	DN32	DN40
		Dimensions						
		12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5	35 x 1.5	42 x 1.5
125	2.08	0.44	—	—	—	—	—	—
150	2.50	0.53	0.31	—	—	—	—	—
175	2.92	0.62	0.37	0.24	—	—	—	—
200	3.33	0.70	0.42	0.28	0.18	—	—	—
250	4.17	0.88	0.52	0.35	0.22	—	—	—
300	5.00	1.05	0.63	0.41	0.27	—	—	—
350	5.83	—	0.73	0.48	0.31	—	0.11	—
400	6.67	—	0.84	0.55	0.35	0.23	0.13	0.09
450	7.50	—	0.94	0.62	0.40	0.25	0.14	0.10
500	8.33	—	—	0.69	0.44	0.28	0.16	0.12
600	10.00	—	—	0.83	0.53	0.34	0.19	0.14
700	11.67	—	—	0.97	0.62	0.40	0.22	0.16
800	13.33	—	—	—	0.71	0.45	0.25	0.19
900	15.00	—	—	—	0.80	0.51	0.28	0.21
1000	16.67	—	—	—	—	0.57	0.31	0.23
1500	25.00	—	—	—	—	0.85	0.47	0.35
2000	33.33	—	—	—	—	1.13	0.63	0.46
2500	41.67	—	—	—	—	—	079	0.58
3000	50.00	—	—	—	—	—	0.94	0.70

Recommended pipe dimension

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Pressure drop of the pipework

For water/glycol mixtures at temperatures higher than 50 °C.

Flow rate (total collector area)	Pressure drop per m pipe length (including valves) in mbar/m / kPa/m				
	Pipe dimension				
l/h	DN 10	DN 13	DN 16	DN20	DN25
	Dimensions				
	12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
100	4.6/0.46				
125	6.8/0.68				
150	9.4/0.94				
175	12.2/1.22				
200	15.4/1.54	4.4/0.44			
225	18.4/1.84	5.4/0.54			
250	22.6/2.26	6.6/0.66	2.4/0.24		
275	26.8/2.68	7.3/0.73	2.8/0.28		
300		9.0/0.90	3.4/0.34		
325		10.4/1.04	3.8/0.38		
350		11.8/1.18	4.4/0.44		
375		13.2/1.32	5.0/0.50		
400		14.8/1.48	5.6/0.56	2.0/0.20	
425		16.4/1.64	6.2/0.62	2.2/0.22	
450		18.2/1.82	6.8/0.68	2.4/0.24	
475		20.0/2.00	7.4/0.74	2.6/0.26	
500		22.0/2.20	8.2/0.82	2.8/028	
525			8.8/0.88	3.0/0.30	
550			9.6/0.96	3.4/0.34	
575			10.4/1.04	3.6/0.36	
600			11.6/1.16	3.8/0.38	
625				4.2/0.42	
650				4.4/0.44	
675				4.8/0.48	
700				5.0/0.50	1.8/0.18
725				5.4/0.54	1.9/0.19
750				5.8/0.58	2.0/0.20
775				6.0/0.60	2.2/0.22
800				6.4/0.64	2.3/0.23
825				6.8/0.68	2.4/0.24
850				7.2/0.72	2.5/0.25

Flow rate (total collector area) l/h	Pressure drop per m pipe length (including valves) in mbar/m / kPa/m				
	Pipe dimension DN 10	DN 13	DN 16	DN20	DN25
	Dimensions 12 x 1	15 x 1	18 x 1	22 x 1	28 x 1.5
875				7.6/0.76	2.6/0.26
900				8.0/0.80	2.8/0.28
925				8.4/0.84	2.9/0.29
950				8.8/0.88	3.0/0.30
975				9.2/0.92	3.2/0.32
1000				9.6/0.96	3.4/0.34

Range between 0.4 and 0.7 m/s flow velocity

18.9 Sizing the circulation pump

If the flow rate and pressure drop of the entire solar thermal system are known, the pump can be selected on the basis of the pump curve.
Viessmann supplies the Solar-Divicon and a separate solar pump assembly to simplify the installation and the selection of pumps and safety equipment. For construction and specification see chapter "Installation accessories".

Note
The Solar-Divicon and the solar pump assembly are unsuitable for direct contact with swimming pool water.

Absorber area in m²	Specific flow rate in l/(hm²) 25	30	35	40	50	60	80
	Low flow operation	High flow operation					
	Flow rate in l/min						
2	0.83	1.00	1.17	1.33	1.67	2.00	2.67
3	1.25	1.50	1.75	2.00	2.50	3.00	4.00
4	1.67	2.00	2.33	2.67	3.33	4.00	5.33
5	2.08	2.50	2.92	3.33	4.17	5.00	6.67
6	2.50	3.00	3.50	4.00	5.00	6.00	8.00
7	2.92	3.50	4.08	4.67	5.83	7.00	9.33
8	3.33	4.00	4.67	5.33	6.67	8.00	10.67
9	3.75	4.50	5.25	6.00	7.50	9.00	12.00
10	4.17	5.00	5.83	6.67	8.33	10.00	13.33
12	5.00	6.60	7.00	8.00	10.00	12.00	16.00
14	5.83	7.00	8.17	9.33	11.67	14.00	18.67
16	6.67	8.00	9.33	10.67	13.33	16.00	21.33
18	7.50	9.00	10.50	12.00	15.00	18.00	24.00
20	8.33	10.00	11.67	13.33	16.67	20.00	26.67
25	10.42	12.50	14.58	16.67	20.83	25.00	33.33
30	12.50	15.00	17.50	20.00	25.00	30.00	—
35	14.58	17.50	20.42	23.33	29.17	35.00	—
40	16.67	20.00	23.33	26.67	33.33	—	—
50	20.83	25.00	29.17	33.33	—	—	—
60	25.00	30.00	35.00	—	—	—	—
70	29.17	35.00	—	—	—	—	—
80	33.33	—	—	—	—	—	—

Use of type PS10 or P10, with a residual head of 150 mbar/15 kPa (≙ 1.5 m)
Use of type PS20 or P20, with a residual head of 260 mbar/26 kPa (≙ 2.6 m)

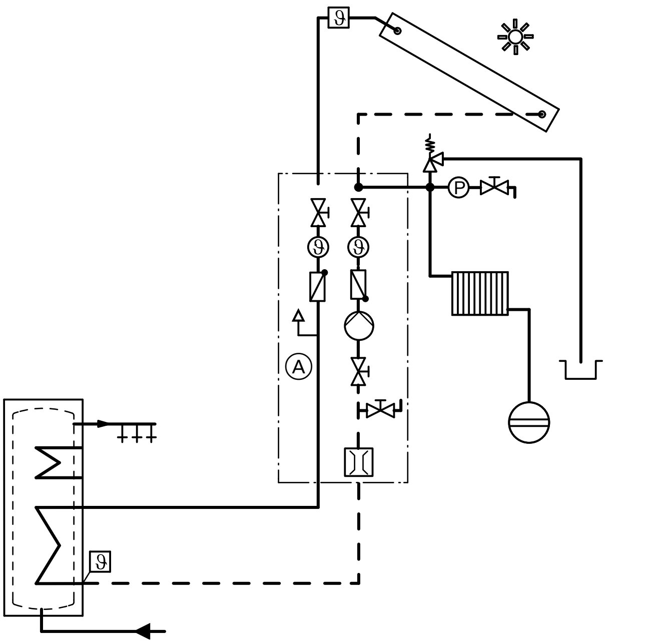
Information regarding solar thermal systems with Vitosolic
Pumps with a power consumption of more than 190 W, in conjunction with a Vitosolic solar control unit, must be connected via an additional relay (on site).

18.10 Ventilation

At points in the system that are at high risk from steam or in roof installations, only use air separators with manual air vent valves, which require regular manual venting. This is particularly necessary after filling.
Correct ventilation of the solar circuit is a prerequisite for trouble-free and efficient operation of the solar thermal system. Air in the solar circuit generates noise and puts at risk the reliable flow through the collectors or through individual array sections. In addition it can lead to accelerated oxidation of organic heat transfer media (e.g. commercially available mixtures of water and glycol).

Air vent valves are used to vent air from the solar circuit:
- Manual air vent valve
- Automatic air vent valve
  - Quick-action air vent valve
  - Air separator

Solar thermal systems with a heat transfer medium have to be vented for longer than those filled with water. We therefore recommend automatic ventilation in such systems.
For the construction and specification of air vent valves, see chapter "Installation accessories".
The air vent valves are installed in the solar flow line at an accessible point in the installation room upstream of the heat exchanger inlet.



Ⓐ Air vent valve, built into Solar-Divicon

When setting up and connecting larger collector arrays, the ventilation characteristics of the system can be optimised by flow lines joined above the collectors. This prevents air bubbles from causing flow problems in individual collectors in partial arrays linked in parallel.
In systems higher than 25 m above the air vent valve, air bubbles that form in the collectors are dispersed again as a result of the high pressure increase. In such cases, we recommend using vacuum deaerator systems.

18.11 Safety equipment

Stagnation in solar thermal systems

All safety equipment in a solar thermal system must be designed for stagnation. If, during insolation on the collector array, heat can no longer be transferred inside the system, the solar circuit pump stops and the solar thermal system goes into stagnation. Longer system idle times, e.g. due to faults or incorrect operation, can never be completely ruled out. This results in a rise in temperature up to the maximum collector temperature. Energy yield and loss are then the same. In the collectors, temperatures are reached that exceed the boiling point of the heat transfer medium. For this reason, solar thermal systems must be designed to be fail-safe in accordance with the relevant regulations.

Being fail-safe means the following:
- The solar thermal system must not be damaged by stagnation.
- The solar thermal system must not pose any risk during stagnation.
- Following stagnation, the solar thermal system must automatically return to operation.
- Collectors and pipework must be engineered for the temperatures expected during stagnation.

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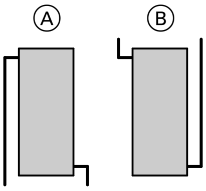
A lower system pressure is beneficial where stagnation characteristics are concerned: **1 bar/0.1 MPa** positive pressure (during filling and at a heat transfer medium temperature of approx. 20 °C) at the collector is adequate. A definitive parameter when designing pressure maintenance and safety equipment is the **steam production capacity**. This indicates the output of the collector array, which during stagnation is transferred to the pipework in the form of steam. The maximum steam production capacity is influenced by the draining characteristics of the collectors and the array. Subject to collector type and hydraulic connection, different steam production capacities can occur (see figure below).



Ⓐ Flat-plate collector without liquid pocket
Steam production capacity = 60 W/m²

Ⓑ Flat-plate collector with liquid pocket
Steam production capacity = 100 W/m²

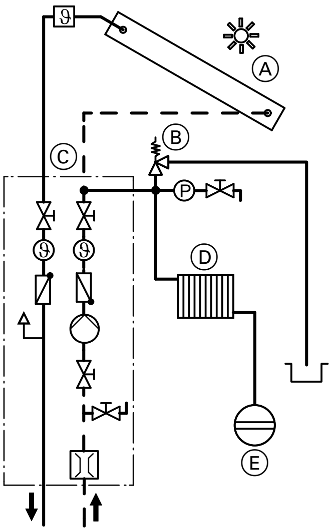
Note
For vacuum tube collectors based on the heat pipe principle, a steam production capacity of 100 W/m² can be expected, no matter where the collectors are installed.

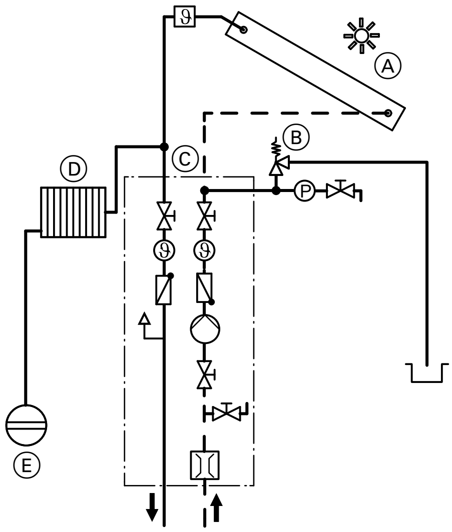
The length of pipe that holds steam during stagnation (steam spread) is calculated from the balance between the steam production capacity of the collector array and the heat loss from the pipework. The actual values assumed for the loss from a solar circuit pipe made from copper and 100 % insulated with commercially available material are as follows:

Dimensions	Heat loss in W/m
12 x 1/15 x 1/18 x 1	25
22 x 1/28 x 1.5	30

- Steam spread **less** than the pipe run in the solar circuit (flow and return) between collector and expansion vessel:
  The steam cannot reach the expansion vessel in the event of stagnation. The displaced volume (collector array and pipework filled with steam) must be taken into account when sizing the expansion vessel.
- Steam spread is **greater** than the pipe run in the solar circuit (flow and return) between collector and expansion vessel:
  Plan in a cooling line (heat sink) to protect the expansion vessel diaphragms against thermal overload (see figures below). Steam condenses again in this cooling line and reduces the liquefied heat transfer medium to a temperature below 70 °C.

Expansion vessel and heat sink in the return	Expansion vessel and heat sink in the flow
The steam can spread in the flow and return.	The steam can only spread in the flow.





Ⓐ Collector
Ⓑ Safety valve
Ⓒ Solar-Divicon
Ⓓ Heat sink
Ⓔ Expansion vessel

The necessary residual cooling capacity is determined from the differential between the steam production capacity of the collector array and the heat dissipation of the pipework up to the connection point for the expansion vessel and the heat sink.

Note
*The "SOLSEC" program is available at **www.viessmann.com** for calculating the residual cooling capacity and sizing the heat sink.*

The program offers three options:
- Sufficiently long, uninsulated pipework branching to the expansion vessel
- A sufficiently large pre-cooling vessel, in relation to the cooling capacity
- A correctly sized stagnation cooler

For the heat sink, standard radiators with an output calculated at 115 K are assumed. For greater clarity, the program indicates the heating output as 75/65 °C.

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Note
As contact protection, Viessmann stagnation coolers (see page 106) are equipped with a plate without flow due to the anticipated high temperature on the surface. When using commercially available radiators, contact protection must be provided and the connections must be diffusion-proof. All components must be able to withstand temperatures of up to 180 °C.

Specification

	Output at 75/65 °C in W	Cooling capacity during stagnation in W	Liquid content in l
Stagnation cooler			
– Type 21	482	964	1
– Type 33	835	1668	2
Pre-cooling vessel	—	450	12

Expansion vessel

For layout, function and specification of the expansion vessel, see chapter "Installation accessories".
The expansion vessel can be calculated once the steam spread has been determined and any heat sinks that may be used have been taken into consideration.

The required volume is determined by the following factors:
- Expansion of the heat transfer medium in its liquid state
- Liquid seal
- Expected steam volume, taking account of the static head of the system
- Pre-charge pressure

$V_{dev} = (V_{col} + V_{dpipe} + V_e + V_{fv}) \cdot Df$

V_{dev} Rated volume of the expansion vessel in l
V_{col} Liquid content of the collectors in l
V_{dpipe} Content of the pipework subject to steam loads in l (Calculated from the steam spread and the pipework content per m pipe length)
V_e Increase in the volume of the heat transfer medium in its liquid state in l
$V_e = V_a \cdot \beta$
V_a System volume (content of the collectors, the heat exchanger and the pipework)
β Expansion factor
β = 0.13 for Viessmann heat transfer medium from −20 to 120 °C
V_{fv} Liquid seal in the expansion vessel in l (4 % of the system volume, min. 3 l)
Df Pressure factor
$(p_e + 1) : (p_e - p_o)$
p_e Max. system pressure at the safety valve in bar (90 % of the safety valve response pressure)
p_o System pre-charge pressure
p_o = 1 bar + 0.1 bar/m static head

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To determine the system and steam volume in the pipework, the content per m of pipe must be taken into consideration.

Vitotrans 200, type WTT	Part no.		3003 453	3003 454	3003 455	3003 456	3003 457	3003 458	3003 459
Contents	l		4	9	13	16	34	43	61

Copper pipe	Dim.	12 × 1	15 × 1	18 × 1	22 × 1	28 × 1.5	35 × 1.5	42 x 1.5
		DN 10	DN 13	DN 16	DN20	DN25	DN32	DN40
Contents	l/m pipe	0.079	0.133	0.201	0.314	0.491	0.804	1.195

Corrugated stainless steel pipe	Dim.	DN 16
Contents	l/m pipe	0.25

For the liquid content of the following components see the relevant "Specification" chapter:
- Collectors
- Solar-Divicon and solar pump assembly
- DHW cylinder and heating water buffer cylinder

Selection of the expansion vessel
The details in the following table are standard values. They allow quick estimates at the design and calculation stage. These values must be verified by appropriate calculations. The selection relates to system hydraulics with a liquid "bag" (see page 152) and to the use of a 6-bar safety valve.

Note
Check the size of the expansion vessel on site.

Vitosol-F, type SV

Absorber area in m²	Static head in m	System capacity in l	Recom. capacity of the expansion vessel in l	Recom. heat sink (see page 106)
2.3	5	22.3	18	—
	10	25.7	25	
	15	29.2		
4.6	5	24.7	25	2 m uninsulated pipe
	10	27.6		—
	15	31.0		—
6.9	5	28.5	40	Type 21
	10	29.6		0.6 m uninsulated pipe
	15	32.9		—
9.2	5	30.3	40	Type 21
	10	33.8		
	15	34.7		—
11.5	5	32.2	40	Type 21
	10	35.6	50	
	15	39.1		
13.8	5	34.0	40	
	10	37.4	50	
	15	40.9	80	
16.1	5	35.8	50	
	10	39.3		
	15	42.7	80	
18.4	5	37.7	50	
	10	41.1	80	
	15	44.6		

Vitosol-F, type SH

Absorber area in m²	Static head in m	System capacity in l	Recom. capacity of the expansion vessel in l	Recom. heat sink (see page 106)
2.3	5	22.9	18	—
	10	26.4	25	
	15	29.8		
4.6	5	26.0	40	2 m uninsulated pipe
	10	28.9		—
	15	32.3		—
6.9	5	30.5	40	Type 21
	10	31.5		0.6 m uninsulated pipe
	15	34.8	50	—
9.2	5	32.9	40	Type 21
	10	36.4		
	15	37.3	50	—
11.5	5	35.4	50	Type 21
	10	38.9		
	15	42.3	80	
13.8	5	37.9	50	
	10	41.3	80	
	15	44.8		
16.1	5	40.4	50	
	10	43.8	80	
	15	47.3		
18.4	5	42.9	80	
	10	46.3		
	15	49.8		

Vitosol-T

Absorber area in m^2	Static head in m	System capacity in l	Recom. capacity of the expansion vessel in l	Recom. heat sink (see page 106)
1.51	5	21.7	18	—
	10	25.1		
	15	28.6	18	
3.03	5	22.3	18	
	10	25.7	25	
	15	29.2		
4.54	5	23.3	25	1.5 m uninsulated pipe
	10	23.6		—
	15	29.8	40	—
6.06	5	26.6	25	Type 21
	10	27.5	40	—
	15	31.0		—
7.57	5	27.8	40	Type 21
	10	31.3		
	15	32.2	50	—
9.09	5	28.4	40	Type 21
	10	31.9		
	15	32.8	50	—
10.60	5	29.0	40	Type 21
	10	32.5	50	
	15	33.8	80	1.2 m uninsulated pipe
12.12	5	30.2	40	Type 21
	10	33.7	50	
	15	37.1	80	
15.15	5	32.0	40	
	10	35.5	50	
	15	37.2	80	

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Safety valve

The heat transfer medium is drained from the solar thermal system via the safety valve if the max. permissible system pressure (6 bar/0.6 MPa) is exceeded. According to DIN 3320, the response pressure of the safety valve is the max. system pressure +10 %.
The safety valve must comply with EN 12975 and 12977, be matched to the heating output of the collectors and be able to handle their maximum output of 900 W/m^2.

Absorber area in m^2	Valve size (size of the inlet cross-section) DN
40	15
80	20
160	25

Discharge and drain lines must terminate in an open container, capable of collecting the total capacity of the collectors.
Use only safety valves sized for max. 6 bar/0.6 MPa and 120 °C, which bear the marking "S" (solar) as part of the product identification.

Note
The Solar-Divicon is equipped with a safety valve for up to 6 bar/0.6 MPa and 120 °C.

High limit safety cut-out

The solar control units Vitosolic 100 and 200 are equipped with an electronic temperature limiter.
A high limit safety cut-out in the cylinder is required when less than 40 litres cylinder capacity is available per m^2 absorber area. This reliably prevents temperatures above 95 °C in the cylinder.

Example:
3 Vitosol-F flat-plate collectors, 7 m^2 absorber area
DHW cylinder with 300 l cylinder capacity
300 : 7 = 42.8 l/m^2,
e.g. a high limit safety cut-out is **not** required.

18.12 Additional function for DHW heating

DVGW W 551 specifies that the total water content must be maintained at least at 60 °C and the DHW preheating stages must be heated once every day to 60 °C.
- Systems with a cylinder capacity, incl. DHW preheating stages, in excess of 400 l
- Systems with a pipework capacity in excess of 3 l from the DHW cylinder to the draw-off point

We recommend heating up in late afternoon. This ensures that the lower cylinder area or the preheating stage is cold again following the expected draw-offs (evenings and the following morning) and can subsequently be heated up again by solar energy.

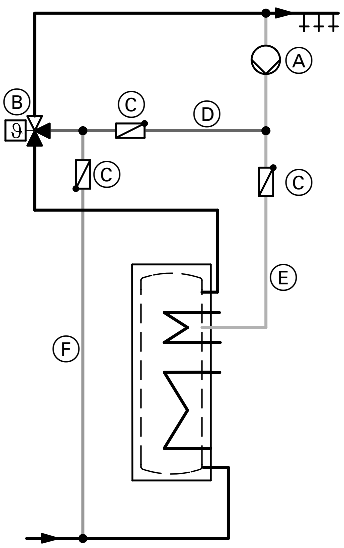
Note
For detached and two-family houses, this heat-up is recommended, but not compulsory.

5822 440 GB

18.13 Connecting the DHW circulation and thermostatic mixing valve

To ensure trouble-free functioning of the solar thermal system, it is important that, in the DHW cylinder, areas with cold water are available to receive the solar energy. These areas must not under any circumstances be reached by the DHW circulation return. The DHW circulation connection in the DHW cylinder **must** therefore be used (see following diagram).
DHW with **temperatures in excess of 60 °C** can cause scalding. To limit the temperature to 60 °C, install a mixing device, e.g. a thermostatic mixing valve (see page 107). If the maximum set temperature is exceeded, the valve mixes cold water into the DHW as it is drawn off.
If the thermostatic mixing valve is used in conjunction with a DHW circulation pipe, a bypass line is required between the DHW circulation inlet on the DHW cylinder and the cold water inlet on the mixing valve. To avoid incorrect circulation, a check valve should be installed (see following diagram).

Note
Viessmann offers a thermostatic DHW circulation set as an accessory (see page 107).



Ⓐ DHW circulation pump
Ⓑ Automatic thermostatic mixing valve
Ⓒ Check valve
Ⓓ DHW circulation return in summer
Line required to prevent excessive temperatures in summer.
Ⓔ DHW circulation return in winter
Flow temperature max 60 °C.
Ⓕ Thermostatic mixing valve inlet
Pipe runs as short as possible, as these receive no flow in winter.

18.14 Intended use

The appliance is only intended to be installed and operated in sealed unvented systems that comply with EN 12828 / DIN 1988, or solar thermal systems that comply with EN 12977, with due attention paid to the associated installation, service and operating instructions. DHW cylinders are only designed to store and heat water of potable water quality. Heating water buffer cylinders are only designed to hold fill water of potable water quality. Only operate solar collectors with the heat transfer medium approved by the manufacturer.

Intended use presupposes that a fixed installation in conjunction with permissible, system-specific components has been carried out.

Commercial or industrial usage for a purpose other than heating the building or DHW shall be deemed inappropriate.

Any usage beyond this must be approved by the manufacturer for the individual case.

Incorrect usage or operation of the appliance (e.g. the appliance being opened by the system user) is prohibited and results in an exclusion of liability.

Incorrect usage also occurs if the components in the system are modified from their intended use (e.g. through direct DHW heating in the collector).

Adhere to statutory regulations, especially concerning the hygiene of potable water.

19.1 Subsidy programs, permits and insurance

Solar thermal systems play an important role in protecting natural resources and the environment. Together with advanced Viessmann heating systems, they create an optimum system solution that is fit for the future for DHW and swimming pool heating, central heating backup and other low temperature applications. This is why solar thermal systems are frequently subsidised by government.
Application forms and subsidy conditions can be obtained from the Federal Office of Economics and Export Control (www.bafa.de). Solar thermal systems are subsidised by some national, regional and local authorities. Further information is available from our sales offices.
Information regarding current subsidy programs [Germany] is also available at "**www.viessmann.com**" (Fördermittel [subsidy programmes]>Förderprogramme des Bundes [subsidy programmes in Germany]).

Viessmann collectors meet the requirements of the "Blue Angel" certificate of environmental excellence to RAL UZ 73. The approval of solar thermal systems is not universally regulated. Your local planning office will be able to advise you on whether solar thermal systems need planning permission.
Viessmann solar collectors are tested for impact resistance, for example against hailstones, to DIN EN 12975-2. Nevertheless we recommend that the user insures against extreme weather conditions and includes the collectors on their buildings insurance. Damage due to these conditions is excluded from our warranty.

19.2 Glossary

Absorber
Device contained inside a solar collector designed to absorb radiation energy and transfer this as heat to a liquid.

Absorption
Radiation absorption

Irradiance (insolation)
Radiation level impacting on a unit of surface area, expressed in W/m^2.

Emission
Radiation of beams, e.g. light or particles

Evacuating
Extraction of the air from a container. This reduces the air pressure, thereby creating a vacuum.

Steam production capacity
The output of the collector array in W/m^2 that, during stagnation, is transferred into the pipework in the form of steam. The max. steam production capacity is influenced by the draining characteristics of the collectors and the collector array (see page 152).

Steam spread
Length of the pipework that is subjected to steam loads during stagnation. The max. steam spread is dependent on the heat loss characteristics of the pipework (thermal insulation). Conventional details refer to 100 % insulation strength.

Heat pipe
Sealed capillary container that contains a small volume of highly volatile liquid.

Condenser
Device where steam is precipitated as a liquid.

Convection
Transfer of heat by the flow of a medium. Convection creates energy losses caused by a temperature differential, e.g. between the glass pane of the collector and the hot absorber.

Standard roof pitch
The roof pitch limit, at which the roof cover is considered to be adequately protected against the ingress of rain, is described as standard roof pitch.
The rules stated here correspond to the rules of the [German] roofing contractor trade. Observe alternative manufacturer's details.

Selectively coated surface
The absorber in the solar collector is highly selectively coated to improve its efficiency. This specially applied coating enables the absorption to be maintained at a very high level for the sunlight spectrum that hits the absorber (approx. 94 %). The emission of long-wave heat radiation is largely prevented. The highly selective black chromium coating is very durable.

Radiation energy
Volume of energy transmitted by radiation.

Dispersion
Interaction of radiation with matter by which the direction of the radiation is altered; total energy and wavelength remain unchanged.

Vacuum
A space devoid of air.

Heat transfer medium
Liquid that absorbs the available heat in the absorber of the collector and delivers it to a consumer (heat exchanger).

Efficiency
The operating efficiency of a solar collector is the ratio of the collector output to the power input. Relevant variables are, e.g., the ambient and absorber temperatures.

Keyword index

Subject to technical modifications.

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