

TopTechnology

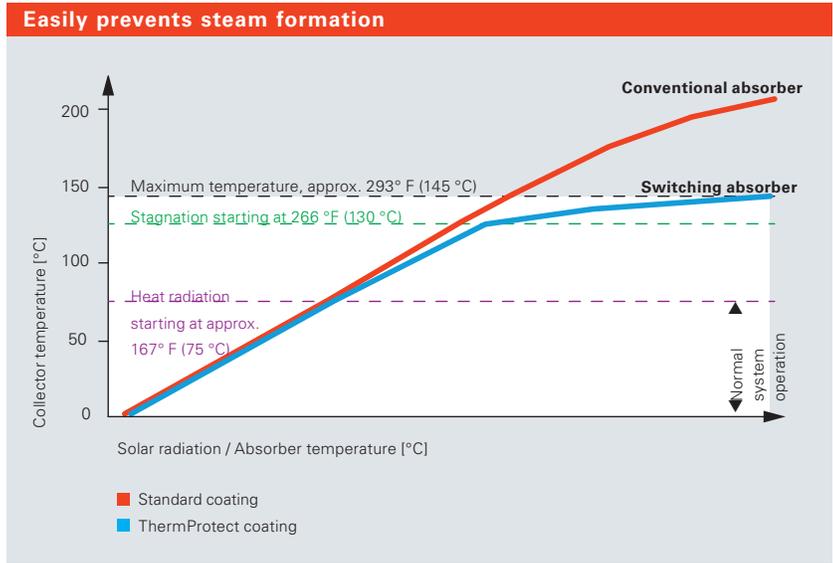
Flat-plate collectors with ThermProtect temperature shut-off for a simplified design and high operational reliability



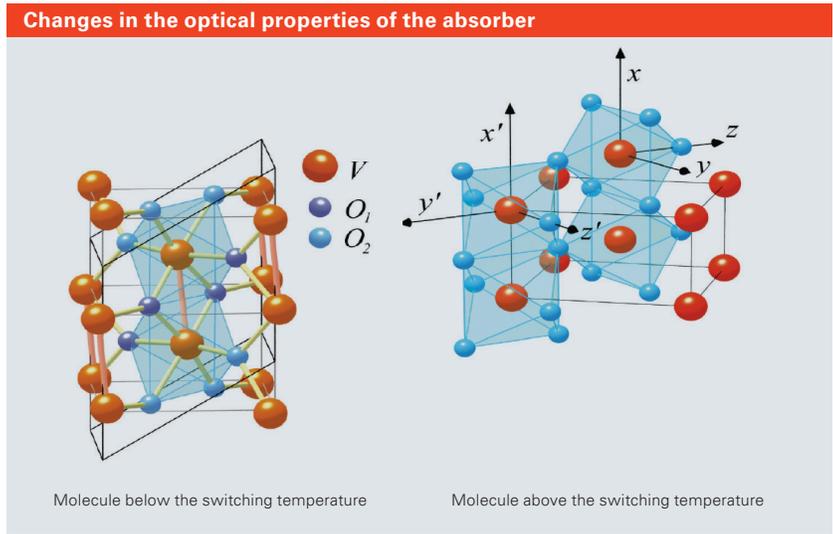
High solar coverage rates that bring substantial energy savings usually require large-scale collector surfaces. However, on warm summer days in particular, large collector surface areas can lead to long stagnation periods which causes steam formation, as the heat cannot be used. In order to prevent this steam formation, the flat-plate collectors Vitosol 200-FM and Vitosol 100-FM are now equipped with a self-regulating absorber coating.

This coating causes a temperature shut-off in the collector, which reduces the collector stagnation temperature and prevents overheating and formation of steam.

Viessmann solar collectors with ThermProtect automatic temperature shut-off interrupt the energy intake during stagnation.



During normal collector operation, the new absorber coating of the Vitosol 200-FM and Vitosol 100-FM flat-plate collectors acts like any standard absorber coating. Above the collector switching temperature, radiation increases many times over. When this occurs, overheating and steam formation during stagnation are prevented.



The new absorber coating consists of multiple layers. Vanadium dioxide (VO₂) is one of these layers. The optical properties of Vanadium dioxide change at temperatures above the switching temperature. It heats up and thus increases the rate of heat radiation. By increasing the rate of heat emission, the stagnation temperature of the collector is reduced. The more the absorber layer heats up, the greater the heat radiation.

A solar collector generates heat whenever sunlight falls on the absorber - even when there is no demand for heat. This may be the case during the summer, for example, when the homeowner is on vacation. If there is no longer a heat requirement, due to a fully charged DHW tank or heating water buffer tank, the circulation pump shuts off and the solar system goes into stagnation.

Continued incoming solar radiation can lead to increasing temperatures in standard collectors and cause steam formation in the heat transfer medium. Systems with the ThermProtect temperature shut-off operate with higher system pressure that reliably prevents steam formation.

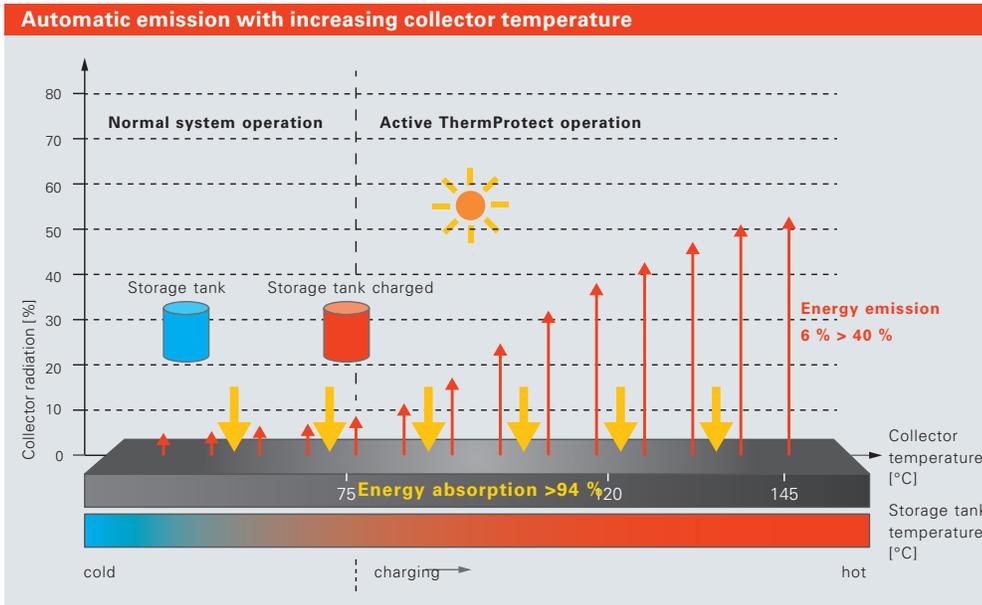
Flat-plate collector with switching absorber

Viessmann developed and patented flat-plate collectors that stop further energy uptake when the collectors reach a specific temperature. The absorber coatings of the Vitosol 200-FM and Vitosol 100-FM collectors operate on the basis of the "switching layers" principle. A temperature-dependent alteration of the crystalline structure of the collectors occurs, resulting in a change in the energy output. This causes a decrease in the stagnation temperature.

Above the switching temperature, the crystalline structure of the coating changes and the rate of heat radiation increases many times over. As the collector temperature rises, output is reduced, the stagnation temperature drops significantly, and steam formation is prevented.

When the collector temperature lowers, the crystalline structure reverts to its original state. More than 95 percent of the incoming solar energy will then be absorbed and converted into heat. Only a small proportion of less than six percent will be irradiated back.

Thus the output of the new collector is higher than that of conventional flat-plate collectors as it can supply heat again more quickly. There is no limit to the number of times the crystalline structure can reverse, making this function available at all times.



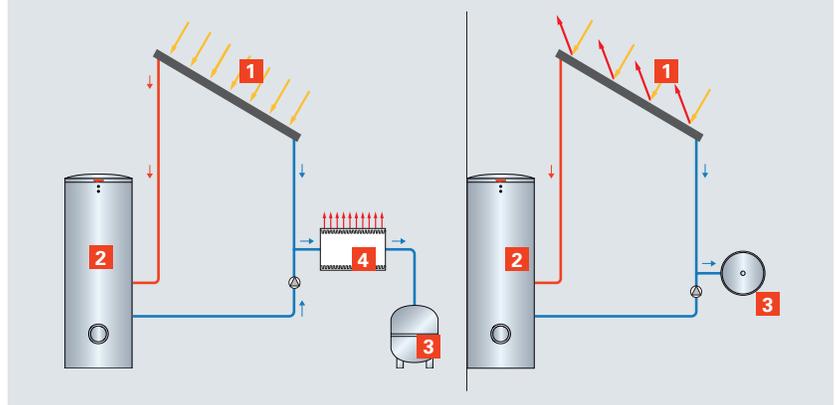
At temperatures up to the switching temperature, around six percent of incoming solar radiation is emitted. Beyond that, the heat emission automatically adjusts to a value of more than 40 percent.

Easy system planning

The temperature shut-off function operates completely independently of system configuration and control unit settings. Systems with Vitosol 200-FM or Vitosol 100-FM are entirely fail-safe. The thermal loads on system components and on the heat transfer medium will always remain within their normal range. This significantly increases service life and operational reliability compared to conventional solar systems.

Aside from robust operation, collectors with ThermProtect are not as vulnerable to incorrect sizing. They can be installed with minor design alterations - without having to take precautionary steps for a potential stagnation.

Conventional vs switching absorbers



- 1 Solar collector
- 2 Buffer / DHW storage tank
- 3 Expansion vessel
- 4 Stagnation cooler / Auxiliary vessel

Steam formation is reliably avoided in systems operating with an active Therm-Protect function.

Benefits for commercial partners

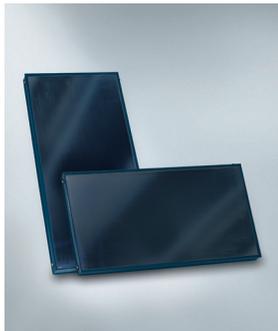
- High operational reliability and long service life as a result of lower stagnation temperatures
- Independent of controller settings, power failures and mechanical devices (i.e. dampers)
- Significantly lower stress on system components
- Dimensioning for large systems can be easily adapted
- Simplified component selection

Benefits for the user

- No overheating problems during the summer or when residents are away
- Higher solar coverage for central heating backup and DHW heating

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Technical data Vitosol 200-FM Vitosol 100-FM



Vitosol 200-FM

Type		Vitosol 200-FM Type SV2F	Vitosol 200-FM Type SH2F
Gross area	ft ² (m ²)	27.0 (2,51)	27.0 (2,51)
Absorber area	ft ² (m ²)	25.0 (2,32)	25.0 (2,32)
Aperture area	ft ² (m ²)	25.1 (2,33)	25.1 (2,33)
Dimensions			
Width	in. (mm)	41¾ (1056)	93¾ (2380)
Height	in. (mm)	93¾ (2380)	41¾ (1056)
Depth	in. (mm)	3½ (90)	3½ (90)
Weight	lb (kg)	90 (41)	90 (41)



Vitosol 100-FM

Type		Vitosol 100-FM Type SV1F	Vitosol 100-FM Type SH1F
Gross area	ft ² (m ²)	27.0 (2,51)	27.0 (2,51)
Absorber area	ft ² (m ²)	25.0 (2,32)	25.0 (2,32)
Aperture area	ft ² (m ²)	25.1 (2,33)	25.1 (2,33)
Dimensions			
Width	in. (mm)	41¾ (1056)	93¾ (2380)
Height	in. (mm)	93¾ (2380)	41¾ (1056)
Depth	in. (mm)	2¾ (72)	2¾ (72)
Weight	lb (kg)	91 (42)	91 (42)