VIESMANN
climate of innovation

TopTechnology

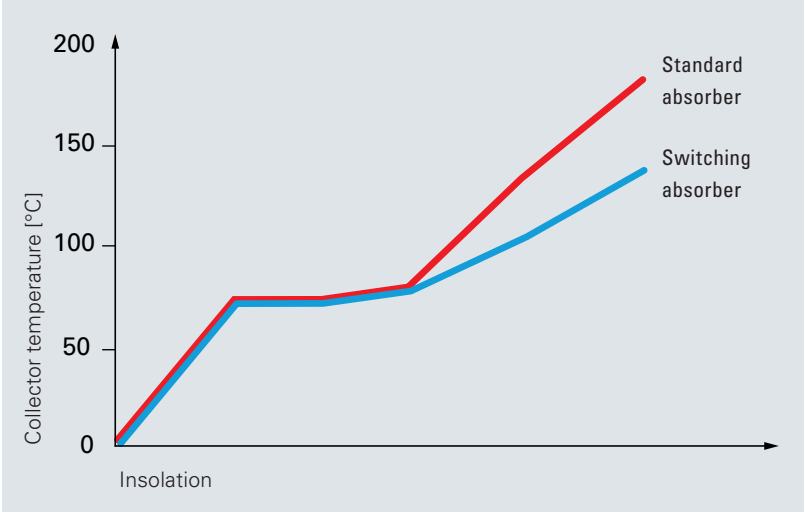
ThermProtect temperature-dependent shutdown for simplified design and high operational reliability

Viessmann solar collectors with innovative, automatic ThermProtect collector shutdown that interrupts the absorption of energy in the event of stagnation.

Generously sized collector surface areas lead to high levels of solar coverage and impressive energy savings. However, such large collector surfaces can also result in long periods of stagnation, and thus to the formation of steam, because the available heat cannot be used. This is particularly the case in summer. The innovative absorber coating in the Vitosol 200-FM flat-plate collector means that, in addition to the Vitosol 300-T vacuum tube collector with phase-change temperature-dependent shutdown, a second self-regulating collector is now available. Both products reliably prevent overheating and the formation of steam by reducing the stagnation temperature.

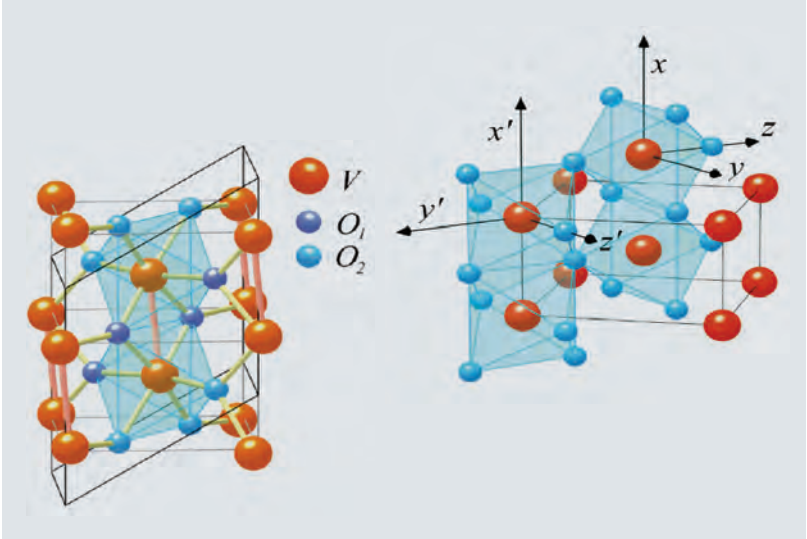
ThermProtect
temperature-dependent shutdown

Reliable prevention of steam formation



In standard collector mode, the new absorber coating of the Vitosol 200-FM flat-plate collector acts like any standard absorber coating on Viessmann flat-plate collectors. At collector temperatures of 75 °C and above, heat transfer increases many times over, thus reliably preventing overheating and the formation of steam in the event of stagnation.

Change to the optical properties of the absorber



The new absorber coating comprises several layers. One of these is vanadium dioxide (VO_2). From a temperature of around 75 °C and above, the optical properties of vanadium dioxide change. It heats up, thus increasing heat radiation. Increased emissivity reduces the stagnation temperature of the collector. The more the absorber heats up, the higher the radiation level. This effect is particularly marked at absorber temperatures above 100 °C.

A solar collector generates heat whenever sunlight falls on the absorber – even at times when no heat is required. This may, for example, be the case in summer when residents are on holiday. If heat transfer, through the DHW cylinder or heating water buffer cylinder, is no longer possible because either is already fully heated, the circulation pump switches off and the solar thermal system goes into stagnation.

If further insolation falls on the collector, its temperature will rise until the heat transfer medium evaporates, causing high thermal stresses on system components such as seals, pumps, valves and the heat transfer medium itself. In systems with ThermProtect temperature-dependent shutdown, the formation of steam is reliably prevented.

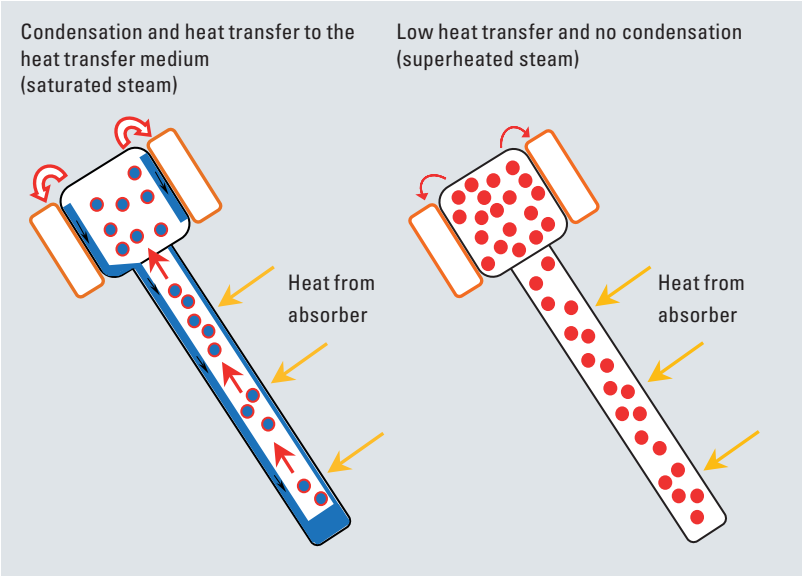
Flat-plate collector with switching absorber layer

For the first time, a flat-plate collector has been developed and patented that prevents further energy absorption once a certain temperature has been reached. The absorber coating of the Vitosol 200-FM is based upon the principle of "switching layers". The crystalline structure, and therefore the collector's output, changes depending on the collector temperature, thereby reducing the stagnation temperature. At absorber temperatures of 75 °C and above, the crystalline structure of the coating changes, increasing the rate of heat radiation many times over. This reduces the collector output as the collector temperature rises, the stagnation temperature drops significantly and prevents the formation of steam.

Once the temperature in the collector falls, the crystalline structure returns to its original state. More than 95 percent of the incoming solar energy can now be absorbed and converted into heat; only a tiny proportion (less than 5 percent) is irradiated back. This means that the yield of the new collector is higher than that of conventional flat-plate collectors, as the collector never enters the stagnation phase and can supply heat again at all times. There is no limit to the number of times the change in crystalline structure can be activated, meaning that this function is always available.

Vacuum tube collector with phase-change temperature shutdown
The Vitosol 300-T is a highly efficient vacuum tube collector based on the heat pipe principle. Solar heat causes the sealed-in medium inside the heat pipe to evaporate. When it reverts to its liquid state inside the condenser, the heat absorbed transfers to the solar circuit and the medium flows back to the sunlit area of the vacuum tube.

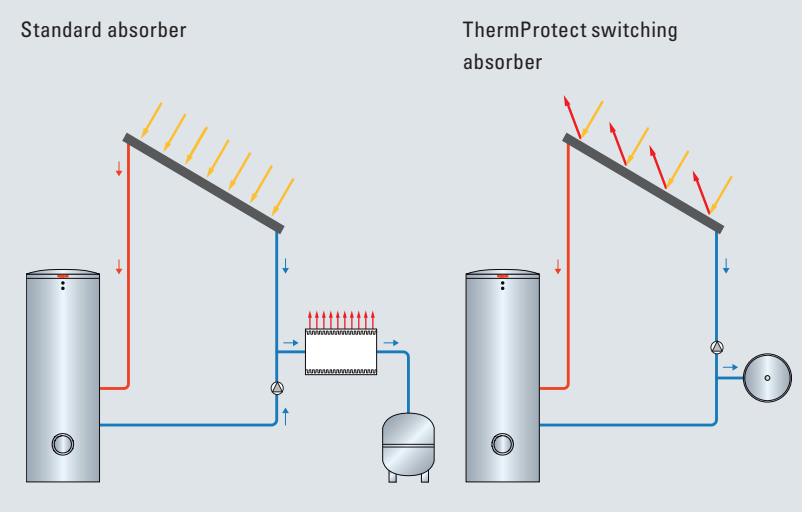
At collector temperatures of 145 °C and above, the medium is no longer able to condense. Thanks to this phase-change temperature shutdown, heat transport is interrupted and the system is thus protected against excessively high stagnation temperatures. Only at low collector temperatures does the circulation in the heat pipe restart, so that solar heat can once again be transported into the heating system.



At temperatures of 145 °C and above, the vaporised heat transfer medium in the condenser of the Vitosol 300-T vacuum tube collector is no longer able to condense, thereby interrupting the heat transfer.

Benefits for trade partners

- High operational reliability and long service life thanks to lower stagnation temperatures
- Independent of controller settings, power failures and mechanical devices (e.g. dampers)
- Significantly lower stress on system components
- Can easily be sized for large plants
- Immediate restart after system standstill
- Simplified component selection (e.g. smaller expansion vessels)



In systems with ThermProtect temperature-dependent shutdown, the formation of steam is reliably prevented.

Benefits for the user

- No overheating problems in summer or when residents are away from home
- Higher solar coverage for central heating backup and DHW heating

Straightforward system engineering
The temperature-dependent shutdown of these two collectors is entirely independent of system configuration and control unit settings. Solar thermal systems are, therefore, completely fail-safe. The thermal loads on system components and the heat transfer medium always stay within their normal range. This increases service life and operational reliability compared to conventional solar thermal systems. In addition to robust operation, collectors with temperature-dependent shutdown are also more tolerant of incorrect sizing.

climate of innovation

Viessmann Limited
Hortonwood 30, Telford
Shropshire, TF1 7YP
Tel: 01952 675000
Fax: 01952 675040
www.viessmann..co.uk

Your trade partner:

9442 402 GB 01/2016