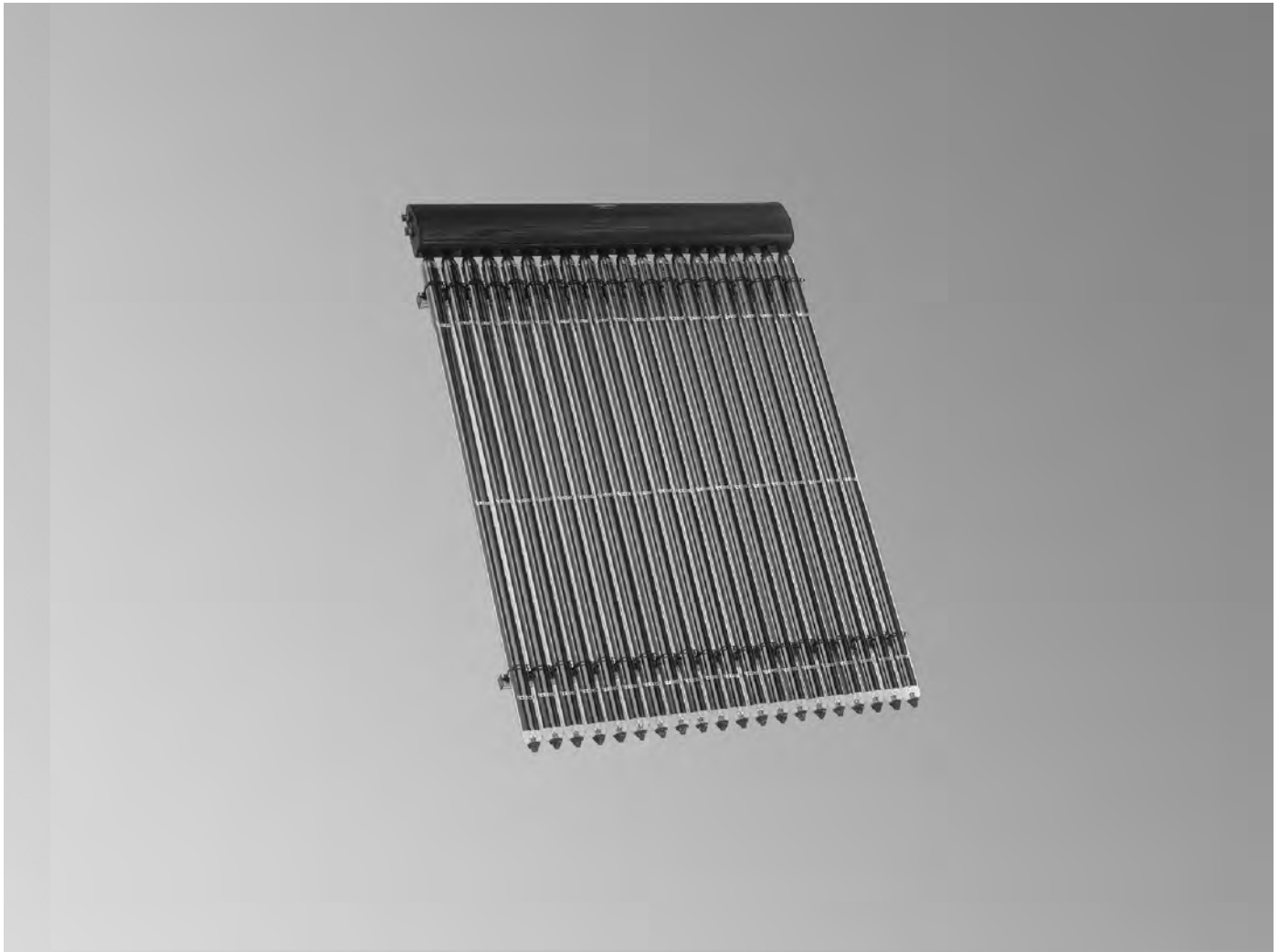


Vacuum tube solar collector utilizing the heat pipe principle to harness solar energy

## Technical Data Manual

Model Nos. and Pricing: see Price List



### VITOSOL 300-T Model SP3

#### Vacuum tube solar collector

for vertical, or angled installation on sloped or flat roofs

To produce domestic hot water, or to supplement low-temperature heating systems or swimming pools via a heat exchanger, as well as the generation of process heat.



Certified in accordance with SRCC OG-100



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



SPF quality seal from the Solar Energy Testing and Research Institute in Rapperswil, Switzerland.

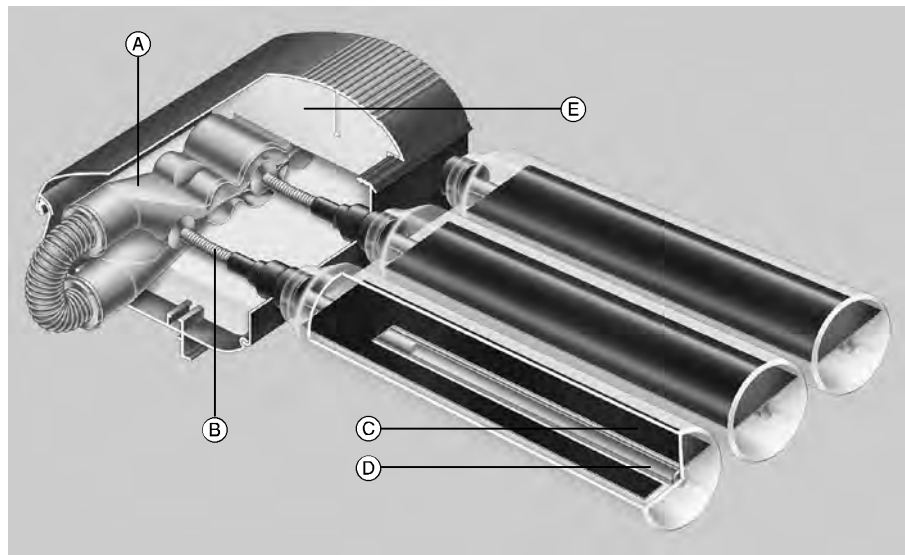
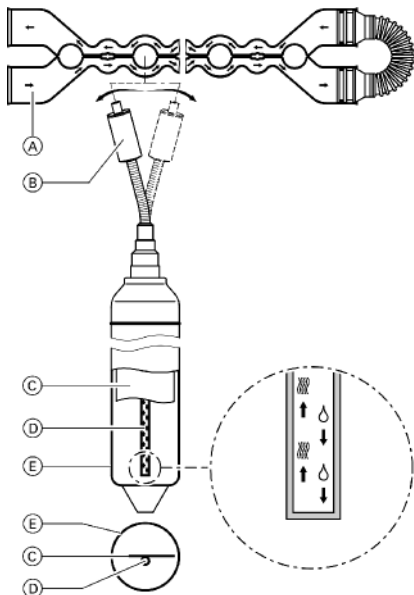
## Product Information

### Vitosol 300-T

Model SP3

#### The benefits at a glance:

- **High level of operational reliability and a long service life** thanks to the use of **high-grade, corrosion-resistant materials** such as borosilicate solar glass, copper and stainless steel. Durable, vacuum-tight glass-to-metal seals.
- **Extremely high efficiency** thanks to the **Sol-titanium coated absorber**; the vacuum collector tubes greatly reduce heat losses.
- **Superior heat utilization** by the patented **"Duotec" double-pipe heat exchanger** which almost completely encloses the condensers for **better heat transfer**.
- Flexible connection between vacuum tube and condenser due to a corrugated pipe. The individual tubes can be rotated for **optimum alignment to the sun**.
- **Straight-forward installation and service** thanks to **dry connection** of collector tubes. Individual tubes can be installed and disassembled without having to drain the solar system.
- **Fast installation times** due to proven plug-in system for the connection of several collectors to form one collector panel (max. 60 tubes).
- Vacuum tube design outperforms conventional flat-plate collectors in cold, cloudy or windy conditions. **Ideally suited for year round energy collection in cold weather climates.**
- **Built-in temperature limiter** inside the condenser controls the heat flow at very high collector temperatures, protecting the heat transfer fluid.



#### Legend

- Ⓐ Duotec double-pipe heat exchanger
- Ⓑ Bronze flexible coupling
- Ⓒ Sol-titanium coated absorber plate
- Ⓓ Heat pipe
- Ⓔ Insulation

#### Vitosol 300-T - vacuum tube collector based on the heat pipe principle

#### Construction and function

Vitosol 300-T vacuum tube solar collectors are available as two models:

- 2m<sup>2</sup> with 20 tubes
- 3m<sup>2</sup> with 30 tubes

Built into each vacuum tube is a Sol-titanium coated copper absorber, ensuring a high absorption rate of solar radiation and low emission of thermal radiation.

A heat pipe filled with an evaporator liquid is placed on the absorber and connected to the condenser in the Duotec double-pipe heat exchanger via a flexible coupling.

A so-called "dry connection" between the heat pipe and the heat exchanger allows pipes to be rotated or replaced even when the installation is filled and under pressure. Solar energy is transferred to the heat pipe, causing the liquid to evaporate. The vapor rises into the condenser. Heat is conveyed to

the passing heat transfer medium (glycol / water) by the double-pipe heat exchanger containing the condenser; this causes the vapor to condense. The condensate flows back into the heat pipe and the process is repeated.

The angle of inclination of the collector must be at least 25°, in order to guarantee a circulation of the evaporator liquid in the heat exchanger. Corrections for deviations from south can be made by rotating the vacuum tubes.

By means of flexible and insulated connection pipes sealed with O-rings several collectors can be joined to form a total collector surface area of up to 65 ft.<sup>2</sup> / 6 m<sup>2</sup> (60 tubes).

A connection kit with clamping ring connections facilitates the attachment of the collector panel to the piping of the solar circuit.

The collector temperature sensor is installed in a sensor mounting clip directly on the Duotec heat exchanger inside the connection housing of the collector.

- Ⓐ Duotec double-pipe heat exchanger
- Ⓑ Condenser
- Ⓒ Absorber
- Ⓓ Heat pipe
- Ⓔ Vacuum glass tube

Technical Data

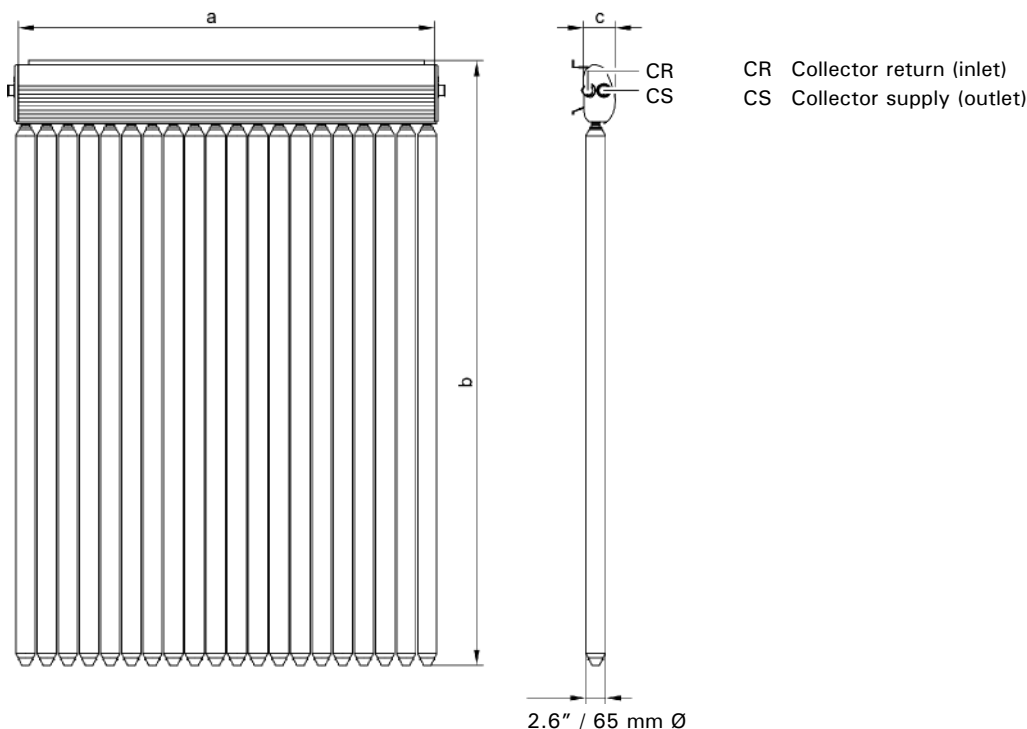
Model		SP3 2m <sup>2</sup>	SP3 3m <sup>2</sup>
Number of tubes		20	30
Gross area	ft. <sup>2</sup> / m <sup>2</sup>	31 / 2.88	46.5 / 4.32
Absorber surface area	ft. <sup>2</sup> / m <sup>2</sup>	22 / 2.05	33 / 3.07
Aperture area <sup>*1</sup>	ft. <sup>2</sup> / m <sup>2</sup>	22.7 / 2.11	34.1 / 3.17
<b>Dimensions</b>			
Width (a)	inches	55¾	83¾
	mm	1418	2127
Height (b)	inches	80	80
	mm	2031	2031
Depth (c)	inches	5½	5½
	mm	143	143
Optical efficiency <sup>*2</sup>	%	81.5	78.4
Heat loss coefficient	K <sub>1</sub> <sup>*2</sup> W/(m <sup>2</sup> ·K)	1.43	1.36
	K <sub>2</sub> <sup>*2</sup> W/(m <sup>2</sup> ·K <sup>2</sup> )	0.0076	0.0045
Thermal capacity	kJ(m <sup>2</sup> ·K)	5.4	5.4
Weight	lbs / kg	112 / 51	167 / 76
Fluid capacity (heat transfer medium)	USG	0.32	0.48
	ltr	1.2	1.8
Maximum working pressure <sup>*3</sup>	psig	87	87
	bar	6	6
Maximum stagnation temperature <sup>*4</sup>	°F / °C	302 / 150	302 / 150
Connection Ø	inches	¾	¾
	mm	22	22
Space requirement for flatroof installations	ft. <sup>2</sup> / m <sup>2</sup>	approx. 15.6 / 1.45	approx. 20.5 / 1.9
Requirements for installation surface and anchorage	Roof construction with adequate load capacity for prevailing wind forces Minimum angle of inclination: 25°		

<sup>\*1</sup> Used when sizing the system.

<sup>\*2</sup> Based on the absorber surface area. (As tested by ISFH in Europe)

<sup>\*3</sup> In sealed systems, operating pressure of at least 15 psig + 0.45 psig x static head (ft.) / 1.0 bar + 0.1 bar x static head (m) must be present in the collectors in cold condition.

<sup>\*4</sup> The stagnation temperature is the temperature which applies to the hottest point of the collector at a global radiation intensity of 3412 Btu/h / 1000 W when no heat is conducted by the heat transfer medium.



# Standard Equipment

## Standard equipment

The following are packaged in separate cartons:

- Insulated distribution header with installation rails and Technical Literature
- Vacuum tubes (10 per box)

Accessories (individually packaged, depending on order):

- Mounting accessories
- Connecting pipes with insulation
- General connection set
- Solar-Divicon (pumping station for collector circuit)
- Vitosolic differential control
- Air separator
- Fast air vent valve comes with shut off
- Solar hand pump
- Solar expansion tank
- Heat transfer medium
- Antifreeze tester
- Set of spare parts (assortment of small parts which may be misplaced during installation of collectors)

## Heat transfer medium

Tyfocon non-toxic liquid for solar heating systems with active anti-corrosion and anti-ageing protection.

*Frost protection:* to -31 °F / -35 °C

*Specific gravity at 68 °F / 20 °C:* 1.032 to 1.035 g/cm<sup>3</sup> to ASTM D 1122

*Viscosity at 68 °F / 20 °C:* 6.5 to 8.0 mm<sup>2</sup>/s to DIN 51562

*pH value:* 7.5 to 8.5 to ASTM D 1287

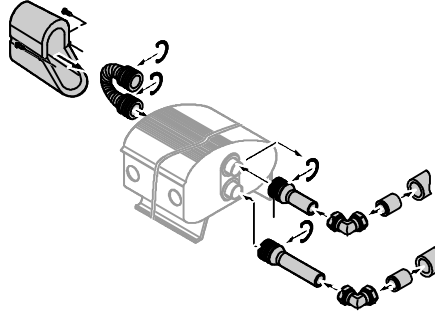
*Color:* transparent, blue-green

*Container:* 5.3 USG / 20 ltr. in a disposable container

## Accessories

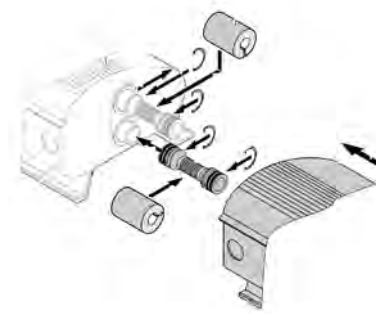
### General connection set

Required to connect solar collector to system piping. One set required per collector array - max. 65 ft.<sup>2</sup> / 6 m<sup>2</sup>



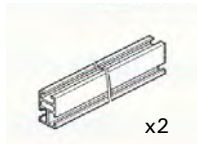
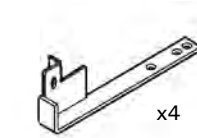
### Pipe connection set

Required to connect multiple solar collectors



### Sloped roof hardware kit

Required for direct-mounting of collector to shingled roof



### Flat roof hardware



### Solar Divicon

Preassembled pumping station for solar collector circuit.

Includes: 3-speed pump (2 sizes), pressure gage, 2 thermometers, 2 ball valves, pressure relief valve, flow meter, 2 flowcheck valves, air separator, system fill manifold, and foam insulation cover.



### SCU 124/224

Electronic differential temperature control for solar heating.



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