



#### Principle:

Because of the warming up the fluid into the absorber pipe converts into steam, the vacuum into the circuit supports this process. The steam rises by its own incentive. The fluid liquefies into the condenser, descends and the circulation starts again. The warmth that arised in the condenser is absorbed by the solar medium in the collecting pipe.

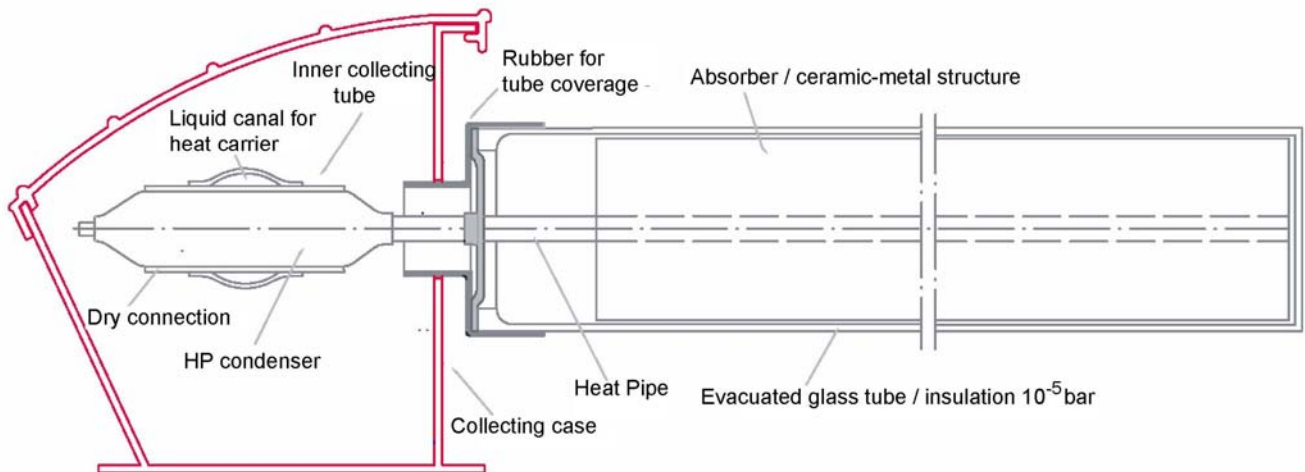
#### Assembly:

Glass:	Tubes of Borosilikat hard glass, vacuum sealing with special brass coating through thermo compression, diameter 65 mm, wall thickness 2 mm
Vacuum:	$<10^{-5}$ mbar
Absorber:	Cu-strip absorber, ultra sonic welding, highly selective coating absorption: ~ 95 % emission: < 5 %
Insulation:	Compressed, laminated rock wool
Manifold box:	Of extruded aluminium, burn-in lacquering, manifold of copper

#### Technical specifications:

	vacuTube HP 65/20	vacuTube HP 65/30
Dimensions (mm):	1980 x 1450 x 165	1980 x 2150 x 165
Number of tubes:	20	30
Absorber area:	2,0 m <sup>2</sup>	2,97 m <sup>2</sup>
Aperture area:	2,1 m <sup>2</sup>	3,21 m <sup>2</sup>
Gross area:	2,9 m <sup>2</sup>	4,29 m <sup>2</sup>
Weight without heat carriers:	50 kg	75 kg
Volume:	0,9 l	1,35 l
Nominal flow:	160 l/h	240 l/h
Min. inclination:	15°	15°
Max. inclination:	90°	90°
Max. operating pressure:	6 bar	6 bar
Testing pressure:	10 bar	10 bar
Max. idling temperature, collector:	240°C	240°C
Max. idling temperature, tube:	290°C	290°C

# GASOKOL vacuTube



### Characteristic efficiency values (acc. to EN 12975-2):

Report number:	C668LPEN (SPF)	
	Absorber	Aperture
Conversion factor $\eta_0$	0,80	0,74
Conversion factor $\eta_{0,05}$	0,73	0,67
Conversion factor $\eta_{0,1}$	0,63	0,59
Thermal transmittance coefficient simple $a_1$ :	1,16 W/m <sup>2</sup> K	1,08 W/m <sup>2</sup> K
Thermal transmittance coefficient square $a_2$ :	0,0060 W/m <sup>2</sup> K <sup>2</sup>	0,0056 W/m <sup>2</sup> K <sup>2</sup>
Angle factor:	0,96	

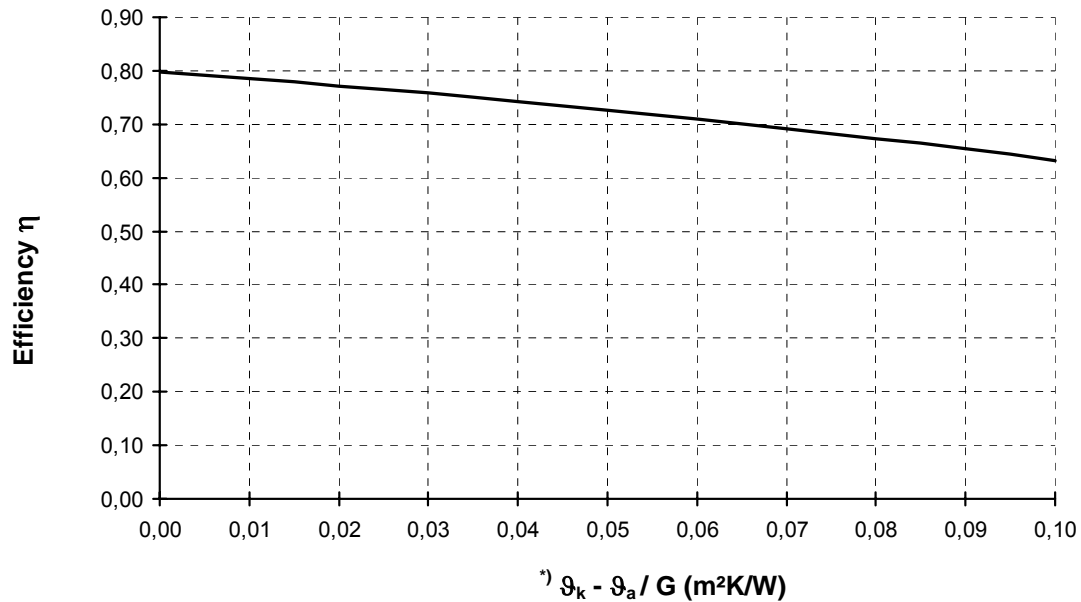
### Power output (power in watts per collector):

	irradiation W/m <sup>2</sup>		
	400 W/m <sup>2</sup>	700 W/m <sup>2</sup>	1000 W/m <sup>2</sup>
<sup>*)</sup> $\vartheta_k - \vartheta_a = 10$ K	912	1622	2333
<sup>*)</sup> $\vartheta_k - \vartheta_a = 30$ K	828	1539	2250
<sup>*)</sup> $\vartheta_k - \vartheta_a = 50$ K	731	1442	2152

# GASOKOL vacuTube

## Efficiency characteristic curve (acc. to EN 12975-2):

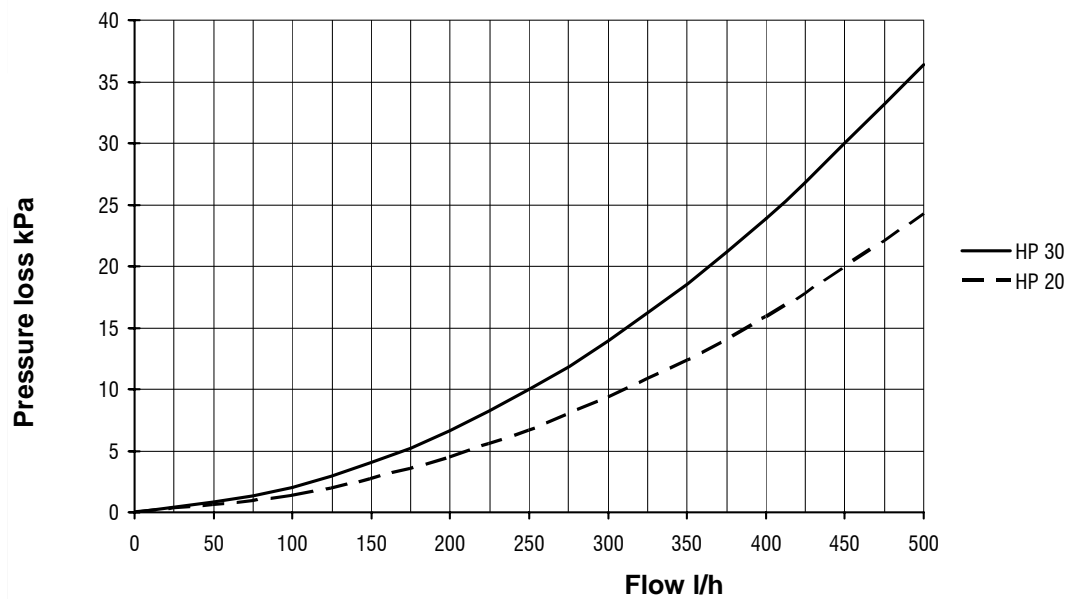
Referring to absorber area:



\*)  $\theta_k - \theta_a$  difference between average collector temperature and the ambient temperature; G – global irradiance

## Pressure loss:

(Medium: 33,3% propylene glycol-water mixture, temperature 20°C)



	100 l/h	200 l/h	300 l/h	400 l/h	500 l/h
20°C	2021	6674	13959	23876	36426

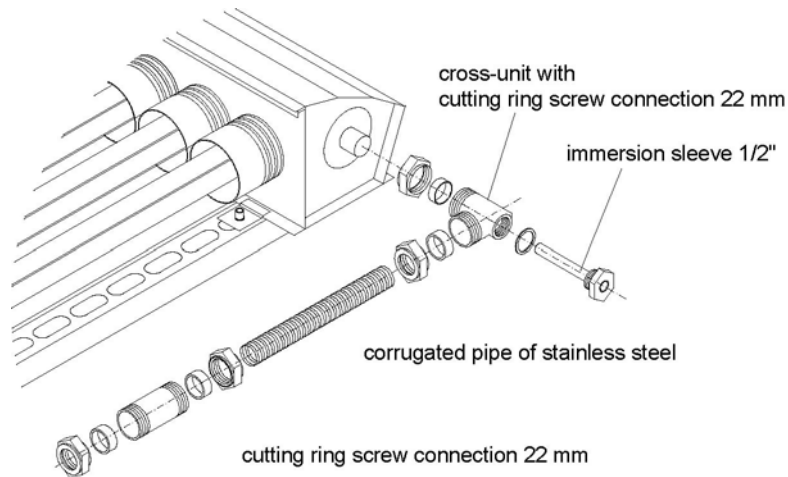
If the collectors are connected serial you can determine the pressure loss per collector with the volume flow of the complete collector field. Then multiply the result with the number of collectors.

# GASOKOL vacuTube

## Connection kit:

Cross-unit made of brass, mutual rugged cutting ring screw connection of brass, 8 mm immersion sleeve, with corrugated pipe of stainless steel

• *help:* one kit is necessary for positioning the sensor



## Hydraulic connection:

Install the sensor on the right collector (using the connection unit)

**Attention!** If the sun is shining during the installation of the collectors the connection units can be very hot!

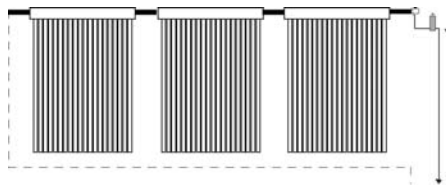
**Attention!** Make measures against accidents before working on the roof! Note the rules for accident prevention!

**Attention!** The tubes of the solar collector achieve high temperatures at the edge above, the condenser, temperatures over 200°C if they are exposed to direct or diffuse solar radiation. So don't touch them! Cover the collector tubes for being able to apply the heat carrier paste, before inserting the condenser.

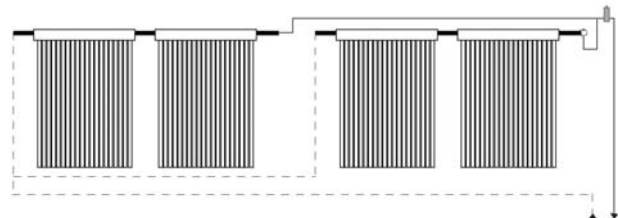
**Attention!** The collector tubes have to be protected against pushes and other rough handling. Don't expose the condenser to unnecessary bending stress. The vacuum sealing could be damaged.

**Attention!** The tolerable operating pressure is 6 bar. Pay attention on the safety regulations of DIN, VDE and DVGW as well as on the rules of accident prevention of the professional association.

pict. 1



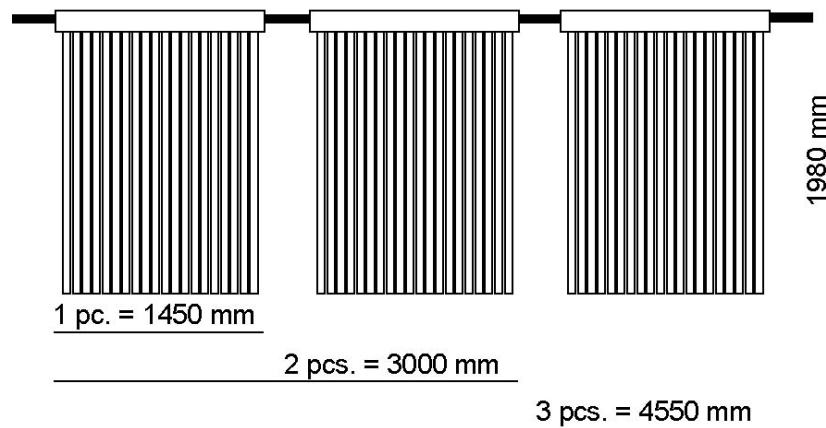
pict. 2



• *note:* You can connect up to 60 collector tubes serially! Further the collectors should be separated and connected according to Tichelmann (pict. 1 and pict. 2).

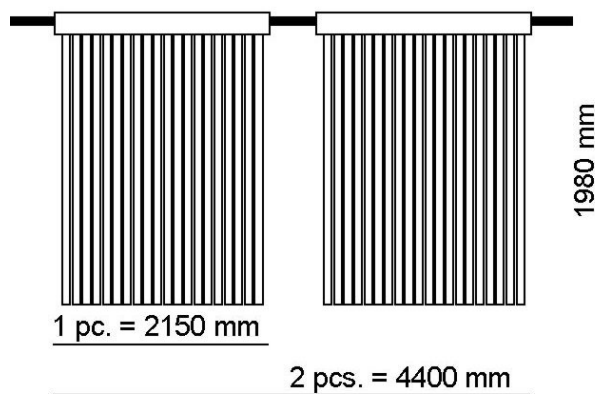
# GASOKOL vacuTube

## Measurements vacuTube HP 65/20



Number of solar collectors	Width
1 piece	1450 mm
2 pieces	3000 mm
3 pieces	4550 mm

## Measurements vacuTube HP 65/30



Number of solar collectors	Width
1 piece	2150 mm
2 pieces	4400 mm