Pure Energy TECHNOLOGY LTD.

RENEWABLE ENERGY SOLUTIONS

Pure Tube Technical Data

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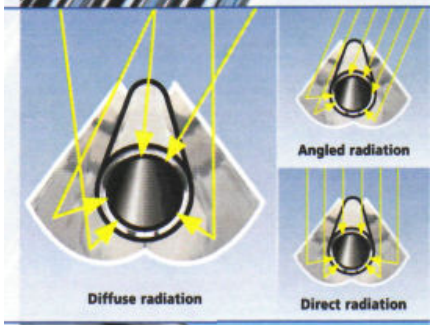
Technology

Pure evacuated tube collectors are mass-produced products made in Baden-Wurttemberg. Their outstanding design, professional processing, top quality and high energy yield, as well as their excellent price/performance ratio make them stand out. High-quality, corrosion-resistant and tested materials ensure smooth operation over a long useful life. The well-known indestructibility of Pure Solar tubes was confirmed by positive test results in the hailstone test according to DIN EN 12975-2 and the thermal shock test (ITW test report no. 02COL 282).

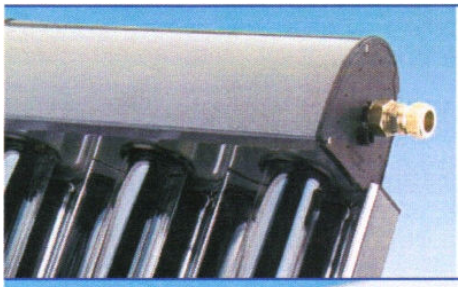
The CPC OEM / INOX and XL INOX evacuated tube collectors were developed especially for solar water heating and for solar backup heating. The low pressure loss allows several modules to be connected in series. The aperture area measurements of 1.0, 2.0 and 3.0 m2 allow accurate adjustment to water and/or space heating requirements. We also paid careful attention to details which are important for mounting the system: the solar system is delivered with a tentered sun protection sheet to allow commissioning the system even during maximum solar irradiation. Hand straps which can be attached to the collector frame ensure safe and easy transport onto and across the roof and can be used as transport straps for quick crane mounting.

The evacuated tube collector CPC w INOX is a specialist system for efficient water heating. It was developed especially for hot water production in single-family houses. It can be used as a standalone collector which cannot be linked with additional modules. With manageable module sizes of 3.2 and 4.0 m2 aperture area, it is capable of very high performance and easily handled for quick and easy installation.

To increase the efficiency of evacuated tube collectors, a highly reflective, weather-proof CPC reflector (Compound Parabolic Concentrator) is fitted behind the evacuated tubes. The special, improved geometry of the reflector ensures that direct and diffuse sunlight falls onto the absorber even when the angle of incidence is not ideal. This considerably improves the energy yield.
The special mirror geometry ensures that even at unfavourable irradiation angles direct and diffuse sunlight falls onto the absorber. Due to the particular mirror geometry, the power yield over the course of the day is almost constant.

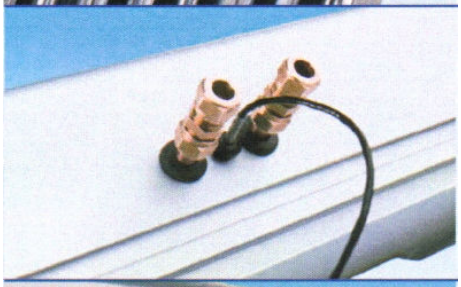


The evacuated tube is a product with improved geometry and performance. The evacuated tubes consist of two concentric glass tubes which are sealed in a semi-circular shape on one side and are joined to one another on the other side. The space between the tubes is evacuated and then hermetically sealed (evacuated insulation). To use solar energy, the internal glass tube is coated with an environmentally friendly, highly selective layer on the outside, thus turning it into an absorber. The coating is protected in the evacuated space. The aluminium nitrite sputter coating used is characterised by extremely low emissions and excellent absorption.



In the development of the collectors, Pure used their many years of experience with CPC in combination with the latest findings from production technology.

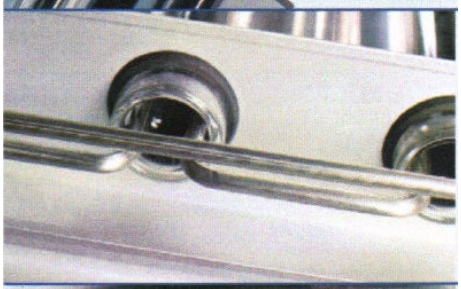
Sharp reflector edges are framed in the aluminium frame profile. The edges of the collector frame are sealed with rubber profiles. Only few screws are used in those places which need to be unfastened for maintenance; rivets are never used.



In the CPC w INOX the hydraulic connections and the sensor are located at the centre on top of the collector. The hydraulic connections to the collector are fastened and unfastened with metal olive connections. This is the only type of connection which is completely wear and tear free and gas proof.

For CPC OEM / INOX and XL INOX the flow and return pipe may be fitted to the left or the right of the manifold.

Depending on the location of the flow pipe, the sensor is placed on the right or the left

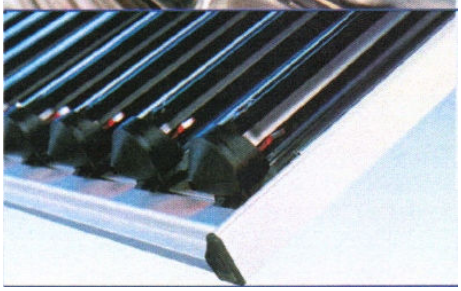


The pipes are mass produced with just a minimum numbering of soldering points. This results in high leakage safety and a reduction of internal scaling.

A small specific area leads to the desired low heat capacity.

The reflector is produced from a metal sheet with protective coating using accurate roil forming technology. The special fastening technique allows the reflector to be exchanged without using tools.

The heat transfer palates are made of aluminium so that even high stagnation temperatures have no effect on the metal's characteristics. The heat transfer plate is folded into both pipes.



The tube retainer can be mounted and demounted from the foot rail without using tools.

Sharp edges are sealed with rubber profiles.

Evacuated tube collectors CPC 6 OEM, CPC 12 OEM, CPC 18 OEM

for water heating and backup heating, series connection

Pipe material: copper

Scope of delivery:

fully pre-assembled unit comprising

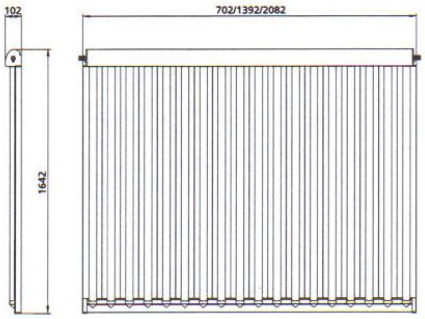
- evacuated tubes based on the thermos flask principle
- manifold with direct flow heat conduction unit and dry tube connection
- CPC reflector

Collectors are packed in individual boxes.
In addition, there is a sun protection sheet over the evacuated tubes.

Installation types:

- on-roof installation
- flat roof / wall installation

Note: The manifold must always be mounted on top. The minimum angle for on-roof and flat roof installation is 15°.

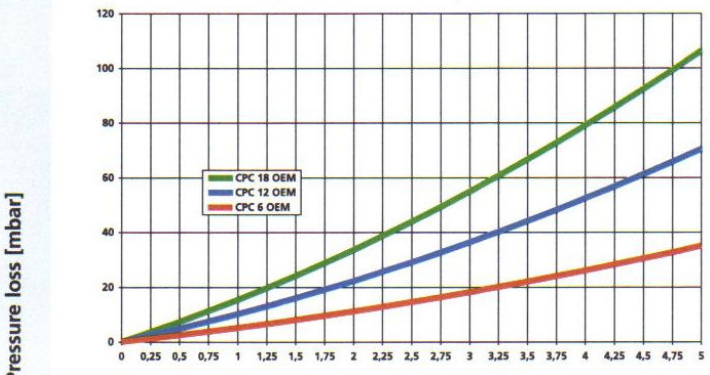


Series		CPC 6 OEM	CPC 12 OEM	CPC 18 OEM
Number of evacuated tubes		6	12	18
η_0 in relation to aperture, EN 12975	%	64.2	64.2	64.2
a_1 with wind, in relation to aperture	W/(m²k)	0.89	0.89	0.89
a_2 with wind, in relation to aperture	W/(m²k²)	0.001	0.001	0.001
Yield forecast	kWh/m²a	651	651	651
(location Würzburg, Germany, reference area 3 m²)				
Yield forecast	kWh/m²a	589	589	589
(location Würzburg, Germany, reference area 5 m²)				
Grid dimensions (length x height x depth)	m	0.70 x 1.64 x 0.1	1.39 x 1.64 x 0.1	2.08 x 1.64 x 0.1
Gross surface area	m²	1.15	2.28	3.41
Aperture area	m²	1.0	2.0	3.0
Collector contents	l	0.8	1.6	2.4
Weight	kg	19	37	54
Max. working overpressure	bar	10	10	10
Max. stagnation temperature	°C	272	272	272
Connection diameter, compression fitting	mm	15	15	15
Sensor sleeve	mm	6	6	6
Collector material		Al / Cu / glass / silicone / PBT / EPDM / TE		
Glass tube material		borosilicate glass 3.3		
Selective absorber coating material		aluminium nitrite		
Glass tube (Ø ext./Ø int./wall thickn./tube lgth.)	mm	47/37/1.6/1500		
Colour (aluminium frame profile, anodised)		aluminium grey		
Colour (plastic parts)		black		
Thermal shock test / ITW test number		06COL513		
Hailstone test according to DIN EN 12975-2 / TÜV test number		435/142448		
EC type examination		Z-IS-DDK-MUC-07-08-100029919-003		
DIN CERTCO registration number		011-7S113R		
Order no.		**08-9735**	**08-9736**	**08-9737**

For orders > 7,000 m²/a the collector can be designed to your requirements.

Pressure loss of the tube collectors CPC 6/12/18 OEM

Heat transfer medium: Tyfocor LS, medium temperature 40 °C

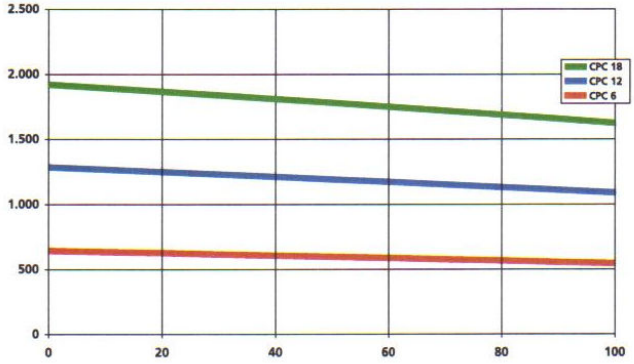


Pressure loss [mbar]

Flow rate [l/min]

Power curve

(G = 1000 W/m²)



Power output per collector unit [W]

$\Delta T = T_{Collector} - T_{Ambient\ air}$ [K]