



Evacuated tube collectors

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The overall performance of ecological heating systems based on solar thermal energy is significantly dependent on how efficiently the solar collector converts sunlight into energy. The evacuated tube collectors offered by Ritter Energie lead this sector.

This is primarily thanks to their innovative design which is the result of many years of research and technological innovations. The result: using the evacuated tube collector manufactured by Ritter Energie, it is possible to achieve significantly higher energy yields than with other conventional collectors.

Other system suppliers also benefit from this efficiency when they integrate Ritter Energie collectors as OEM (Original Equipment Manufacturer) products in their solar thermal heating systems. Customised requirements on design can be realised by designers at Ritter Energie as can technical modifications or specifications.

Apart from perfect compatibility, the OEM collector of Ritter is also convincing thanks to its careful workmanship, durability, high-quality design and a fair price/performance ratio.

Consistently high quality in series production, maximum flexibility during order processing and optimum adherence to deadlines are what distinguish OEM products offered by Ritter Energie.

The "Ritter collector" is regarded by experts in the sector as being synonymous with outstanding quality. Ritter Energie customers also include renowned companies in the heating industry who rely on this outstanding quality.

Recognised

All collectors fulfill the requirements of the EN 12975 / ISO 9806 and are awarded with the Solar Keymark label.

Ecological consequent

Ecology is close to our heart and technology is our passion. Together, they determine the way we act at Ritter Energie. And this has been the case since the company was first established in 1988. We think and work in an ecologically consequent manner, i. e. "ecoquent", and develop our products accordingly.

This philosophy makes us one of the most innovative companies in the solar thermal energy sector. These results are an incentive for us to strive towards even more innovation: for our customers and for the sake of the environment.

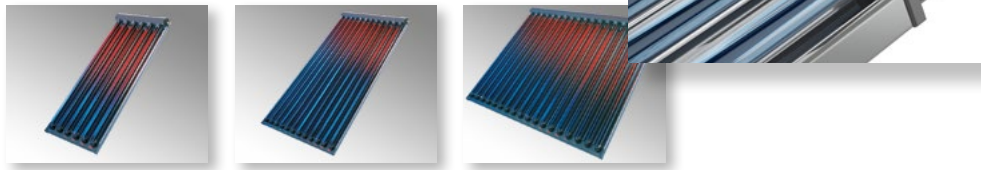
Ritter Energie is one of the leading manufacturers of highly efficiently evacuated tube collectors.

Ritter collectors can be used for hot water preparation, heating support, process heat, district heating and solar cooling.



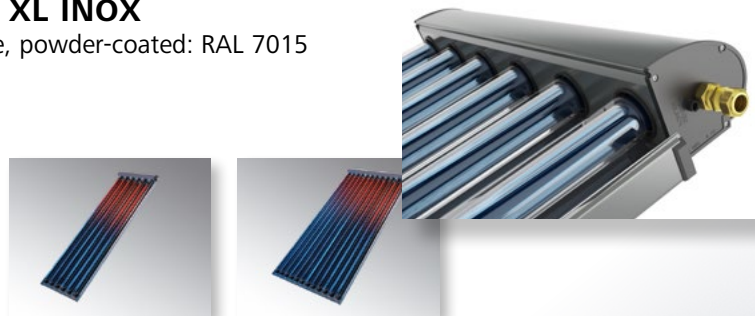
CPC 6 INOX, CPC 12 INOX, CPC 18 INOX

Colour of aluminium frame profile, powder-coated: RAL 7015
Pipe material: stainless steel



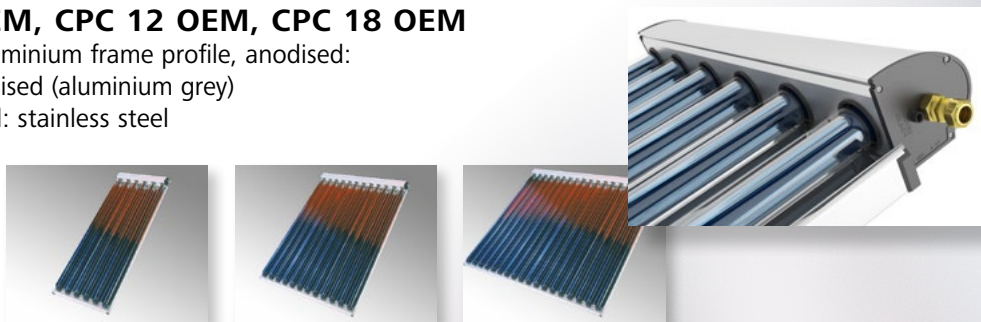
CPC 6 XL INOX, CPC 12 XL INOX

Colour of aluminium frame profile, powder-coated: RAL 7015
Pipe material: stainless steel



CPC 6 OEM, CPC 12 OEM, CPC 18 OEM

Colour of aluminium frame profile, anodised:
Natural anodised (aluminium grey)
Pipe material: stainless steel



OEM 21

Colour of aluminium frame profile, anodised:
Natural anodised (aluminium grey)
Pipe material: stainless steel



Performance and quality speak by themselves

Ritter evacuated tube collectors consist of the following components.

The evacuated tube

The evacuated tube is optimized in geometry and performance.

The evacuated tubes consist of two concentric glass tubes. On one side, the glass tubes are sealed in a semi-circular shape and joined to one another on the other side. The space between the tubes is evacuated and subsequently hermetically sealed (vacuum insulation).

The highly selective absorber coating covers the external surface of the internal glass tube.

Due to the circular absorber design of the vacuum tubes, the tubes always work with ideal orientation to the sun.

Everlasting vacuum leak proof due to pure glass connection between inner and outer glass tube, no glass-metal transitions, thermos flask principle. A preassembled barium getter in each tube allows fast indication of the vacuum inside.

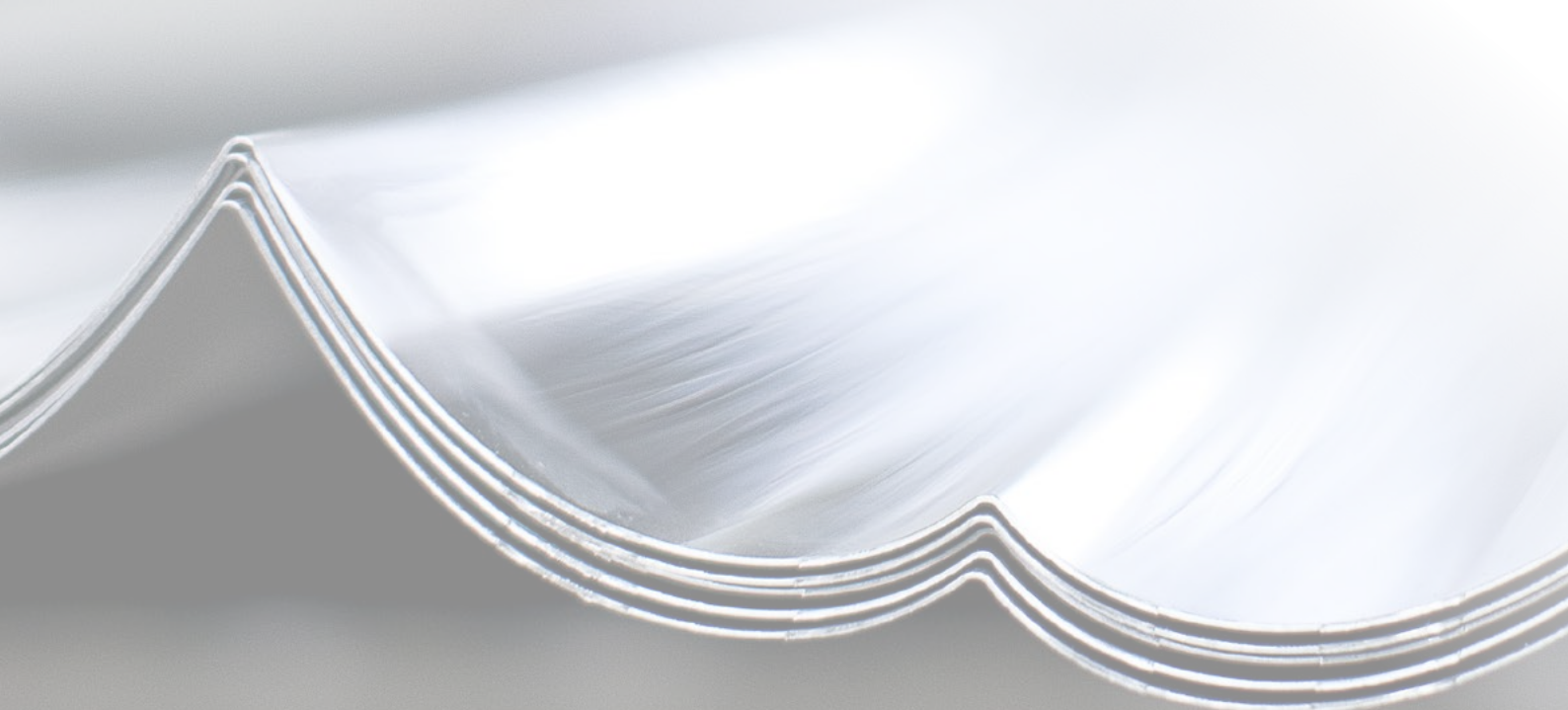
The CPC reflector

In order to increase the efficiency of the evacuated tubes, a highly reflective, weather-proof CPC reflector (Compound Parabolic Concentrator) is placed behind the tubes (except for the collector OEM 21). The optimised reflector geometry of the reflector ensures that even at unfavorable irradiation angles direct and diffuse sunlight falls onto the absorber. Due to the optimised reflector geometry, the energy yield is almost the same during the day.

Manifold and heat transfer unit

The manifold contains the insulated collecting and distributing pipes.

Each evacuated tube contains a U-pipe that is directly flown through by the heat transfer medium. The U-pipe is connected to the collecting or distributing pipe. It is also pressed against the inside of the tube with the heat transfer plates.



Features:

Engineering

- Hail and thermal shock tested
- The heat transfer medium flows through the collector without the use of a heat exchanger
- The hydraulic connections of the collector are extremely safe. They are made of a long-lasting, metallic sealing which is free from wear and gas-tight
- Large collector area up to 13 m² can be connected in series (less pressure loss; requires a 6m pump)
- The whole collector construction is fully recyclable

Easy to assemble

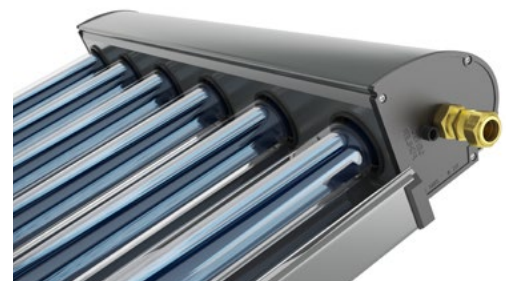
- Short assembly time through preassembled collectors and user-friendly mounting kits
- Easy connection method for add-on collectors through preassembled connection fittings. No additional piping or insulation is required
- Flexible hydraulic connection due to the symmetrical collector design: the sensor can be placed on the left or on the right side
- Optional location of the flow and return connection at both sides of the collector
- Safe handling: the collector's edges are fitted with plastic profiles and the edges of the CPC reflector are mounted in the aluminium frame to avoid injuries during installation
- The collector is delivered with a sun protection foil to allow commissioning even at full sunlight
- Carrying straps attached to the collector ensure a save and easy handling on the roof and can be used as transport straps for a crane as well
- The absence of a CPC reflector makes the collector OEM 21 perfectly suitable for a horizontal installation

Easy to service

- Easy and fast replacement of the tubes and of the CPC reflector without using tools and even without draining the system
- Due to the dry connection, it is not necessary to drain the system in order to replace a tube
- Simple and homogeneous recycling of the individual components

Others

- Extremely high energy yield with a small collector gross area
- Minimal heat losses even with very cold ambient temperature and high collector temperature
- Long service life and high series quality
- High operation security and long life service due to the use of high quality and anti-corrosion materials
- High operation safety due to the dry connection of the tubes to the solar circuit



Series		CPC 6 INOX	CPC 12 INOX	CPC 18 INOX	CPC 6 XL INOX	CPC 12 XL INOX
number of evacuated tubes		6	12	18	6	12
collector energy output scale (50°C/75°C) (Solergy) ¹⁾		AA/AA	AA/AA	AA/AA	AA/AA	AA/AA
collector energy output (50 °C Würzburg)	kWh/year	663	1326	1988	855	1703
energy output per collector module ²⁾	W	606	1212	1818	782	1558
energy output per collector module ³⁾	W	644	1288	1932	831	1655
product data according to Commission Regulation (EU) No 811/2013 and 812/2013 (Erp-relevant Data) regarding aperture area						
A _{sol} collector aperture area	m ²	1.00	2.00	3.00	1.29	2.57
η ₀ zero-loss efficiency		0.644	0.644	0.644	0.644	0.644
η _{col} collector efficiency	%	61	61	61	61	61
a ₁ first-order coefficient	W/(m ² K)	0.75	0.75	0.75	0.75	0.75
a ₂ second-order coefficient	W/(m ² K ²)	0.005	0.005	0.005	0.005	0.005
IAM incidence angle modifier		1.00	1.00	1.00	1.00	1.00
other product details						
gross area	m ²	1.16	2.29	3.42	1.45	2.87
collector dimensions (length x width x height)	m	1.64 x 0.71 x 0.10	1.64 x 1.40 x 0.10	1.64 x 2.09 x 0.10	2.06 x 0.71 x 0.10	2.06 x 1.40 x 0.10
collector contents	l	0.87	1.73	2.60	1.06	2.11
weight of empty collector	kg	17.5	32.7	48.0	21.1	39.9
max. operation pressure	bar	10	10	10	10	10
max. stagnation temperature	°C	301	301	301	301	301
connection-diameter, compression fitting	mm	15	15	15	15	15
sensor sleeve	mm	6	6	6	6	6
colour (aluminium frame profile, anodized)		RAL 7015, powder-coated			RAL 7015, powder-coated	
colour (plastic parts)		black			black	
conformity ⁴⁾		Pressure Equipment Directive 2014/68/EU			Pressure Equipment Directive 2014/68/EU	
impact resistance test according to ISO 9806	mm	35			35	
tests and licence		ISO 9806, Solar Keymark			ISO 9806, Solar Keymark	
DIN CERTCO-licence number		011-75134R			011-75134R	

¹⁾ usable only with own Solar Keymark certification, details refer:: www.initiative-sonnenheizung.com and www.dincertco.de

²⁾ at 1000 W/m² and 40 K temperature difference between the average collector temperature and ambient temperature

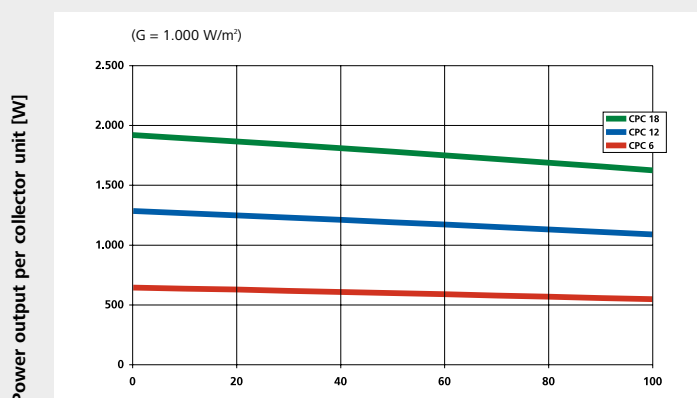
³⁾ at 1000 W/m² and 0 K temperature difference between the average collector temperature and ambient temperature

⁴⁾ existing certification of collectors by TÜV SÜD Industrie Service GmbH for Ritter Energie- und Umwelttechnik GmbH & Co.KG; Validity within Germany. A separate certification according to Pressure Equipment Directive can be applied for at TÜV when needed



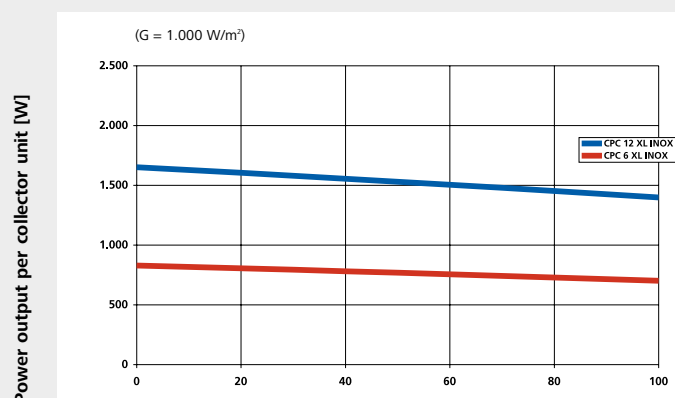
Power curves

6,12,18 OEM / INOX



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

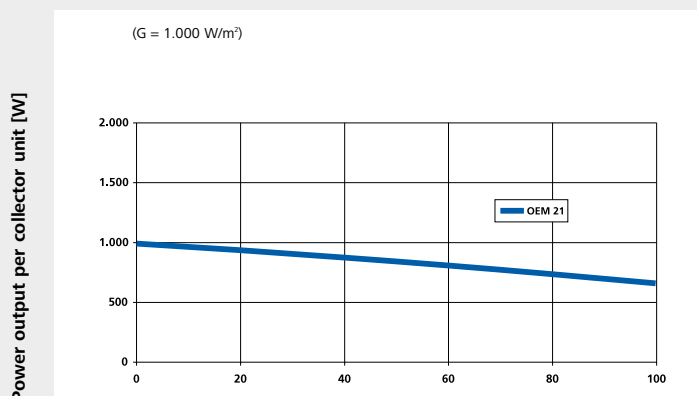
6,12 XL INOX



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

CPC 6 OEM	CPC 12 OEM	CPC 18 OEM	OEM 21
6	12	18	21
AA/AA	AA/AA	AA/AA	A+++/ A+++
663	1326	1988	1201
606	1212	1818	907
644	1288	1932	998
1.00	2.00	3.00	1.33
0.644	0.644	0.644	0.750
61	61	61	68
0.75	0.75	0.75	1.44
0.005	0.005	0.005	0.007
1.00	1.00	1.00	1.27
1.16	2.29	3.42	2.38
1.64 x 0.71 x 0.10	1.64 x 1.40 x 0.10	1.64 x 2.09 x 0.10	1.64 x 1.45 x 0.10
0.87	1.73	2.60	2.76
17.5	32.7	48.0	46.0
10	10	10	10
301	301	301	239
15	15	15	15
6	6	6	6
	aluminium grey, anodised		aluminium grey, anodised
	black		black
	Pressure Equipment Directive 2014/68/EU		Pressure Equipment Directive 2014/68/EU
	35		35
	ISO 9806, Solar Keymark		ISO 9806, Solar Keymark
	011-7S134R		011-7S114R

OEM 21



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



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