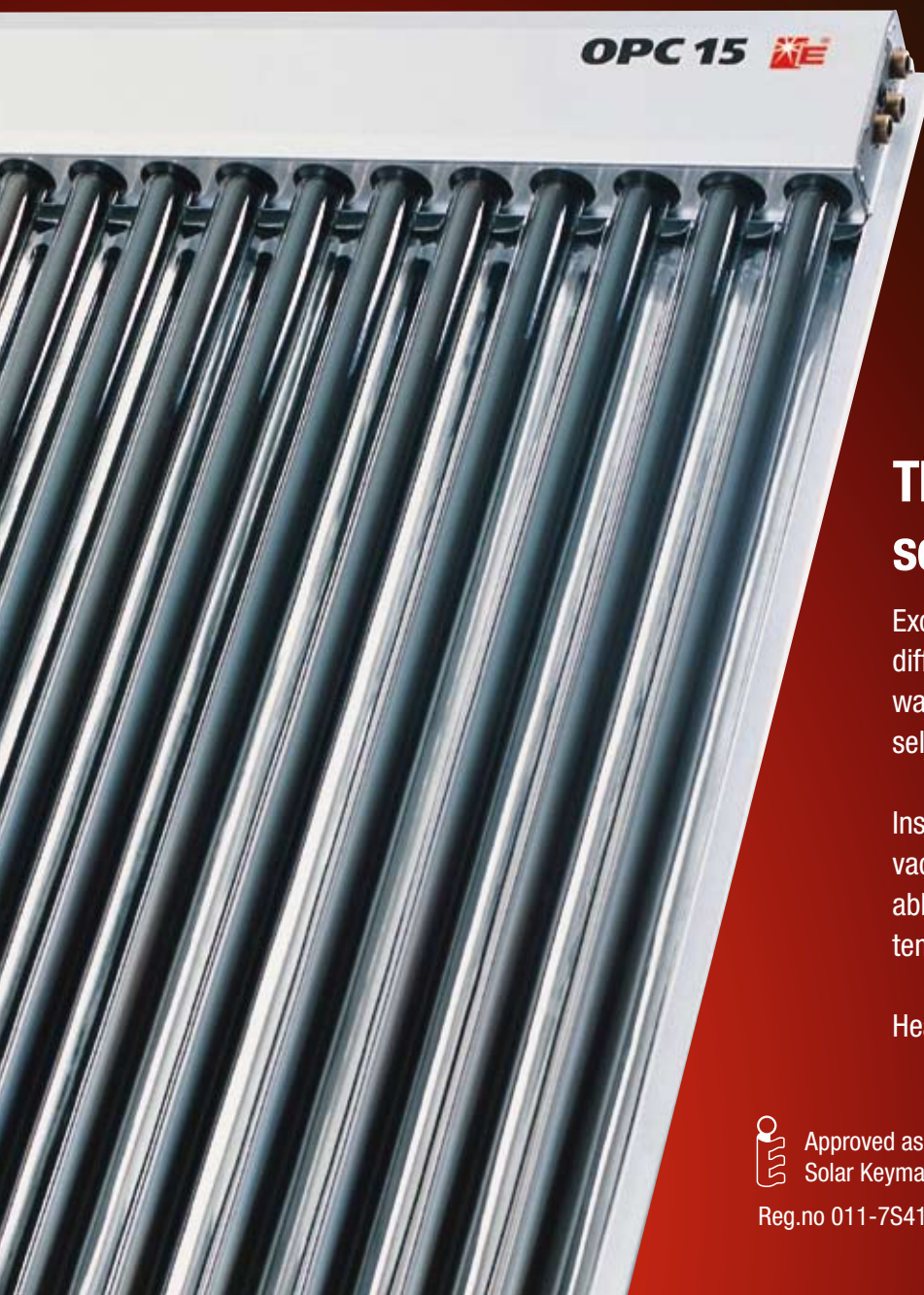


ExoSol[®]

VACUUM TUBE SOLAR COLLECTOR

GreenEnergy



The 3rd generation solar energy collector

ExoSol[®] OPC converts both direct and diffuse solar radiation in a very efficient way thanks to the absorber's unique, selective surface.

Insulated vacuum tubes, designed as a vacuum flask make the ExoSol[®] OPC able to function at very low outside temperatures, even during wintertime.

Heat transfer through longlife U-tubes



Approved as to
Solar Keymark

Reg.no 011-7S411 R

FLIK: 10-0903-345

Euronom ExoSol® OPC

The new standard in the utilization of thermal solar energy!



The pioneer of 360° absorber vacuum tube technology was awarded the gold medal in 1987 at the international inventor fair in Geneva, Switzerland.

The **ExoSol® OPC** collectors distinguish themselves through maximum output at low structural mass. It has been proven that only 360° tube collectors achieve highest energy yields throughout the entire service life.

The **ExoSol® OPC** collectors are developed and manufactured in Switzerland according to a quality standard above normal CE requirements and EU standard.

The **ExoSol® OPC** mounting system offers a simple installation of the collectors.

The **ExoSol® OPC** collector technology is patent protected.

See also the brochure for ExoSol EU21, our new prize awarded hybride solar collector that also generates energy for operation of the circulation pump.



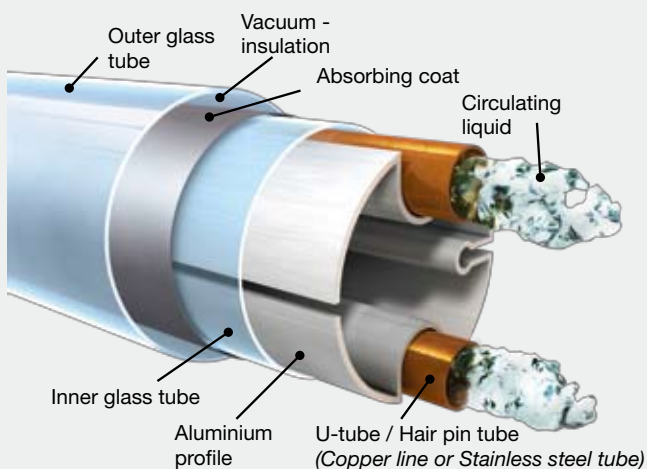
Applications:

- Tap water heating only.
- Combination of heating and hot water in private houses.
- Heating/hot water in apartment houses, hotels, industrial and commercial buildings.
- Air condition/heating by the absorption method.

The best vacuum tube solar collectors!

The vacuum tube collector for any weather all year round!

Our 360° absorber tube utilizes solar energy all year round, also when the weather is gloomy and only indirect solar radiation available. Even at sub-zero temperatures a large quantity of solar energy can be absorbed. Vacuum is the best insulation material in the world. Therefore vacuum is used between the inner and outer tubes to prevent energy losses at low temperatures.



Solar radiation - direct and diffuse - permeates the outer glass tube and is captured on the outside of the inner glass tube by the selective coat on the inner tube's outer 360° surface.

The 360° absorber tube is entirely made of toughened glass. The captured energy is transferred to the flush-contact aluminium shield and the copper or stainless steel U-tubes. The tubes are filled with heat transfer medium that transfers the energy to the accumulator tank.

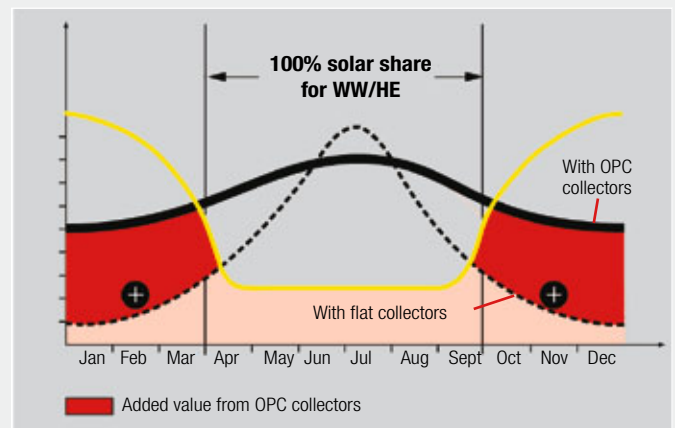
EXOSOL® OPC - TECHNICAL DATA

Solar collector	OPC 10	OPC 15	
Tube length	1,700	1,700	mm
Width	850	1250	mm
Height incl. frame	97	97	mm
Gross surface	1.45	2.13	m ²
Active absorber surface, 360°	1.67	2.50	m ²
Aperture surface	1.15	1.72	m ²
Weight	32	45	kg
Total volume	2.1	3.1	l
Allowed working pressure	10	10	bar
Structural pressure	15	15	bar
Test pressure	20	20	bar
Recommended flow	0.7	1.1	l/min*
Min. flow	0.5	0.83	l/min*

* Per module

Double plus!

Higher efficiency and solar energy during the whole year! The vacuum insulation and the large 360° absorption surface utilize a 100 % of direct solar energy and even the diffuse solar energy. This means that a great part of the heating and tap water requirement can be taken from the sun even during autumn, winter and spring. The figure below shows the advantages compared to the "old" technique.



The new OPC vacuum tube solar collectors compared to the old flat collectors.



- The absorber is a uniform body of glass. No metal attachments where leakage can occur.
- High vacuum capacity is maintained for the whole service life.
- 360° absorber for the greatest possible energy-collecting surface; utilizes also the diffuse radiation.
- A consistently high rate of efficiency is maintained for the service life because the vacuum level does not break down with time.
- It is easy to replace a defect tube without opening the fluid system.
- 9 layers of copper nitrite are used as selective coat on the absorber tube.

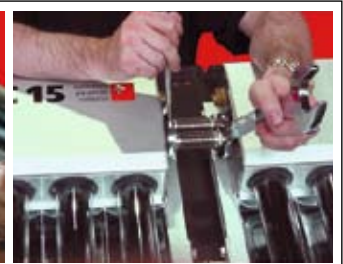
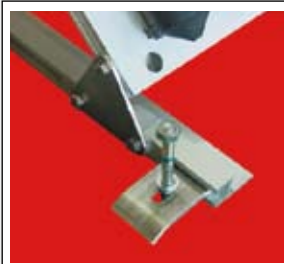
Efficient modul assembly system!

ExoSol® OPC collectors for cost-saving and simple installation



With a height of only 90 mm, the OPC collectors look elegant and functional on every roof.

Even for large energy requirements only one side of the roof needs to be provided with collectors, which makes the installation easier as all mounting details will be in the same direction.



There is a OPC mounting system for every roof type.

For a flat roof there is a mounting kit that allows a flexible collector angle.

A multifunctional glide channel section makes the mounting extremely cost efficient.

The OPC system uses newly developed high-

temperature and pressure-proof compensators between each module. In this way slight deviations in the installation will be compensated.

- Shortest possible installation time. OPC collectors for the hot water system in an ordinary house are normally installed in half a day.
- No constructional changes are required to the house.
- Removable at any time.
- Self-explanatory installation technique.
- Standard tools can be used.
- Low weight, very simple to handle.
- Modular, flexible installation technique.



The vacuum tube solar collectors can be connected to the cost-efficient FlexiFuel system



ExoSol® OPC the most efficient collector!



3-tube system

- Fits all sizes
- Low pressure loss
- Factory mounted sensor socket



Integrated system, factory mounted

- No external tubes needed
- The best possible insulation



Shortest possible installation time

- One-side connection
- One-side, in-/outlet
- Only one roof penetration

Minimum energy loss!

The patented collector is provided with an integrated 3-tube system and is well insulated. This means that only one side of the collector needs to be connected, the other side is built-in and ready. Maximum energy utilization with 360° absorber and parabolic reflector. The optimized tube spacing and the co-ordinated reflector provide maximum energy recovery from both direct and indirect solar radiation.

Optimal energy data for the collector

Output per collector, watt, 90° direct radiation

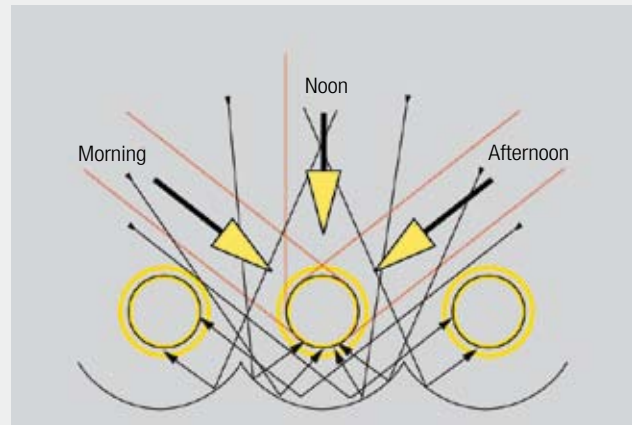
	400 W/m ²	700 W/m ²	1000 W/m ²
$t_m - t_a = 10 \text{ K}$	501	899	1.296
$t_m - t_a = 30 \text{ K}$	438	835	1.233
$t_m - t_a = 50 \text{ K}$	366	764	1.161

Angular correction factors

	0°	10°	20°	30°	40°	50°	60°	70°	90°
K(0)trans	1.0	1.0	1.0	0.9	0.84	0.93	1.08	1.03	0.0

The collector design has optimized geometry to convert maximum radiation, every day all year round.

The optimal co-operation between collector and parabolic reflection gives maximum energy flow from early morning to late evening, independent of direct or indirect solar radiation.



Max. energy utilization during the whole day created from the OPC geometry!

- Maximum efficiency, small dimensions.
- Certified efficiency and quality.
- New innovative design and technology.
- Optimized to collect solar energy from early morning to late afternoon.
- High utilization ratio all year round.
- High utilization ratio for the entire service life.
- High material quality.
- Collector installation with standard tools; no soldering or welding.

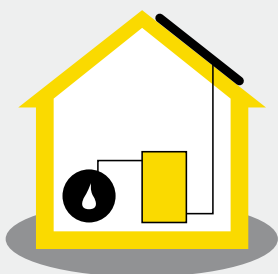
- Flexible sizes - from small to large systems.
- All material recyclable.
- Suitable for new as well as existing buildings.
- Solar energy calculation programs: Polysun, T-sol.
- Usable for waterheating/heating support/process heat /cold production via the absorption method.

ExoSol® OPC with intelligent system technology

The ExoSol® OPC collectors provide the highest efficiency when integrated into the house heating system. Thereby relieving the load on the normal house system,

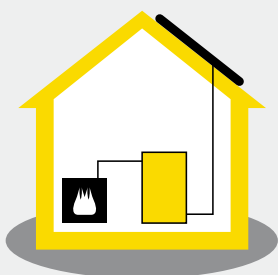
independant of which type of heating system. Welcome to contact your dealer for advise about the most suitable system design for your house.

Ybna.se



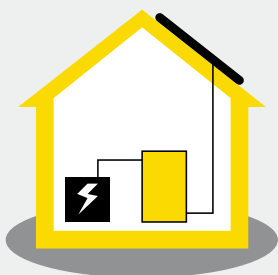
1. Electrical/oil heating and ExoSol® OPC

Longer operational times, less service. Less need of energy from the existing heating source.



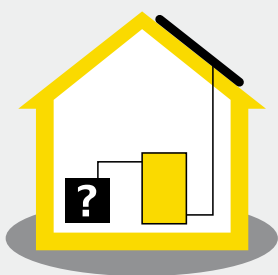
2. Wood heating together with ExoSol® OPC

An ideal combination. An existing accumulator is normally used for storing the heat. The firewood consumption sinks sharply and during summertime there is no need to use wood at all.



3. Heat pump and ExoSol® OPC

The heat pump does not need to be operated during summer, spring and autumn and in wintertime the OPC collectors help to save even more.

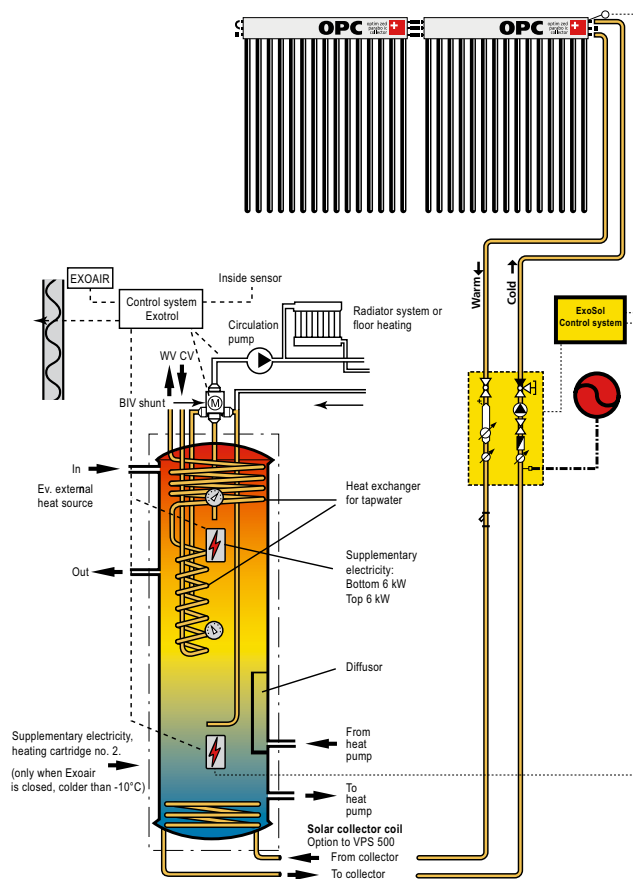


4. Your specific system together with ExoSol® OPC

Optimize your own solution. It can be combined with all conventional energy systems. Ask your dealer for advise.

System connection - ExoTank VPS

- in ExoAir version
- complemented with the ExoSol OPC system.



The above system schematic shows a combined system in a normal house. This system is used for both heating and hot water production by solar energy.

The right to technical modifications is reserved.

FLIK: 10-0903-345



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