

Solar

domestic hot water systems



Using the sun's
energy to provide
hot water



Soaking up the sun

Solar heating for domestic hot water is the fastest growing renewable technology across Europe

With global temperatures continuing to rise and as traditional energy resources decline, it's no wonder that domestic energy conservation remains a universally high priority. The development of innovative and effective renewable energy solutions is critical to future efficiency and environmental wellbeing. Solar heating for domestic hot water is one such solution and is the fastest growing renewable technology across Europe. It is based on harnessing energy from the sun to indirectly heat water in a cylinder, and in the UK alone, sales of glazed solar collector units are forecast to double over the next four years. It is a market in which Vaillant continues to make significant investment to create category leading products that precisely meet the needs of specifiers, installers, home owners and, of course, the environment.

Vaillant - the natural choice

Vaillant are well placed to offer solar heating technology; with over 130 years experience of developing products that have shaped the heating industry. As Europe's leading boiler manufacturer, Vaillant sets the standards for performance, efficiency, quality and reliability. And just as importantly, it's about working with our customers to deliver exactly what they require. That's why, just as it is throughout Europe, our solar DHW heating system is the natural choice in the UK.

Vaillant's solar DHW system can provide around 50-60% of annual domestic hot water requirements and because it uses indirect solar radiation, not just direct sunlight, it works as efficiently in the UK as it does in other countries with similar climates. And, as you would expect from Vaillant, the solar control system has a built-in intelligence allowing it to automatically switch from solar to conventional power when needed. Vaillant's solar domestic hot water system ensures hot water comfort, helps reduce fuel bills, adds value to a property and is a positive benefit to the environment because it reduces carbon dioxide emissions.

All the benefits under the sun

The principles of solar heating are fairly basic but in practice, designing a system that efficiently captures the sun's energy and turns it into hot water requires advanced technology.

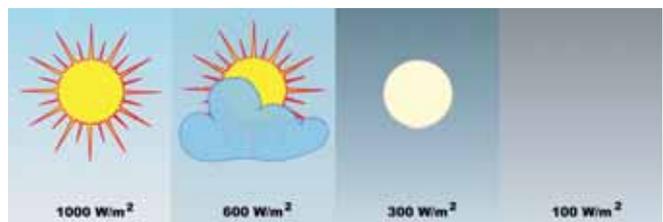
Vaillant solar domestic hot water system

Vaillant's range of highly efficient solar collectors have been designed to give maximum energy absorption and are easy to install in various applications. As the panels work on diffused solar radiation as well as direct sunlight, they will even generate small amounts of energy on partially cloudy days. Multiple panels can easily be fitted together as required for larger systems.

Vaillant's **auroTHERM exclusive** vacuum tube collector has an external reflector known as a Compound Parabolic Concentrator (CPC) and has the highest annual solar yield of any of our collectors. This small and lightweight collector is delivered pre-assembled for easy installation. Brackets are available to suit most pitched roofs, and A-frames are available for flat roof installations. The robust tubes are made from borosilicate glass and have a glass vacuum seal for longevity. The tubes are internally coated with a high selective aluminium nitrite absorber coating for maximum solar efficiency. They have an appealing design, and multiple collectors can be easily fitted in series as required.

The **auroTHERM plus** flat plate collector has a special anti-reflex coating on the glass to maximise solar transmission and is one of the highest performing flat plate collectors currently available on the UK market. It is an ideal alternative to the vacuum tube collector in areas where collector durability is paramount or where collector weight is less important. This collector can be fitted using a range of mounting brackets to a pitched roof, flat roof or can even be integrated into the roof of a property for improved aesthetics. It can also be installed in portrait or landscape orientation.

Where price/performance ratio is considered more important than collector efficiency, the **auroTHERM** flat plate collector offers an excellent alternative. Using the same roof fixings as the auroTHERM plus collector, it has the same degree of installation flexibility.



Generates low levels of energy even with low solar radiation

Total Solar System Solution

The sun's energy heats solar fluid in the solar collector which is then pumped by the **solar pump unit** to a coil designed to heat water in a dedicated stainless steel storage cylinder, **auroSTOR**. A second indirect coil in the cylinder is connected to a conventional heating source, such as a gas boiler, to provide additional heating when there is insufficient solar energy available. The boiler is also required to provide central heating. Managed by the solar control **auroMATIC 560** the system is able to automatically switch between solar and the auxiliary heat source to ensure there is always hot water on demand.

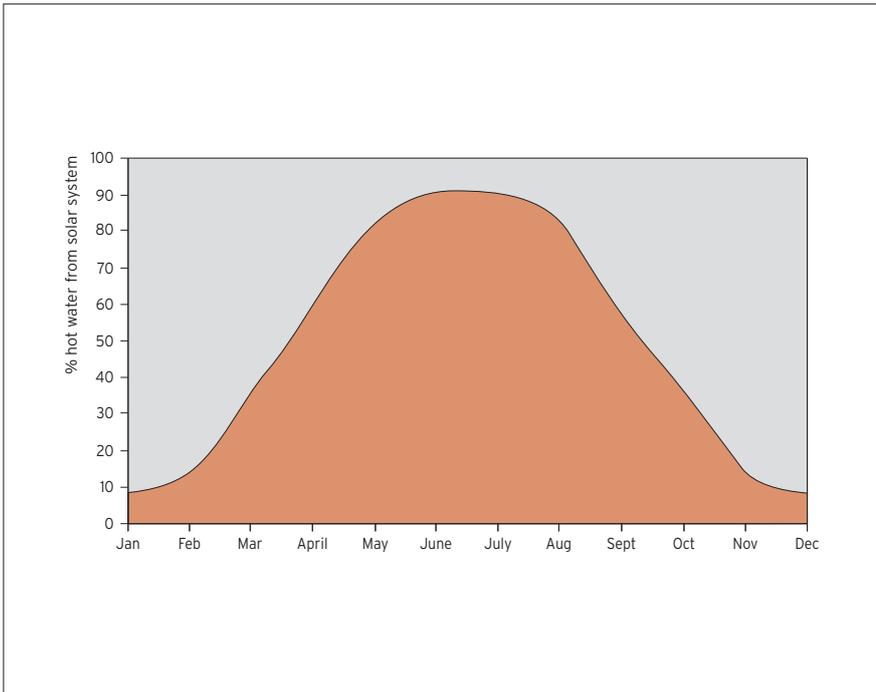
So, by incorporating the most modern technology, Vaillant's unique Total Solar System Solution intelligently blends solar and conventional energy supplies to optimise domestic heating efficiency.



auroTHERM exclusive

Vacuum tube solar collectors

The Vaillant solar domestic hot water system is a sealed pressurised solar system with unique features built-in to every component. It's the most advanced complete solar heating system available and is totally consistent with our commitment to providing maximum efficiency, high performance and total reliability.



Graph showing the typical hot water contribution from solar heating in the UK



auroTHERM exclusive

auroTHERM exclusive VTK570

Vaillant's latest vacuum tube collector is manufactured using toughened glass and each tube is internally coated with a special high selective absorber coating. Each collector is delivered pre-assembled with 6 tubes per collector, and is compact and lightweight for ease of installation. The tubes have the benefit of a 10-year guarantee against loss of vacuum and if necessary, can be replaced without draining down the solar system. Collectors can be connected together and up to 12 collectors can be connected in series providing a neat

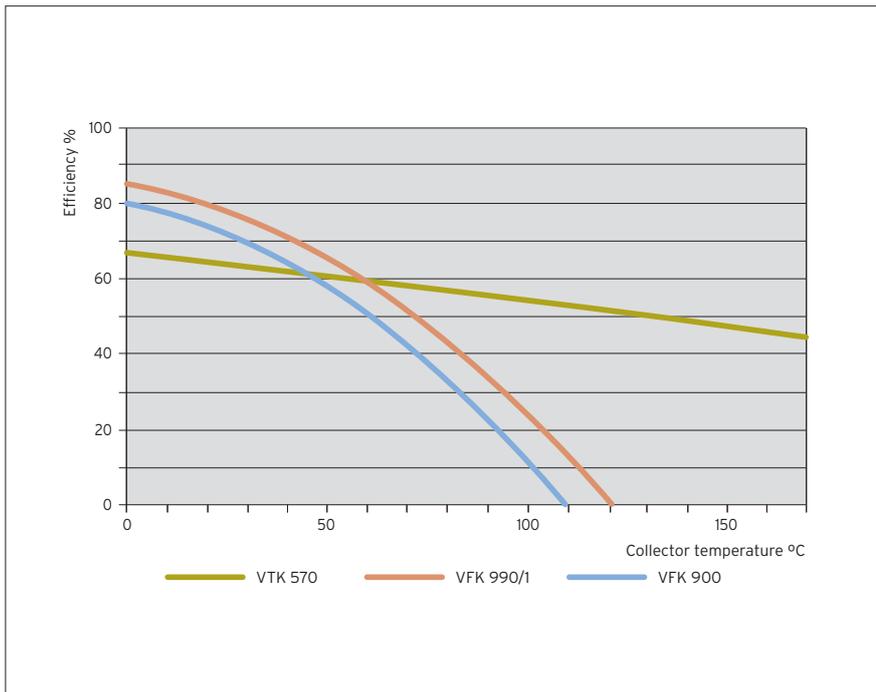
and attractive installation. The external Compound Parabolic Concentrator (CPC) ensures that solar radiation is efficiently directed toward each tube and has a ceramic coating to limit the build-up of dirt. Total siting flexibility is provided by an extensive range of roof brackets for concrete profiled tiles and flat tiles, and A-frames for flat roof installations. The auroTHERM exclusive collectors are fully tested and approved to EN 12975.





auroTHERM flat plate collectors

Flat plate solar collectors



Efficiency of collectors (solar radiation 800 W/m²)



auroTHERM flat plate collectors

auroTHERM flat plate collectors

The **auroTHERM plus** VFK 990 flat plate collector has a special anti-reflex coated glass for excellent solar transmission, and toughened 4mm thick glass for improved durability. The collector consists of an ultrasonically welded copper grid with a high selective absorber coating and 60mm rear and side insulation. The whole assembly is encased in a black anodised aluminium frame for a neat construction. The collectors can be connected in series in horizontal or vertical orientation to suit the available roof space. An extensive range of accessories are available for pitched or flat roof, and the added option of in-roof installation means that the flat plate collector can be fitted in virtually any situation. The collector has the benefit of a 5 year warranty.

The **auroTHERM** VFK 990 flat plate collector has the same high build quality as the auroTHERM plus but with a slightly lower solar efficiency. It has a toughened 4mm thick solar glass cover and 60mm rear and side insulation. The collector can be connected in series in horizontal or vertical orientation to suit the available roof space. The same range of roof fixing accessories can be used.



Solar cylinders

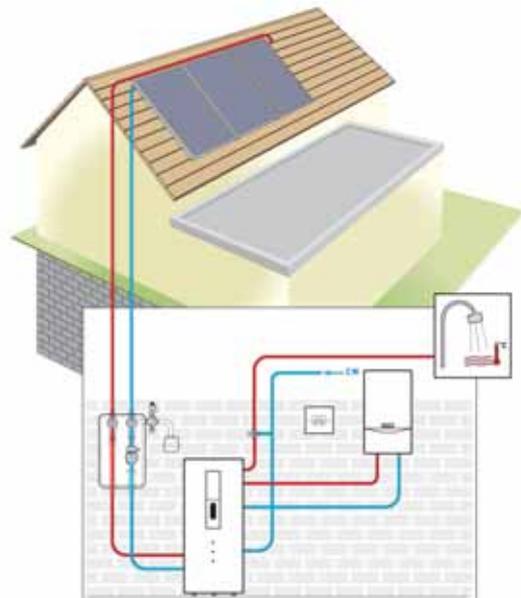


auroSTOR cylinder

auroSTOR solar cylinder

This twin coiled unvented solar cylinder manufactured from stainless steel is designed for use with a boiler to provide auxiliary hot water during periods of low solar gain. Delivered with a 3kW back-up immersion heater as standard, it comes in three sizes of 200, 250 and 300 litre volumes and has a 25 year warranty on the cylinder shell. Each cylinder features two sensor pockets for simple straightforward connection of the control sensors and a 22kW rated auxiliary coil for a rapid heat up. Insulation exceeds CHeSS best practice and heat loss is as low as 0.08kW/h. Compact and stylish the cylinders are easy to install.

auroSTOR complies with G3 Building Regulations and is WRAS and KIWA approved for use within solar systems. The Vaillant Total Solar System Solution package also has WRAS approval which allows the heating system to be controlled by the Vaillant VRC 400 weather compensator to optimise heating efficiency.



25
year
guarantee
cylinder shell

2 year
guarantee

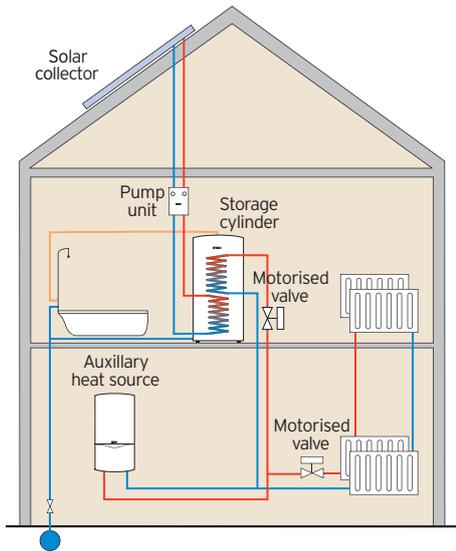
WRAS
APPROVED
PRODUCT



Solar control



auroMATIC 560 control



Typical solar installation and heating system

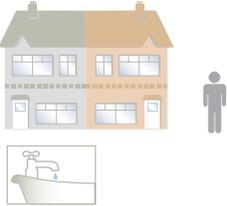
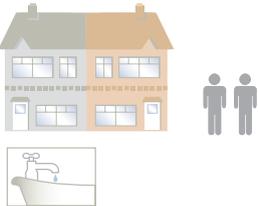
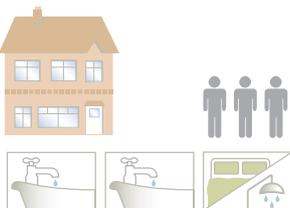
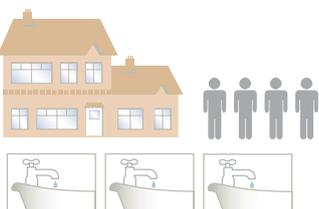
auroMATIC 560 solar controller

An intelligent solar differential control with an easy to read LCD display and simple push button operation, auroMATIC offers three time periods for auxiliary cylinder heating giving the end user total control over the availability of hot water. The control monitors the temperature of the collector and of the cylinder. When sufficient solar energy is available the control switches on the solar pump unit to charge the cylinder. If there is insufficient solar energy available the control will automatically determine when the auxiliary heat source is required.

Solar sets

Solar sets and cylinders

Solar system sizing guide

	Boiler ecoTEC plus	Solar system auroTHERM exclusive vacuum tube solar collector	Solar system auroTHERM flat plate collector	Solar cylinder auroSTOR
				
Typical 1 bedroom house / flat / apartment with 1 bathroom¹				
	ecoTEC plus 415 ecoTEC plus 615	2 collectors	1 collector ³ (auroTHERM plus 990 only)	200 litres ²
Typical 2 or 3 bedroom semi-detached with 1 bathroom¹				
	ecoTEC plus 415 or 418 ecoTEC plus 615 or 618	2 or 3 collectors	2 collectors ³	200 litres ²
Typical 3 or 4 bedroom detached with 1 or 2 bathrooms plus en-suite¹				
	ecoTEC plus 418 or 428 ecoTEC plus 618, 624 or 630	3 or 4 collectors	2 collectors ³	250 litres ²
Typical 4 bedroom detached with 3+ bathrooms¹				
	ecoTEC plus 428 or 438 ecoTEC plus 630 or 637	4 or 5 collectors	2 or 3 collectors ³	300 litres ²

¹ Full heat loss calculation should be done to accurately size boiler and hot water requirement.

² Recommended cylinder size assumes average requirement of 40 litres per person per day.

³ An additional flat plate collector might be required depending on solar radiation level and site conditions. Your installer will advise.

auroTHERM exclusive VTK 570 vacuum tube solar collector sets

Solar set	auroTHERM exclusive VTK 570			
	mini set	small set	medium set	large set
Article number	00264785	00264786	00264787	00264788
auroTHERM exclusive VTK 570	2	3	4	5
On-roof set for 2 collectors	1	-	2	1
On-roof set for 3 collectors	-	1	-	1
Connection cover set	1	2	3	4
Conection set VTK 2 x 15mm x 3/4" BSP	1	1	1	1
Extension rail on roof	-	-	1	1
Single insulated tube, DN16, length 15m	2	2	2	2
Collector tubing 2 x 1 meter DN16	1	1	1	1
Thermostatic mixing valve	1	1	1	1
Solar control auroMATIC 560	1	1	1	1
Solar pump unit	1	1	1	1
Expansion vessel 25 L	1	1	-	-
Expansion vessel 35 L	-	-	1	1
Protection vessel 5L	1	1	1	1
Solar fluid 20 L	1	1	1	2
Solar fluid 10 L	2	2	2	1
Automatic air separator	1	1	1	1
NTC sensor VR10 (solar gain)	1	1	1	1

auroTHERM flat plate collector sets

Solar set	auroTHERM plus VFK 990			auroTHERM VFK 900	
	1 panel set	2 panel set	3 panel set	2 panel set	3 panel set
Article number	0020057935	0020057936	0020057937	0020036552	0020057934
auroTHERM plus VFK 990	1	2	3	-	-
auroTHERM VFK 900	-	-	-	2	3
Roof brackets for concrete tiles (6 pcs)	-	1	1	1	1
Roof brackets for concrete tiles (4 pcs)	1	-	-	-	-
Roof brackets for concrete tiles (2 pcs)	-	-	1	-	1
On-roof kit for 1 collectors	1	-	-	-	-
On-roof kit for 2 collectors	-	1	-	1	-
On-roof kit for 3 collectors	-	-	1	-	1
Stainless steel connection hose, DN 12, 2 x 1m	1	1	1	1	1
Single insulated tube, DN 16, 15m	2	2	2	2	2
Fitting pack for DN 16 tube	2	1	1	1	1
Solar control auroMATIC 560	1	1	1	1	1
Solar pump unit	1	1	1	1	1
Expansion vessel 18 litres	1	1	-	1	-
Expansion vessel 25 litres	-	-	1	-	1
Protection vessel (5 litres)	1	1	1	1	1
Solar fluid (20 litres)	1	2	2	2	2
Thermostatic mixing valve	1	1	1	1	1
Automatic air separator	1	1	1	1	1
Solar gain sensor (VR 10)	1	1	1	1	1

Please note: additional fixing brackets can be ordered for auroTHERM flat plate collectors.

In-roof kits for flat plate collectors VFK

In-roof kit	2 panel	3 panel
Article number	0020057933	0020059990
In-roof kit (fixing material)	1	1
In-roof kit (metal sheets)	1	1
In-roof kit for an additional collector		1

auroSTOR solar cylinders

auroSTOR	Article number
Twin coil stainless steel solar cylinders	
auroSTOR 200 litre	307 206
auroSTOR 250 litre	307 207
auroSTOR 300 litre	307 208

A full range of solar accessories are sold separately. Please see solar price list for further details.

Questions and answers

Your questions about solar heating for domestic hot water answered

Why should I consider using solar energy?

Firstly, by reducing carbon dioxide emissions, you can rest assured that it's better for the environment and you will also be helping to conserve the world's rapidly diminishing supplies of gas and oil. Secondly, utilising solar energy for hot water will help to reduce the impact of rising oil and gas prices and means that you won't be so reliant on these conventional fuels. Thirdly, installing a good solar system can add value to your property.

How does a solar DHW heating system work?

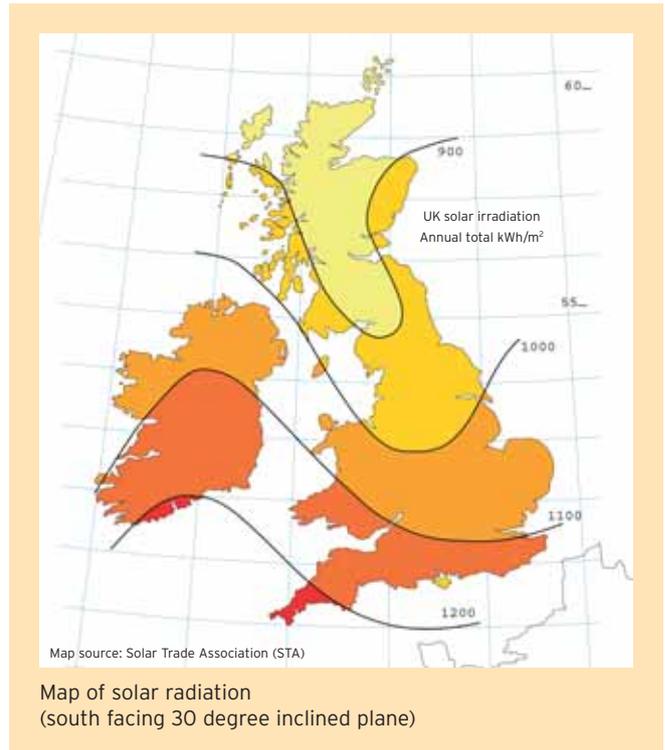
The principles are quite straightforward. Solar collectors absorb energy from the sun to heat a fluid that is pumped in a sealed circuit to an indirect coil in a water cylinder to heat the domestic water.

Where are the collectors fixed?

Vaillant's high performance solar collectors are easily sited on pitched, flat roofs, or in roof. Ideally the solar panels should be oriented to face south, but they will work with a small loss of efficiency sited between 30 degrees east and 40 degrees west of south.

Do I want vacuum tube or flat plate collectors?

Vacuum tube collectors offer the highest operating efficiency all year round and, due to their low weight and smaller dimensions, offer easier installation and handling. Flat plate collectors should be used when efficiency during autumn, winter and spring is not so important and in areas where a tough collector is preferred, e.g. in areas at risk of vandalism.



Surely there is not enough sunshine in this country to make it work?

As the panels work on diffused solar radiation as well as direct sunlight, they will even generate small amounts of energy on partially cloudy days. This lowers the energy required from your boiler. The DTI has calculated



Different mounting methods for auroTHERM and auroTHERM plus flat plate solar collectors.

that there are sufficient solar radiation levels across the whole UK to provide useful energy. In areas with lower solar radiation, the number of collectors can be increased to maximise solar energy usage. In addition the design of Vaillant's tube collectors ensures that they capture solar radiation at a wide range of angles making them more efficient than other designs during spring and autumn.

So why do I still need a conventional boiler?

Vaillant's solar DHW heating system will provide around 50-60% of annual domestic hot water requirements, but an auxiliary heat source is required for times of low solar energy to ensure there's always hot water on demand. In addition, the boiler is also necessary to operate the central heating system. Vaillant's intelligent solar control unit facilitates automatic switching between solar and conventional power when there is insufficient solar energy available to heat the water - particularly useful during the winter months. The system will work with a new Vaillant boiler and is also compatible with most existing heating appliances but remember to check the controls configuration to make sure the boiler only fires when there is little or no solar energy available.

How much would a typical solar system cost?

There is not really a typical cost - it depends on the number of collectors required, the size of the cylinder and on installation details such as accessibility for the scaffold and the complexity of the wiring.

Are there any financial incentives to install solar power?

The Low Carbon Buildings Programme funded by the Government encourages homeowners to apply for grants of up to £400 to assist with installing a solar domestic water heating system. Please see www.lowcarbonbuildings.org.uk for further details. In addition, a solar system installed by an accredited heating professional is chargeable at the lower VAT rate of 5%.

Vaillant solar products are Low Carbon Buildings Programme approved. When applying for your grant please use the following product codes: auroTHERM flat plate collector ST1109, auroSTOR cylinder SC2094.



What additional products will I need to complete the installation?

Research indicates that installers prefer to purchase all their solar equipment from one manufacturer so Vaillant has ensured that we can supply all the necessary components. This includes the collectors, fixing brackets, solar pump station, stainless steel cylinder, solar control, and even the insulated flexible stainless steel pipes to run between the collectors and the cylinder. The only other items you may need are electrical cables and copper pipe work.

How do I design a solar system?

Vaillant's solar training course will give installers details of how to design solar systems and advice on all the key issues. Our expert technical team will be able to assist with general design questions and will help tackle more complex work. We are committed to working in partnership with our installers, offering the very best industry support and training to develop the solar heating market.

Do you offer solar training?

We offer two types of training course:

- The BPEC Solar DHW course is a two-day course designed for new solar DHW installers who require BPEC certification.
- The Solar appreciation course is a one-day course designed for experienced heating installers to provide an insight into Vaillant's solar DHW heating.

Customer support services



Working in partnership

The after sales service and support behind every Vaillant product is part of the quality package that has helped us build a unique reputation within the industry. It is an approach that is reflected in our support for our Total Solar System Solution. We are committed to working in partnership with our installers, offering the very best industry support and training to develop the solar heating market.

Vaillant technical support team

Our dedicated team is on-hand to offer technical support. We are here to help with product familiarisation and to tackle any other issues that arise in relation to our solar DHW heating products.

High quality training

Please contact our training team to register your interest in attending a Vaillant solar training course.

Contact details

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Technical specification

		auroTHERM exclusive VTK 570 vacuum tube collector	auroTHERM plus VFK 990 flat plate collector	auroTHERM VFK 900 flat plate collector
Gross collector area	m ²	1.15	2.24	2.24
Net collector area	m ²	1.00	2.02	2.02
Height	mm	1640	1930	1930
Width	mm	700	1160	1160
Depth	mm	100	110	110
Weight	kgs	19	43	43
Collector capacity	litres	0.8	1.27	1.27
Collector absorption	%	95 + 1	95	95
Collector emission	%	-	5	5
Transmission	%	-	96	91
Solar efficiency (EN 12975)	η ₀ %	64.2	85.4	81.8
	k ₁ W/m.K	0.86	3.37	3.47
	k ₂ W/m ² K	0.001	0.01	0.01
Insulation		Vacuum tubes	Rockwool 60mm	Rockwool 60mm
Absorber		Copper	Copper	Copper
Operating pressure (max.)	Bar	10	10	10
Stagnation temperature	°C	272	232	227

auroSTOR unvented solar hot water cylinder		auroSTOR 200	auroSTOR 250	auroSTOR 300
Volume	litres	200	250	300
Maximum water supply pressure	bar	10	10	10
Operating pressure	bar	3.5	3.5	3.5
Pressure reducing valve	bar	3.5	3.5	3.5
Expansion relief valve	bar	6.0	6.0	6.0
Expansion vessel charge pressure	bar	4.0	4.0	4.0
Temperature & Pressure valve	°C / bar	95°C / 7 bar	95°C / 7 bar	95°C / 7 bar
Maximum primary circuit pressure	bar	2.5	2.5	2.5
Weight (empty)	kgs	39	44	49
Weight (full)	kgs	245	310	340
Height	mm	1500	1790	2110
Width (excluding connections and PRV)	mm	554	554	554
Heat Loss	kW / 24 hrs	1.9	2.1	2.4
Cylinder connections		22mm compression	22mm compression	22mm compression
Electrical connections		230/240 V, 50 Hz	230/240 V, 50 Hz	230/240 V, 50 Hz
Back-up immersion heater output	kW	3	3	3

auroMATIC solar control		auroMATIC 560
Dimensions (W x H x D)	mm	272 x 175 x 55
Operating voltage	V	230
Power consumption	W	Max 10
Minimum sensor wire diameter	mm ²	0.75
Minimum power cable wire diameter	mm ²	1.5
Level of protection		IP 20

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