Types of solar water heater

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Learn about the types, benefits, and installation of solar water heating systems for your home. Compare active and passive systems, storage tanks, collectors, and b...

There are several types of solar water heater systems, primarily divided into passive and active systems. Passive systems use natural convection to circulate water, with main types being integral collector-storage (ICS) systems and thermosyphon systems. Active systems use electric pumps and controllers to circulate water, and are typically direct or indirect circulation systems.

Solar water heating is a cost-effective way to heat water year-round, even in the coldest or foggiest climates. By relying on the sun, a consistent and renewable resource, we reduce our dependency on conventional fuel sources, which not only sway with market changes but also contribute to environmental pollution. In fact, one of the primary benefits of solar water heaters is their inherent sustainability and efficiency. They reduce your carbon footprint while cutting down on energy bills.

Without getting too technical, the simplest explanation is that a solar water heater transfers heat from the sun to increase the temperature of the water storage. Depending on the type, they may directly heat the water or heat a ‘working fluid’ that’s then used to heat the water. To understand it in-depth, consider visiting What is Solar Water Heating page.

Solar collectors are typically installed on the roof. These collectors are designed to absorb the warmth from the sun’s rays and transfer it directly to the water. The heated water is then returned to the house.

Given that water is directly heated, these systems are prone to freezing in colder climates. They also have more moving parts and complexity, thus require somewhat more maintenance than passive systems.

In these systems, a pump moves an antifreeze fluid through the solar thermal collectors, which then heats up by absorbing the sun"s heat. The heated fluid then passes through a heat exchanger, which transfers the heat from the fluid to the water in the hot water tank.

Indirect systems offer protection from freezing conditions and overheating. They are better suited for homes in areas with freezing winter temperatures and/or hard water.

One of the main drawbacks is the higher complexity, and consequently, higher cost and maintenance involved due to the use of additional equipment like pumps and controllers.

As water warms, it gets lighter and naturally rises into the tank. This natural circulation of water, owing to changes in water density with temperature, is the driving principle of thermosyphon systems.

On the flip side, they’re less efficient than active systems due to slower water circulation, and the heavier weight of the storage tank on the roof might have structural implications.

When comparing different types of solar water heating systems, consider factors like your geographical location, the amount of sunlight your home receives, your budget, and the expected maintenance effort.

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