

# Solar Passive FAQs

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## What is solar passive?

This is where the sun's rays pass through windows into the building and heat is stored by the floor and walls within the building and then radiates warmth later, after the sunlight has gone. Good building design will maximise solar gain whilst managing overheating by careful use of shading and natural ventilation.

These systems rely on south-facing windows with good insulation and coated glass to reflect the heat back into the building. Windows are usually shaded to allow the low winter sun into the building providing much needed heat but keeping out the summer sun to prevent the building from overheating. These principles can be best maximised in conjunction with insulation and air tightness in the design of new buildings.

## The different systems

Passive systems move household water or a heat-transfer fluid through the system without pumps. Passive systems have the advantage that electricity outage and electric pump breakdown are not issues. This makes passive systems generally more reliable, easier to maintain, and possibly longer lasting than active systems. Passive systems are often less expensive than active systems, but are also generally less efficient due to slower water flow rates through the system.

A thermosiphonic system (although not commonly used in this country) relies on warm water rising, (a phenomenon known as natural convection), to circulate water through the solar absorber and to the tank. In this type of installation, the tank must be located above the absorber tubes/panel. As water in the absorber heats, it becomes lighter and naturally rises into the tank above. Meanwhile, cooler water in the tank flows downwards into the absorber, thus causing circulation throughout the system. This system is widely used with both flat plate and evacuated tube absorbers. The disadvantages of this design are the poor aesthetics of having a large tank on the roof and the issues with structural integrity of the roof. Often the roof must be reinforced to cope with the weight of the tank.

Batch heaters (although not commonly used in this country) are simple passive systems consisting of one or more storage tanks placed in an insulated box that has a glazed side facing the sun. Batch heaters are inexpensive and have few components, but only perform well in summer when the weather is warm.

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