

# To store or not to solar thermal store?

Steve Woolas of HWA member RM Cylinders looks at the various benefits of solar thermal hot water storage



## TAKING THE HEAT

The debate on the pros and cons of solar heated hot water has been well aired throughout the industry and, for the majority of householders, the benefit of having "free" heated hot water is a welcome addition to the family home in these times of financial constraints.

An efficient and effective solar thermal hot water system can heat some 50% to 70% of the annual hot water requirements of the home. Fossil fuel costs have increased sharply over recent years and are forecast to continue doing so, whereas the sun's rays continue – with some seasonal fluctuation – to beat down with perpetual regularity onto the roofs of our homes absolutely free of charge.

## THE KEY TO THE STORE

At the heart of every solar-powered hot water system is a storage cylinder and Hot Water Association (HWA) member manufacturers offer cylinders and tanks which provide compatibility with solar-powered hot water systems.

Solar hot water can be introduced into existing homes installed with open-vented storage, unvented storage or thermal primary store systems. Equally, all the mentioned cylinder formats may be linked to a variety of fossil fuels including gas, oil, electricity or a combination of multiple heat sources. Solar storage cylinders have developed in the UK

taking a number of factors into account, in particular the physical constraints of installing cylinders within the home. The majority of UK homes do not offer the luxury of space required to enable a designated solar storage cylinder to be installed in addition to the standard conventional cylinder already installed within the property. To overcome this space constraint, dual-function cylinders are available which create two separate areas of water within one cylinder.

## AN EXTRA PORTION

This division of heated waters is created by thermal stratification of water within the cylinder by strategic siting of the heat input devices, such as coils immersion heaters, at specific levels throughout the cylinder height.

Typically, such cylinders have in their lower section a designated solar area which equates to at least 30% of the total cylinder capacity. The designated solar area is fitted with a high-performance, coil-type heat exchanger connecting to the solar thermal panels, ensuring maximum effective heat transfer of the solar heated water. Within this area will be mounted a thermostat point to enable controlled activation of the solar input.

The remaining section within the upper portion of the cylinder contains the fossil fuel heat input device. This is usually in the form of a coil type

heat exchanger for gas- or oil-fired boiler input, or an immersion heater(s) for electrically-powered heat input. Cylinder models which are designed for connection to a heat pump may even employ an external plate-to-plate heat exchanger.

## MEASURING UP

The sizing of the storage vessel is all important and consideration must be given to a number of factors. In the UK the established recommendation of at least 25 litres of designated solar volume within the cylinder per  $\text{m}^2$  of nett solar collector panel has proven to be a successful formula in establishing the minimum

required capacity of the designated solar area within the cylinder.

Evaluation of the remaining fossil fuel heated section of the cylinder is also important as in days of little or no solar gain, for instance, on days of heavy fog or when the panels are covered in snow, this quantity of water may be the sole volume of hot water available to the property.

Sizing this area is similar to that of sizing a non-solar solution for the home, taking the fossil fuel type into account coupled with the excellent guidance found within BS6700 and Building Regulation Part L.

## A WORD OF ADVICE

Once both the designated solar and fossil fuel volumes are established, a suitable cylinder may be chosen.

The majority of HWA member manufacturers have literature detailing their solar-compatible cylinders and some will also offer bespoke non standard sizes and capacity ratios to suit the required needs of the system.

The storage cylinder is a very important component within the overall solar powered hot water system and careful consideration should be given to the choice of storage cylinder.

