My solar domestic hot water by Nathan Jowett



Modern day Solar Water heaters have come a long way, using simple but more efficient design to maximise heat exchange. No longer are separate anti-freeze heat transfer circuits required to avoid winter freezing issues. The running costs of driving an electrical pump, to circulate the heat transfer medium from the sun's solar rays through to the water storage tank, can also be taken out.

My Domestic Unit consists of 18 tri-element evacuated tubes held on a stainless-steel stand. They recess directly inside the overhead 200Litre insulated storage reservoir. This system is gravity based but it can also go straight on to the mains, as long as an expansion vessel is added to the set up.

The vacuum tubes consist of two glass tubes, which are fused at one end. The outer surface of the inner tube is coated using 12 layers of spattering deposition. It works with the same principle as a Pilkington glass coating ie. allowing the heat/energy photons to transfer through the surface, but not allowing further heat loss through refraction (like a one-way street).



As the air is also removed this eliminates convective and conductive heat loss so that all this heat energy is transferred into a long hollow copper heat pipe, which is filled with a volume of



acetone, in the centre. An additional folded aluminium strip, which acts as heat dissipator, is inserted within the inner glass diameter for the copper heat pipe to rest on, it also assists the solar energy transfer from liquid to vapour. This reduces heating time, as water is removed from the circulation loop, enabling the Solar Heater to withstand temperatures as low as -35° centigrade, which, I'm hoping, even with "Global Weirding", we won't be getting those sort of temperature extremes (yet?). 15 years is given as the warranty lifespan of the tubes.

I've only had to replace two so far over the 5 years of installation. One due to accidental damage and one because the vacuum seal had been lost (condensation within the glass, heat transfer would have continued but maybe not as efficiently or for as long).

On the top of the tank is a pressure relief valve which vents/discharges if the unit reaches boiling point. On the underside are three more fittings, these are;

- 1. Zinc cathodic protection stick (to minimise limescale build up on the inside of storage tank).
- 2. 1.5kW Stainless Steel immersion heater.
- 3. Temperature Measurement probe, on Sunny days I notice +0.1 0.2° centigrade /minute which can also be doubled with use of the back-up immersion heater.

The heat remains within the tank for up to 72 hours, this works very well.

The Unit stands at 6' height, 5'6" length and 5' width. It has two 22mm connection couplings (cold water in, hot water out) and the immersion is wired to the same rating as a normal kettle (live, neutral and earth, but doesn't have a thermal cutout). There are three different stands available, the roof mounted stands have shorter back legs so the angle of the vac. tubes reduces from 45° to ~30 and lower (close roof frame).

Oh, cost? Well, under half that of the EST's estimate(£4000=6000).I bought my unit from a local Plumbing merchants Baker &Soars,there are a number of different sizes available; 100,150,200,250 & 300 Litre

Thank you to Haining Saneng for allowing me to use some of the pictures and technical information from their Product catalogue.

https://www.bakerandsoars.com/store/product_inf o.php?products_id=8502

