TASK39

SHC SOLAR HEATING & COOLING PROGRAMME INTERNATIONAL ENERGY AGENCY

Polymeric storage tanks

INFO Sheet B14

Description:	*Ideas for design and manufacturing of plastic storage tanks*
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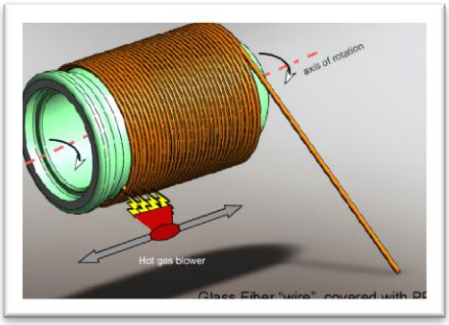
Download at:	http://task39.iea-shc.org/publications

Introduction

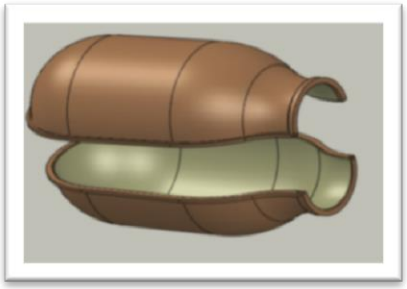
In the last years plastic solar collectors have been developed and manufactured by various companies. Plastic pipes are used in these solar systems (PP, PEX, CPVC) but storage tanks are still mainly metallic. This info sheet presents some ideas for manufacturing low cost thermoplastic pressure storage -tanks for DHW solar systems.

Thermoplastic endless glass fiber wound reinforced polyolefin tank.

A blow-moulded, thin wall vessel (100 -120 liter volumes) will be covered by a cross-wound sheet of endless glass-fibers, encapsulated in a polypropylene coating similar to a wire. These cross-wound layers of PP and fibers are molten by means of hot air and fused to the vessel (Leister system) and form a hybrid pressure resistant tank. This method is similar to the process using thermoset polyester glass reinforced resins (GRP) but presents the advantage of a clean, chemical free procedure and yields a recyclable product.



Injection moulding of two half shells made from glass reinforced engineering materials specially designed for liquid applications.



No internal lining will be necessary. The shells can be welded by means of hot-plate, vibration welding or infrared radiation. Welding coefficients are quite strong. This will enable to make a lightweight but pressure resistant tank. The water temperatures are moderate and do not negatively impact the pressure resistance of these engineering materials. The materials used have to be certified according to NSF 61.

For both methods the pressure vessel is insulated by means of PU foam or mineral wool, covered by an external injection moulded or thermoformed protection, and enhanced with an electric heater and thermocouple, inlets outlets, and connection flanges etc.