Issue 5, August 2007

Good Practices for Equipment & Installers
The Installers' Newsletter

The aim of this newsletter is to publish and share good practice for installers of systems supported under the Greener Home Scheme. The comments in this newsletter have arisen from inspection of installations supported by the Greener Homes Scheme. This edition focuses on Solar Thermal, QA Process and Soft Start for HeatPumps.

Solar Thermal

Cylinders for Solar Thermal Systems

Suitably sized and designed cylinders should be chosen for the installation. Solar heated hot water systems require additional storage, which can influence the size of the installation and its location. For optimum heat retention, the cylinder should be well insulated. It should include sensor pockets appropriately placed to ensure rapid system response and good system control. A dual coil cylinder is recommended. For optimum solar performance, the solar system should supply the bottom coil providing pre-heating of the water in winter and on dull days and the secondary heating system should supply the second coil.

Controllers and Cylinder Capacity

Many controllers on the market for solar thermal systems default to a maximum cylinder temperature of 60 °C. The heat storage capacity of the cylinder is greatly reduced at 60°C. Assuming the 'rule of thumb' of 50 litres per m^2, at 60° C not even the energy from a full days sunshine could be stored. A capacity of 70 litres per m^2 at 60 °C would give approximately the same heat storage capacity as 50 litres per m^2 at 85 °C. Increasing the maximum cylinder temperature to approximately 80°C when measured at the bottom of the cylinder and approximately 90°C when measured at the top of the cylinder can increase the heat storage capacity and can prevent stagnation of the system. Minimum cylinder temperature should be set below 35°C to allow solar energy to be put to use at low cylinder temperatures and in bad weather.

Hard Water Areas

Increasing the maximum cylinder temperature can have adverse affects where the water is hard. At high temperatures, the calcium separates from the water and deposits on the heat exchanger of the cylinder. This can result in loss of efficiency of the heat exchanger and the overall system. To compensate for hard water use a water softener or increase the ratio of cylinder volume to aperture area and maintain a 60°C temperature setting.

Thermal Mixing Valves

Good practice recommends maintaining water in a hot water cylinder at a minimum of 60°C to prevent the growth of legionella bacteria. Thermal mixing valves are necessary to prevent scalding of the homeowner when the temperature is raised above 60°C. In open vented systems, pressure may be lost using thermal mixing valves. This problem can be overcome by using a mixing valve of a larger pipe size, usually a 1-inch valve for a 3/4 inch pipe.

Common faults found during Solar System inspections

- **Insufficient insulation on pipework in solar loop;** Insufficient insulation will result in heat loss to the atmosphere and will result in lower efficiency.
- **Sensor at bottom of cylinder is not fixed;** The sensor at the bottom of the cylinder must be fixed to ensure the system responds rapidly and to ensure control of system efficiency.
- **Overflow/vent pipe is not routed to drainage/ground/vessel;** The overflow or vent should be piped to drainage at ground level or to a sufficiently sized vessel to prevent harm to the property or the homeowner. Ensure it is routed to a visible location so the homeowner is aware when it vents and can contact their installer.
- **Maximum cylinder temperature may be set too low at 60°C thus reducing the heat storage capacity;** Setting the cylinder temperature to 60°C may result in greatly reduced heat storage capacity and should be increased to between 80° and 90°.
- **Potential for shading of solar collectors;** Care should be taken when deciding on the location of solar collectors to check that where possible the collectors will not be overshadowed by trees or other buildings.

The Greener Homes Scheme has been running for over 16 months. Over 17,000 applications have been received. The applications are spread over the three technologies as follows:

26 % HeatPumps, 37 % Biomass and 37 % Solar.

Sustainable Energy Ireland, Greener Homes Scheme, Glasnevin, Dublin 9.
T: 1850 734 734, F: (01) 808 2013 Web: www.sei.ie Email: greenerhomes@sei.ie

Commissioning Reports

The Greener Homes Scheme Commissioning Reports for the three technologies have changed considerably in the last year. Currently we are using versions 3.2 for Heatpumps and Biomass (last modified Dec '06) and version 3.4 for Solar Thermal (last modified Aug'07). The Solar Thermal Commissioning Report was modified in August of this year to reflect the maximum cylinder temperature versus cylinder capacity question. The latest versions are stored in PDF format on the Greener Homes Website. Please check periodically for updates. It is important that you use the correct version of the commissioning report to ensure that the homeowners grant is processed in a timely manner. Commissioning reports will be returned to the homeowner if the incorrect version is used.

All sections of the commissioning report must be filled out for each installation by a registered commissioner. Ensure to complete all sections on pages 1 and 2 and be sure to read page three and four carefully before signing off on the checklist. The commissioning report is used as the foundation for Technical Inspections. Incomplete commissioning reports will be returned to the homeowner and payment of the grant may be delayed.

QA Process

Inspections are carried out on installations across all three technologies to monitor quality and support and guide installers as to installation requirements and good practice. Notification of any issues/deficits found during an inspection is sent to the commissioner. Commissioners must complete the re-work and respond to SEI in 4 weeks. The re-work declaration signed by the commissioner and the homeowner must be returned to SEI as confirmation of completion of the re-work. Commissioners can dispute/clarify the findings of the inspection if they can verify otherwise, by contacting SEI. Contact details are provided on each letter issued.

Failure to respond to SEI within 4 weeks is a failure to meet the terms and conditions of installer registration *'I accept that failure to act on a direction from SEI or its authorised agent, to remedy a deficit identified as a result of an inspection may result in my removal from the Registered Installers List'*. A letter of non-compliance is sent to the commissioner outlining the outstanding re-works and they have 4 weeks to complete the re-work and return the paperwork to SEI. Failure to comply may result in the commissioner's removal from the Registered Installers List.

Grant Valid for 12 Months

The grant is only valid for 12 months; no exceptions. Ensure that all homeowners are made aware and that work is completed in time to claim the grant.

Removal of an Installer from the Registered Installers List

Installers will be removed from the list of registered installers for the following reasons;

- TCC expiration – An installer will be notified 1 and 2 months prior to the expiration of their TCC. It is up to the installer to send in a new TCC form to remain on the list.
- Voluntary Request to De-Register – Installer sends in a letter requesting their removal from the Registered Installers List.
- Failure to meet the terms and conditions of Registration and/or the Commissioning Report.

ESB Requirements: Soft Start for HeatPumps

Electricity Connection for Houses with Heat Pumps

Electric motors draw a momentary surge of current from the supply system when they are switched on. When a large motor (>1kW) is installed in a house, there is a risk that the current surge on starting will cause a dip in supply voltage affecting lighting and other appliances. This can be a nuisance; not just in the house with the motor but also in neighbouring houses. This is especially true for a heat pump motor which starts automatically a number of times a day during the heating season

ESB Networks have advised that these problems can be avoided by the incorporation of a **soft starting device** in the heat pump installation and also by ensuring a sufficiently strong electricity connection to the house. A soft starter is a device that limits the surge of current to a motor on starting. Without a soft starter, the current surge can be 5 to 6 times normal running current. With a soft starter, the surge is reduced to 2 to 3 normal current. It is a cost effective way of reducing the problem and ESB Networks are now insisting that a soft starter be incorporated in heat pump installations in houses. It is a requirement in other countries and some equipment suppliers incorporate a soft starter as standard.

Even with a soft starter, it is important to ensure that the electricity connection is sufficiently strong. ESB have recently updated their connection application requiring the **starting current** to be entered where a heat pump is being installed. This will allow ESB Networks to ensure that a sufficiently strong connection is provided. ESB Networks are currently arranging to write to approved installers to explain these arrangements in more detail.

Further information is available by contacting Kevin Niall, Network Strategy Manager, ESB 01-7027278 or kevin.niall@esb.ie