

## **Gaining Efficiency with Automatic Vent Dampers**

All boilers and direct-fired hot water storage tanks have a few common construction characteristics. They all have a cabinet, a burner arrangement and a heat exchanger. The heat exchanger (hx) is a very efficient, hard working machine even though it has no moving parts. A hx has an operating principle described clearly and simply as the First Law of Thermodynamics, which says that, heat will move from a hotter source to a colder source. The Second Law is also useful to bear in mind in this discussion and it says that the rate of heat transfer is directly proportional to the difference in temperature of the two sources.

When the boiler burner is on the hx is bathed in very hot flue gases and so the direct of heat transfer is from the hot flue gases through the metal walls of the hx and into the water within. After the burner shuts off the hx is still an hx and the laws of thermodynamics still apply. The hot flue gases are replaced with ambient air and now the direction of heat transfer reverses. The hot water now surrenders its heat to the air on the other side of the heat exchanger and that air rises as a column of hot air is formed. That flow of hot air is called chimney action and represents a huge loss of energy. The owner has all ready paid to heat the both the boiler water and ambient air and then has to pay to heat the outside air that is drawn in to replace the ambient that disappears up the stack. This heat loss is an example of stand by heat losses. In the case of some types of appliances many people pay more money reheating water to recover from standby heat loss then heating water for their own use.

A means to stop this type of standby loss is the use of a motorized damper in the vent just above the appliance. This damper is opened by a control system before the burner is allowed to start and is closed after a burner run cycle. The closed damper interrupts chimney action thus lending the system a gain in overall efficiency. Please note that only approved devices may be used and careful determination must be made as to the correct device. Not every appliance can accept an auto vent damper but many can benefit from their use.