WHY THERMAL STORAGE?

Why couple thermal energy storage with heating equipment that utilizes cord-wood or other biomass fuels? Doing such yields **significant benefits** when one is trying to utilize a difficult to control fuel. In particular, thermal energy storage:

- Eliminates the short cycling of burners thus reducing emissions. In conventional wood heating equipment wood combustion produces *maximum emissions* during the "idle" cycle. Also, by minimizing the on/off cycle, maintenance is reduced.

- Allows any burner to be set up for steady state **continuous peak combustion efficiency** because the burner does not have to cycle as demand for heat increases. The burner simply "charges" the thermal storage.

- Allows a **continuous exact match** of heat output to widely varying loads of any building or process. This is very important during the "fringes" of any heating season when a typical wood burner is grossly oversized because it is based upon the largest heating load during winter conditions.

- Allows **interfacing** biomass fuels **with off peak electric** heating. Provides a convenient secondary fuel at **very** reasonable rates.

- Thermal storage allows interfacing with other intermittent energy sources such as solar thermal and wind generated energy.

- Allows simple **connection to** fan coil units (make-up air and prime heating), hot water baseboard, cast iron and European style radiators, and radiant floor delivery systems **with a single** thermal storage unit.

- Allows for **burner maintenance, repair or cleaning without a loss of heating** ability because the thermal storage can carry the load for a period of hours **without** burner input.

Thermal energy storage may be provided via a separate storage tank piped to the burner unit (boiler), or as an **integral unit** with the burner. The integral unit approach provides **greater simplicity, lower first and maintenance costs,** easier installation, greater efficiency and greater safety. If the thermal storage is non-pressurized, the benefits are even greater because safety is further improved and the following equipment is *eliminated:* air separator, pressure reducing fill valve, back-flow preventer and expansion tank.

DECTRA CORPORATION has been providing **GARN WHS®** wood heating equipment with integral non-pressurized thermal storage with every unit sold since 1978. This approach has **SOLVED** many wood heating problems and yielded consistent **CUSTOMER BENEFITS.** For instance:

- A high **independently** verified efficiency. **GARN WHS®** equipment was **independently** tested for efficiency and certified in 1986 at 70% and 2006 at 75.4%.

- **GARN WHS®** efficiency produces fewer emissions. This results in less smoke, less wood burned, less ash and less wood handling

- Because of internal energy storage, **GARN WHS®** further increases safety by not requiring an active fire overnight.

In fact, a paper published in Sweden in April 2004*, concludes that emissions can be reduced 95% by *properly connecting* a conventional wood fired hydronic heater to a heat storage tank and allowing the unit to operate at its continuous peak combustion efficiency.

This is exactly how every GARN® WHS unit manufactured since 1976 is designed to operate!

* Emission characteristics of modern and old-type residential boilers fired with wood logs and wood pellets by Linda S. Johanssona, Bo Lecknerb, Lennart Gustavssona, David Cooperc, Claes Tullina and Annika Potterc

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