

## Tech Bulletin: Hydronic Models

P/N: TB14.003

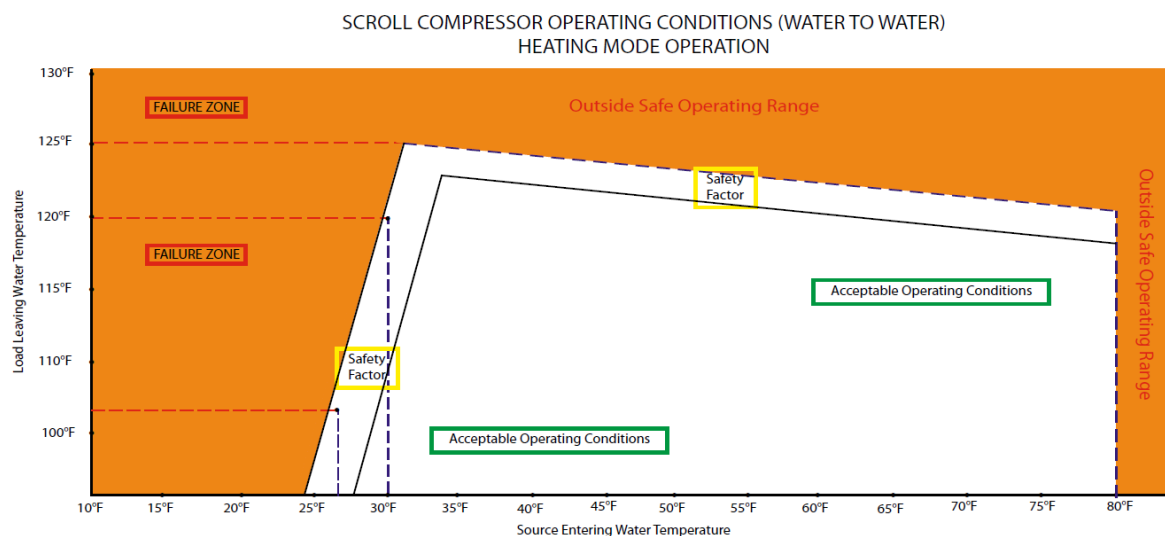
A while back we started noticing some water-to-water units having a vibration issue. To reduce the vibration and possible damage to refrigeration components, we issued Tech Bulletin TB13.003 and a Water-to-Water Vibration Damper kit. The kit was designed to reduce objectionable sound transmissions and vibrations found in older A and B revision model WT units. In the service bulletin was a subtle reference stating “do not set the water temperature controllers above 110°F.

Since the release of this bulletin, we have investigated vibration and increased sound levels and believe we need to clarify Enertech’s system requirements.

Enertech recommends the temperature controller not be set above 110°F for the storage tank. Excessive vibration and part failure can occur at higher than recommended temperature settings. The higher operating temperatures cause substantial efficiency and capacity reductions. The performance is negatively affected as the unit operates at the higher water temperatures. It benefits the unit and the homeowner to operate at or below the recommended water temperature of 110°F.

With the lower efficiency created by higher water temperatures, the output capacity of the unit is decreased along with the efficiency. When operating at the higher entering water temperature the heat of extraction is significantly reduced, as well. In order to maintain the needed capacity, more of the heat is coming from the compressor working harder to compress the refrigerant.

The illustration below shows the parameters which are safe for compressor operation. Based on the leaving load water of 120°F, the loop would have to maintain 35°F to operate within the acceptable operating conditions for the compressor. Once your loop temperatures drop below 35°F, the acceptable leaving load temperature drops below 120°F. If you are designing loops for 30°F, the recommended leaving load temperature is 110°F.



The obvious correlation is that the warmer the **Source Entering Water** temperature, the hotter the **Load Leaving Water** temperature. Refrigerant R410A can only handle up to 120°F leaving load water temperature before placing the compressor at risk.

Our field investigations also discovered many controls are not accurate. We found they had too wide of a differential, were placed in the wrong position or not simply not reading correctly. Actual usage and choices of heat distribution devices need to follow the acceptable operating conditions presented in the chart. Additionally, we found the water temperature leaving the water-to-water unit averages 8 to 10 degrees above the temperature controller setting in the tank.

Below are our recommendations on the control:

An accurate thermometer should be used to measure the leaving load water temperature of the water-to-water unit and the temperature controller can be adjusted to satisfy at the recommend leaving water temperature of the unit.

This adjustment method would also apply to the hydronic side of the combo unit!

### **Second Stage Operation**

During our investigations we also noticed increased vibration when leaving water temperatures were set high (105°F-110°F) and the system was operated *extensively* on low stage. **We do not recommend extended run times on low stage when high leaving water temperatures are selected.** Discharge gas runs about 25°F-30°F higher (or more) on low stage. If higher leaving water temperatures are selected, we recommend second stage is energized utilizing a temperature control that will energize second stage based on runtime/time and/or temperature.

If you are setting leaving water temperatures in the range of 90°F to 100°F (more efficient unit operation at lower LWT), staging/timing for unit going to second stage becomes less critical.

If you have questions please consult the Technical Services Department.