

## START-UP AND SHUTDOWN PROCEDURES

Regardless of system design, size or heat source there are a few basic procedures that should be followed when starting up or shutting down your heat transfer system. Following these procedures will help maximize your fluids life.

### SYSTEM START-UP

A fluid at room temperature may have a viscosity as high 100Cst but if the system is outdoors and the ambient temperature is below 32°F or 0°C the viscosity could be 1000 cSt or higher.

While a fluid with these viscosities is quite easily pumpable it is not yet 'ready' for full heat. Your heater whether small and electric or large and gas fired is designed to apply heat at a set rate in consideration of the fluids flow or velocity.

When a fluid hasn't achieved the ideal viscosity its flow or velocity will not be of that specified and required by the heat source. Basically the fluid will be too thick to allow for efficient flow. If a heater is allowed to fully fire during these periods it will most likely overheat and thermally degrade the fluid. Basically the fluid will move too slow past the heater and absorb too much heat.

Therefore when starting up any system it is important to allow for gradual temperature increases until the fluids flow or velocity is with the range required by the boiler. Generally a 20°F to 30°F incremental increase in the set point will allow for steady even heating without the chance of overheating or thermally degrading the fluid.

### SYSTEM SHUTDOWN

When shutting your system down a few basic steps will help ensure that no damage from over heating is inflicted on your thermal fluid. During the course of normal operation your heat source whether a small electric heater or a large gas fired boiler will be cycling either on and off or from a low fire to a high fire in order to maintain your set temperature. As well within a short period of time the heater piping or vessel will become nearly as hot as the heat source itself.

It is also important to remember that your heater is actually hotter than your output temperature. The actual temperature at the impingement point of the heater in most cases will even be higher than that of the recommended maximum fluid temperature for your fluid.

If a system is shutdown abruptly without allowing the heat source and adjacent areas to cool when the fluid ceases to flow it will become trapped and subsequently 'burn' or thermally degrade Therefore when shutting down any system it is important to simply allow the fluid to cool below 250°F (121°C) before shutting down the pump. The use of a heat exchanger or leaving your heater blower running will help expedite cooling the fluid temperature to under 250°F (121°C).