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## Dealing with Water in your Heat Transfer System

Water in any high temperature heat transfer system is not only a nuisance it can be very dangerous. Care must always be taken to ensure water is not introduced into your system.

### Precautions

Water should never be used to pressure test a system.

Heat exchangers utilizing a water side should be inspected regularly and monitored for leaks.

Heat transfer drum storage should be covered but if they must be kept outdoors they should be stored on their sides to keep water (rain) from collecting on the tops of the drums. It is also good practice to dedicate pumps and transfer hoses for your heat transfer fluid to avoid any contamination, including water.

Moister can also be drawn in from outside humid air. It should also be noted that if the tank fluid temperature is below the dew point, condensation can form within the expansion tank.

### Detection before Start-Up

Fortunately most common heat transfer fluids are not water soluble and will, if significant amounts of water are present, form a distinct layer that can be seen if a sample is drawn from a low point while the system is not circulating. While this will provide a clear observation of larger amounts of water, a few hundred ppm of water would not easily be seen but could still cause operational issues.

### Detection during Start-up

If during the start-up of a system everything is fine until the temperature reaches about 220°F water could be the cause. As you heat up your system the fluid thins out and it's normal to see a decrease in the pump discharge pressure. However, if at around 200°F the pressure drops suddenly and the pump starts to shake from cavitation, you've most likely got water in your system.

### Detection during Operation

Often times trace amounts of water ( a few hundred ppm ) can show up as fluctuations in pump pressure or as small disruptions or cavitation of the pump. Do not ignore these signs. Although your system might be above 212°F ( or above the boiling point of water ) it is possible to have water trapped in low lying areas or dead legs that will break free at random times. A leaky heat exchanger could also be introducing water into the system a small amount at a time.

### Safety

Caution should always be used when dealing with water. Water expands over 1000 times when turned to steam; if water is suddenly introduced to hot fluid, the steam expansion will displace an equivalent amount of fluid. This displacement can in turn force hot fluid through the expansion tank or reservoir and out through the vent.

### Removing Water

Larger amounts of water can and should be attempted to be removed through system low points whenever possible. During start-up however, it is possible to slowly heat the system toward 200 - 220°F and coax small amounts of water out as it turns to steam. If water evacuation persists the expansion tank or reservoir fluid can be elevated above 220°F to keep the escaping steam from condensing to water.