Paratherm™ HEAT TRANSFER FLUIDS
A Division of Lubrizol

Water in Thermal Fluid Systems

Rev. 716

Checking for Water Prior to Start-up

Before starting up a new system, it's a good idea to take a sample from a low point drain into a glass jar. If the sample is hazy, there is most likely water in the fluid which must be removed by a system boilout. A clear or rust colored layer in the bottom of the jar is pure water. Draining excess water from any and all low point drains will reduce the time necessary to completely boilout the system.

NOTE – Just because you don't see water in the sample doesn't mean that there isn't any water hiding in the system.

Detecting Water After Start-up

Water expands by up to 1100 times its volume when it turns to steam, which makes it very hard to ignore in a closed loop thermal fluid system. Some of the indicators are:

1. Low Pump Discharge Pressure— During a normal cold start-up, the pump discharge pressure will gradually decrease as the temperature increases. If the pump pressure drops suddenly after the heater outlet temperature reaches about 220°F (105°C), water is present.
2. Pump pressure fluctuations - Trace amounts of water (less than 300-400 ppm) will show up as pump cavitation. Sometimes these pressure fluctuations are misinterpreted or ignored because the system's heater outlet temperature is well above 212°F (100°C).

Always remember that an 8 ounce glass of water will displace 55 gallons of fluid. The steam bubble will force fluid up into the expansion tank and out of the vent if the tank is full. Serious injury — and possibly fire — can occur during these incidents, especially if an open drum is used as the catch tank.

Boilout the System to Remove Water

Running the system at low heat until the pump pressure stabilizes will not purge the water from the system — it only relocates it all to the bottom of the expansion tank. The only way to completely remove water is to force it to flash off as steam through the expansion tank vent.

NOTE: If the system is severely contaminated, consider completely replacing the fluid. This will not eliminate the need for a boilout, but it will shorten the time required.

To boilout a system as fast as possible, make sure that the tank temperature stays above 212°F (100°C). If your system is not equipped with a warm-up (boilout) line, consider running an insulated line with a valve on it from the heater outlet directly to the top of the expansion tank. Temporarily insulating the tank will also speed things up.

The boilout should continue until the temperature at the pump suction is above 220°F (105°C). Once the system is running properly, check for water in the bottom of the expansion tank.

Preventing Contamination by Water

Water contamination is almost always self-inflicted.

1. Do not "hydro-test" a system with water. Either pressurize the system with very dry gas and use soap solution to test for leaks or pressurize the fluid after it has been charged and look for leaks. You're going to have tighten all of the flange bolts, seals, etc. anyway when the system has been heated up.

Note: If you are replacing a component, make sure that the vendor dries it out thoroughly prior to installation.

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2. If fluid must be stored outside, lay the drum on its side to prevent water from collecting in the drum head. If you see any rust or water stains on the drum head, do not use the fluid.

3. Use a dedicated pump and lines for charging fluid into the system. Do not use this pump for any other materials.

Note: Use only fluid from sealed drums that have been stored properly if you have to add fluid directly into the piping of an operating system. If you're not sure, add the fluid to the expansion tank.

4. Install a nitrogen blanket on the expansion tank in a high humidity area. Water vapor can condense in the fluid if the tank temperature drops below the dew point during a shutdown.

Questions? We'd like to hear from you. Call toll-free, +1 800-222-3611, or fax or e-mail us, or visit our website, **www.paratherm.com**.

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