Paratherm™
HEAT TRANSFER FLUIDS
A Division of Lubrizol

Maximize Fluid Life 1 – Film Temperature

The film temperature is defined as the temperature of the heated surface inside a heater.

For fired heaters, the film temperature is measured inside the tube at the wall. For electric immersion heaters, it is measured at the surface of the element.

Because heat flows from high temperature to lower temperature, the film temperature will always be higher than the temperature of the surrounding fluid. If the velocity of the fluid drops below the turbulent flow rate and/or the heat flux (measured as BTU/hr-ft2 or watts/in2) is too high, the film temperature can be up 200F to 300F higher than the fluid flowing a short distance away.

If this film temperature exceeds the fluid's maximum recommended film temperature, the fluid will become "overheated". This causes thermal cracking which produces the Low Boilers that cause pump cavitation, loss of heating capacity and high system pressure.

To prevent overheating, make sure that you maintain the right fluid flowrate under all operating conditions. If you are building your own immersion heating system, check with your fluid supplier about their recommended watt density. Finally, if you have a fired heater, have the burner alignment and components checked periodically to avoid flame impingement.