

PLASTICS MANUFACTURER IMPROVES PLANT RELIABILITY WITH ALTERNATE THERMAL FLUID

ABSTRACT

A manufacturer of high performance plastic resin operates a thermal fluid system that both heats and cools the process. The thermal fluid system inventory was approximately 18,000 gal. The thermal fluid selected when the plant was constructed was chosen because of its low temperature properties, which efficiently cooled the high temperature (290°C) exothermic reaction. Problems with the fluid's thermal stability became apparent soon after plant start-up. The fluid degraded into components that caused a solid buildup in the system expansion tank vapor space. Nozzles for nitrogen venting and emergency relief could become blocked, requiring inconvenient and costly shutdowns. The fluid's useful life was only about seven (7) years, at which time a complete change out was required. To further complicate the problem, the fluid is manufactured off shore, and reliable quantities of replacement material are not available.

SERVICES PROVIDED

A study was undertaken to find a suitable replacement fluid. Requirements for the replacement fluid were that it had to be miscible with the original fluid, had to have similar heat transport properties, and had to be manufactured domestically. The report evaluated six (6) alternate fluids and recommended one primary replacement with one acceptable back up. The two (2) fluids recommended both had excellent low temperature properties, higher rated maximum bulk temperatures, and degraded into low molecular weight species that would not foul the expansion tank. Expected fluid life is 10 to 15 years.

Price and delivery were negotiated with the preferred vendor and the system was scheduled for a fluid change during a scheduled annual shutdown.

The plant did not have a formal fluid change procedure nor did it have a new fluid start-up procedure. These procedures were developed for the owner.

During the shutdown the draining, refilling and start-up of the thermal fluid system was managed in the field by this office.

IMPROVEMENTS NOTED

1. The plant started up normally and operated as before with the new fluid.
2. Analysis of the fluid after the change indicated a 95% replacement of fluid had been achieved.
3. At present time, the replacement fluid is performing well and is suitable for continued use with only minor annual top up additions.