



THERMINOL

Heat Transfer Fluids by Eastman

Pushing it to the limit

Improving operations with synthetic heat transfer fluids

PROBLEM

A requirement to produce at higher temperatures caused fluid degradation, increasing top-up rates and filter maintenance.

ANALYSIS

Synthetic heat transfer fluids could offer similar heating performance but with higher thermal stability.

SOLUTION

Synthetic Eastman Therminol® heat transfer fluid was selected to replace the mineral-oil-based fluid.

RESULT

Lower maintenance, lower top-up rates, potential to reach higher temperatures to allow better operating margins, and much longer fluid life at higher temperatures

Versalis is an Italian petrochemical company wholly owned and operated by Eni SpA. Its three divisions—basic chemicals, polyethylene, and elastomers and styrenes—offer a portfolio of products, and its many production plants have heat transfer fluid systems operating at various temperature ranges.

In 1975, the plant's ethyl benzene distillation column, which is a key part of the styrene monomer process, was started up using a mineral-oil-based fluid nominally rated to 608°F (320°C) but operated at bulk temperatures up to only 500°F (260°C). Although the heat transfer system performed adequately at this temperature, all the mineral oil, approximately 27,000 gallons (90 metric tons), had to be changed due to product degradation. The fluid replacement was made during a scheduled plant shutdown when degradation products, consisting mainly of sludge and tar, were observed at the pump in-line filters.

A requirement to increase the distillation rate in the early 1980s meant that the maximum temperature of the mineral oil heating the distillation column was raised to 554°F (290°C). The higher temperature caused the fluid degradation to increase exponentially, and Versalis had to increase the top-up rates and repeatedly clean the filters. Given this experience of disruptive thermal instability, the company decided to switch to a synthetic heat transfer fluid offering similar heating performance but with higher thermal stability. Therminol synthetic heat transfer fluid, manufactured by Eastman, was selected to replace the mineral-oil-based fluid. Since this

replacement in 1995, Therminol has been continuously used in operations, reaching bulk temperatures up to 572°F (300°C). Today, the bulk temperature of the fluid at the heater outlet is maintained successfully between 561° and 572°F (294° and 300°C).

As an added benefit, within the first 6 months of operation, Therminol's solvency power (provided by the superior aromatic base), eliminated a high proportion of solids left behind from the previous fluid via new bypass filters installed in a side-stream installation. Today, these filters continue to remove previous product residues during normal operation.

Indicators of fluid performance and routine analysis have shown no significant deviation in fluid quality over time. In addition, since the plant was filled with Therminol, no major unplanned shutdowns have been needed due to problems with the heat transfer fluid condition. The condition of the Therminol fluid at Versalis is now regularly monitored in Eastman laboratories, where specific analysis for heat transfer fluids is performed with results and guidance provided by Eastman. This type of analytical service is also available globally through Eastman's TLC Total Lifecycle Care® program.

Versalis representatives report that, while operating with Therminol heat transfer fluid, the company has experienced lower maintenance, lower top-up rates, the potential to reach higher temperatures to allow better operating margins, and much longer fluid life at higher temperatures.



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