Avoiding costly disruptions: The role of proper heat transfer fluid selection

Resolving system failures by returning to Therminol® 66.

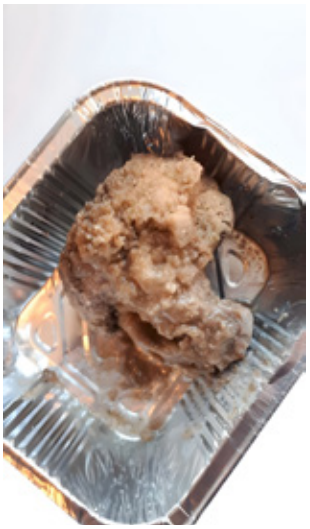
Customer 1 | 2022
Application: chemical manufacturing
Case: Therminol 66/fluid from other supplier

Problem: A customer had used Eastman Therminol® 66 heat transfer fluid in their system for several years without any major issues. However, they suddenly encountered severe pump cavitation, which significantly reduced system efficiency and brought plant operations to a halt. Compounding the issue, mysterious residue began to appear at multiple critical points throughout the system, including flanges and lower circuit areas. This raised concerns about potential contamination or fluid degradation. These unexpected challenges not only disrupted production but also posed serious risks to system reliability and maintenance costs.

Analysis: Initial testing and analysis indicated that both the Therminol 66 fluid and the system were operating within expected parameters. However, the severity of the operational issues prompted a deeper look. It was found that the original Therminol 66 had been topped up with a partially hydrogenated terphenyl product from a different supplier. This top-up negatively affected the system's performance, leading to pump cavitation and the formation of thick residue. The nonconforming fluid altered the fluid's thermal and chemical properties, resulting in compromised efficiency and reliability. This finding underscored the importance of maintaining fluid integrity to prevent operational disruptions.

Solution: Our technical and service teams took a proactive and consultative approach, advising the customer against mixing incompatible fluids. They communicated the chemical and thermal properties that make Therminol 66 the optimal fluid for their system, emphasizing how its properties are essential for maintaining performance and preventing operational issues. By reinforcing the importance of selecting the correct heat transfer fluid, our team helped the customer understand that proper fluid selection is not just a recommendation but a key factor in maximizing system reliability, efficiency and life span.

Result: The incompatible fluid was removed and replaced with Therminol 66, restoring the system's stability and optimal performance. Following the replacement, the pump cavitation issues ceased. No further fluid-related problems have been reported. This outcome underscores the critical role of using the correct heat transfer fluid to ensure reliable, uninterrupted plant operations.



Images of thick residue from incompatible fluid mixing. PHT solids residue removed from valve body.

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Sample of new material showing solid/liquid-phase separation and formation of waxy solids.

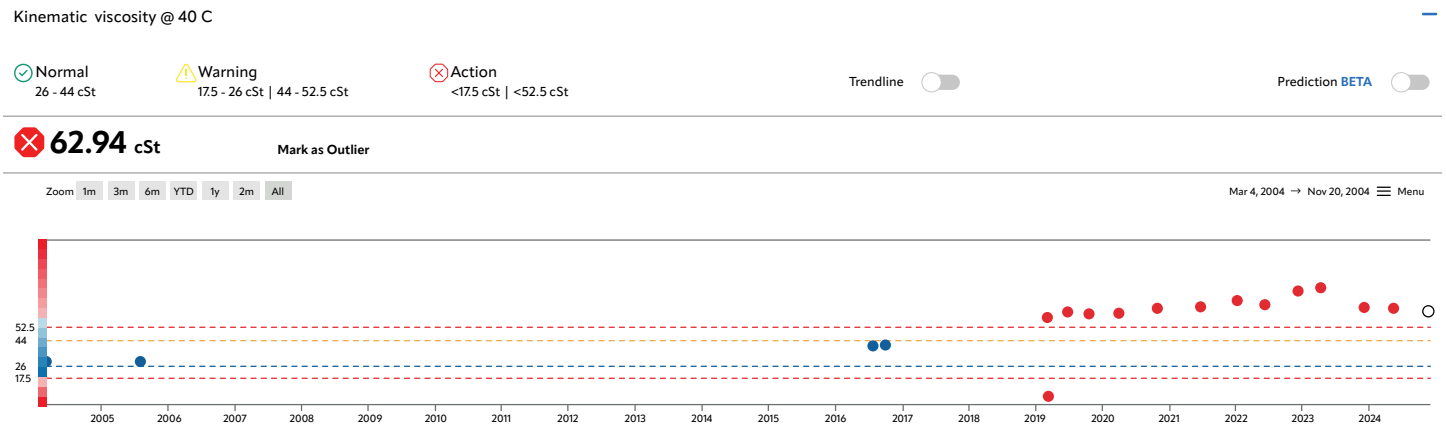
Customer 2 | 2019–2021
Application: textile manufacturing
Case: Therminol 66/fluid from other supplier

Problem: After years of reliable operation with Eastman Therminol 66, the customer's system began generating high boilers that cut circuit efficiency, produced heavy sludge and drove viscosity up rapidly.

Analysis: The system's operating parameters stayed within the expected range, yet the fluid's condition deteriorated — an anomaly in our database of thousands of samples collected over more than 60 years. No abnormal events were recorded during the fluid's service life, pointing to an external cause. Investigation revealed that an unapproved substitute fluid had been used for routine top-ups. A sample of this non-original fluid was taken, and investigators found the product had separated into two phases: one liquid and one solid.

Solution: Our team verified that Therminol 66 had not always been added during top-ups. To ensure optimal fluid performance and demonstrate the benefits of Therminol 66, the site was enrolled in Eastman's complimentary fluid-sampling and analysis program, Fluid Genius™. This ongoing monitoring provided data that highlighted the advantages of maintaining fluid purity and compatibility. Equipped with these insights, the customer committed to exclusive use of Therminol products to safeguard system reliability and performance.

Result: Once the system was replenished solely with Therminol 66, high-boiler levels declined to normal parameters and viscosity dropped. While fully restoring the fluid to its original condition will take time, steady improvements are already evident.



Fluid Genius graph displaying poor fluid viscosity. Fluid condition began deteriorating after addition of incompatible material; Fluid Genius aided in diagnosing performance problems.

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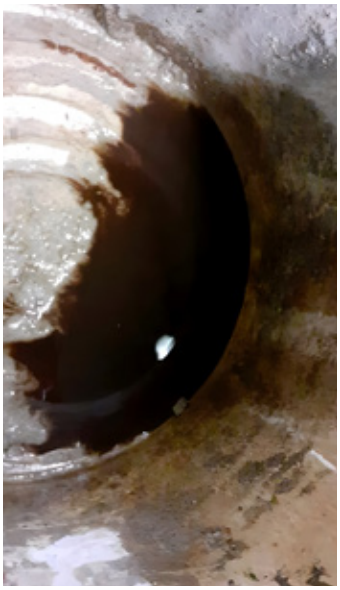
Customer 3 | 2022
Application: ORC biomass
Case: Therminol 66/fluid from another supplier



Problem: Following a system leak, the contaminant was vented and the leak sealed. The fluid initially continued to perform as expected. Weeks later, fluid levels dropped sharply and the system required an urgent top-up. Immediately afterward, the pump began to cavitate violently, disrupting system operations and causing unplanned downtime.

Analysis: Through an urgent fluid analysis service, Eastman technicians discovered a drop in viscosity and a reduction in the flash point of the fluid by more than 77°C. We identified that the customer, despite using the original Therminol 66 without issues for years, had topped-up the circuit with a partially hydrogenated terphenyl product marketed as identical to Therminol 66.

Solution: Through close collaboration with our analysis service team, we compiled a detailed fluid history, confirmed the source of contamination, and recommended venting the system through the expansion tank and then replenishing it exclusively with Therminol 66. This targeted approach ensured optimal fluid performance and system reliability.

Result: The problem was resolved, and the circuit returned to safe, steady operation, allowing the customer to resume normal production.

Criteria	Normal	Attention	Action	Measured value	State
Kinematic viscosity 40°C, cSt	26–44	Inferior: 17.5–26 Superior: 44–52.5	Inferior: < 17.5 Superior: > 52.5	24.68	⚠
Total acidity, mgKOH/g	0–0.3	Superior: 0.3–0.7	Superior: > 0.7	0.10	✓
Humidity, ppm	0–360	Superior: 360–700	Superior: > 700	32	✓
Insoluble solids, mg/100 g	0–125	Superior: 125–400	Superior: > 400	0	✓
Low boiling, %	–	Superior: 4–5	Superior: > 5	1.7	✓
High boiling, %	–	Superior: 8.5–10	Superior: > 10	0.6	✓
Flash point, °C	–	10–75	< 75	89	⚠

Fluid Genius analysis identified reduced viscosity and presence of low boilers, confirming contamination by the partially hydrogenated terphenyl added during the top-off.

Photos show volatile, low-boiling contaminants collected after system venting, highlighting fluid degradation that resulted from an incompatible fluid top-off.

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