



GRAPHALLOY® Survives Where Plastic Fails

A major oil company's chemical plant was experiencing run dry failures with a multistage axially-split cased pump in a hydrocarbon process service. The plant was operating with batching requirements rather than continuous feed. As a result of the batching requirement, the operators and instrumentation were unable to prevent run dry transients from occurring.

The plant engineers had approved modifying the pumps to incorporate plastic composite wear rings and sleeves on the rotating assembly. These modifications were made in hopes of preventing pump failures during the dry running upsets. After modification the pump continued to experience dry running upsets and the plastic composite materials failed.

This pump is a multistage volute style with a flow crossover so that some of the stages work in the opposed direction to help balance thrust. The rotor utilizes stationary and rotating wear rings on the eye and hub side of the impellers as well as inter-stage bushings, center bushing and throttle bushing.

Operating conditions:

- Temp: 350°F
- Flow: 370 GPM
- TDH: 2020 ft
- Speed: 3560 RPM
- Motor Drive

After the failure of the plastic composite rings, engineers at Graphite Metallizing worked closely with the repair service company and the end user to upgrade the pump with GRAPHALLOY nickel-grade materials. GRAPHALLOY allows the pump to survive dry running transients and avoid the issues associated with the original plastic composite rings. The plastic would melt as a result of the heat generated due to a lack of fluid between ring fits. The stationary wear parts were replaced with GRAPHALLOY inserts while the original metal rotating wear parts were put back into the pump. Installing GRAPHALLOY as inserts into the metal stationary rings enabled the material to be installed in compression, taking advantage of GRAPHALLOY's compressive strength.

The repair service company completed the installation and returned the pump to service. Upon start-up the pump ran smoothly. Over the next several months, this pump experienced four separate incidents where the pump was run dry for four to eight minutes. GRAPHALLOY allowed the pump to operate through these transients without shutdown or failure because of its non-galling/self-lubricating features.

Since installing GRAPHALLOY, the plant operators have not observed any fluctuations in the pump's performance (throughput and pressure) and vibration levels have remained constant. The end user is pleased with the results of the GRAPHALLOY upgrade.

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