

Chloride Salt Control (CSC) Technology Effective in Catalytic Reforming Unit



The chemistry of results™

Key Benefits

- No corrosion or fouling in the reactor effluent heat exchangers
- No fouling in the recycle gas compressor
- No corrosion in the debutanizer overhead system
- Higher productivity and increased reliability of the unit
- Reduced cleaning and maintenance costs

Challenge

A major refiner was experiencing significant fouling and corrosion failures in the catalytic reforming unit. Hydrochloric acid (HCl) was measured in the recycle gas with an average concentration of 2-3 ppm, which sometimes reached a maximum concentration of 5 ppm. As a result, ammonium chloride salts formed and caused several major issues in the unit. The reformer effluent heat exchangers between the reactor and the debutanizer column showed serious corrosion and fouling problems. Corrosion failures were also observed in the debutanizer overhead system. Lastly, the blades of the recycle gas compressor were fouled and showed a noticeable vibration increase. Analysis determined these issues were due to ammonium chloride salts.

CSC Technology Solution

The Chloride Salt Control (CSC) Technology is a patented, strong-base chemistry that reacts directly with hydrochloric acid, ammonium chloride, and amine salts. The CSC displaces weaker bases and forms a highly water-absorbent salt with low corrosivity. This technology was selected to, one, remove the existing ammonium chloride salts, and two, to prevent further formation of ammonium chloride salts by reducing HCl in the recycle gas. It was injected continuously with a reformate slipstream to enable dispersion in the feed. The dissolved chloride salts from the exchangers were separated from the reformate and drained from the vessel after the high-pressure separator.

Results and Benefits

Several points were monitored during the initial trial with this program to determine its effectiveness. The concentration of the dissolved salts drained from the system increased by a factor of five, indicating successful removal of chlorides. Consequently, the concentration of HCl in the recycle gas decreased to 0 ppm. The iron concentration in the debutanizer overhead was reduced to trace amounts as a result of less corrosion activity. Overall, the trial was deemed successful in both removing and preventing salt formation, and the CSC Technology was implemented as a permanent treatment program. Several long-term benefits were realized by the refiner including reduced corrosion and fouling, flexibility to increase throughput, and reliability that allowed for greater run lengths.

