Derakane™ epoxy vinyl ester resins for flue gas desulfurization linings
FGD linings based upon Derakane™ epoxy vinyl ester resins

A proven, cost-effective solution to premature corrosion of stainless steel scrubbers

Nearly 400 flue gas desulfurization (FGD) systems have been installed since the U.S. Environmental Protection Agency regulations mandated the use of comprehensive FGD systems to meet emission requirements for sulfur dioxide (SO₂) and mercury in coal-fired utilities. Wet-FGD systems are capable of removing 95% or more of the SO₂ in flue gases. However, such state-of-the-art FGD systems that were intended to last for 25 years are already showing severe corrosion and in some cases, in as little as three months.

The majority of these FGD units were constructed with duplex stainless steel 2205. This alloy was initially thought to be quite suitable for such corrosive environments; yet the Electric Power Research Institute has identified more than 80 units already in need of repair. Duplex stainless steels like 2205 simply do not have sufficient corrosion resistance needed for the exceptionally challenging absorber environment, particularly in the presence of scale.

Challenges of Stainless Steel in FGD Scrubber Environments

- The immersion zone in the scrubber operates at about 125°F (52°C), and a pH of 5
- Chloride concentrations typically range around 5000 ppm but have been reported as high as 20,000 ppm in some systems depending upon the coal source in use
- Dissolved fluorides further compound the challenge to metal durability

Benefits of Lining Systems Based on Derakane epoxy vinyl ester resin technology

- Superior corrosion resistance to hydrochloric and sulfuric acids
- Proven performance in FGD environments
- Outstanding abrasion resistance
- Considerably less expensive than absorber replacement
- Linings based on Derakane epoxy vinyl ester resin technology are an ideal solution to premature stainless steel corrosion

Epoxy vinyl ester resins have been used for wet-FGD processes in absorber vessels, slurry piping, ductwork and stack liners dating back to the early 1970s, with the most prominent applications being limestone slurry piping and stack liners. Fiber Reinforced Plastic (FRP) pipe based upon epoxy vinyl ester resin has been successful in more than 150 plants for over 15 years. In fact, from 2004 to 2010, epoxy vinyl ester-based FRP was used in more than 70 stack liners, 75 limestone slurry piping systems and over 25 FGD scrubbers. All of these systems are still in service today.

The same epoxy vinyl ester resin technology is employed in flake glass lining systems. Epoxy vinyl ester systems are specially designed to withstand the low pH aqueous chloride environment commonly found in FGD absorbers. These polymers are frequently employed for corrosion control in much more aggressive chlorine environments such as sodium hypochlorite (bleach) and hydrochloric acid. It would be rare to find stainless steel in these same corrosive environments.
Global Competency With a Precise Focus on Customer Challenges

Ashland constantly evaluates the performance of Derakane resin laminates for corrosion service both in the field and in our laboratory in Dublin, Ohio. While primary research and development activities are based in the United States, we also maintain product development teams in Asia and Europe to ensure we develop solutions suited to our global customer base.

Ashland’s technical service team has an industry-leading reputation for solving problems. We will work closely with our customers to understand specific application challenges and recommend the best product to meet business objectives. Whether focused on product design, process optimization or new product development, Ashland prides itself on building partnerships that lead to innovative solutions.

Ashland Inc.

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Derakane™ and Hetron™ resins are not labeled in accordance with the requirements of Architectural, Industrial, and Maintenance (AIM) coatings rules, implemented by the U.S. Environmental Protection Agency (40 CFR Part 59, Subpart D) and by various States, e.g., Ohio Administrative Code 3745-113. Coatings based on Derakane and Hetron resins, bearing proper labels and sold in compliance with AIM regulations are available from coatings suppliers.