

How Dow beats Corrosion at Chlor Alkali Plants



In 1962, Dow researchers started work on a new concept that turned a highly sophisticated combination of plastic raw materials into a unique new product family - it was the birth of the Derakane epoxy vinylester thermosetting resins.

The initial, and perhaps toughest, job for the new resins was gaining approval among Dow's own maintenance technology experts and plant engineers. They put the new resins through the most demanding tests available for corrosion

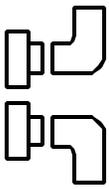
resistance, strength, flexibility and projected maintenance requirements.

Gradually, through a painstaking selection process, fiber reinforced plastic composites (FRP) fabricated with Derakane resins gained acceptance for many applications and pieces of equipment within the Dow production facilities. The epoxy vinylester resins turned out to provide the best available cost and performance alternatives; especially compared with various types of metals.

Time has proven that components made with high quality epoxy vinylester resins require little maintenance over long service lives; offering significant cost advantages over other materials. Today the epoxy vinylester composites are used throughout Dow in piping, absorption towers process vessels, storage tanks, ducts, and exhaust stacks.

Epoxy vinylester resins have become invaluable to Dow Chemical in handling the tough, corrosive environments present in chlor-alkali production. Two chlor-alkali complexes, each with a capacity of 1,000 mt/day, which Dow started-up in 1972 and 1975 at Stade on the Elbe river in Northern Germany, provide excellent examples of Derakane 411, 470 and 510 resins withstanding highly corrosive and aggressive chemicals.

At Stade, FRP composites fabricated with Derakane 411 and 470 are being used for headers to transport hot wet chlorine at 60 - 90°C. Recent examination of a header made with Derakane 411-45 showed its laminate to be in excellent condition after years of operation, indicating a long projected service life.



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Case History

FRP Composites for Chlorine Service

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FRP composites fabricated with Derakane 411-45 are also used for headers which receive cell effluent containing 6-12% sodium hydroxide at between 60 - 90°C. Fire retardant resin Derakane 510A-40 is used for ducting systems and stacks to handle hydrogen gas. Dow also employs FRP composites for brine feed lines and tanks - along with many vessels and scrubbers in the process.

An important advantage of FRP composites is its electrical insulation, which reduces risk of corrosion from "creep" currents present in electrolysis plants.

Scrubbing of chlorine with caustic soda is a very common operation in chlor-alkali production. At Stade, packed towers and venturi scrubbers fabricated with Derakane 411-45 have a continuous throughput of dilute caustic soda. In some units, gas streams containing small concentrations of chlorine gas are continuously scrubbed; while in others gas streams containing large concentrations of chlorine gas are scrubbed periodically. Typical operating temperatures in these units are 40-70°C. With sodium hypochlorite being generated, and with the other chemicals present, a chemically aggressive environment exists.

Ongoing inspections of the equipment, and discussion with the engineers at Stade have reconfirmed the good performance of well-fabricated epoxy vinylester composite equipment in these critical wet chlorine applications.