

INJECTION REPAIR

Repair and Maintenance of Sulfuric Acid Towers by Resin Injection

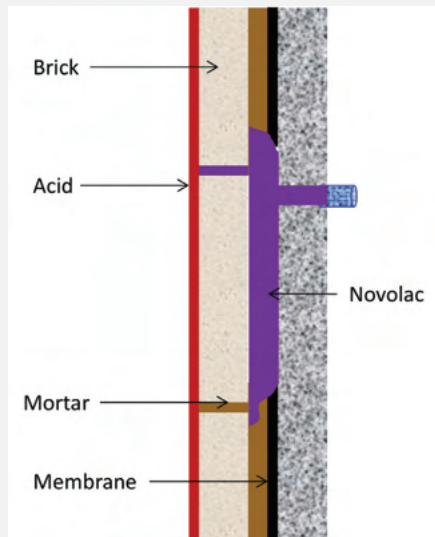


A leader in acid proof and corrosion solutions.

Our Solution

The Epoxy resin, unlike the Pecora Mastic, is not diluted, and therefore will not incorporate any Volatile Organic Components that will evaporate when curing. The Epoxy resin, once it reacts and hardens, will therefore not leave any open evaporation channels for the acid to penetrate the membrane again and get to the steel shell and attack it.

If big sections of the shell have been affected by acid corrosion, a steel plate can be welded on top of the existing shell to regain structural integrity. We have developed an alternate repair system with which we try not to destroy the existing membrane and keep the repair impact to a minimum.



The main advantages of our repair system are:

- The complete tower is injected during a single plant shutdown
- We have a record of repairs executed with more than 8 years of operation without subsequent failures or major repairs
- By injecting the whole tower we manage to restore the acid protective membrane in almost the entire tower
- When we inject the resin, we also push out most of the acid that is trapped in the gap between the brick and the steel shell
- Quick turnaround scheduling
- Low repair cost that is recovered by a greater equipment availability
- We have already executed more than 30 tower repairs around the world



Knight Material Technologies Service Excellence in Surface Protection

Corrosion is a transverse and daily problem in almost every industrial sector and, therefore, so is the required surface protection. Companies belonging to the Mining, Chemical, Food and Paper Industry, among others, see their processes constantly threatened by it, and, accordingly, they need a technical and commercial partner to help them keep their operational continuity.

With over 100 years of leadership in the field, the Knight Material Technologies name offers quality assurance. From the supply of antacid bricks and ceramic saddles, to coatings for surfaces with the most versatile and customized requirements, adapted to the needs of our customers.

Our Specialties:

- Lining for Process Columns and Towers
- FRP and Duallaminate Towers
- Installation of New Floors and Repair and/or Replacement of Existing Floors in Production Plants
- Construction and Maintenance of Autoclaves
- Ceramic and Plastic Saddles, Ceramic and Plastic Internals and Ceramic Bricks and Tiles
- Special Mortars and Resins Subject to High Exposure in Chemical, Thermal Environments and Mechanical Attacks
- Tower Repair by Resin Injection
- Local Manufacturing of our Own Products



Repair of the Acid Protective Membrane in an Acid Tower



Sulfuric Acid is one of the most widely used chemicals by the industry worldwide.

In the Sulfuric Acid Production Process – both as cleaning of Smelter Off Gas or as Sulfur Burning gas – there is a series of towers involved in this process in which SO_2 / SO_3 is absorbed and converted into Sulfuric Acid.

When the acid is irrigated in counter current flow of SO_2 / SO_3 , it comes into contact with the ceramic saddles and the ceramic lining of the tower.

The Problem to Be Solved

Both the brick and the mortar of the antiacid lining are porous, promoting a natural migration of the acid towards the membrane and steel shell. Once the acid reaches the membrane, the acid converts the surface of this protective barrier into carbon.

The carbon layer is stable, as long as it is not washed away by a continuous flow of acid. The washing of the carbon surface between the brick and the membrane generates a wear of the membrane, reducing its thickness which in turn, when completely depleted, compromises the steel shell and begins to thin out the thickness of the external steel wall.



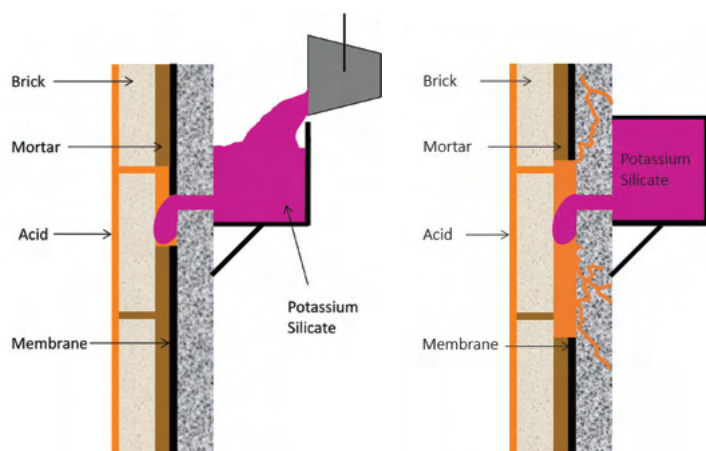
Existing Technologies – Use of Potassium Silicate

At first it was thought that welding a box or metal sheet directly on top of the perforation of the steel shell and injecting the void created with a solution of Potassium Silicate would be the solution to contain the acid flow and stop the damage.

Soon the plant operators realized that the acid continued attacking the shell, enlarging the problem: During the welding process of the steel plate or box they also damaged the acid protective membrane and so increased the area of acid attack to the shell.

That is the main reason why it is not recommended to weld anything to towers or process tanks that have a membrane as main acid protection applied to them.

Use of Potassium Silicate



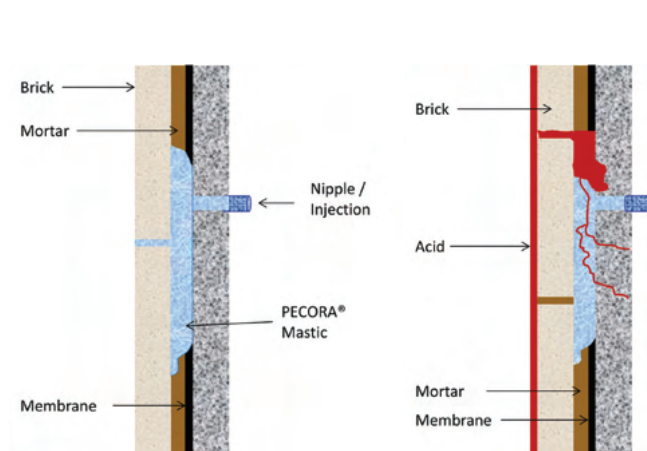
Existing Technologies – Use of PECORA Mastic

Since many of the newer acid tower constructions use PECORA Mastic A103 as a membrane, it was thought that by injecting this same material into the created void it would be possible to restore the worn-out membrane.

Pecora Mastic is a thick and highly viscous material that is required to be diluted with a solvent and heated up before it can be injected into the void. The diluent incorporates volatile materials into the product, which evaporate shortly after being injected, leaving open channels and voids through which the acid can circulate back once again and attack the carbon steel shell.

Therefore, the attack is mitigated for a short period, but the same corrosion problems reappear.

Use of PECORA Mastic



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CAPABILITIES

Knight Material Technologies works closely with our customers in taking a comprehensive look at their applications. We offer complete solutions for the corrosion and processing application using innovative custom designs or standard configurations and materials.

Our design and application expertise encompasses decades of engineering knowledge, experienced field crew installation, and maintenance and market leadership within the industry.

Knight Material Technologies offers value-added service with engineering support, custom design capabilities, and personable customer service. We are your single-source supplier of custom design packages. Our focus is to provide customers with superior products and materials, world-class engineering support, high-quality installation and responsive maintenance.

24-Hour Service: Call (330) 313-6372



Visit us on the web: knightmaterials.com

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