HEGGEL®

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NEWSLETTER

HEGGEL® Corr 212

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Exclusive Solution for Gas Sweetening Plants

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Protection in Extreme Corrosive Environments

The surface of industrial facilities exposed to corrosive elements are inevitably deteriorated due to corrosion effects. In case corrosion prevention techniques are not properly implemented, destructions take place over time resulting in various types of operating losses such as unscheduled outages, waste of time, increasing costs, hazards & safety issues, and industrial parts may even require a complete replacement.

Although Material selection can significantly reduce the corrosion initiation tendency, the presence of extremely corrosive agents at elevated temperatures & pressures exacerbates corrosion, necessitating fortified protection. Major assets in Oil & Gas industries including Gas Sweetening Plants in refineries with the most sever corrosive environments are even more vulnerable, since corrosion is dramatically intensified by existing dissolved acid gasses, higher concentration of corrosive species, high operating temperatures and increased pressures.

Among multiple types of corrosion protection methods, protective coatings can efficiently extend the lifespan of equipment by shielding it from harsh environmental conditions while postponing decays caused by constant abrasive/oxidizing factors, and the consequent breakdowns. In addition, coatings with protective and functional properties provide industries with numerous benefits including cost reduction and industrial performance optimization.

Corrosion in Gas Sweetening Plants

Industrial malfunctions may occur for several reasons. Depending on every plant design and structure, they could be a result of mechanical damages such as dislocations, metallurgical faults, or chemical/physical defects followed by progressive corrosion.

Similarly, Miscellaneous parts of Amine Sweetening Units such as Reboilers, Regenerators, Chimney Trays, etc. are always subjected to intensive corrosion. High-pressure steam, high-temperature vapor/solution flow, condensation of acidic vapor media, heat-stable salt formation, oxygen presence and the most severe corrosive agents including H2S, CO2 and amine degradation products considerably accelerate corrosive mechanisms.

Stress corrosion cracking, pitting, galvanic and crevice corrosion as well as accumulated corrosion products can be named as severe defects detected in several parts of Gas Sweetening Process units. Moreover, since the constituents of Amine Gas Treating Units operate in close contact with each other, functional defects in one operating device can easily disrupt the performance of others.

Operational damages in refinery units, poor-quality products, destructive contaminants and large-scale economic hardships are the main consequences of the corrosion phenomenon in this area. Remarkable material loss in specific zones cause the augmented corrosion rate. For instance, despite the Amine Regeneration Column having a maximum corrosion allowance of 3 mm/yr., the corrosive environment severely accelerates material degradation far beyond this limit in most areas of the Column.

Additionally, the repairs needed for corrosion are considered to be among the most expensive and time-consuming maintenance work in this industry. Accordingly, providing comprehensive corrosion protection through advantages of coating systems is essential in eliminating these risks.

Conventional Solutions to Corrosion in Amine Plants

In Amine Plants, several methods have been utilized to reduce the corrosion rate. Material selection, Purification of Amines & Feed Gas, application of Corrosion Inhibitors and Process Variables Modification are some of the applicable solutions to control the progression of corrosion, as well as the recently adopted method of temperature/pressure reduction in Amine Absorption Columns to resolve degrading corrosion influences of sour gas.
Current solutions are extremely challenging since their implementation is complicated and time consuming. In addition, most of them are considered uneconomical treatments and/or provide only short-term effectiveness, deteriorating especially when the temperature/pressure profiles bear intensive changes.

HEGGEL® Corr 212: Unprecedented Surface Protection

High-Tech Hybridized Polymeric Coating

Coatings of various types are often specialized to enhance surface protection, retain properties for longer periods, promote quality and most importantly improve corrosion resistance. Reviewing the challenges within industrial circumstances including high temperature variations, extreme wear and various harsh corrosive media, proper selection of a coating with holistic design plays a key role in providing different substrates with aesthetically-pleasing proper protection and balanced with cost-effectiveness.

Among technological approaches of surface modifications, a lot of attention have been drawn to polymeric coatings due to their high strength, light weight and anti-corrosion features. However, commonly used coatings including prevalent Epoxies are not the choices best qualified to withstand harsh environments.

HEGGEL Corr 212 is the 2-component hybridized epoxy semi-paste grade coating, derived from state-of-the-art polymer engineering technology. **HEGGEL Corr 212** best displays significant chemical resistance, outstanding adhesion to the substrate and stable protection against corrosive debris as well as chemically destructive environments.

HEGGEL Corr 212 is a combination of organic & inorganic molecules with extremely cross-linked structure. This advanced coating, exclusively designed for intense protection in harsh environments, offers extraordinary chemical resistance in a broad scope of anti-corrosion applications. One of the technical advantages of HEGGEL Corr 212 is its structural thermal stability, providing effective corrosion protection from sub-ambient temperatures as low as -70˚C to elevated temperatures in excess of 225˚C (according to the standard test method for evaluating protective coatings, NACE TM0174), after conveniently curing in ambient temperature. A long-lasting protection is provided due to the remarkable adhesion strength (>25 MPa) of HEGGEL 212, which is approx. 5 times more than the adhesion strength of other conventional Epoxy coatings to the substrate.

A cured single-coat of HEGGEL Corr 212 efficiently preserves surfaces when one or more of the very corrosive fluids are present at the same time. Moreover, the coating is effectively protective against severe external localized corrosion such as Corrosion Under Insulation (CUI).

Apart from corrosion resistant traits, sliding and abrasion resistance properties of cured HEGEL Corr 212, coupled with a very smooth surface finish, are other notable technical aspects which promote corrosion protection performance. Moreover, it would facilitate fluid flow, thereby prevent sludge build-up and as a result, hinder corrosion initiation. The high-tech HEGGEL Corr 212 can be easily steam-washed at temperatures exceeding 225˚C, in order to ensure that corrosive depositions are removed from sensitive locations. Hot exterior surfaces can be conveniently protected by HEGGEL Corr 212 application for corrosion inhibition.

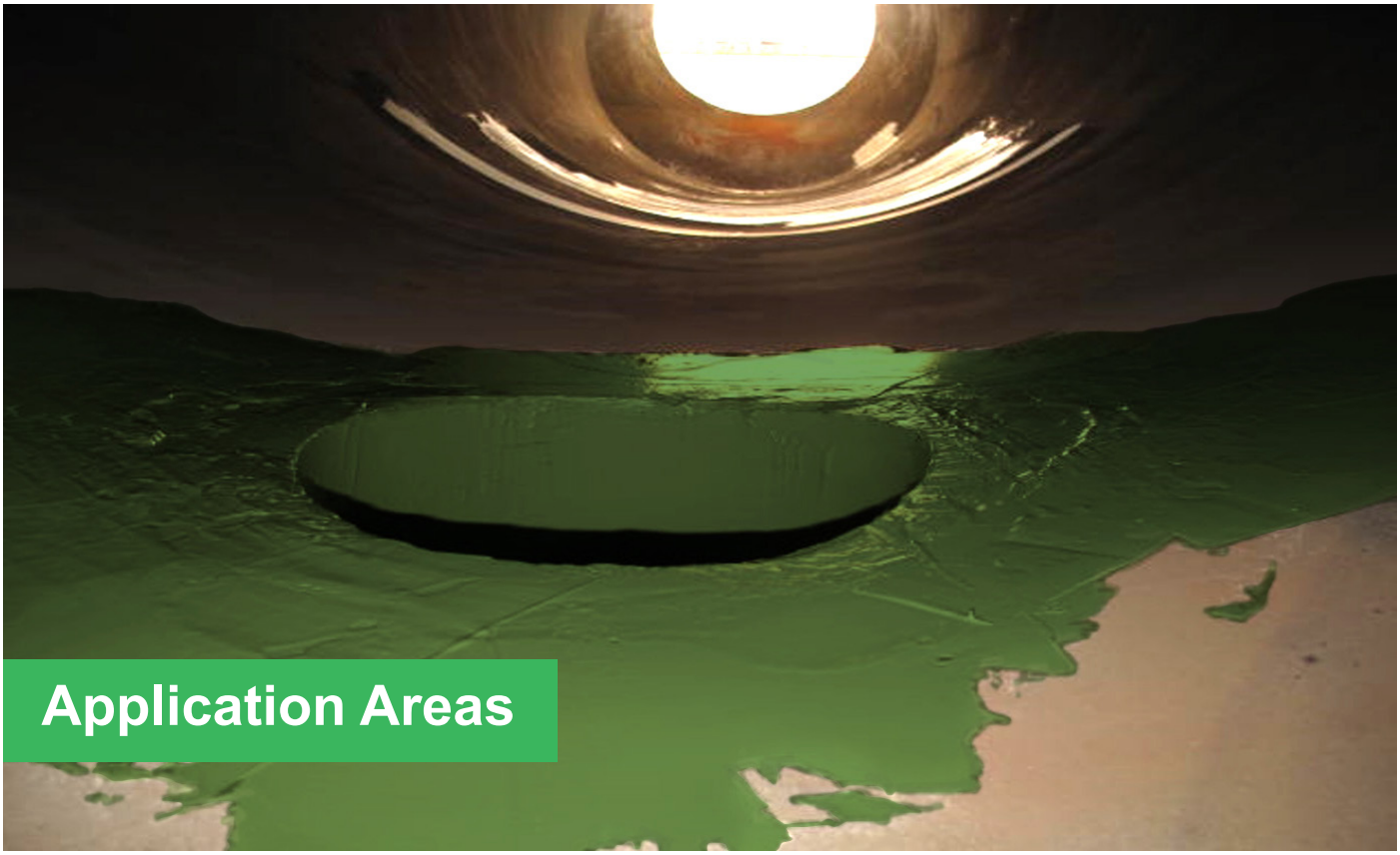
Environmentally-friendly synthesis of HEGGEL Corr 212, i.e. the solvent-free chemical production, has successfully eliminated the hazardous materials increasingly polluting the environment. Finally, the solvent-free microstructure of the coating provides comprehensive corrosion protection, economically applicable in the industry, being that the material consumption would be an optimized volume.

Competitive Advantages

+ Excellent broad range chemical resistance against intense aggressive environments
+ Solvent-free
+ Temperature resistance from -70°C to +225°C (437°F) immersed and +280°C (536°F) non immersed
+ Self-priming
+ Single coat curing at ambient temperature
+ Easy to repair
+ Resistant to CUI conditions
+ Very high fouling resistance

Chemical Resistance

- Amines (DEA, MDEA, MEA, DGA, ADIP)
- Spent amines rich in H2S/CO2
- 98% sulphuric acid
- 37% hydrochloric acid
- 100% glacial acetic
- 50% nitric acid
- Methylene chloride, vinyl chloride, benzyl chloride
- Carbon disulphide
- Molten sulphur + acidic vapour
- Conc. Methanol, ethanol and derivatives
- Sodium hypochlorite, sodium perchlorate
- MEK, toluene, xylene, acetone, ammonia
- 50 – 75% Sodium hydroxide
- Any chemical solution rich in chlorides or sulphates



Application Areas

Due to the extreme protective characteristics of the coating against severe corrosive media, strategic locations in Oil & Gas industry are the main areas in which the application of HEGGEL Corr 212 is recommended:

- ✓ Chemical tanks
- ✓ Sour gas service
- ✓ Hydrocarbon pressure vessels
- ✓ Sour gas treating-amine units (DGA/MDEA/MEA)
- ✓ Amine regenerator / storage tanks
- ✓ Amine molten sulphur recovery tanks

In addition to the above-mentioned areas, the HEGGEL Corr 212 has been applied in various sections of Gas Sweetening Plants such as:

- ✓ Chimney trays
- ✓ Reboilers
- ✓ Welding joints of chimney trays
- ✓ Distributors body
- ✓ Regenerator manways

Thanks to its wide application scope, HEGGEL Corr 212 may also be used to provide corrosion protection on many other industrial facilities such as:

- ✓ Condensers
- ✓ Chemical tanks
- ✓ Heat exchangers
- ✓ Scrubber units
- ✓ Process vessels