HEGGEL®

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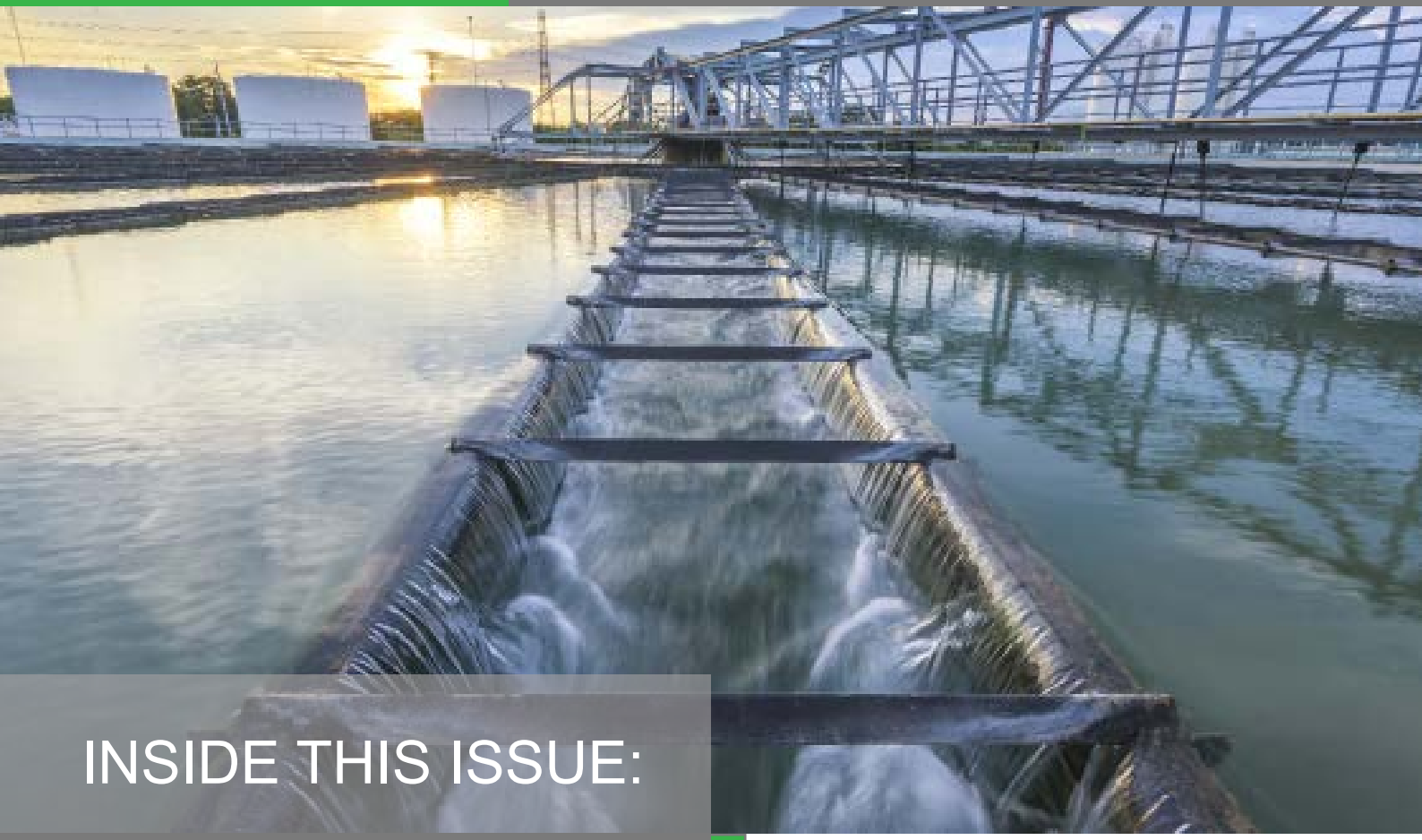
NEWSLETTER

HEGGEL® Coat 111

March 2022



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Ion Exchange Industrial Applications

Ion exchange processes have been long used throughout various types of industrial facilities for multiple objectives. They are commonly performed in water treatment to reduce dissolved minerals in hard water, and in a wide range of industrial applications where the purity of water is critical and even the slightest contamination may result in depositions, corrosion and surface or deep-rooted damages, diminishing the efficiency and limiting the life time of the systems.

Industrial treatment purposes applicable through ion exchange also encompass those in chemical processes, refineries, utility power stations, metal finishing, hydro-metallurgy, and petrochemical industries to remove detrimental particles from water, particles which could cause corrosion to industrial facilities such as vessels, pipes, filters and containers.

Risk of Corrosion in Ion Exchange Processes

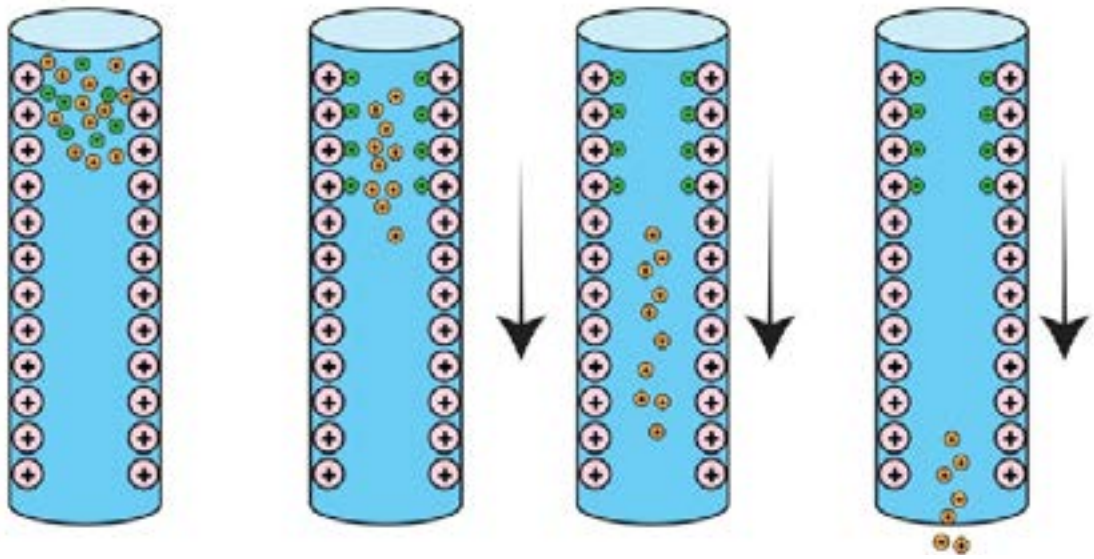
Depending on whether they are positively or negatively charged, ion exchangers proceed with cation or anion exchange respectively in treatment. With ion exchange processes, chemical reactions between two substances take place and anions and cations exchange overtime i.e., atoms trading positive ions for negative and vice versa, to build or break down materials made of ions.

In cation exchange, vessels contain strong acid cation resin that includes hydrogen ions. As the water passes through the resin bed, once the ion exchange process is completed, hydrogen ions will be released, undesired impurities e.g. minerals are bound up, and the corresponding acids will remain. In anion exchange, vessels contain strong base anion resin in order to neutralize the acids from the cation vessels.

Furthermore, mineral acids such as hydrochloric acid and sulfuric acid are typically applied in optimized concentrations to the resins to carry out the regeneration of cation exchange resin, so that the fully loaded ions are removed and the resin can continue to be used. Likewise, alkaline solutions like caustic in low concentrations are applied for the regeneration of anion exchange resin.

Ion exchange and regeneration processes impose a great deal of corrosion on various facilities including vessels, piping, tanks and container material in contact with corrosive acids and alkaline solutions. Localized corrosion like pitting on industrial steel cation exchanger vessels caused by acidic solutions or the increased rate of corrosion resulting from the cathodic reduction of alkaline compounds, could create adverse conditions in which the installed infrastructures eventually fall to fail.

In addition, the acidic or alkaline solutions are applied in process at high temperatures to improve efficiency while corrosion rate is concurrently increasing.



The Necessity of Corrosion Protection in Ion Exchange Equipment

Considering chemical reactions occurring during the procedures, ion exchanges are among the main causes of corrosion, posing a serious threat to the integrity of industries, the safety of working individuals and the environment.

Variables involved in ion exchange processes including the temperature, pressure and the variety of solutions place specific demands for corrosion protection to ensure the longevity and efficiency of the operating parts such as containers, vessels, tanks, filters, pipes, etc.

Traditional Lining Options

Metals in contact with low-concentration acidic and alkaline solutions will be gradually corroded, the ions can be adhesively attached to the substrates and scaling and corrosion can destructively affect the metal. Therefore, depending on various circumstances, there could be different options for internal lining/coating of ion exchange facilities:

Rubber lining is a very well-known solution for corrosion protection which is inert against a range of solutions. However, material and installation costs increase the upfront expenditures. The application of multiple layers of rubber sheets with bonding adhesives steadily, make the installation a tough procedure. Moreover, rubber-lined facilities like tanks should not remain dry and empty for long periods to avoid cracking issues. The challenging repair of rubber lining is among its other disadvantages.

Polyvinyl Chloride (PVC) is another option to protect equipment against corrosive mediums. Nevertheless, it cannot fully resist the pressure and the service conditions with elevated temperatures, especially during the regeneration process of anion exchange resin.

Vinyl ester epoxy coatings are another solution against corrosion. Here, installation is a highly critical procedure to achieve adequate coating adhesion to the substrate. To withstand corrosion in long-term operations more thickness is required and multilayer application is most of the time inevitable. Moreover, the coating is vulnerable to strong impacts. In some cases, reinforcement would also be required to achieve the desired thickness, meaning that the material consumption and costs will be increased and the application will be time consuming.

HEGGEL Bionic Technology

A durable corrosion resistant coating is essential to protect the integrity of facilities involved in critical industrial processes. Corrosion can lead to various unintended outcomes. In case of inadequate protection, premature corrosion is not far from expectation and expensive repairs with greater frequency, costly replacements of the equipment, contaminated end products and system failure would be some of the consequences.

HEGGEL Coat 111 is a remarkable protective coating with bionic technology which shows superior corrosion resistance, effectively maintaining capital investments by reducing destructive effects, preventing equipment failure and the subsequent shutdown costs.

HEGGEL® Coat 111

Two-component Corrosion Protection Coating

Incorporating micro and nanoparticles into a state-of-the-art resin matrix, **HEGGEL Coat 111** has been innovatively designed to represent excellent chemical resistance, mechanical properties including outstanding abrasion resistance and high performance in corrosion protection.

Optimized with VOC< 1 %, **HEGGEL Coat 111** is a two-component, self-priming coating providing effective corrosion protection within a versatile range of industrial applications in wastewater, oil industry, power plants, etc.

Due to the special formulation, **HEGGEL Coat 111** is well characterized for high-build application in one coat. **HEGGEL Coat 111** is extremely adherent to the substrate without using primer in application process.

With convenience in both surface preparation and application procedures, **HEGGEL Coat 111** demonstrates time saving and economical features for an efficient corrosion protection.

Application Areas

- Ion exchangers
- Ion filters
- Flood gates
- Steel sheet piles
- Steel constructions for hydraulic engineering
- Industrial pipelines
- Splash zones
- Storage tanks for crude oil, hydrocarbons, chemicals, etc.
- Process vessels
- Weir plants

Technical Features

Characteristics

- Self-priming, single layer coating
- Curing at ambient temperature
- Excellent corrosion protection
- Very high abrasion resistance
- Easy to apply, repair & maintenance
- No shrinkage by migration of plasticizer
- 100% solvent free
- Excellent surface gloss (even at high relative humidity)
- Excellent adhesion strength

Chemical Resistance

- Industrial and marine conditions
- Water, seawater, brackish water
- Oil, fat and lubricants
- Diluted acids and alkalis
- Neutral salt solutions
- Mineral oil, aliphatic hydrocarbons

Thermal Resistance

- Dry heat up to +100°C continuously
- Short term up to +150°C

Mechanical Resistance

- Impact resistant
- High abrasion resistant
- Hard wearing