HEGGEL®

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NEWSLETTER

HEGGEL® Coat 111

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Industrial Acidic Vapors

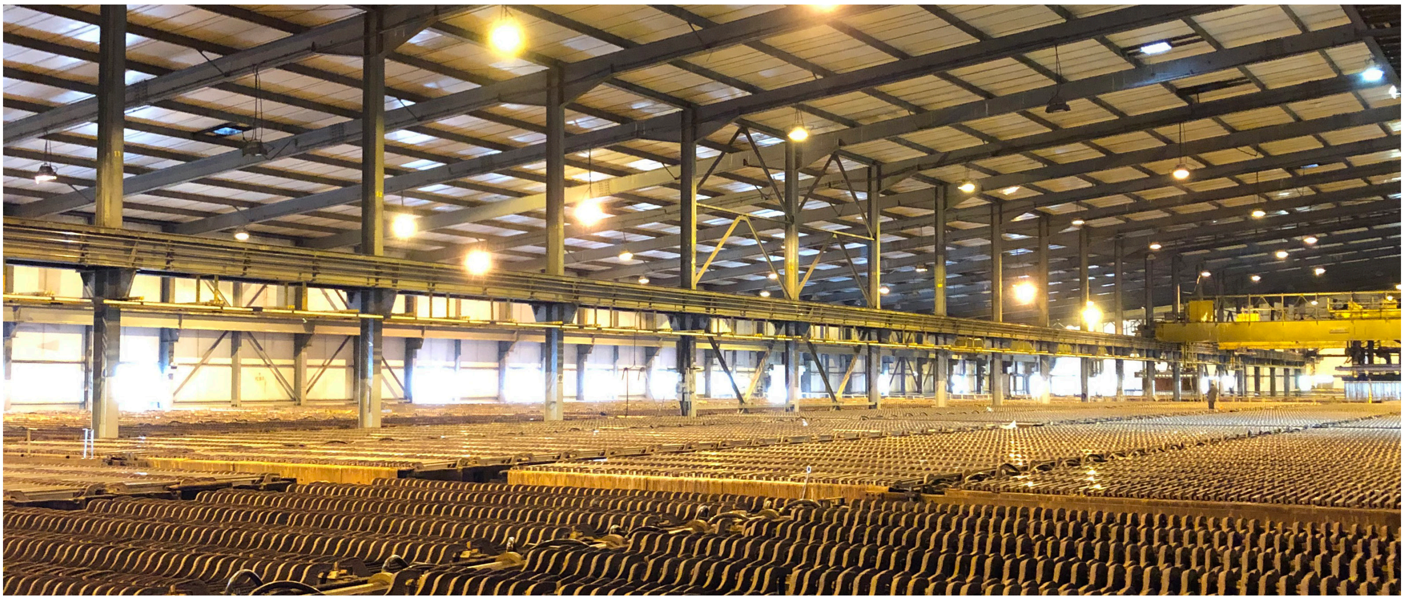
Industrial fumes and acid vapors are often generated as byproducts in various industrial processes. Being produced as a result of the application of highly concentrated chemicals during various industrial activities or the manufacturing process itself, acid vapors spread into the air, both inside the plant exposing the equipment directly, as well as outside.

While some acid vapors are used for industrial specific purposes, e.g., hydrochloric acid in pickling lines, most of the produced vapors/mists are not intentionally applied, and are only derivatives of industrial processes. Corrosive fumes of widely used sulfuric acid in diverse applications are an instance of acidic gaseous byproducts.

Corrosive gases/vapors are among main causes of property loss in industrial assets worldwide. Beyond their deteriorating effects, the explosive and hazardous nature of these materials and the capability of deep penetration exacerbate the magnitude of devastating consequences at various exposures and overexposures in industry.

Corrosion Factors

One of the most pressing concerns related to the integrity of metal structures in contact with acidic vapors is the corrosion effect. As a consequence of chemical or electrochemical reactions when metal structures are exposed to acidic gases/vapors in surrounding environment, corrosion can occur, detrimentally affecting the durability of metal structures such as metal roof sheets, assorted steel equipment, etc.



Generally, corrosive reactions alter the microstructure of the metal surfaces, and undermine the mechanical strength of the substrates; consequently, the life time of metal structures in proximity to corrosive gases/vapors are severely curtailed. The rate of corrosion and the extent of corrosion-related damages depend on many factors; for instance:

Oxygen combined with present water and the metal substrates create an electrolytic envi-ronment, activating corrosion reactions. Although corrosion can occur even without oxygen (non-aerobic phenomenon), high concentrations of oxygen in the air is the key cause of de-structive, atmospheric corrosion.

Moisture considerably increases the electrical conductivity of the surrounding environment of metal structures in contact with acid vapors/fumes, thus markedly accelerating corrosive chemical reactions.

Contaminations ranging from dust to other industrial pollutants that settle on metal structures and equipment are another impacting reason for the occurrence of corrosion by changing the pH balance to more acidic conditions.

Temperature also plays a major role in exacerbating the corrosion rate and destructive reactions.

Chemical Composition of Vapor/Gas in contact with metal structures is also a significant measure to accelerate the rate of corrosion. For example, substances like chlorides and sulfuric fumes extremely contribute to rapid corrosion and rust formation on the steel structures.

Composition and Microstructure of Metals/Alloys are determining parameters in the oc-currence of corrosion and its pace.

Corrosion Defects

Above mentioned corrosion factors are among parameters that determine the severity of corrosion caused by acid gases/fumes. Meanwhile, common types of corrosion observed in metal structures subjected to acid gas/fumes include:

General (Uniform) Corrosion, representing the greatest percentage of corrosion-related damages on metal structures, prevalently results in uniform, overall material loss which gradually diminishes the mechanical strength and leads to structural failure. Due to easy detectable nature of uniform corrosion, it is possible to identify the initial corrosion signs and prevent exacerbation of defects.

Localized (Non-Uniform) Corrosion may occur on specific areas of the metal structures. Pitting corrosion, for instance, happens where the deep penetration of corrosive gas/fumes into the metal surfaces is possible. Stress cracking corrosion is also another form of localized corrosion, observed on parts under increased stress.

Crevice Corrosion arises where there is a lack of oxygen and/or where dusts, debris and/or other deposits accumulate on the surface of metal structures.

Multiple forms of corrosion are observed in various industrial sectors as a consequence of metal surface exposures to acid gases/fumes. Chemical manufacturing plants, food processing, electronics, metalwork, water treatment, mining industry are among the main areas of industry where corrosive gas/vapors are causing concern.

Corrosion Control

Corrosion of metal/alloy structures can lead to severe failures and costly damages to critical infrastructures. Given that corrosion parameters vary based on process conditions of different industrial operations, there is a need to attentively monitor deteriorating measures to come up with effective corrosion control methods.

In order to prevent or minimize potential corrosion and, to predict the failure of metal/alloy structures and key facilities, the following solutions can be helpful, controlling the electrochemical reactions to prevent destructive damages;

- Appropriate material selection; for example, selecting a suitable grade of steel considerably helps corrosion prevention due to its inbuilt corrosion resistance properties
- Proper design to avoid locations with suitable circumstances for activation of corrosion mechanisms
- Examination of the surrounding environment to control elements initiating and/or accelerating corrosion
- Extraction of destructive industrial fumes/gases/vapors using air purifiers, hoods, and vents
- The application of corrosion Inhibitors
- Careful installation and regular maintenance
- Monitoring of corrosion initiation, and validation of corrosion rates
- Utilization of other protective methods such as coatings, anodes, etc. that have more substantial effects on corrosion prevention

Depending upon service conditions of each industrial application, protective coatings are among the most durable and economical methods to reliably avert corrosion consequences. In this context, **HEGGEL Coat 111** is an innovative solution, designed to meet protective requirements, specifically when metal/alloy structures are exposed to harsh corrosive vapors/fumes.

HEGGEL® Coat 111

Two-Component Epoxy Corrosion Protection Coating

Incorporating bionic technology, **HEGGEL Coat 111** is a high-performance coating demonstrating strong mechanical features, chemical resistance and excellent anti-corrosion properties.

The chemical composition of **HEGGEL Coat 111** contains VOC < 1 % and is free of heavy metals, benzyl alcohol, coal tar, anthracene oil and plasticizers. This has created an exceptional protective barrier in a single or multiple coat application; and is especially suitable as a corrosion protective coating for steel constructions in hydraulic engineering.

With excellent adhesion to the substrate, **HEGGEL Coat 111** does not require any primer or undercoat during installation process, and provides much stronger mechanical properties by a single-layer coat compared to multi-layer coatings installed with primer application.

HEGGEL Coat 111 is a high-build coating by spray application, offering a cost-effective solution to fully meet protective requirements against harsh environment.

Remarkable abrasion resistance and impact tolerance of **HEGGEL Coat 111** add to the novel properties of the product under heavy conditions that pose a threat to structures.

Exclusive formulation with the lamellar pigments in microstructure makes **HEGGEL Coat 111** an excellently impermeable coating with increased durability.

Maintaining the outstanding corrosion resistance to a wide variety of chemicals, both liquid or gas, **HEGGEL Coat 111** reliably ensures protection for an extended lifespan.

Characteristics

- Self-priming
- Solvent-free
- Ambient curing
- Excellent corrosion protection
- High tolerance to early water stress
- Very high abrasion resistance
- Excellent adhesion strength
- Inert and harmless once cured
- No shrinkage by migration of plasticizer
- Excellent surface gloss even at high relative humidity

Application Areas

- Industrial and marine conditions
- Metal/alloy structures exposed to acidic vapors/fumes
- Water, seawater, brackish water
- Flood gates, steel sheet piles and weir plants

Chemical Resistance

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

Technical Data	
Temperature Resistance	Dry heat up to +100°C continuously Short term up to +150°C
Volume solids	Approx. 100 %
Viscosity (23°C)	Approx. 3500 mPa.s ± 500
Density (23°C)	Approx. 1.65 g/cm³