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NEWSLETTER

HEGGEL® SP 660

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INSIDE THIS ISSUE:

Sulfuric Acid Chemical Resistant Flooring

- Prevalence of Sulfuric Acid
- Protective Floorings
- Current Flooring Solutions
- HEGGEL Potassium-Silicate Mortar
- Halogen-free & Washable

Sulfuric Acid

As an oily liquid which is extremely dissolvable in water in all proportions, sulfuric acid is one of the most vital compounds, predominantly used around the world. Playing a key role in oil and gas industry, sulfuric acid is also a building block for other strategic industrial productions.

As a very powerful mineral acid with multifunctional capabilities and inexpensive accessibility, sulfuric acid is extensively used in producing other important chemicals such as hydrochloric acid, phosphoric acid, nitric acid, sulfate of metals, sodium carbonate, etc. Sulfuric acid has immeasurable applications in oil & gas production systems; i.e., from catalyst in alkylation units of petroleum refining to dehydrating agent in oil industry. Over a wide range of applications, from the raw material to the process agent, sulfuric acid is also utilized in fertilizers, synthetic detergents, glass, paper, textiles, dyes and pigments, fuel, battery, explosives and pharmaceutical industries. It is also used in large quantities in metal processing, pickling and plating procedure.

Sulfuric acid is also the major component in mining and metallurgical processes for ore enrichment and metal purification. In water and sewage treatments, sulfuric acid is often used for adjustment of the pH level, solid particles elimination, odor control as well as other chemical treatments.

Commercial concentrated sulfuric acid is an essential heavy chemical without which numerous industrial processes could not be performed. Usually in the form of a 98% solution, it is very reactive with strong oxidizing properties. Concentrated sulfuric acid is less corrosive than its water-containing counterpart; however, the aggressiveness of corrosion could be limited in diluted sulfuric acid, as it has been observed that its corrosiveness is to a great extent dependent on the temperature and concentration of the solution.

Protective Floorings

An important sector of corrosion industry concentrates on providing proper protection by the installation of flooring and walls in areas exposed to chemical attacks. Floor corrosion can result in an unstable foundation as well as damage to equipment.

Trenches, containment areas, sumps, chemicals storehouses and re-concentration plants are among industrial settings on which serious corrosion damages could be inflicted overtime due to various harsh chemical exposures. Since the flooring of mentioned areas undergo chemical reactions when exposed to extremely destructive substances, choosing a proper flooring system is an effective approach to avoid corrosion consequences.

In this regard, chemical resistance should be noted as the main concern, since a great deal of corrosion imposed by contact to corrosive chemicals can deteriorate the flooring instantly or during a longer period of time in case of continued exposure. Although it might be possible to limit the harms by cleaning harsh contaminations regularly, the cleaning process and urgent actions are difficult, costly and time-consuming to follow.

With regards to the extremely corrosive nature of sulfuric acid, from transporting through pipes to storing in steel tanks, whether in assets prone to leakage or with incidental spills and splashes, corrosion protection is always a great concern.

Chemical resistant floorings are ideal options for areas where sulfuric acid and other corrosive substances are regularly used or stored. Corrosion consequences could be described as visible changes on surfaces such as cracks and fissures, pitting, swelling, stains and discolorations, etc., or invisible destructions developed through the layers beneath the surface, leading into breaking down the floor structure. Meanwhile, rehabilitation of constructions and repair of unprotected floorings is costly and demands weeks or months. Moreover, floor degradation could harm the health and safety of people on site. Accordingly, with corrosion protective floorings, the life of industrial areas could be considerably increased while operations are running smoothly.

Current Flooring

Depending on each industrial environment, certain factors should be evaluated, such as chemical resistance, compressive strength, impact resistance, slip resistance, cleanability, etc., to determine the accurate flooring system to protect assets.

When it comes to severe chemical exposures, e.g., to sulfuric acid, the foremost goal of protection is to provide areas with flooring material with adequate chemical resistance capabilities; even for industries in which diluted sulfuric acid is mainly used, there are reservoir areas where high-end concentrated sulfuric acid is stored, corroborating the necessity of floorings with high chemical resistance properties. Chemical resistant flooring material does not react with corrosive substances and has the barrier function to prevent corrosion from passing through.

Grouting, cement flooring and concrete seem to be the primary options for surface protection of the floors. Here, chemical exposures would gradually (or in harsh cases at once) deteriorate the surface. In continuous exposure to acids and chemicals, corroded floors become porous and dusty. They're also slowly washed away and get dissolved during cleaning processes due to the high absorption properties of porous material. Even without corrosive chemicals, extreme temperature changes could worsen the situation. This could be combined with seams, cracks and breaks, destructing the monolithic surface of the floor, and in case of rooted damages end with extensive failure.

To conform with standards, conventional materials including epoxy, poly urethane, various FRP linings and laminate systems, rubber mats etc. have been commonly used since they could provide better protection compared to grouted, cement treated and concrete surfaces.
There are a few limitations in traditional floorings that are worth considering before deciding on their installation. For instance, Epoxy floorings do not perform well in areas with harsh chemical exposures such as concentrated sulfuric acid. Therefore, As the coat wears away, there will be the constant need to replace the damaged areas with new coats.

Polyurethane coatings are more resistant to diluted acids; so, the floorings will experience a degree of corrosion in extreme chemical environments. Furthermore, PU floorings are more likely to abrade and extremely sensitive to humidity which cause challenges in installation process.
Despite several beneficial aspects for high-use industrial settings, FRP linings, usually based on Epoxy and Vinyl ester resins, are not sufficiently resistant against concentrated sulfuric acid.
Rubber mat or PVC sheets installation is merely a temporary flooring solution; corrosion, cracks and wearing, oxidation reactions with light and flammability in economic grades are some of the disadvantages in rubber mats/PVCs.
Finally, Corrosion Resistant Tiles & Mortars are another available option, providing long lasting surface protection. The main point here is to choose an applicable bedding & jointing mortar to provide enough corrosion resistance as per various harsh process conditions.

HEGGEL® SP 660

Two-Component Halogen-Free Potassium Silicate Mortar

Characterized by Impermeable Structure, Providing Wide Range Chemical Resistance

Widely used in the installation of chemical and abrasion resistant masonry, HEGGEL SP 660 bedding and jointing potassium silicate mortar in tile/brick lining systems is specifically recommended where resistance to sulfuric acid or mixtures of sulfuric and other acids is required. Highly resistant to severely corrosive solutions like sulfuric acid, nitric acid, etc., HEGGEL SP 660 exhibits outstanding mechanical properties including compressive strength, tensile strength and flexural strength. In addition to the wide range of chemical resistance, HEGGEL SP 660 is an innovative solution for protection of vulnerable surfaces in contact with concentrated sulfuric acid (98%), providing superior durability against acidic attacks and alleviating future repair or replacement costs and downtime.

Halogen-free chemical composition of HEGGEL SP 660, has made is an optimized choice to a successful acid protection flooring/ lining. In halogen-contained potassium silicate mortars, specifically exposed to strong sulfuric acid, hydrogen produced by various reactions, including the decomposition of the water present in the concentrated sulfuric acid, etc., would combine with halogens in the mortar chemical composition and result in the release of vapor hydrogen fluoride, and subsequently have destructive corrosion effects. The released hydrogen fluoride from mortar, either during curing or when the equipment is put into service could eventually corrode the substrate. Moreover, halogen-contained dusts may cause health issues for workers if inhaled during the constructional operations.

In contrast with commonly used potassium silicate mortars that are easily washed away, HEGGEL SP 660 with excellent resistance to water and rinsing actions can efficiently withstand the wearing effects during water-based cleaning processes. Given that washability for cleaning purposes is a priority for customers, HEGGEL SP 660 is an excellent option to meet this demand.

Sulfuric acid is an indispensable chemical commodity in almost all indus trial sections; on this, dealing with any concentration, HEGGEL SP 660 is an appropriate corrosion protective solution to a multitude of industries.

Technical Data	Value
Flexural Strength EN ISO 178	10 N/mm^2
Density (Mixture) EN ISO 2811 (ASTM D1475)	2.0 g/cm^3
Compressive Strength EN ISO 604	25 N/mm^2
E-Modulus	1.1×10^4 N/mm^2
Hardness Shore D	> 20
Coefficient of Thermal Expansion	12×10^{-6} 1/K
Thermal Conductivity	1.2 W/(m • K)
Max. Operating Temperature Liquids	+ 900°C