Systematic corrosion protection

KAIMANN
SAINT-GOBAIN

Understanding and preventing corrosion

Rust acts. Permanently. It eats away, gets stuck in, never lets up – and is thus capable of causing considerable damage to technical equipment and pipework systems. Economically speaking, rust as a result of corrosion is therefore a significant cost factor in terms of claims settlement. In the worst case, leaks in large-scale systems can even cause fires or explosions and endanger human life.

Particularly deceptive: corrosion under insulation (CUI). Anyone who works with insulation products has to take note of many things that don't necessarily belong to their core business and/or they didn't learn during their training. Due to the potential damage it can cause and the consequential damage and loss, corrosion is one of the most important of these.

It's the responsibility of the installer to be aware of the risk of corrosion and take appropriate preventative measures. These depend on the choice of materials, their combination and the quality of the installation.

Failing to observe it can therefore lead to serious claims regarding loss of insurance cover and legal security. This also applies if the corrosion protection has not been carried out by the insulator, but if faults are determined with the existing paintwork or coatings and these have not been reported or remedied.

Kaimann corrosion protection systems play a major part in safely curbing the risk of corrosion. Their material structure and intelligent technical properties permanently prevent a high degree of moisture absorption – and thus one of the triggers of CUI.

How does corrosion occur?

Corrosion processes under thermal or acoustic insulation (CUI – corrosion under insulation) belong to the hidden and therefore particularly critical damage processes. Particularly endangered are installations that tend to draw (moist) air through the insulation while in operation. This applies to he following applications:

- refrigeration and air-conditioning systems
- cold water zone
- technical systems exposed to high and changing temperatures
- on- and offshore

A lack of insulation or incorrect insulation can therefore cause considerable damage. Condensation water results when the temperature of a material lies below that of its environment and thus an atmosphere saturated with moisture occurs on the material. Pipework in these application areas transport media that have a temperature much lower than that of the environment. This temperature differential causes moisture condensation on the external surfaces of the pipes. The results include frozen condensation water, drips, moisture penetration, corrosion and mould. An increase in energy consumption, operational disruptions or even the total failure of the system lead to increasing and incalculable operating costs, not to mention the need to replace all of the insulation. Anyone who ensures diligent planning, installation and quality at this stage will prevent these risks.

The normative basics

For a corrosion protection system under insulation systems of operational systems in the industry and in technical building equipment.

Excerpt from DIN 4140:2014-04 / 4.6

For cold insulations, the object must be corrosion-protected if it is made of unalloyed or low-alloyed steel.

Excerpt from AGI Q 151 / 1.1

Corrosion under insulation (CUI according to ASTM G189) is a critical aspect for operational systems. Moist insulation not only reduces the insulating effect, but also leads to strong, invisible and therefore uncontrollable corrosion.

Excerpt from AGI Q 151 / 3.1

In planning and operation, it must be observed that insulation and corrosion protection are two different crafts that are not interchangeable.

When selecting the coating systems, observe that the coatings, adhesives and insulation materials are compatible with each other.

More information about the development of corrosion can be found here:

www.kaimann.com/blog/cui-special

Safe, sustainable and economical: effective corrosion prevention by Kaimann

First step: Protecting metal

With pipework, corrosion protection usually involves the application of a coating. The purpose of this is to keep moisture, harmful ions and, if possible, oxygen at bay from the metal, but it must also be applied in a sufficiently thick and encompassing layer to all metallic parts. The type of metal doesn't matter – all alloys are prone to corrosion in one way or another. Viable corrosion protection coatings must therefore adhere equally well to and function with ferrous and non-ferrous metals.

The corrosion protection system Kaifinish is especially developed for coatings of zinc-plated steel (C steel), ustenitic steels (stainless steel),copper and steel tubes and therefore fulfills the special demands of DIN 4140 and AGI Q 151. The lack system is easy to apply and fast drying. Multiple top coat layers and re-applications can be done quickly and efficiently. Kaifinish coatings have been tested for compatibility with each other and with Kaiflex elastomeric insulation products: They do not affect the properties of these materials when applied correctly. The corrosion protection system is also compatible with Kaiflex special-purpose adhesives.

More information about the product range, application and technical details can be found at www.kaimann.de

Kaifinish Primer

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The primer with adhesive effect for DIN-compliant coating of non-ferrous metals such as stainless steel and zinc-plated surfaces (C steel).

Kaifinish Base

1

The base coat is applied to ferrous metals or Kaifinish Primer and therefore forms a DIN-compliant base coat.

Kaifinish Cover

2

The top coat is applied to Kaifinish Base and thus completes the corrosion protection system.

Second step: Correct insulation

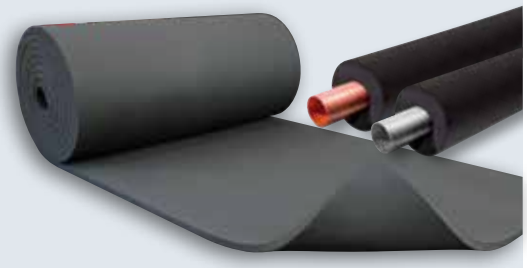
An essential component of a preventive corrosion protection is, in addition to the pre-coat with Kaifinish, an insulation material which must be resistant to moisture in order to prevent condensation and for it not to become saturated. The barrier effect against the penetration (diffusion) of water vapour is measured by the water vapour transmission factor µ. The greater the resistance – or better said, the higher the µ value – the higher the level of protection. This is where Kaiflex insulation products score with a very good value of up to µ 10,000. As closed cell insulation products, they already come with an integrated "vapour barrier". In flexible, fine-celled elastomeric foams, this is as thick as the insulation itself. A reliable vapour barrier is thus integrated over the entire insulation thickness and pipework is permanently protected. Open cell structures, that to a large extent consist of air and are not permanently hydrophobic, soak up water like a sponge and consequently lose their insulating properties.

Open cell materials to some extent have a significantly lower µ-value of <10 or even 1, making them susceptible to water vapour migration and giving them a water vapour diffusion "resistance" that only matches that of the air. They therefore always require an external vapour barrier such as a film, which makes them more complicated to install and less reliable in terms of their impermeability.

The super-fine structure of Kaiflex insulation products is formed of individual cells that are self-contained units. Scratches on the surface of the insulation therefore do not cause any damage to the adjacent unit and the moisture resistance is thus retained despite the damage. In comparison, any damage to water vapour barriers on open cell insulation products allows the moisture to penetrate the insulation product unhindered, and this becomes entirely saturated over time, with all the associated consequences for the insulation effect and installation.

Refrigeration and air-conditioning sytems

- Water vapour permeability μ ≥7.000 (sheets) or ≥10.000 (tubes)
- Thermal conductivity λ ≤0,038 W/(m·K) (sheets) and λ ≤0,033 W/(m·K) (tubes)
- Resistant to mould and bacteria
- Combines fire protection, energy efficiency and corrosion protection
- Coordinated components ensure outstanding reliability



kaiflex KK plus s2

Technical systems exposed to high and changing temperatures

- Keeps its flexible properties in the temperature range between +150 ° C and –50 °C (–200 ° C)
- Integrated water vapor barrier reduces the risk of CUI
- Good thermal efficiency, λ ≤0,038 W/(m·K) at 0 °C

kaiflex EPDM plus

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