



SUNROCK[®]
Insulating the World

**INHIBITED STONEWOOL INSULATION
FOR USE IN CONTACT WITH
AUSTENITIC STAINLESS STEEL**

Thermocare Rock wool (I) Pvt. Ltd.

STRESS CORROSION CRACKING (SCC)

- Stress corrosion cracking (SCC) is the failure of metal, taking the form of cracks that potentially occur under the combined influence of certain corrosive environments and applied or residual stresses.
- Stress corrosion cracking of austenitic stainless steel is a metallurgical phenomenon. One cause of stress corrosion cracking is the presence of contaminants in water solution, which can be concentrated at the stressed surface by evaporation of the water.



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- Studies have shown that insulation containing certain water-soluble compounds have the capacity to retard or prevent stress corrosion. Numerous materials thought to inhibit stress corrosion cracking have been tried with varying degrees of success. An inhibiting compound commonly used is sodium silicate. Present knowledge indicates that the sodium silicate dissociates in the presence of water, leaving the silicate ion to form a protective mechanism that inhibits or prevents the chloride ion from attacking the stainless steel. Under adverse environmental conditions, this protective agent will possibly be leached from the product with time and permanent protection is not afforded.



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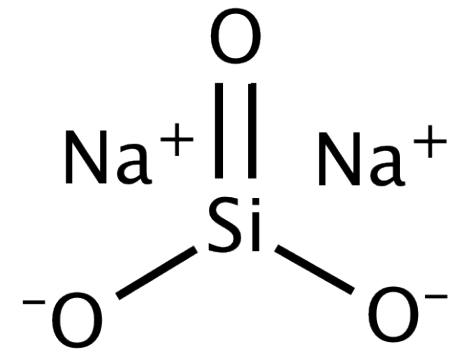
- There is an apparent correlation between stress corrosion cracking of austenitic stainless steel and the use of insulation which either contains water-leachable chloride or, by reason of its water absorptivity, acts as a vehicle through which chlorides from outside the system are concentrated at the surface of the stainless steel.
- The inhibitory qualities of sodium silicate compounds have been found to be different for different molar ratios of sodium to silicate.
- A variety of acids and ionic chemical solutions are known to induce metal pitting, hydrogen embrittlement, intergranular corrosion and stress corrosion cracking on sensitized austenitic stainless steel.

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MINIMUM REQUIREMENT OF INHIBITED STONEWOOL INSULATION

- The minimum allowable value of sodium plus silicate shall be 50 ppm. There is no minimum limit on chloride plus fluoride. Extrapolating the chloride plus fluoride level below 10 ppm is considered to be in the acceptable area when the sodium and silicate is above 50 ppm.



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PREVENTING CUI



It is a complex process to find right solutions and take a right decision. With this in focus, preventing corrosion is a serious concern, which must be addressed during design phase itself.

- Pipework and equipment must be designed properly to ensure supports, fittings and are positioned to shed-off water as much as possible.
- The suitable anticorrosion surface treatment must be given to pipework as well as equipment and shall be regularly checked as part of a robust maintenance plan.
- The right insulation layer must be selected to ensure the product is fit for purpose and will not be the source for additional corrosion.
- The right weather protection system must be chosen. It must be fit for purpose, compatible with the underlying insulation and regularly checked as part of a robust maintenance plan.

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THE PROBLEM

The main issue “Corrosion” occurs in the presence of water and oxygen. So, obviously, if the steelwork under insulation remains dry there would be no corrosion problem. Keeping insulation dry can be difficult. It is essential that every effort is made to keep the insulation dry during storage and installation.

Failure to do this correctly leads to water seepage into the installation which can lead to steelwork corrosion, commonly referred to as corrosion under insulation (CUI). In practice CUI especially appears in the temperature range between -50°C and 200°C or in case of cyclic operation of the equipment. CUI can be found underneath all types of insulation when you have installation issues or damage as detailed above.

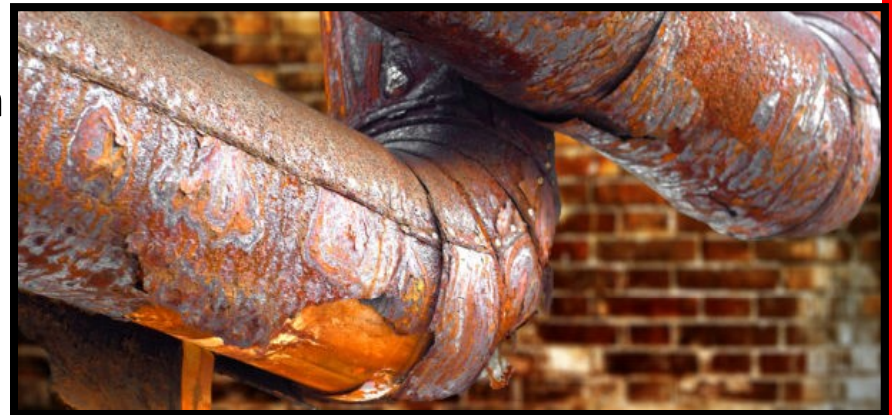
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TYPES OF CORROSION

When applying insulation and taking measures to prevent corrosion, the corrosion resistance of the metal surface to be insulated is an important factor. The most typical types of CUI are:

- General and pitting corrosion of carbon steel, which may occur if wet insulation comes into contact with carbon steel, particularly if acidic product can be extracted from the insulation material itself.
- Another important type of corrosion is Stress corrosion cracking (SCC) of austenitic stainless steel, which is a specific type of corrosion is commonly caused by the action of water-soluble chlorides from rainwater or, say, the insulation material not meeting the appropriate requirements. Austenitic stainless steel is generally susceptible to this type of attack in the temperature range of 50°C to 200°C.



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FOR PROTECTION OF PIPE & EQUIPMENT WHAT SHOULD BE DONE?

There are different ways to protect the aforesaid equipments like protective coatings or paints play a vital role in preventing corrosion under insulation. There are a variety of coatings and paints based on organic or inorganic compounds. Each one is designed to protect a specific metal in a specific temperature range.



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PROTECTION OF AUSTENITIC STEEL WITH ALUMINIUM FOIL

The foil acts as a physical barrier, which stops chloride-containing fluids migrating towards the stainless steel surface. Aluminium foil applied between the austenitic stainless steel surface and the insulation layer will significantly reduce the risk of stress corrosion in insulated stainless steel surfaces.

Aluminium foil provides protection in wet insulation systems which prevents pitting & cracking. The foil can be simply wrapped around the pipe or equipment with approximately 50% overlay for shedding of water properly.

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SUNROCK INSULATION & CORROSION PREVENTION

SUNROCK Technical Insulation has a wide range to offer high-quality stone wool insulation products for the insulation of industrial plants. All products are part of our extensive range for technical insulation. Each product has been manufactured to be suitable for specific applications such as pipework, boilers, & storage tanks.

SUNROCK STONEWOOL MATTRESS (LRB)

They are lightly bonded stonewool mattresses stitched on galvanised wire mesh. They are light in weight, strong, resilient, easy to handle and they can be cut to fit over curved or intricate surfaces making it suitable for insulating Boilers, Equipments, E.S.P, Ducts, Ovens, Furnace, Tanks, Pipe Lines, Chimney walls etc.



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SUNROCK Pre-formed Sectional Pipe

insulations are highly applicable for industrial Steam and Process Pipe Lines in Oil Refineries, Chemical Plants, Petrochemical Plants, and Power Plants etc. It also has the versatility to be used in heating and ventilating or other non industrial applications.



SUNROCK STONEWOOL SLABS can withstand temperature up to 750°C which makes it best suited for various high temperature application requirements. They are also water repellent so it helps it to maintain its insulating value.

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