

CORROSION PROTECTION

WHAT IS CORROSION AND METHODS TO PREVENT IT



What is Corrosion?

During storage and transport, non-treated metals can corrode. When products are fabricated out of iron, or other metals, it is natural for them to return to their original state. Corrosion is a natural process that is the result of oxidation or aggressive elements in the air. The metal begins to release its stored up energy by reacting with oxygen.

Corrosion of sensitive parts or equipment in transit is one of the leading causes of damage claims by shippers, and product rejection by end users.



For products transported under tough conditions with significant humidity and temperature changes, humidity control and corrosion protection are needed.

Bags and Desiccants

To control the moisture efficiently and to prevent products from corroding, desiccants can be used together with an adapted barrier material to stop moisture from getting in.

The bag, or barrier film, which is used to create a controlled atmosphere around the shipped product, is customized for each application. Environmental circumstances and the specific product being shipped determine the choice of whether an aluminum shielding bag, conductive bag or ESD treated pink PE bag should be used.

There are two main types of desiccants: Silica Gel and Activated Clay. For container shipments, strips of desiccants can be hung inside the container to control the humidity level inside the sea container.

NEFAB uses only high quality products to ensure that the packaging solution achieves the required protection.

Vapor Barrier Packing

Vapor Barrier Packing involves enclosing electronic items or parts with extremely sensitive metal surfaces in a water-vapor-proof foil barrier. The items are cushioned and activated desiccant is placed in the bag prior to closing all seams. One corner of the bag is left open and a vacuum is used to remove excess air, then the opening is sealed. Packing in this method reduces the humidity inside the barrier to very low levels.

This method of protection is particularly important for sensitive items that are being shipped via ocean transport where salt-laden moisture could invade and jeopardize product integrity.

When items are packed in this method for military packaging, humidity indicator cards are placed inside the bag and this area is marked for opening at periodic intervals to check the condition of the desiccant. Humidity indicator plugs that protrude through the foil barrier are also available so that the



barrier does not have to be opened to check the desiccant status.

Vapor Barrier Packing protects the items within the foil barrier for twelve to eighteen months. Nefab uses different foil materials from standard polyethylene-foil-polyethylene on lighter items to scrim-foil-nylon for large items such as generators weighing hundreds of thousands of pounds.

Volatile Corrosion Inhibitor

Volatile Corrosion Inhibitor (VCI), is an efficient method designed to protect untreated metal against corrosion/oxidation.

VCI packaging protects highly sensitive metal surfaces from attack by corrosive agents (moistures, salty air, airborne acids, and contaminants) during shipment. This is particularly critical when shipping machined parts or electronics, which must remain corrosion-free in transit. In addition, VCI barriers protect against corrosion caused by acidic packaging materials, such as corrugated boxes or wooden pallets.



How does VCI work?

VCI creates an invisible molecular protection layer on the metal. The chemicals found in the corrosion inhibitor evaporate from the different products (PE film, PUR foam, paper, tablets etc) to saturate the environment. Once the environment around the metal is saturated, a thin molecular protection layer is formed on the metal, inhibiting corrosion. The protection remains as long as the product is enclosed in the saturated space.

Moisture or impurities in the direct air around the metal can no longer influence metal to corrode. The metal product is placed in the VCI packaging material, which is then closed and put into the transport packaging.

VCI is compatible with most metals and alloys and requires no grease or oil and no pre-treatment except ensuring that the metal surfaces are dry and clean.

After opening the packaging, the molecular protection



layer (VCI) on the metal dissolves in the air leaving a dry, corrosion free product that is ready to use without any cleaning operations.

VCI is harmless to health and the environment and VCI products can be recycled just like any other plastics or paper-based products.

Benefits of VCI:

- Easy to implement
- Can be applied as a normal packaging
- Multi metal corrosion protection
- Maintains effective protection against corrosion for a minimum of 2 years
- VCI can be used for storage and long distance transport purposes
- Protects places that are difficult to reach (complex machinery)
- Safe to use (recyclable, environmentally safe)
- Do not affect the metal: after unpacking the VCI layer simply evaporates in the air
- Opening and re-closing of the packaging does not affect the VCI functioning
- No extra handling after use (the VCI layer disappears once the active VCI source around the metal is taken away)

