WHITEPAPER

# Corrosion and its Effects on Painted Mild Steel Enclosures

Corrosion is a destructive process that significantly affects various metallic materials including mild

steel. One effective way of limiting corrosion and prolonging the life of mild steel surfaces is by painting. However, understanding the effects of corrosion on painted mild steel surfaces is crucial for adequate maintenance and care of the steel surfaces.

The following is an overview of the corrosion process and the effects of corrosion on painted mild steel surfaces to assist in best caring for your enclosures.

Corrosion is the gradual destruction of metallic materials by a chemical or electrochemical reaction with the surrounding environment. In the case of mild steel, corrosion occurs when the iron in the metal reacts with oxygen and moisture in the air to form iron oxide (rust). Rusting weakens the steel and affects its mechanical properties, making it more prone to structural failure.

Painting is an effective method of protecting mild steel surfaces from corrosion. A properly painted mild steel surface acts as a barrier, preventing oxygen and moisture from coming into contact with the metal. The paint also prevents the formation of rust by isolating the steel surface from the environment.

However, painted mild steel surfaces are not entirely immune to corrosion. Several factors can cause the paint to fail, exposing the steel surface to the elements and promoting corrosion. For instance, mechanical damage, such as scratches or chips on the paint, can expose the underlying steel surface to oxygen and moisture. Additionally, exposure to harsh chemicals or extreme temperatures can cause the paint to deteriorate, further exposing the steel surface to corrosion.

The effects of corrosion on painted mild steel surfaces can be profound. Firstly, corrosion weakens the steel, reducing its load-bearing capacity and making it more prone to structural failure. Secondly, rusting causes the paint to peel, crack, or bubble, exposing even more of the steel surface to corrosion. Thirdly, rust stains, which are often in the form of reddish-brown streaks, can appear on the painted surface, spoiling its appearance. Lastly, corrosion can lead to increased maintenance costs, as the steel surfaces will require frequent repair and repainting.

The IEC Standard IEC 62208 allows for a degree of rusting Ri1, in accordance with ISO 4628-3, and although in practice this degree of rusting does not affect the function or mechanical properties of the enclosure, regular maintenance to avoid its aesthetic deterioration and to prolong its useful life is recommended.

The IPD range of mild steel enclosures are compliant with corrosion resistance standard UNE-EN 62208.

**General enclosure selection guide** (recommended):

| Installation Environment | Mild Steel | Stainless Steel or Polymer |
|---|---|---|
| **Indoors** - normal environmental conditions, low dust, dry | ☒ | ☐ |
| **Outdoors*** - normal environmental conditions, minimal road pollution, no chemical exposure, moderate temperature, low dust, minimal direct sunlight, dry | ☒ | ☐ |
| **Indoors** - exposure to chemicals and high humidity, dusty | ☐ | ☒ |
| **Outdoors** – exposure to sea air/sea breeze, high temperatures, direct sunlight | ☐ | ☒ |
| **Outdoors** – direct sunlight, dusty, wet | ☐ | ☒ |

**For mild steel enclosures installed outdoors it is recommended installing an enclosure canopy as well to provide additional shielding from the weather.*

Even though the IP rating may be suited for the intended application, the correct enclosure must be selected to suit the environmental conditions, so corrosion is minimised.

When in doubt, choose stainless steel or polymer as the additional investment will outweigh the ongoing maintenance costs.

In conclusion, corrosion is a significant problem that affects mild steel surfaces. Painting and corrosion inhibitors are effective ways of protecting mild steel surfaces from rusting. However, painted mild steel surfaces are not entirely immune to corrosion, and several factors can cause the paint to fail, exposing the steel surface to corrosion. Understanding the effects of corrosion on painted mild steel surfaces is essential for adequate maintenance and care of the steel surfaces, reducing costs, and ensuring its longevity.

## Periodic maintenance:

A highly recommended practice to ensure the longevity and structural integrity of the enclosure resulting in long-term cost savings and equipment reliability.

The maintenance instructions below are now included with all the MSB series mild steel enclosures.

## Maintenance recommendations for steel wall-mounting cabinets.

## (Argenta Series)

- ✓ Cabinets and accessories in the Argenta series meet the requirements of standard **IEC 62208** for metallic enclosures that are to be installed outdoors.
- ✓ Although standard IEC 62208 allows for a degree of **rusting Ri1**, in accordance with ISO 4628-3, and although in practice this degree of rusting does not affect the function or mechanical solidity of the enclosure, maintenance to avoid its aesthetic deterioration and to prolong its useful life is recommended.

### Recommended maintenance:

- ✓ **Frequency:** annual.
- ✓ **Visual inspection:** detection of any harm to the surface such as scrapes or impacts that could have damaged the paint coating.
- ✓ **Initial signs of rust:** due to scrapes, impacts or any other causes.
  - Remove the surface rust.
  - Abrade the surface rust to get rid of it completely.
- ✓ **Cleaning:** clean the affected area with alcohol or an evaporating cleaner.
- ✓ **Paint:** paint the affected surface with a synthetic paint, RAL 7035. (We recommend our grey textured paint colour RAL 7035, reference 48292).

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