

Salt spray test

Corrosion simulation

Background

A salt spray test is a corrosion testing method that uses high-saline environments to measure the corrosion resistance of products, paints and coatings over extended periods.

Powder coating offers many advantages such as; consistent finish, requires no manual surface treatment such as grinding or polishing, give edges roundness, it's a closed process, high repeatability and time efficient. Compared to other surface treatments such as metal plating or anodizing the coating adds as a layer on top of the material. This entails two major risks:

1. Damage that goes through the coating exposes the underlying material (this is why we use high quality stainless steel).
2. Delamination between the coating and underlying material. If there is a scratch, delamination could accelerate further from here (this is why we prepare the surface for extra adhesiveness).

Purpose of salt spray test

We initiated this test to visualize and share the powder coating properties from our process, and to compare high quality stainless steel with basic steel.

Test specifications

STANDARD ISO 4628-8 - PAINTS AND VARNISHES - EVALUATION OF DEGRADATION OF COATINGS - DESIGNATION OF QUANTITY AND SIZE OF DEFECTS, AND OF INTENSITY OF UNIFORM CHANGES IN APPEARANCE. ASSESSMENT OF (ISO 4628-8:2012).

The most common environmental conditions indoors belong to corrosivity categories C1 and C2, provided that no significant amounts of corrosion-effective elements are present in addition to moisture. Outdoor conditions belong to corrosivity category C2-C5. According to the quality and amount of impurities in the air, local atmospheric environments can be classified into rural, urban, marine or industrial atmospheres.

Test criteria:

- C4-high (durability > 15 year)
- C5-medium (durability 5-15 year)

Test duration: Test duration in test = 1,000 hours

Requirement: Max corrosion spread from scratch: 1 mm

Simulated scratch: Each object was damaged with a scratch before test was started

Test objects

We tested four different objects in stainless steel vs. magnesium coated steel (similar to galvanized steel but with magnesium added), and compared our pretreatment to a standard chemical cleaning process:

- A. Stainless Steel Bracket + Spaza pretreatment and cleaning
- B. Magnesium Coated Steel + Spaza pretreatment and cleaning
- C. Stainless Steel + Standard chemical cleaning
- D. Magnesium Coated Steel + Standard chemical cleaning



Test objects A, B, C and D

Conclusion

This test was run for extreme amount of hours. It shows that if a scratch or damage appears in the surface finish that exposes underlying material, delamination of the powder coating from the stainless steel will not tend to creep (as shown in case C). Accordingly abrasive cleaners or cutting compounds should not be used nor sharp metal objects that could risk damage the finish. There is no sign of corrosion around the scratch nor artificial defect.