

TECHNICAL & EDUCATIONAL INFORMATION FOR SURFACE FINISHING SHOPS IN AND AROUND THE SOUTH

WHAT IS SALT SPRAY (FOG)?

A DETAILED LOOK AT A COMMON TEST

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Salt Spray is considered one of the most useful standards for measuring corrosion resistance in the painting industry, yet it is also the most misunderstood. Salt Spray provides a highly corrosive environment that induces rusting, blistering, cracking, and loss of adhesion. Salt Spray is a method used for pretreatment and paint qualification, as well as quality assurance purposes.

People speak of their paint specification being 1000 hours salt spray, but what does this really mean? Without criteria for evaluation, all this means is the painted part was placed in a salt spray cabinet for 1000 hours. There could be blisters all over, rust showing through the paint, severe delamination of the paint, or extreme creepage if the part was scribed. The real question is, "What are the results after 1000 hours of exposure?" Are you testing for paint delamination, blistering, corrosion, etc...? If so, what method is being used? This article will try to explain salt spray (fog) for painted surfaces and how to create a more accurate specification for your paint process.

Salt spray tests are performed using a special cabinet, appropriately named or described as a Salt Spray Cabinet. ASTM B117-07 "Standard Practice for Operating Salt Spray (Fog) Testing Apparatus" gives the operating parameters of the cabinet. The parameters include temperature, air pressure, concentration of salt, collection rate, and so on. The salt solution is made up of 5% salt in deionized water, and the cabinet temperature is kept at 95-98 degrees F. The salt solution is atomized in the cabinet "such that for each 80cm² of horizontal collection area there will be collected from 1-2 ml per hour". These parameters have strict operating ranges that must remain in check to insure proper reproducible testing. This test method does not describe the type of test specimen or exposure periods to be used for a specific product, nor the interpretation to be given to the results. The only reference in ASTM B117-07 to the test panel is that the panel (or part) is to be placed between 15 and 30 degrees and that the panels should not touch one another. Section 5.1 of the standards says:

"The type and number of test specimens to be used, as well as the criteria for the evaluation of the test results, shall be defined in the specifications covering the material or product being exposed or shall be mutually agreed upon between the purchaser and the seller."

Therefore, when someone mentions getting 1000 hours salt spray they must specify as Section 5.1, says the criteria for the evaluation. Typically the evaluation method is ASTM D1654-05, "Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to corrosive Environments."

The ASTM D1654-05 standard is the most common evaluation method for ASTM B117-07. ASTM D1654-05 has four procedures: Procedure A is "Evaluation of Scribed Specimens"; Procedure B is "Evaluation of Unscribed Areas"; Procedure C is "Evaluation of Unprotected Edges"; and Procedure D is "Evaluation of Formed Areas". In conducting testing for our customer, Procedure A is the most common followed by Procedure B. Procedures C and D are rarely used.

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WHAT IS SALT SPRAY (FOG) ?—CONTINUED FROM PAGE 1...**Procedure A**

ASTM D1654-05 tells how the panel(s) should be scribed and evaluated. This procedure mentions to use a straight line, unless indicated otherwise. Also, the scribe is to be placed vertically in the testing chamber (Salt Spray Cabinet). The lengths of test and evaluation intervals are to be agreed upon prior to testing. There are two testing methods. Method 1 is for using "Air Blow Off" and Method 2 is "Scraping". Method 2 is the most common method that our customers request. Once the testing has been performed, the amount of creepage or delamination is measured. This measurement can be in inches or mm, and then is converted to a rating. The rating system goes from 0 to 10, where 10 means zero creepage.

Procedure B

This procedure deals with the unscribed areas of the panels. Panels are tested for corrosion spots, blisters, and other signs of failure. This procedure references ASTM D714-02e1 "Standard Test Method for Evaluating Degree of Blistering of Paints" and ASTM D610-01 "Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces". The degree of blistering, as per ASTM D714-02e1, is recorded by blister size and frequency. Size is rated from 0 to 10, with ten representing no blisters, and frequency is recorded as

dense, medium dense, medium, and few. The degree of rusting, as per ASTM D610-01, is recorded by percent of surface area with a rating scale of 0 to 10, where 10 has no rust.

An appropriate paint specification could be:

Example 1: Salt Spray Exposure using ASTM B117-07. The test panels will be of production metal and will be treated through our production line. The panels will be tested for 600 hours with a rating of 6 or better using ASTM D1654-05, Procedure A, Method 2.

Example 2: Salt Spray Exposure using ASTM B117-07. The test panels will be of production metal, and will be treated through our production line. The panels will be tested for 600 hours with a rating of 6 or better using ASTM D1654-05, Procedure A, Method 2 and Blisters of Few, Size Number 6.

Example 3: Salt Spray Exposure using ASTM B117-07. The test panels will be standard test panels and will be treated through our production line. The panels will be tested for 1000 hours with a rating of 7 or better using ASTM D1654-05.

If production metal cannot be used for salt spray testing then standard test panels can be purchased from a variety of sources. These panels can be used to test paint or pretreatment. These suppliers also

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carry standardized treated panels that are available for testing paints or they can be used as a standard to compare pretreatment chemistries against. By using the above specifications you are stating a more descriptive specification that actually gives a measurement for comparison purposes. Without the ratings and method of rating the salt spray hours are not enough for a specification.

Your paint and/or chemical supplier should be able to help set up a salt spray specification if you do not have one or need to refine your current specifications. This specification should suit your needs and your customer's needs. Both of these suppliers should have

their own salt cabinets and will be able to test panels for you to verify the results of your current process.

Salt spray results are used for comparison purposes only. Salt spray lets you compare different paints and/or different types of pre-treatment chemicals. Hours of salt spray do not correlate to a certain number of days in the field; however, the longer salt spray hours for a given rating will provide longer field life for the part.

*This article was provided by
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