



PAINTED SHEET METAL CORROSION TEST
(Laboratory-Simulated Arizona Proving Ground Test)

Application

This test procedure is used to evaluate the relative corrosion performance of paint coating systems applied to test panels and to car body sheet metal parts. It is designed to simulate the corrosive conditions of the Arizona Proving Ground (APG) Vehicle Accelerated Corrosion Test (CETP 00.00-R-311).

Apparatus Required

Automatic Method:

Humidity Cabinet

Thermotron Industries
291 Hollen Park Drive
Holland, MI 49423
(616) 392-1491

Autotechnology Company
20026 Progress Drive
Strongsville, OH 44149
(440) 572-7800

Automated Cyclic Corrosion Test Chamber, model ACT-30-CHM-1(Thermotron) or NC series test chambers (Autotechnology Co.), or equivalent, with forced air circulation, temperature control of $\pm 2^{\circ}\text{C}$ to 65°C and relative humidity control of $\pm 2\%$ up to 90%.

Manual Method:

Humidity Cabinet

Thermotron Industries
291 Hollen Park Drive
Holland, MI 49423
(616) 392-1491

Model No. SE-600, or equivalent with forced air circulation, temperature control of $\pm 2^{\circ}\text{C}$ to 65°C and relative humidity control of $\pm 2\%$ up to 90%.

Tank

Polyethylene or plastic-lined tank, with cover, of sufficient size and capacity to permit the test samples to be immersed in the salt solution. For 100 x 300 mm test panels a 42 L Nalgene polyethylene tank (VWR Catalog No. 60463 - 040) is adequate.

Brush

Camel hair brush, flat style (VWR Catalog No. 17215-067, or equivalent).

Materials Required

Tape

20 mm wide, 3 M No. 898 Test Tape, or equivalent.

Date	Action	Revisions
2005 03 22	Revised	Automatic/Manual test procedure changes, revised procedure and evaluation M. Kelly
2001 03 20	Revised	Editorial – no technical change A. Cockman
1996 10 02		

**Scribing Tools**

Straight shank lathe cutting tool bit, 8 mm.

(High speed steel, Type E, ground to a 60° included angle).

Placed in a steel handle as shown in Figure 2 or a file handle as shown in Figure 3.

Tool bits and wooden file handles available from:

Production Tool Supply (Tip: E-6, Wooden Handle: 001 or L001)
12161 Telegraph Road
Redford, MI 48239
Telephone: 1-800-366-3600

Carbide-tipped scriber available from:

Aircraft Specialties (#90C)
P.O. Box 98
Lapeer, MI 48446
Telephone: (810) 664-2981

G.T.S. Co (General Scriber #CM88)
12015 Telegraph Road
Redford, MI 48239
Telephone: (313) 531-7666

James Neill Tools (Eclipse Model 225)
James Neill Sheffield Ltd.
Sheffield S11 8 HB U.K.

Towels

Paper or cloth.

Sodium Chloride

Reagent grade.

Hydrochloric Acid

Reagent grade.

Sodium Hydroxide

Reagent grade.

Distilled or Deionized Water

10 ppm max dissolved solids per ASTM D 1888.

Kaolin

Powder, N.F. grade.

Stop-off Lacquer

Microshield Stop-off Lacquer, or equivalent.

Source: Pyramid Plastic
Tolber Division
P.O. Box 704
Hope, Arkansas 71802-0704
Telephone: (501) 777-3251 or 5759

Test Panels

Panels shall be prepared in accordance to FLTM BI 120-01 (for electrocoat systems) or as indicated in the applicable Engineering Materials Specification.





Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5% relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

Prepare a 5% salt solution for manual spray as follows:

1. Dissolve 53 g of sodium chloride per liter of distilled or deionized water. Sufficient test solution should be prepared to allow samples to be completely immersed for the manual method.
2. Adjust the solution pH to 6.0 - 8.0 by the addition of hydrochloric acid or sodium hydroxide.
3. For the manual method, replace salt solution and clean out tank when appreciable rust accumulates in the bath and deposits on the samples, or when the pH is outside of the 6.0 - 8.0 range (do not readjust the pH).
4. (Optional) In instances of extended testing or for paint-coating systems that do not resist corrosive attack at the edges, it may be necessary to mask the edges and holes of the sample parts and the holes, edges and backs of panels with an air-dry stop-off lacquer. Such masking should be denoted in the Materials Engineering Specification. Allow to dry for twenty-four hours.
5. Scribe or condition the panels or parts as indicated by the applicable Materials Engineering Specification. Hold the scribe at a 45 to 60° angle to the part or panel (see Figure 4). Scribe test panels with an "X" using the straight shank lathe cutting tool bit. When testing zinc coated steels, scribe through the coating to the substrate. A carbide tip scribe may be used for samples with narrow scribe areas or curved surfaces.
6. In order to simulate dust contamination, load a camel hair brush with a small amount of dry kaolin powder and lightly brush it on the painted surfaces to obtain a uniform, thin, dry coating prior to the initial test cycle only.
7. Wipe the bottom edge of the samples with a towel to remove excess salt, which accumulates during the drain-and-dry period. Use care not to remove the kaolin from the remainder of the panel.
8. Samples shall be suspended from rods on insulated hooks. The intent is to prevent galvanic corrosion resulting from contact with a bare hook. Non-Metallic slotted racks may also be used.

After sample preparation run the samples per the test requirements outlined in the following procedure.