

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS BT-9
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TITLE: Humidity Corrosion Test		CURRENT REV No.: 1608
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1.0 SCOPE

This method covers a test procedure for determining the corrosion protection offered by various materials to a finished ferrous surface under dynamic humidity conditions.

2.0 APPARTUS

- (1) 500 milliliter Erlenmeyer flask, wide mouth (see Figure 1).
- (2) 25 milliliter Erlenmeyer flask (see Figure 1).
- (3) Modified No. 10 rubber stopper (see Figure 1).
- (4) Bath capable of maintaining a temperature of $90 \pm 1^\circ \text{F}$ ($32.2 \pm 0.6^\circ \text{C}$).
- (5) Water jacket (see Figure 2).
- (6) Test tube, 25 x 150 millimeters.
- (7) Drill or lathe rated at 2500 revolutions per minute.
- (8) 30 milliliter polyethylene beaker.
- (9) Bath, controlled at $80 \pm 1^\circ \text{F}$ ($26.7 \pm 0.6^\circ \text{C}$) with pump capable of circulating solution through water jacket.

3.0 MATERIAL

- (1) Test specimen:
The test specimen is made from 0.56 inch (14 mm) diameter cold drawn bar of 1018 steel and finished to 11 microinches (0.28 mm), AA, max. Finished part from vendor must be free from scratches and rust and must be protected for storage by coating with MIL-C-15074B fluid (see Figure 3).
- (2) Toluene, ACS.
- (3) Isopropanol, ACS.
- (4) Carborundum Aloxite Flexbac Metal Cloth Strip, Grade A-320, 1 inch (25 mm) wide.
- (5) Distilled water.
- (6) Kleenex or equivalent.
- (7) Plastic or rubber gloves.

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4.0 PROCEDURE

4.1 The rod specimens will be given a preliminary cleaning by immersing in a hot 50% mixture of toluene and isopropanol to remove rustproof coating.

4.2 Chuck the test specimen in a lathe or drill (fixed position) and run at 2500 revolutions per minute. Use a 14 x 1 inch (360 x 25 mm) strip of the abrasive cloth and pass slowly from the chuck end to the specimen tip. Pull the abrasive cloth slowly from one end to the other in opposition to the rod rotation to provide a fresh surface on the paper while progressing down the specimen. The pass should take approximately 20 seconds. Make three passes using a new strip of abrasive cloth each time. Final overall specimen finish will range from 9 to 14 microinches (0.23 to 0.36 mm) AA, except for the chucking area. CAUTION: Do not use chucking area as test portion.

4.3 Rinse rods with toluene and wipe clean with toluene-soaked Kleenex. Rinse again with toluene followed by dipping in clean toluene at 135°F (57°C) for 15 seconds, then clean isopropanol at 120°F (49°C) for 15 seconds. Remove any adhering drop at bottom of rod with clean piece of Kleenex after each dipping.

4.4 Allow to dry and immediately immerse the 6 inch (150 mm) test section of the specimen 6 times per minute for 1 minute in a test tube containing 40 milliliters of the fluid to be tested. Use a fresh sample of fluid for each specimen dipped.

4.5 After the last dip, place the test section of the rod in a plastic beaker (on a nonskid surface) containing approximately 1 inch (25 mm) of test fluid. Push the predrilled rubber stopper down the rod until a 3 inch (75 mm) section protrudes. Hang the rod vertically by the exposed 3 inch (75 mm) section and allow the test fluid to drain for 30 minutes. Next, place the rod vertically in a 500 milliliter flask containing 100 millilitres of distilled water and a 25 milliliter flask containing 15 milliliters of distilled water. Place the 25 milliliter flask so that test fluid from the rod cannot enter this flask (See Figure 1).

4.6 Immerse the assembly to the bottom of the stopper in the bath maintained at $90 \pm 1^{\circ}\text{F}$ ($32.2 \pm 0.6^{\circ}\text{C}$). Place a water jacket as shown in Figure 2, over the exposed 3 inches (75 mm) of rod and circulate water controlled to $80 \pm 1^{\circ}\text{F}$ ($26.7 \pm 0.6^{\circ}\text{C}$) maintaining a 10°F (6°C) differential.

4.7 At the end of the specified time period, the rod will be vapor cleaned with a boiling mixture of 50% toluene and isopropanol.

4.8 Test to be run in triplicate.

4.9 Examine rods with the unaided eye for rust spots. Failure is defined as six or more spots per any linear inch (25 mm). The first 0.38 inch (10 mm) below the contact line of the stopper with the rod will be disregarded. Two specimen failures will be cause for rejection.

5.0 REPORT

Report pass or fail.

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