

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS BT-10
		Former Designation: CEMS BT-10
TITLE: Oxidation Corrosion Test		CURRENT REV No.: 1608
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<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		

1.0 SCOPE

This is a method for determining oxidation stability of fluids and their corrosive attack on metals.

2.0 APPARATUS

- 2.1 Test cell - Pyrex glass test tube, 38 x 300 millimeters, with a 34/45 standard taper ground glass joint
- 2.2 Condenser - Allihn type, Pyrex glass, 300 millimeter jacket and a 34/45 standard taper ground glass joint to fit the test cell.
- 2.3 Air tube - Pyrex (see Figures 1 and 3, pages 3 and 5, respectively)
- 2.4 Ring rod - (see Figure 2, page 4)
- 2.5 Bath capable of maintaining a test temperature $\pm 2^{\circ}\text{F}$ ($\pm 1^{\circ}\text{C}$)
- 2.6 Analytical balance with a sensitivity of 0.1 milligram
- 2.7 Nylon or stainless steel forceps
- 2.8 Flowmeter capable of measuring 50 ± 5 milliliters per minute of clean dry air
- 2.9 Four ounce (120 ml) bottle

3.0 MATERIAL

The metal corrosion specimens will be as shown in Figure 4, page 5, and will meet the following specifications:

- 3.1 Aluminum, cold rolled sheet: 2024-0 per ASTM B 209 (AA2024-0 per SAE J457)
 - 3.2 Copper, cold rolled annealed sheet: Alloy 110 per ASTM B 152 (CA110 per SAE J463), or Type C11000 per MPAPS C-3
 - 3.3 Steel, SAE 1010 cold rolled sheet
 - 3.4 Cartridge brass, annealed: Alloy 260 per ASTM B 36 (CA260 per SAE J463), or Type C26000 per MPAPS C-3.
 - 3.5 Test fluid
- Other required test fluids/materials are:
- 3.5.1 Mild wetting agent, Alconox or equivalent:
 - 3.5.2 Potassium cyanide, reagent grade:
 - 3.5.3 Toluene, reagent grade
 - 3.5.4 Alundum, 90 mesh, RR Crystalline, Blue Label

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- 3.5.5 Isopropyl alcohol, reagent grade
- 3.5.6 Trichloroethylene, technical grade
- 3.5.7 Cleansing tissue, Kleenex or equivalent
- 3.5.8 Acetone, reagent grade
- 3.5.9 No. 212 Eberhard Faber Eraser or equivalent
- 3.5.10 Cotton, clean
- 3.5.11 Rubber or plastic gloves

4.0 PROCEDURE

4.1 Prepare the metal specimens as follows:

Clean the metal specimens by washing with hot toluene followed by rinsing with isopropyl alcohol. Rub the surface with cotton dipped in toluene and alundum using enough pressure to remove all surface imperfections. The edges of the specimens and hole should also be polished. Rewash the specimens as before and wipe with a cleansing tissue. For the final rinse wash with alcohol, handling the specimens with stainless steel or nylon forceps, and allow to dry on glass or stainless steel hooks. CAUTION: Do not use the same alundum for cleaning different metals as this may transfer metal.

4.2 Assemble ring rod on the air tube. Weigh each specimen to 0.1 milligram and place on the ring rod ready for immediate use. Record as Weight No. 1.

4.3 Place test specimens, ring rod and air tube assembly into the test cell. Add sufficient test fluid to cover specimens. The height of the test fluid should be 0.25 to 0.50 inch (6 to 12 mm) above the specimens. Install the condenser and then place the assembly in the bath maintained at the specified temperature such that the assembly is immersed above the level of the fluid in the test cell. Start clean, dry air through the cell and adjust the flow rate to 50 ± 5 milliliters per minute. Start flow of cooling water through condenser. If foam rises to bottom tip of condenser, discontinue the test and restart with clean glassware. If foaming persists, valid test results are not possible.

4.4 At the end of the specified time period, shut off the air, and water, and remove the test assembly from the bath. Remove condenser from the assembly. Raise the ring rod air tube assembly to permit the test fluid to drain from the specimens. Remove the test specimens, vapor degrease with trichloroethylene and allow specimens to cool to 70 to 80°F (21 to 27°C). Weigh each specimen to the nearest 0.1 milligram, record as Weight No. 2. Transfer test fluid and solids, if any, into a 40 ounce (120 milliliter) bottle and retain as Weight No. 2. Transfer test fluid and solids, if any, into a 4 ounce (120 milliliter) bottle and retain for determination of precipitation number. Retain test cell for glassware rating as per "Procedure, 4.8".

4.5 Clean the metal specimens as follows:

4.5.1 Wash aluminum and steel specimens using cotton and a solution of wetting agent in hot water.

4.5.2 Dip copper and brass specimens in a 10% potassium cyanide solution until the film loosens (usually about a minute). Rinse with hot water, and wash as in step **4.5.1**.

4.5.3 After hot water rinse, dry all specimens with acetone.

4.5.4 Lightly rub all the specimens with the eraser to remove any visible dried water or wetting agent film.

4.5.5 Rinse the specimens with acetone and allow to dry.

4.6 Weigh each specimen and record as Weight No. 3.

4.7 Within one hour of stopping test determine precipitation number of the test fluid recovered from the test cell in step **4.4**. Use ASTM D 91 modified with a test tube per D 2273.

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