The Engineering Society For Advancing Mobility Land Sea Air and Space®

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Corrosion Test for Insulation Materials

SAE Recommended Practice
Reaffirmed December 1988

Submitted for Recognition as an American National Standard

The Engineering Society For Advancing Mobility Land Sea Air and Space®

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

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MATERIALS PRACTICE

SAE J1389

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CORROSION TEST FOR INSULATION MATERIALS

1. SCOPE:

This test applies to various insulation materials used in vehicles for control of heat and noise and other applications.

2. PURPOSE:

The purpose of this test is to provide a means to evaluate and compare the corrosiveness of insulation materials. Three panelists compare a sample insulation material to a standard (inert fibrous material). The rationale for the test is that the corrosion of steel should not be greater for the insulation material than for an inert fibrous material.

3. APPARATUS:

3.1 Steel Test Plates: The plates shall be 2.5 cm (1.0 in) wide, 10 cm (4.0 in) long, and 0.05 cm (0.020 in) thick. The steel shall be SAE grade number 1010, cold rolled, strip steel. The steel shall have bright No. 2 finish and No. 3 temper--quarter hard.

3.2 Wire Mesh: The wire mesh shall be type 304 stainless steel wire cloth with 1.25 cm (0.5 in) mesh. The mesh should be cut to 3.8 cm (1.5 in) wide by 11.5 cm (4.5 in) long.

3.3 Humidity Chamber: The humidity chamber shall be clean and maintain a temperature of 49 ± 2°C (120 ± 3°F) and 95 ± 3% relative humidity.

3.4 Inert Fibrous Standard Material: Any fibrous material free from chemical contaminants is satisfactory as a standard material. Two materials that have been shown to be satisfactory are:

1. Unbonded, unlubricated fibrous glass;

2. Sterile cotton, extracted in acetone for 48 h and vacuum dried at low heat. Because cotton has variable amounts of oil on it, it must be extracted in solvent to obtain reproducible results.

3.5 Rubber Bands: Rubber bands shall be No. 12.

4. TEST SPECIMENS AND CONDITIONING:

4.1 Test specimens should be representative of the material being evaluated. Test specimens should be 3.8 cm (1.5 in) wide by 11.5 cm (4.5 in) long by 1.3 cm (0.5 in) thick. Two specimens are required for each sample.

4.2 Prior to the test, the specimens must be brought to room temperature.

5. PROCEDURE:

5.1 Clean the steel plates until they are free of water breaks. Breaks are characterized by uneven cling or coating on the surface of the metal. First, wash the plates with a laboratory grade detergent and rinse with distilled water. Then place the plates in a hot caustic (not boiling) of 15% potassium hydroxide.

CAUTION: Potassium hydroxide can cause severe burns and damage eyes. The caustic bath should be done under a laboratory hood.

Rinse in distilled water and check for water breaks. If there are none, dry immediately with laboratory type paper wipe. Repeat procedure if necessary.

5.2 Boil the No. 12 rubber bands in distilled water for 30 min to remove contamination.

5.3 Place one steel panel between two specimens, per Fig. 1. Both specimens must be cut from the same sample. Place wire mesh on both sides of assembly and secure with two No. 12 rubber bands.

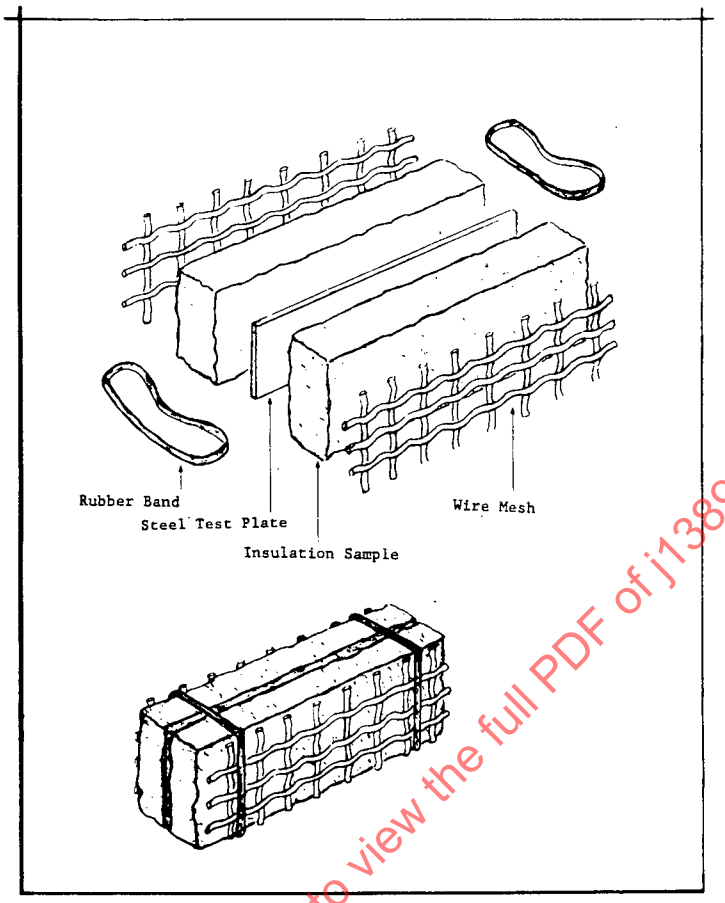

FIGURE 1 - Test Assembly

5.4 Prepare standard panel in same manner as in 5.2, except use inert fibrous standard material.

5.5 Suspend test assemblies vertically in the humidity chamber that has been preset to 49 ± 2°C (120 ± 3°F) and 95 ± 3% RH. The samples must be left in the humidity chamber for 96 h. (Since the test compares sample material to a standard, other test conditions may be chosen, provided they produce acceptable rates of corrosion.)

5.6 Remove the samples and grade the test panels according to the following scale using the control panel for comparison:

Standard

Worse
1 - Substantially worse than standard
2 - Moderately worse than standard
3 - Slightly worse than standard
4 - No significant difference
5 - Slightly better than standard
6 - Moderately better than standard
7 - Substantially better than standard
Better

Surface blush or stain rust should be ignored. Heavy rust, flaking, and pitting should be weighed heavily in the ratings.

5.7 Repeat 5.6 for at least two other knowledgeable panelists.

5.8 Report for each sample:

a. Median and all numerical ratings.

b. Type of rust and description of patten observed per 5.5.

c. Complete description of sample insulation material including generic composition, manufacturing, material identification, thickness, and weight.