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GB/T 16267-2025

Replacing GB/T 16267-2008

Test method of packaging materials - Vapor corrosion inhibiting ability

包装材料试验方法 气相缓蚀能力

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1 Scope

This document describes the test method for the vapor corrosion inhibiting ability of volatile rust preventive inhibitors.

This document applies to the determination of vapor corrosion inhibiting ability of volatile rust preventive paper, volatile rust preventive plastic film, and volatile rust preventive inhibitors. This document can be used as a reference for testing the vapor corrosion inhibiting ability of other volatile rust preventive materials.

2 Normative references

GB/T 678

GB/T 687

GB/T 699

GB/T 6682

GB/T 11372

GB/T 11414

GB/T 26497

GB/T 28851

GB/T 30435

GB/T 35491

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in GB/T 11372 and GB/T 35491, as well as the following apply.

3.1 test surface

The surface of a material specially processed for testing to check for corrosion.

3.2 blank test

A test in which the test apparatus containing only a test piece without the volatile rust preventive inhibitor.

3.3 volatile rust preventive inhibitor

A volatile rust preventive material of which the main component is a volatile corrosion inhibitor.

NOTE. Primarily available in powder, granular, flake, or liquid form.

4 Principle

By controlling the temperature, relative humidity, and condensation conditions in a confined space, an accelerated corrosion environment is created. The volatile rust preventive inhibitor and the metal test piece are placed in this environment without contact. The vapor corrosion inhibiting ability of the volatile rust preventive inhibitor is characterized by the corrosion state of the test piece surface.

5 Laboratory environmental conditions

The test shall be conducted in an environment of 20 °C ~ 30 °C and relative humidity not exceeding 80 %.

6 Reagents and materials

6.1 Sandpaper. 400-grit alumina sandpaper.

6.2 Anhydrous ethanol. GB/T 678, analytical grade.

6.3 Glycerol. GB/T 687, analytical grade.

6.4 Test water. GB/T 6682, grade 3.

6.5 Test piece. Meets the requirements of GB/T 699, a No. 10 steel column with a diameter of 16 mm and a height of 12 mm ~ 13 mm, with a flat-bottomed hole with a diameter of 10 mm and a depth of 10 mm drilled in the center of one end face; the other side is the test surface.

6.6 Rubber stoppers. No. 13 rubber stoppers, with a large face diameter of 68 mm ± 2 mm, a small face diameter of 54 mm ± 2 mm, and a height of 40 mm ± 2 mm; No. 9 rubber stoppers, with a large face diameter of 46 mm ± 2 mm, a small face diameter of 36 mm ± 2 mm, and a height of 31 mm ± 2 mm.

6.7 Aluminum tube. Outer diameter 16 mm, wall thickness 1.5 mm.

6.8 Glass container. Inner diameter 40 mm ± 2 mm, height 10 mm ~ 20 mm.

6.9 Petri dish. Diameter 120 mm.

6.10 Rubber tube. Inner diameter 16 mm, outer diameter 21 mm, length 15 mm ± 1 mm.

6.11 Silica gel desiccant. Meets the requirements of 5.1.5.1 in BB/T 0049-2021.

6.12 Wide-mouth bottle. Meets the requirements of GB/T 11414, volume 1000 mL,

inner diameter of the bottle mouth (ground joint size) 60 mm.

7.1 Drying oven. Meets the requirements of GB/T 30435, temperature fluctuation ±

2 °C.

7.2 Incubator. Meets the requirements of GB/T 28851, temperature fluctuation ± 1 °C.

7.3 Electronic balance. Sensitivity 0.1 mg.

8 Samples

The samples shall be representative. The samples shall be sealed and stored before the test. The samples shall be protected from contamination before and during the test.

9.1 Preparation of test pieces

Before the test, sand the surface of the test piece with sandpaper to make the surface flat, free of pits, scratches, or rust. Use tweezers to hold degreased cotton or degreased gauze and wash it three times in anhydrous ethanol. Then dry it with hot air before use.

Do not touch the prepared test piece with bare hands. Test pieces not immediately used in the test shall be stored in a desiccator containing silica gel desiccant and used within 8 h, or re-sanded and cleaned after 8 h. Each test requires 4 test pieces, one of which is for a blank test.

9.2 Treatment of test apparatus before use

Before assembling the test apparatus, wide-mouth bottles, rubber stoppers, thumbtacks, paper clips, glass containers, and petri dishes shall be carefully cleaned and rinsed twice with distilled water, then dried with dry air or hot air. Before assembly, the test apparatus was placed in the laboratory at ambient temperature to ensure its temperature matched the ambient temperature.

9.3 Assembly of test piece

9.3.1 Drill a 15 mm diameter through hole at the center of the end face of one No. 13 rubber stopper and two No. 9 rubber stoppers.

9.3.2 Press the test piece prepared as described in 9.1 into the through hole on the large face of one of the No. 9 rubber stoppers, ensuring the test surface is parallel to the large face of the No. 9 rubber stopper, with 2 mm to 3 mm of the test piece protruding from the large face of the No. 9 rubber stopper, as shown in Figure 1a).

9.3.3 Pass an aluminum tube through the center of the No. 13 rubber stopper, and insert No. 9 rubber stoppers into the protruding ends of the aluminum tube, with the small faces of the two No. 9 rubber stoppers facing the No. 13 rubber stopper. A rubber tube is pre-fitted between the small face of the No. 13 rubber stopper and the No. 9 rubber stopper containing the test piece. The aluminum tube inside the No. 9 rubber stopper containing the test piece shall be in contact with the concave surface of the test piece.

The large face of the No. 13 rubber stopper is in contact with the small face of the No.

9 rubber stopper without the test piece, as shown in Figure 1b). .....