Australian Standard®

Methods of test for metallic and related coatings

Method 3.11: Corrosion and related property tests — Chemical residue tests

1 SCOPE. This Standard sets out four alternative test methods for determining the presence of contaminants including rosin, on electroplated coatings used for engineering, decorative, or protective applications, and on printed circuit boards.

NOTE: Many electroplated items are used in electrical appliances and equipment. Contaminants from plating solutions or soldering processes can seriously affect the life and serviceability of these items.

2 PRINCIPLE. The methods are based on the following two principles:

(a) Electroplated items are agitated in water, or in an alcohol/water mixture, of known conductivity for a specified time. The increase in conductivity of the solution, caused by the extraction of ionic residues from the items, is used to assess the degree of contamination.

(b) Electroplated items are agitated in an alcohol/water mixture and the extract is evaporated to dryness. The residue is then tested for impurities.

3 REAGENTS. The following reagents are required:

(a) Deionized water having an electrical conductivity not greater than 150 μS/m.

(b) Absolute alcohol (≥190 proof).

(c) A solution of isopropyl alcohol (isopropanol) (AR grade) and deionized water in the following proportions:

(i) Isopropyl alcohol . . . . . 75 mL

(ii) Deionized water . . . . . 25 mL

(d) Acetic anhydride.

(e) Sulfuric acid, ρ_{20} 1400 kg/m^3 (approx. 50% V/V).

(f) Equilibrated water, conductivity not greater than 200 μS/m.

4 APPARATUS. The following apparatus is required:

(a) Laboratory glassware.

(b) Conductivity bridge, or other instrument, capable of measuring to an accuracy of 1 μS/m.

NOTE: Test equipment for determining conductivity is available commercially.

5 TEST METHODS.

5.1 Method A.

5.1.1 *Application*. This method is suitable for determining the presence of ionic contaminants on electroplated items.

5.1.2 *Procedure*. The procedure shall be as follows:

(a) Prepare equilibrated water by half-filling a glass bottle or a polyethylene bottle with deionized water.

(b) Immediately seal the bottle and shake vigorously for 2 min to equilibrate the water with atmospheric carbon dioxide.

(c) Measure the electrical conductivity of the solution.

NOTE: The equilibrated water will remain stable for about 1 week if the bottle is kept tightly sealed.

(d) Submerge the electroplated items in equilibrated water, allowing 100 mL of solution per each 30 cm^2 of plated surface area, and slowly agitate for 10 min.

(e) Measure the conductivity of the extract and compare this reading with the conductivity of unused equilibrated water measured just prior to the test.