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Superseding ARP1360

Detection of Chloride and Bromide Contamination of Electronic Equipment

1. SCOPE:

1.1 Purpose:

This recommended practice covers a test for detecting residual chlorides and bromides on electronic equipment.

1.2 The detailed procedures noted herein are based on laboratory and production experience and reflect those design practices and fabrication procedures, such as wave soldering, that require the use of activated flux for solder connections. This procedure has been used as a means of satisfying the intent of MIL-STD-454, Requirement 5, which permits the use of only R or RMA flux.

1.3 Application:

Primarily to establish qualitatively and quickly the effectiveness of cleaning processes used during production operations to remove chloride and bromide contamination.

2. PREPARATION OF SOLUTIONS:

2.1 Chloride and/or Bromide-Free Water:

Rinse water shall be distilled or deionized water having resistivity not lower than 1 megohm-cm, measured using an in-line cell.

2.2 Silver Nitrate Solution:

Shall be approximately 5% by weight silver nitrate in chloride/bromide-free water containing 1 mL of 70% nitric acid per liter of solution.

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3. PROCEDURE:

- 3.1 Rinse surfaces to be tested with water meeting the requirements of 2.1, adjusting quantity of water used as required to rinse desired amount of surface area. Quantity of rinse water should be kept to a minimum. Drops of rinse water may be used on small, localized areas.
- 3.2 Drain rinse water into suitable glassware that has been adequately rinsed with water in accordance with 2.1 or, in case small amounts of rinse water are used, transfer rinse water by means of clean pipette or dropper to a properly rinsed test tube or black spot plate.
- 3.3 Large quantities of rinse water may be reduced in volume to increase test sensitivity by boiling off excess water.
- 3.4 Add silver nitrate solution (see 2.2) at a ratio of one drop of reagent per 200 mL of rinse water. In a darkened room, beam a focusable spot light through the glass beaker containing the rinse solution. Examine for turbidity, using Tyndall effect by observing at right angles to the beam, against a dull black background. Rinse water shall be considered bromide and chloride-free if no turbidity appears within two minutes.
 - 3.4.1 The standard used for turbidity comparison shall be the source water used for rinsing, with the silver nitrate test solution added as in the chloride test, and contained in glassware or spot plate of the same diameter as used in the actual test.
 - 3.4.2 Because of the high sensitivity of this test when run in a darkened room, the exterior of the glassware must be clean in order to avoid light-scattering which could interfere with chloride haze observation.

4. NOTES:

- 4.1 The change bar (|) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this specification. An (R) symbol to the left of the document title indicates a complete revision of the specification, including technical revisions. Change bars and (R) are not used in original publications, nor in specifications that contain editorial changes only.
- 4.2 Processes involving use of solutions or compounds containing chlorides and/or bromides, such as soft soldering, etching, and plating, must be followed by adequate cleaning to ensure removal of chlorides and bromides. Electronic assemblies are subject to contamination during all phases of manufacturing and testing and must be properly cleaned prior to conformal coating and final assembly, after which further cleaning for the removal of ionic contamination is not possible. Subject testing can be used to determine the presence of contamination at various stages of assembly and thereby ensure chloride and bromide-free final assemblies.