

JEDEC STANDARD

Test Methods and Acceptance Procedures for the Evaluation of Polymeric Materials

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TEST METHODS AND ACCEPTANCE PROCEDURES FOR THE EVALUATION OF POLYMERIC MATERIALS

(From Board Ballot JCB-99-48A, formulated under the cognizance of the JC-13.5 Subcommittee on Hybrid, RF/Microwave, and MCM Technology.)

1 Scope

This Test Method covers the minimum requirements that should be in effect for the evaluation and acceptance of polymeric materials for use in industrial, military, space, and other special-condition products which may require capabilities beyond standard commercial microelectronics applications. It is not the intent of this Publication to specify a material, but to evaluate the material to assure that the quality and reliability of the microelectronic devices are not compromised. These materials shall be classified in two types as follows:

- a) Type I being electrically conductive.
- b) Type II being electrically insulative.

The user may elect to use test data from routine tests or evaluations for all or part of the user certification.

The test methods included as a part of this Publication are those which best address those physical, chemical, mechanical, and electrical properties of materials which can impact the reliability of these microelectronic devices. This Publication is not designed to be exhaustive of all techniques available as newer and more nearly absolute techniques are constantly being developed.

2 Applicable documents

The Standards and Publications listed below, of current issue, form a part of this Test Method to the extent specified herein.

MIL-STD-883, *Test Methods and Procedures for Microelectronics*

MIL-PRF-38534, *General Specification Hybrid Microcircuits*

MIL-PRF-38535, *General Specification for Integrated Circuits (Microcircuits) Manufacturing*

FED-STD-406, *Federal Test Method Standard for Test of Adhesives*

ANSI/NCSL Z540-1, *General Requirements for Calibration Laboratories, Measuring and Test Equipment*

ASTM C177, *Steady State Heat Flux Measurement and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus*

2 Applicable documents (cont'd)

ASTM C518, *Steady State Heat Flux Measurement and Thermal Transmission Properties by Means of the Heat Flowmeter Apparatus*

ASTM D150, *AC Loss Characteristics and Dielectric Constant of Solid Electrical Insulating Materials*

ASTM D257, *DC Resistance or Conductance of Insulating Materials*

ASTM D972, *Evaporation Loss of Lubricating Greases and Oils*

ASTM D1002, *Apparatus Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tensile Loading (Metal to Metal)*

ASTM D3574, *Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Forms*

ASTM D3386, *Coefficient of Linear Thermal Expansion of Electrical Insulating Materials by Thermogravimetric Method*

ASTM D3850, *Rapid Thermal Degradation of Solid Electrical Insulating Materials by Thermogravimetric Method (TGA)*

ASTM E1461, *Thermal Diffusivity of Solids by the Flash Method*

JEP114, *Guidelines for Particle Impact Noise Detection (PIND) Testing, Operator Training and Certification*

JESD22-A104, *Temperature Cycling*

JESD22-A106, *Thermal Shock*

JESD22-B103, *Variable Frequency Vibration*

JESD22-B104, *Mechanical Shock*

3 Requirements

3.1 Apparatus

Suitable measurement equipment necessary to determine compliance with the requirements of the applicable acquisition document and other apparatus as required in the referenced test methods.

3.2 Material acquisition specification

The microcircuit manufacturer shall prepare an acquisition specification describing the detailed electrical, mechanical, chemical, and thermal requirements for the polymeric material to be acquired. The requirements shall not be less stringent than those imposed by this method, but may be increased to reflect the specific parameters of a particular material or requirements of a particular application.

3.3 Certificate of compliance

The material supplier shall provide upon the user's request a certificate of compliance for each polymeric order. This certificate shall contain the actual test data for the supplier's testing as prescribed in this Publication.

3.4 Evaluation procedures

Evaluation procedures for polymeric materials shall be performed as specified in 4.1 through 4.18.

3.5 Properties of uncured materials

3.5.1 Materials

The components of a polymeric material and/or system shall be examined in accordance with Table 1 and 4.2 and shall be uniform in consistency and free of lumps or foreign matter when examined in film, liquid or other acceptable form. Any filler shall remain uniformly dispersed and suspended during the required pot life (see 4.4). the electrically conductive fillers used in type I materials shall be gold, silver, alloys of gold or silver, or other precious metals.

3.5.1.1 Encapsulating compounds

Encapsulating compounds are liquid material and are to tested in accordance with the requirements in Table 1.

3.5.1.2 Molding compounds

Molding compounds as used in microelectronic devices are normally solid material and are to be tested in accordance with MIL-PRF-38535.