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EIA STANDARD

TP-31F

Humidity Test Procedure for Electrical Connectors and Sockets

EIA-364-31F

(Revision of EIA-364-31E)

January 2019



Electronic Components Industry Association

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(From Standards Proposal No. 5401, formulated under the cognizance of the EIA CE-2.0 Committee on National Connector and Socket Standards).

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TEST PROCEDURE No. 31F
HUMIDITY TEST PROCEDURE
FOR
ELECTRICAL CONNECTORS AND SOCKETS

(From EIA Standards Proposal No. 5401, formulated under the cognizance of the EIA CE-2.0 Committee on National Connector and Socket Standards, and previously published as EIA-364-31E.)

1 Introduction

1.1 Scope

The purpose of these tests is to evaluate materials and/or connector/socket assemblies as they are impacted by the effects of high humidity and heat. These tests are intended to be non-condensing.

1.2 Object

1.2.1 Steady state humidity

This test imposes a vapor on the material under test that constitutes the force behind the moisture migration and penetration. Hygroscopic materials are sensitive and deteriorate rapidly under humidity conditions. Absorption of moisture may result in swelling that would destroy functioning utility, and cause loss of physical strength and changes in other important mechanical properties. Degradation of electrical properties may also occur. This is a static environment.

1.2.2 Humidity – temperature cycling tests

1.2.2.1 The addition of temperature cycling provides the opportunity for air exchanges within the test specimen, inducing corrosion processes, and the introduction of moisture into partially sealed test specimens. This condition imposes a vapor pressure on the specimens which constitutes the major force behind the moisture migration and penetration. This is a dynamic environment.

1.2.2.2 Measurements made under high humidity conditions may reflect the peculiar conditions under which the readings were made, and should be compared only to initial readings when careful analysis indicate that such comparison is valid and applicable.

1.3 Definition

Room ambient is defined as a temperature of 15 °C to 35 °C at a relative humidity 20% to 80%.

2 Test resources

2.1 Equipment

The test chamber and accessories shall be constructed and arranged in such a manner as to avoid condensate dripping on the test specimen. A suitable open screen tray or rack shall be provided to ensure that the specimen shall be exposed to circulating air. Specimens shall not be subjected to radiant heat from chamber conditioning processes. The chamber shall be trap-vented to the atmosphere to prevent the buildup of total pressure. When readout charts are used, they shall be capable of being read with a resolution within 0.6 °C (1 °F). The relative humidity shall be controlled within $\pm 3\%$, and the temperature within ± 3 °C (± 5 °F). Steam, distilled, demineralized, or deionized water shall be used to obtain the specified humidity. No rust or corrosion contaminants shall be imposed on the test specimen by the test facility.

3 Test specimens

3.1 Description:

A test specimen shall consist of individual plugs, receptacles, or mated assemblies including accessories, shells, heat sinks, etc. that are normally part of the assembly.

3.2 Preparation:

The specimens, when specified, shall be wired using the contacts, wire type, size and, if applicable, sealing plugs. When required, and as applicable, mounting to test boards shall be indicated. Moisture absorption and temperature ratings should be reviewed when selecting test board material. Conformal coating may be used.

4 Pretest procedures

4.1 Mounting (applies to all procedures unless otherwise specified)

The specimens shall be placed in the test chamber in their normal application orientation, unless otherwise specified. They shall be so positioned that they do not contact each other and shall be minimum of 5 centimeters (2 inches) from each other and any chamber surface. There shall be no drip loops in wires.

4.2 Initial measurements (applies to all procedures)

Unless otherwise specified, prior to any initial preconditioning, the pre exposure measurements as specified shall be performed at room ambient conditions.