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EIA STANDARD

TP-105

Altitude – Low Temperature Test Procedure for Electrical Connectors

EIA-364-105

APRIL 1999

ELECTRONIC INDUSTRIES ALLIANCE

**Electronic Components, Assemblies, Equipment & Supplies
Association**



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This standard is based upon the major technical content of International Electrotechnical Commission standard 512-6, test 11b, combined/sequential cold, low air pressure and damp heat 1984. It conforms in all essential respects to this IEC standard.

This Standard does not purport to address all safety problems associated with its use or all applicable regulatory requirements. It is the responsibility of the user of this Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

(From Standards Proposal No. 4302, formulated under the cognizance of the CE-2.0 National Connector Standards Committee.)

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TEST PROCEDURE No. 105
ALTITUDE - LOW TEMPERATURE TEST PROCEDURE
FOR
ELECTRICAL CONNECTORS

(From EIA Standards Proposal No. 4302, formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards.)

1 Introduction

1.1 Scope

This standard establishes a test method to simulate actual service usage by inducing low temperatures, and applying the test voltage at simulated altitudes.

2 Test resources

2.1 Equipment

2.1.1 Altitude chamber

The altitude test chamber shall consist of a suitably sealed chamber with necessary vacuum pump equipment to maintain a reduced pressure of mercury as required to simulate at least 33528 meters (110,000 feet) of altitude [765 pascals (5.74 torrs)]. The chamber shall have provisions for electrical connections.

3 Test specimen

3.1 Description

The test specimen shall consist of a fully assembled, mated electrical connector with the specified number of contacts. Proper wire type, size, and preparation, sealing plugs, and other hardware shall be as specified. Connectors to be tested shall be free from foreign matter that could affect their operation. It shall be verified that wires provided for connection to connector being tested are electrically connected.

3.2 Preparation

When cleaning is specified, the assembled connector shall be cleaned with a suitable solvent, dipped in distilled water while still moist with solvent, and conditioned in an air circulating oven at $35\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for 2 hours. When removed from the oven, parts shall be cooled in ambient conditions for 1/2 hour before the test. When specified, special preparations or conditions such as special test fixtures, reconnections, grounding, and isolation shall be required.

4 Test procedure

4.1 Altitude-low temperature

Wired, mated assembled connectors shall be conditioned in a dry oven at a temperature of $50\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for a minimum of 8 hours. The connectors shall be wired in a continuous series circuit and placed in a chamber that will simulate actual service usage with strain relief clamps installed.

4.1.1 Reduce the chamber internal temperature to $-54\text{ }^{\circ}\text{C} +0\text{ }^{\circ}\text{C}$, $-4\text{ }^{\circ}\text{C}$ and maintain until the connector stabilizes.

4.1.2 Reduce the chamber internal pressure to a maximum of 2666 pascals (20 torrs).

4.1.3 Maintain the above temperature and pressure for 1 hour minimum.

4.1.4 Unless otherwise specified, apply 625 V rms, 60 Hz between the connector shell and all contacts for 1 minute minimum. A disruptive discharge occurring with the voltage applied 60 seconds or less shall be identified as a failure.

4.1.5 With the test voltage removed, increase the chamber internal pressure and temperature to standard ambient conditions and allow the connector to stabilize.

4.1.6 With the connector mated and the series circuit opened, subject the connectors to a dielectric withstanding voltage test in accordance with EIA-364-20, and an insulation resistance test in accordance with EIA-364-21. The test voltage shall be applied for 5 seconds minimum.

5 Details to be specified

The following details shall be specified in the referencing document:

- 5.1 Wire type and size; see 3.1
- 5.2 Number of contacts and sealing plugs; see 3.1
- 5.3 Wire end preparation (location in chamber); see 3.1
- 5.4 Connector accessories, support hardware to be installed on connector specimen during test; see 3.1
- 5.5 Connector specimen preparation; see 3.2
- 5.6 Test voltages for altitude, dielectric withstanding voltage, maximum leakage current, and test voltage application time, if other than 5 seconds; see 4.1

6 Documentation

Documentation shall contain the details specified in clause 5, with any exceptions, and the following:

- 6.1 Title of test
- 6.2 Specimen description include fixture, if applicable
- 6.3 Test equipment used, and date of last and next calibration
- 6.4 Test procedure
- 6.5 Values and observations
 - 6.5.1 Chamber pressure, temperature and duration of each cycle
 - 6.5.2 Insulation resistance values and identity of each contact pair in test specimen
 - 6.5.3 Dielectric withstanding test results and identity of each contact pair specimen
 - 6.5.4 Connector visual examination
- 6.6 Name of operator and date of test

EIA Document Improvement Proposal

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