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EIA STANDARD

TP-36B

DETERMINATION OF GAS-TIGHT CHARACTERISTICS TEST PROCEDURE FOR ELECTRICAL CONNECTORS, AND OR CONTACT SYSTEMS

EIA/ECA-364-36B
(Revision of EIA-364-36A)

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Electronic Components, Assemblies & Materials Association

THE ELECTRONIC COMPONENTS SECTOR OF THE ELECTRONIC INDUSTRIES ALLIANCE



EIA/ECA-364-36B

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(From Standards Proposal No. 5084-A formulated under the cognizance of the CE-2.0 National Connector Standards Committee.

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TEST PROCEDURE No. 36B

DETERMINATION OF GAS-TIGHT CHARACTERISTICS TEST PROCEDURE
FOR
ELECTRICAL CONNECTORS, AND OR CONTACT SYSTEMS

(From EIA Standards Proposal No. 5084 formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards, and previously published in EIA-364-36A.)

1 Introduction

1.1 Scope

This procedure is to determine the integrity of contacting surfaces (at the mating and/or termination areas) by assessment of the gas tight characteristics of the contacting surfaces. The gas tight characteristic simulates the ability of the contacting surfaces to prevent harsh environments from penetrating between them and forming oxides and/or films that will degrade electrical performance. It is recommended for contacts and/or connector (socket) assemblies directly exposed to outside environments or those that are in uncontrolled environments (internal or external to electronic packaging).

CAUTION—The method, as described herein, utilizes nitric acid vapors. This procedure may involve hazardous materials, operations and equipment. This procedure 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 the standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

2 Test Resources

2.1 Equipment

2.1.1 Nonreactive material of applicable size having the capability of being sealed.

2.1.2 Test equipment as defined in EIA-364-23, low level contact resistance.

2.2 Material

2.2.1 Nitric acid, concentrated, AR grade

3 Test specimen

3.1 Description

The test specimens to be evaluated shall be identified by the test specimen classes indicated in table 1.

Table 1 – Test specimen classes

Class	Description
I	Mated pair of contacts not assembled to their plastic housing (applies to removable type contacts only)
II	Mated pair of contacts assembled to their plastic housing.
III	Crimp terminations not assembled to their plastic housing, but with applicable conductors crimped in place.
IV	Press fit terminations (assembled to printed circuit boards).
V	IDC (Insulation Displacement Contacts) or IPC (Insulation Piercing Contacts) terminations (assembled to housings and conductors).
VI	IDC or IPC terminations assembled to conductors, but not assembled to their plastic housings (applies to removable type contacts only).

NOTES

- 1 For evaluation of mated connectors (sockets), class II shall be specified.
- 2 Class III, IV V, and VI shall be specified when terminations only are to be evaluated.
- 3 Class I shall be specified when unterminated contacts only are to be evaluated.
- 4 Nonremovable type contacts shall be tested as class II or V only.

3.2 Preparation

3.2.1 Unless otherwise specified in the referencing document, the specimens shall be cleaned prior to exposure. In the event that lubricated contacts are to be tested, they shall be tested in the “as received” condition and cleaning shall not be performed.

3.2.2 Cleaning shall be performed by using a solvent that will remove organic films such as lubricants, fingerprints, etc.

3.2.3 Material that absorbs vapors (e.g., paper tags, string, tape) shall be removed prior to cleaning and placing specimens into the test chamber

3.2.4 The specimens shall be prepared for monitoring of low level contact resistance in such a manner that the mating or termination surfaces being tested shall not be disturbed while measurements are being performed.

3.2.5 In the event of test lead attachment via soldering, all specimens shall be cleaned to remove residual flux prior to exposure, see 3.2.2 and 3.2.3.

3.2.6 Test specimen may be placed on a suitable holding fixture material as long as the mating or inert portion of the specimen will be directly exposed to the test medium.

4 Test procedure

4.1 The initial low level contact resistance shall be measured and recorded in accordance with EIA-364-23.

4.2 Upon completion of 4.1. the specimens shall be handled in such a manner as not to disturb the mating or termination surfaces until completion of the final measurement.

4.3 Prior to and after each test exposure, test chambers and other equipment shall be thoroughly cleaned and dried to remove any contaminate or residue remaining from past use.

4.4 Concentrated nitric acid, AR grade, shall be placed in the test chamber of sufficient volume to result in saturation of the test chamber. The conditions shall be room ambient.

CAUTION— All exposure shall be performed under an exhaust hood. Chemical goggles completely protecting the eyes shall be worn. Normal precautions in handling corrosive chemicals shall be observed. It is recommended that the exhaust hood be of such a design as to minimize transverse air currents to prevent purging of the test chamber during the test.

4.5 Allow the solution to saturate the test chamber for a minimum of 15 minutes.

4.6 The test specimens shall be placed in the test chamber and exposed for 60 minutes \pm 5 minutes.

4.7 The test specimens shall not be closer than 25 millimeters (1 inch) from the wall of the test chamber and not closer than 76 millimeters (3 inches) from the solution surface.

4.8 After exposure, the specimens shall be removed from the test chamber and oven dried at 50 °C for a minimum of 1 hour.

4.9 Within 60 minutes of drying, the final low level contact resistance shall be measured and recorded in accordance with EIA-364-23 (test specimen temperature shall be at room ambient).

5 Details to be specified

The following details shall be specified in the referencing document:

- 5.1 The number of specimens to be tested and description
- 5.2 Test current and open circuit voltage
- 5.3 Specimen class (see table 1)

6 Test 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 and quantity
- 6.3 Test equipment used, and date of last and next calibration
- 6.4 If specimens are cleaned or uncleaned
- 6.5 Results including defects and location
- 6.6 Room ambient temperature and humidity
- 6.7 Date of test and name of operator

Annex

A Informative

A.1 Discoloration of contacts shall not be construed as failure. Determination of pass/fail conditions shall be established by an analysis of the resistance observations.

A.2 The environment used should not be construed as typical of operating environments. It is considered an “overkill” environment that is indicative of the gas tight characteristics of contact systems and/or their terminations.

A.3 Other test procedures are “under consideration” that evaluate connectors for long-term performance characterization under harsh environments. The tests described herein are indicative of how a connector or contact system may perform in a severe environment.

A.4 It is recommended that a 50 millimeters (2 inches) to 76 millimeters (3 inches) length of bare copper wire be placed with the Specimens to serve as an indicator that proper reactions occur (bare copper wire will have a greenish or black discoloration).

A.5 The test shall not be performed when room ambient conditions exceed 30 °C and or the relative humidity exceeds 60%.

A.6 The test should be performed in a continuous and uninterrupted manner, within the time constraints as specified in the referencing document.

EIA Document Improvement Proposal

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