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EIA STANDARD

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TP-09C

Durability Test Procedure for Electrical Connectors and Contacts

EIA-364-09C

(Revision of EIA-364-09B)

JUNE 1999

ELECTRONIC INDUSTRIES ALLIANCE

Electronic Components, Assemblies, Equipment & Supplies Association

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(From Standards Proposal No. 4139, formulated under the cognizance of the CE-2.0 National Connector Standards Committee.)

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TEST PROCEDURE No. 09C

DURABILITY TEST PROCEDURE FOR ELECTRICAL CONNECTORS AND CONTACTS

(From EIA Standards Proposal No. 4139, formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards, and previously published in EIA-364-09B.)

1 Introduction

1.1 Scope

This standard establishes a method to determine the effects caused by subjecting electrical connectors or contacts to the conditioning action of mating and unmating, simulating the expected life of the connectors.

1.2 Object

Durability cycling with a gage or blade is intended only to produce mechanical stress. Durability performed with mating components is intended to produce both mechanical and wear stress.

2 Test resources

2.1 Equipment

2.1.1 Mating components or test blades for edgecard connectors shall be used, as indicated in figure 1, unless otherwise specified in the referencing document.

2.1.2 Clamps, jaws, or other mounting means to hold connectors, contacts, or test gage in proper alignment throughout the test allowing one-half of system to free float, if specified in the referencing document.

2.1.3 Automatic or semi-automatic tester to mate and unmate the connector or contact at the specified rate. Unless otherwise specified in the referencing document, sinusoidal motion shall be used.

Note — Manual hand cycling of the connectors or contacts is permitted if specified in the referencing document. Care shall be taken to ensure consistent and accurate orientation and alignment.

3 Test specimen

3.1 Description

The test specimen shall include all applicable guide, keying, and engaging hardware, and shall be terminated with appropriate wire or cable.

3.2 Preparation

3.2.1 Specimens shall be mounted in their normal operating position by the intended mounting means. Normal care shall be taken in the mounting procedure to prevent binding. Mechanisms such as slip clutches may be used to prevent damage from the application of excessive loads to the specimen when tests are performed mechanically.

3.2.2 Connectors are sometimes supplied with a lubricant applied by the manufacturer. Care should be exercised to ensure that this lubricant is not removed prior to the test and is not contaminated by dirt, foreign material, etc. Additional lubrication beyond that normally present at the time of manufacture is not permitted unless otherwise specified in the referencing document.

3.3 Fixturing

Unless otherwise specified in the referencing document, the coupling mechanism of connector assemblies so equipped, shall be fully actuated to simulate mating and unmating of the connectors or contacts as in service.

4 Test procedure

4.1 Alignment

Unless otherwise specified, the specimen shall be allowed to self-align in the test machine prior to securing in the test fixtures; securing of test fixture shall not affect self-alignment. After mounting, fully mate and unmate for the number of cycles specified in the referencing document.

4.2 Cycle rate

Unless otherwise specified in the referencing document, the cycle rate per hour shall be:

— Automatic equipment: 500 ± 50
— Manual mating/unmating: 300 maximum
— Automatic, Circular Connectors: 250 to 300

4.3 Electrical load

No electrical load shall be applied to the specimens during the test, unless otherwise specified.

4.4 Inspection or test

At the intervals specified in the referencing document, inspections or tests may be performed.

CAUTION — Disturbing the specimens for intermediate inspection or measurements could affect subsequent results.

4.5 Measurements

4.5.1 Mating and unmating forces, contact resistance, shell resistance, insulation resistance, dielectric withstanding voltage, contact retention, and sealing tests are examples of measurements that may be made prior to, during or after testing and that would show the effects of durability.

4.5.2 The connectors or contacts shall be examined to determine the effects of durability cycling that would include the following:

4.5.2.1 Wear on coupling device.

4.5.2.2 Loose or worn rivets; where applicable.

4.5.2.3 Uneven wear, galling, removal of plating on contacts and shells.

4.5.2.4 Free metal chips on face of inserts.

4.5.2.5 Displaced, bent or broken contacts.

4.5.2.6 Inability to properly mate and unmate.

4.5.2.7 Pierced resilient inserts and broken or chipped hard dielectrics.

4.5.2.8 Mechanical operational characteristics, including effectiveness of keys and polarizing systems.

5 Details to be specified

The following details shall be specified in the referencing document:

5.1 Number of cycles

5.2 Lubrication, if other than as specified

5.3 Observations or measurements to be made before, during and after cycling

5.4 Cycling rate, if other than as specified in 4.2

5.5 Manual or automatic cycling

5.6 Periodic inspection, if required

5.7 Number of specimens to be tested

5.8 Whether or not coupling devices are to be removed

5.9 Failure criteria

6 Test documentation

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

6.1 Title of test

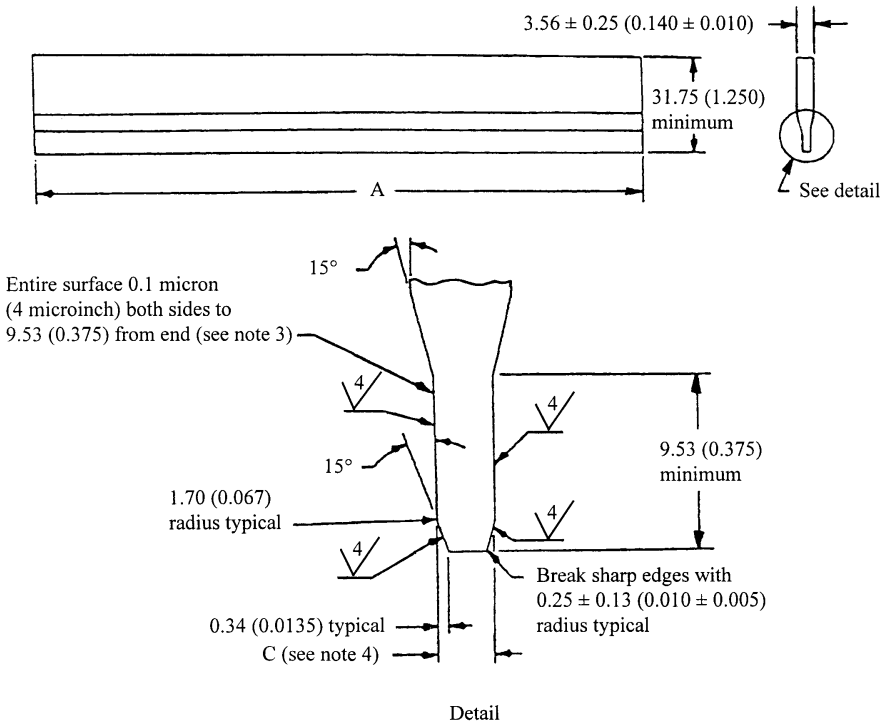
6.2 Specimen description

6.3 Test equipment used, and date of last and next calibration

6.4 Test procedure, including test method, cycling rate and number of cycles

6.5 Values and observations; visual examination

6.6 Operator name and date of test



Detail

Size	C ± 0.003 (0.0001)
2	1.778 (0.0700
3	2.616 (0.1030)
4	3.429 (0.1350)

Style	A ± 0.25 (0.010)
06	27.18 (1.070)
10	41.88 (1.649)
12	51.08 (2.011)
15	62.87 (2.475)
18	74.73 (2.942)
22	90.55 (3.565)
28	114.35 (4.502)
30	122.22 (4.812)
36	120.57 (4.747)
43	171.98 (6.771)

NOTES

1 Dimensions in parentheses are in inches.
2 Unless otherwise specified, tolerance is ± 0.13 mm for two place metric dimensions and (0.005 in) for three place inch dimensions.
3 Only the working surfaces designated 4 shall be finished.
4 0.05 mm (0.002 in) TIR warpage permitted for full length of dimension A.
5 Inch equivalents are based upon 25.4 mm = 1.00 in.

Figure 1 - Test blade

Annex A

A Normative

A.1 Acceptable criteria

Acceptable criteria shall be established in terms of one, or any combination, of the following:

A.1.1 Total mating and unmating force.

A.1.2 Individual contact separation and engaging force.

A.1.3 Maximum allowable change in contact resistance.

NOTE — Not applicable to gage cycled specimens.

A.1.4 Degrees and criticality of wear or component damage resulting from this and succeeding environmental exposure tests.

EIA Document Improvement Proposal

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