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EIA STANDARD

EIA-364-104A

TP-104A

Flammability Test Procedure for Electrical Connectors

EIA-364-104A

(Revision of EIA-364-104)

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Electronic Components, Assemblies & Materials Association

ELECTRONIC COMPONENTS, ASSEMBLIES & MATERIALS ASSOCIATION
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This standard is based upon the major technical content of International Electrotechnical Commission standard 512-9, test 20a, flammability, needle-flame; 1992-04. 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. 4782-R, formulated under the cognizance of the CE-2.0 National Connector Standards Committee.)

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TEST PROCEDURE No. 104A

FLAMMABILITY TEST PROCEDURE FOR ELECTRICAL CONNECTORS

(From EIA Standards Proposal No. 4782-R, formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards, and previously published in EIA 364 as TP-104)

1 Introduction

1.1 Scope

This standard establishes a test method to determine the connector's resistance to burning when exposed to a flame. Burning resistance is defined as the ability to not support or propagate combustion after an ignition source is removed. This test evaluates the time it takes for the flame of a burning connector to extinguish after removal of the applied flame, and the possibility of the spread of burning, as caused by burning droplets and after-glow. This test does not simulate any actual service application. It is intended to test a connector by itself in a condition that can readily be duplicated in any test laboratory.

2 Test resources

2.1 Equipment

2.1.1 Test chamber

A test chamber shall be used that is protected from drafts but provided with means for venting fumes at the top and admitting an adequate supply of fresh air at the bottom. A chemistry hood with the exhaust fan turned off, or a metal box about 0.6 meter (2 feet) wide by 0.9 meter (3 feet) high by 0.6 meter (2 feet) deep, with an open front or a viewing window and holes for air intake and venting of fumes may be used.

2.1.2 Burner

A Bunsen or Tirrill, or equivalent burner with a 6.3 millimeters (0.25 inch) inlet, a nominal bore of 9.6 millimeters (0.38 inch) , and a height of approximately 102 millimeters (4 inches) from the primary inlets to the top. The tube shall not be equipped with end attachments such as a stabilizer.

2.1.3 Stand

A ring stand with clamps, or the equivalent, for horizontal and vertical positioning of the specimen and the wire gauze. Mounting clamps shall be located so as not to act as heat sinks.

2.1.4 Timing device

Stop watch or other suitable timing device.

2.1.6 Conditioning environment

Conditioning room or chamber capable of being maintained at 23 °C ± 2 °C (73 °F ± 3.6 °F) and a relative humidity of 45% to 55%.

2.2 Material

2.2.1 Wire gauze

A 20 mesh (20 openings per 25.4 millimeters (1 inch)), 0.43 millimeter (0.017 inch) diameter iron wire gauze, 127 millimeters (5 inches) square and/or a piece of flammable material, a layer of untreated surgical cotton, shall be positioned centrally and horizontally 305 millimeters (12 inches) below the bottom of the specimens so that any burning particles or material dripping from the specimen will fall on the flammable material.

2.2.2 Gas supply

A supply of technical grade methane gas with suitable regulator and meter for uniform gas flow (natural gas having a heat content of approximately, 37×10^6 J/m^3 = 1000 Btu/ft^3 has been found to provide similar results).

3 Test specimen

3.1 Description

A test specimen shall consist of an unmated connector with unwired contacts assembled. The test procedure requires a minimum of three test specimens.

3.2 Preparation

Specimens shall be thoroughly cleaned of oil, grease, dirt, and foreign material using a noncombustible solvent. The specimens are to be conditioned for at least 48 hours at 23 °C ± 2 °C (73 °F ± 3.6 °F) and a relative humidity of 45% to 55% to establish moisture equilibrium prior to testing.

4 Test procedure

Unless otherwise specified, the following applicable test procedure shall be complied with.

4.1 Unless otherwise specified, testing shall be performed at standard ambient conditions.

4.2 The test specimen shall be held by a mounting clamp within the chamber, with the wiring face vertical and its longest dimension parallel to, and a minimum of 152 millimeters (6 inches) from, any side of the chamber.

4.3 A piece of flammable material shall be positioned as specified in 2.1.3.

4.4 The flame produced by the burner indicated in 2.1.2 shall be not less than 843 °C (1,550 °F).

4.5 The burner flame shall be applied in accordance with the test conditions of table 1, centrally at the lower edge of the test specimen to the wiring face (back) for one set of test specimens and to the mating face (front) for another set of test specimens. It shall be positioned perpendicular to the specimen, and at an angle of 30 degrees to the vertical plane of the specimen. The flame shall not impinge on the clamps or other devices that hold the test specimen, unless these devices are normally used in service to support the specimen. The burner shall be positioned from the lower edge of the specimen so that the end of the burner tube is 1/2 the height of the flame; see figure 1.

Table 1 - Test conditions

Condition	Flame height	Flame application time, seconds	Number of applications of flame
A	38 mm (1.50 in)	60	1
B	38 mm (1.50 in)	30	1
C	19 mm (0.75 in)	10	1

4.6 Unless otherwise specified, the following shall be the criteria for failure:

4.6.1 Burning after removal of applied flame shall extinguish within the time specified in table 2.

4.6.2 After-glow shall extinguish within time specified in table 2 after burning ceases.

4.6.3 There shall be no dripping that shall cause the flammable material to ignite.

4.6.4 There shall be no violent burning or explosive type fire.

Table 2 - Flame and after-glow extinguishing time

Conditions	Flame extinguishing time, seconds	After-glow extinguishing time, seconds
A	3	3
B	15	15
C	Flame extinguish time plus after-glow extinguish time shall be less than or equal to 30 seconds	

5 Details to be specified

The following details shall be specified in the referencing document:

5.1 Test condition from table1; see 4.5

5.2 Flame and after-glow extinguishing time, if other than the time specified in table 2; see 4.6

6 Documentation

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

6.1 Title of test

6.2 Test condition and results of test procedure; see table 1

6.3 Values and observations

6.3.1 Time in seconds of burning of visible flame on the specimen after removal of applied flame

6.3.2 Time in seconds of after-glow after extinction of flame

6.3.3 Any dripping or falling of particles (burning or not burning) onto the flammable material or ignition of the flammable material

6.3.4 Any violent explosion, sputtering, or other unusual type burning

6.4 Name of operator and date of test

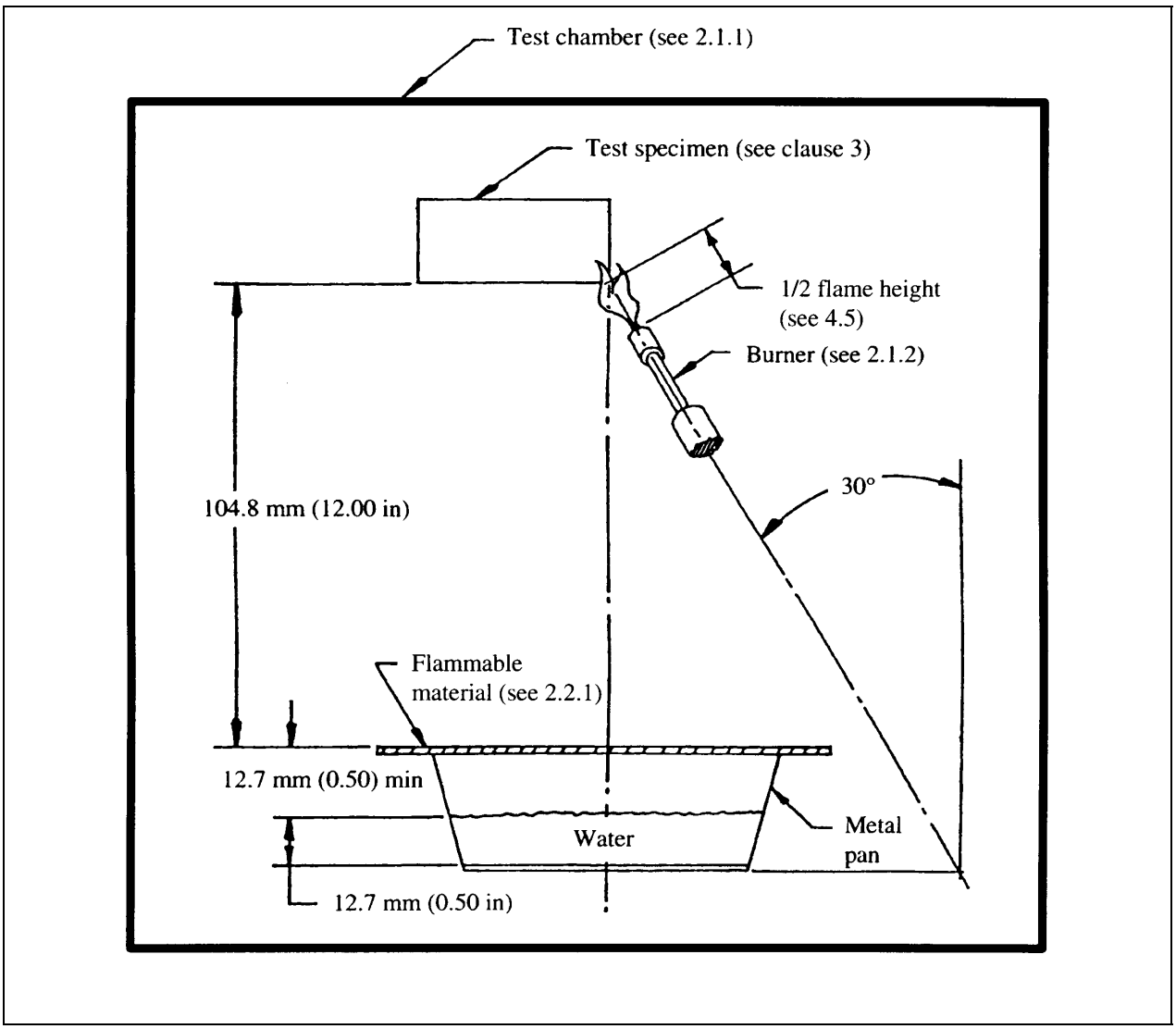

Figure 1 - Flammability test setup

EIA Document Improvement Proposal

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