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EIA STANDARD

TP-14B

Ozone Exposure Test Procedure For Electrical Connectors

EIA-364-14B

(Revision of EIA-364-14A)

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ELECTRONIC INDUSTRIES ALLIANCE

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



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EIA-364-14B

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(From Standards Proposal No. 4305, formulated under the cognizance of the CE-2.0 National Connector Standards Committee.)

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Engineering Department
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TEST PROCEDURE No. 14B
OZONE EXPOSURE TEST PROCEDURE
FOR
ELECTRICAL CONNECTORS

(From EIA Standards Proposal No. 4305, formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards, and previously published in EIA-RS-364-14A.)

1 Introduction

1.1 Scope

This standard establishes a test method to assess the ability of connectors to withstand the effects of controlled amounts of ozone and still maintain effective environmental protection.

CAUTION — Since ozone is a toxic gas, care shall be exercised when using it to perform the testing called out herein.

2 Test resources

2.1 Equipment

The test equipment shall be as follows and in accordance with ASTM-D-1149-64.

2.1.1 Test chamber

The ozone test chamber shall conform to the following requirements:

2.1.1.1 The test chamber shall be constructed of a material with minimal reaction to ozone.

2.1.1.2 The minimum chamber volume shall be 0.14 cubic meter (5 cubic feet).

A means for generating and controlling an air-ozone stream shall be provided. The generating source shall be located outside the chamber. The air can be drawn either directly from the laboratory or from a compressed air supply. In either case, adequate filtration of foreign matter from the stream shall be provided. If the ozone generating source is a silent arc discharge, the air supplied to the ozone generator shall be pre-dried to $-51\text{ }^{\circ}\text{C}$ ($-60\text{ }^{\circ}\text{F}$) dew point or lower to prevent the production of nitric acid. The air-ozone stream shall be introduced into the chamber in such a manner that stratification of ozone is prevented.

2.1.1.3 The air-ozone replacement rate or throughput rate shall be of a magnitude such that no appreciable reduction in ozone concentration results from the introduction of test specimens. This minimum replacement rate will vary with the ozone concentration, temperature, number of test specimens introduced, and their reaction with ozone. In chambers possessing control or the replacement rate at the location of the test specimen, no minimum air-ozone rate need to be defined. For many chambers operating under normal conditions (approximately 100 ppm to 150 ppm (part per million) and with the ozonated replacement rate of a three-fourth change per minute is an acceptable minimum rate. For thorough and accurate work especially under unusual conditions, the minimum or safe replacement rate should be determined.

2.1.1.4 A means of providing adequate internal circulation shall be provided. The air-ozone velocity in the chamber shall be at least 0.6 meter per second (2 feet per second).

NOTE — Where it is not possible to obtain such velocities, the installation of a 1700 rpm electric motor and fan blade of approximately 15 cm (6 in) diameter and 20 to 30 degree pitch will produce such air velocities. The motor itself shall be used with an appropriate seal.

2.1.1.5 A means of controlling the temperature of the chamber from ambient to $70\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F} \pm 9\text{ }^{\circ}\text{F}$) shall be provided. The temperature regulations shall be capable of maintaining the test temperatures.

2.1.1.6 A glass window or glass front door shall be provided with the chamber for visual inspection.

2.1.1.7 Chamber exhaust air, containing ozone, shall be vented out of the test area.

2.1.2 Ozone generator

Mercury vapor lamps, open mercury arc lamps, or silent arc discharge type generators may be used as the source for generating ozone. The ozone concentration can be controlled by means of a variable transformer on the input to the generators.

2.1.3 Ozone measuring devices

Ozone measuring devices shall be capable of measuring the concentration within a tolerance of plus or minus 3%.

3 Test specimen

3.1 Description

A test specimen shall consist of one mated and wired plug and receptacle, unless otherwise specified in the referencing document.

3.2 Preparation

All contacts shall be wired and connectors shall be mated and suspended in an ozone chamber to allow exposure to ozone concentration.

4 Test procedure

4.1 Conditions

Unless otherwise specified, each test specimen and test equipment shall be stabilized at standard ambient conditions. Unless otherwise specified, each test specimen shall then be subjected to an ozone concentration of 100 ppm to 150 ppm by volume for 2 hours.

4.2 Failures

Potential modes of failure resulting from this test are as follows:

4.2.1 Loosening or breaking of parts.

4.2.2 Degradation of elastomers.

4.2.3 Insert bonding failure.

4.2.4 Excessive swelling of resilient materials.

4.2.5 Damage to interface seals.

5 Details to be specified

The following details shall be specified in the referencing document:

- 5.1 The number of specimens to be tested
- 5.2 The ozone concentration and time if other than specified herein
- 5.3 Acceptance criteria after ozone exposure
- 5.4 Test conditions if other than specified in clause 4
- 5.5 Mating conditions if other than specified in 3.1

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 including fixturing, 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 Record ozone concentrations
 - 6.5.2 Visual and mechanical observations
- 6.6 Name of operator and date of test

EIA Document Improvement Proposal

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