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# **EIA STANDARD**

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**TP-100**

**Marking Permanence Test Procedure  
for Electrical Connectors and Sockets**

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**EIA-364-100**

**APRIL 1999**

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**ELECTRONIC INDUSTRIES ALLIANCE**

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



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**EIA-364-100**

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(From Standards Proposal No. 4151-A, formulated under the cognizance of the CE-2.0 National Connector Standards Committee.)

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## CONTENTS

| Clause |                                       | Page |
|--------|---------------------------------------|------|
| 1      | Introduction .....                    | 1    |
| 1.1    | Scope .....                           | 1    |
| 1.2    | Object .....                          | 1    |
| 1.3    | Safety .....                          | 1    |
| 2      | Test resources .....                  | 2    |
| 2.1    | Equipment .....                       | 2    |
| 2.2    | Material .....                        | 2    |
| 2.2.1  | Class 1 solvent .....                 | 2    |
| 2.2.2  | Class 2 solvent .....                 | 2    |
| 2.2.3  | Class 3 solvent .....                 | 3    |
| 3      | Test specimen .....                   | 3    |
| 3.1    | Description .....                     | 3    |
| 4      | Test procedure .....                  | 3    |
| 4.1    | Solvent exposure .....                | 3    |
| 4.1.1  | Class 1 solvent .....                 | 3    |
| 4.1.2  | Class 2 solvent .....                 | 4    |
| 4.1.3  | Class 3 solvent .....                 | 4    |
| 4.2    | Examination .....                     | 5    |
| 5      | Details to be specified .....         | 5    |
| 6      | Test documentation .....              | 5    |
| Table  |                                       |      |
| .      |                                       |      |
| 1      | Solvent classes and description ..... | 1    |

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TEST PROCEDURE No. 100  
MARKING PERMANENCE TEST PROCEDURE  
FOR  
ELECTRICAL CONNECTORS AND SOCKETS

(From EIA Standards Proposal No. 4151, formulated under the cognizance EIA CE-2.0 Committee on National Connector Standards.)

## 1 Introduction

### 1.1 Scope

This standard establishes a method of determining the marking permanence of electrical connectors and sockets.

### 1.2 Object

The object of this test procedure is to determine the ability of a connector or socket to withstand solvents that may be used to clean components as well as to determine marking and color code integrity.

**Table 1 - Solvent classes and description**

| Classes | Description   |
|---------|---|
| 1       | Alcohol and mineral spirits; see 2.2.1                                    |
| 2       | Terpene defluxer; see 2.2.2   |
| 3       | Water, propylene glycol monoethanolamine, and monoethanolamine; see 2.2.3 |

### 1.3 Safety

The solvents listed in 2.2 exhibit some potential for health and safety hazards, and the following safety precautions shall be observed.

1.3.1 Avoid contact with eyes. Chemical goggles shall be worn while performing test.

1.3.2 Avoid prolonged contact with skin.

1.3.3 Perform all work in a laboratory fume hood, or provide adequate ventilation.

1.3.4 It is recommended that the solutions be heated in an explosion-proof laboratory hood. Do not use open flame. Hot plate may also be used.

NOTE — Refer to the manufacturer's material safety data sheets for emergency first aid procedures.

## **2 Test resources**

### **2.1 Equipment**

2.1.1 Basket: Stainless steel mesh basket of sufficient size.

2.1.2 Brush: Toothbrush made of materials that are nonreactive with the solvent being used. Brush shall have three long rows of hard bristles, whose free ends shall be substantially in the same horizontal plane. The brush shall be discarded at the completion of the test.

2.1.3 Vessel: Heat-resistant beaker or vapor degreaser made of nonreactive material and of sufficient size to hold the basket.

2.1.4 Laboratory fume hood.

2.1.5 Explosion-proof heat chamber, or hot plate.

### **2.2 Material**

All organic solvents shall be American Chemical Society technical grade or better.

#### **2.2.1 Class 1 solvent**

A mixture consisting of the following:

2.2.1.1 One part by volume isopropyl alcohol.

2.2.1.2 Three parts by volume mineral spirits, or three parts by volume of a mixture of 80 percent by volume of kerosene and 20 percent by volume ethylbenzene.

#### **2.2.2 Class 2 solvent**

A terpene defluxer consisting of a surfactant containing at least 90 percent d-limonene.



### 2.2.3 Class 3 solvent

A mixture consisting of the following:

2.2.3.1 Forty-two parts by volume water, 1 M  $\Omega$ -cm minimum resistivity.

2.2.3.2 One part by volume of propylene glycol monomethyl ether (glycol ether PM, 1-methoxy-2-propanol).

2.2.3.3 One part by volume of monoethanolamine.

## 3 Test specimen

### 3.1 Description

A separate specimen from the same lot shall not be exposed and serve as a reference. All specimens and marking shall be visually inspected prior to testing.

## 4 Test procedure

### 4.1 Solvent exposure

The specimens shall be subjected to the solvent class specified by the referencing document as selected from table 1.

#### 4.1.1 Class 1 solvent

4.1.1.1 The solution shall be maintained at a temperature of  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ . The specimens shall be placed in a wire basket and completely immersed for 3 minutes + 0.5 minute, - 0 minute in the solution specified in 2.2.1.

4.1.1.2 Dip the bristle portion of the brush in the solution until wetted, then remove the specimen from the solution and immediately brush the specimen with normal hand pressure (approximately 0.56 N to 0.83 N (2 oz-f to 3 oz-f) applied normal to the surface) for five strokes in both the forward and reverse direction on the portion of the specimen where marking has been applied.

4.1.1.3 Immediately after brushing, the procedure shall be repeated two more times, for a total of three immersions, followed by brushing.

4.1.1.4 After completion of the third immersion and brushing, the specimens shall be air blown dry.

4.1.1.5 The specimens shall be inspected in accordance with 4.2 to determine the extent, if any, of deterioration that has occurred.

#### 4.1.2 Class 2 solvent

4.1.2.1 The solution shall be maintained at a temperature of  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ . The specimens shall be placed in a wire basket and completely immersed for 3 minutes + 0.5, - 0 minutes in the solution specified in 2.2.2.

4.1.2.2 Dip the bristle portion of the brush in the solution until wetted, then remove the specimen from the solution and immediately brush the specimen with normal hand pressure (approximately 0.56 N to 0.83 N (2 oz-f to 3 oz-f) applied normal to the surface) for five strokes in both the forward and reverse direction on the portion of the specimen where marking has been applied.

4.1.2.3 Immediately after brushing, the procedure shall be repeated two more times, for a total of three immersions, followed by brushing.

4.1.2.4 After completion of the third immersion and brushing, the specimens shall be rinsed in approximately  $25\text{ }^{\circ}\text{C}$  water and all surfaces air blown dry.

4.1.2.5 The specimens shall be inspected in accordance with 4.2 to determine the extent, if any, of deterioration that has occurred.

#### 4.1.3 Class 3 solvent

4.1.3.1 The solution shall be maintained at a temperature of  $63\text{ }^{\circ}\text{C}$  to  $70\text{ }^{\circ}\text{C}$ . The specimens shall be placed in a wire basket and completely immersed for 3 minutes + 0.5, - 0 minutes in the solution specified in 2.2.3.

4.1.3.2 Dip the bristle portion of the brush in the solution until wetted, then remove the specimen from the solution and immediately brush the specimen with normal hand pressure (approximately 0.56 N to 0.83 N (2 oz-f to 3 oz-f) applied normal to the surface) for five strokes in both the forward and reverse direction on the portion of the specimen where marking has been applied.

4.1.3.3 Immediately after brushing, the procedure shall be repeated two more times, for a total of three immersions, followed by brushing.

4.1.3.4 After completion of the third immersion and brushing, the specimens shall be rinsed in approximately 25 °C water and all surfaces air blown dry.

4.1.3.5 The specimens shall be inspected in accordance with 4.2 to determine the extent, if any, of deterioration that has occurred.

## 4.2 Examination

After subjection to the test, any specified markings that are missing in whole or in part, faded, smeared, blurred, or shifted (dislodged) to the extent that they cannot be readily identified from a distance of at least 152 mm (6 in) with normal room lighting without the aid of magnification or with a viewer having a magnification no greater than 3X shall constitute failure.

## 5 Details to be specified

The following details shall be specified in the referencing document:

5.1 Number of specimens to be tested

5.2 The extent of deterioration of the marking or color code

5.3 The solvent class to be specified

## 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 specimen size

6.3 Results including defects and location

6.4 Name of operator and date of test



## EIA Document Improvement Proposal

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