

Attachment No. 11

Comments from Alan Miklos (Glenair) via Dave Bouzek for SAE 11 February 2008



4 February 2008

SUBJECT: Standards Proposal No. 5164, Proposed **new** of EIA-364-111 "Test Procedure for Determining the Total Ionic Contamination of an Electrical Connector or Socket Assembly or Component"; (if approved, to be published as ANSI/EIA/ECA-364-111).

BACKGROUND: This standard was issued as a Letter Ballot on 26 October 2007 with a ballot expiration date of 26 November 2007. Since the minutes of CE-2.0 subcommittee did not authorize proceeding to SP ballot, Mr. Healey polled the members of the committee for permission to do so on 16 January 2008. SP-5164 is herewith submitted to the CE-2.0 membership for voting and for ANSI public review and other interested parties for comment as steps towards standardization. **If this SP ballot receives insufficient ballot returns, the committee chairman may place it on the formulating committee agenda as an item up for vote at its next stated meeting. Once the SP is placed on the agenda, those members not able to attend the scheduled meeting and wishing to vote must submit their vote to ECA prior to that meeting.**

Please provide the following information whether voting or commenting via public review. Number each comment whether it is either editorial and/or technical.

Company Name	- Comment No.
Type of Comment	- Technical or Editorial
Reference	- Page No., Clause No., Line
Suggested Change	- Change From:... To:... Add; Delete:
Rationale for Technical Change	

FOR PURPOSE OF COMMITTEE VOTE: VOTING PERIOD EXPIRES APRIL 4, 2008
FOR PURPOSE OF PUBLIC REVIEW: COMMENT PERIOD EXPIRES APRIL 4, 2008

Prior to this date, you may forward your comments to the designated EIA contact noted below.

Following the expiration of the comment period, this Standards Proposal will be submitted to the EIA Technology Strategy & Standards Department for final disposition. Any questions should be directed to: Cecelia M. Yates, Phone 703- 907-8026 or cyates@ecaus.org.

2500 Wilson Boulevard • Arlington, Virginia 22201-3834 • (703) 907-7500 • FAX (703) 875-8908

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60- DAY BALLOT

PLEASE CHECK AND SIGN THIS FORM AND RETURN IT TO:

Cecelia M. Yates
ECA Engineering
2500 Wilson Boulevard
Arlington, VA 22201
703-875-8908 FAX
cyates@ecaus.org

SUBJECT: Standards Proposal No. 5164
Proposed new Test Procedure for Determining the Total Ionic Contamination of an Electrical Connectors or Socket Assembly (if approved to be published as ANSI/EIA/ECA-364-111.

COMMITTEE VOTING PERIOD EXPIRES: APRIL 4, 2008

- _____ I approve standardization of the content of SP-5164 as an ANSI/EIA Standard.
- _____ I approve standardization of the content of SP-5164 but recommend that the attached, along with the reason(s) for making the recommendation, be considered by the CE-2.0 Committee.
- _____ I do not approve standardization of the content of SP-5164 Attached are my detailed reason(s) for this disapproval. While editorial comments are welcome, they cannot serve as the sole basis for a negative ballot.
- _____ I do not approve standardization or the content of SP-5164. By not providing any detailed reason(s), the committee is not obligated to address/resolve this negative ballot.
- _____ ABSTAIN.

(PLEASE CHECK APPROPRIATE BLOCK)

- USER** Please check one only to indicate the most accurate description
PRODUCER of the relevance of this Standards Proposal to your company.
GENERAL INTEREST This information **is required by ANSI** to process your ballot.

DATE: _____ NAME: _____
TEL: _____ COMPANY: _____ Please Print
E-MAIL _____ ADDRESS: _____

EIA STANDARD

TP-111

**TEST PROCEDURE FOR DETERMINING THE TOTAL
IONIC CONTAMINATION OF AN ELECTRICAL
CONNECTOR OR SOCKET ASSEMBLY OR
COMPONENT**

EIA-364-111

(Draft Proposal)

27 January 2008



Electronic Component, Assemblies & Materials Association

ELECTRONIC COMPONENT, ASSEMBLIES & MATERIALS
ASSOCIATION

THE ELECTRONIC COMPONENT SECTOR OF THE ELECTRONIC INDUSTRIES ALLIANCE



Electronic Industries Alliance

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This EIA Standard is considered to have International Standardization implications, but the International Electrotechnical Commission activity has not progressed to the point where a valid comparison between the EIA Standard and the IEC document can be made.

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.

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Engineering Department
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TEST PROCEDURE No. 111

TEST PROCEDURE FOR DETERMINING THE TOTAL IONIC CONTAMINATION OF AN ELECTRICAL CONNECTOR OR SOCKET ASSEMBLY OR COMPONENT

(From EIA Standards Proposal No. 5164, formulated under the cognizance of EIA CE-2.0 Committee on National Connector Standards)

1 Introduction

1.1 Scope

This standard establishes a test method for determining the total amount of extractable ionic contamination on the surface of an electrical connector or socket assembly or component. This appears to be an analysis rather than a test method due to the absence of specified pass/fail criteria.

1.2 Object

The object of this test procedure is to determine the amount of ionic contamination that may be present on the surface of a connector or socket assembly or component (either plastic or metallic). The source of the contamination may be in the materials of construction or in residues from manufacturing processes. If excessive, the reliability of electronic equipment utilizing the connector or socket may be compromised. Where are the acceptable levels defined? It is intended to address the total contamination level/limits or to address specific contaminate levels/limits, or both. How does the Annex relate to the test method? This test method does not mention the Annex or its relationship. Recommend incorporating the annex into the test method.

1.3 Definitions

1.3.1 Total ionic contamination

Soluble ionic species such as inorganic salts or weak organic acids.

1.3.2 Connector or socket assembly

Functional part consisting of conjoined components.

1.3.3 Connector or socket component

Individual piece of an assembly such as a housing, a contact, a shield, a guide pin, a retention device, or other miscellaneous hardware.

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2 Test resources

2.1 Equipment

- 2.1.1 Alphas Metals Ionograph 500 M (or equivalent)
- 2.1.2 Analytical balance (capable of milligram measurement)
- 2.1.3 Miscellaneous glass or plastic ware
- 2.1.4 Clean gloves or forceps
- 2.1.5 Hydrometer Would help to indicate the needed range

2.2 Material

- 2.2.1 Isopropanol, reagent grade (IPA)
- 2.2.2 Deionized water (DI water)
- 2.2.3 Sodium chloride (NaCl), reagent grade, 750 micrograms per liter (ppm) recommended

3 Test specimen

3.1 Description

Connector or socket assembly or component.

3.2 Preparation

CAUTION — Use clean gloves or forceps when handling test specimens and clean glass or plastic ware to contain solutions.

4 Test procedure

4.1 Calibration

4.1.1 Prepare or buy a solution of 75% / 25% volume / volume isopropanol to DI water. This will be the extraction solution. Should add tolerances for the solution

4.1.1.1 If the ionograph already contains the extraction solution check its density using a hydrometer and make any necessary adjustment to the concentration. The density should be 0.855. Should add tolerance on this

4.1.2 Prepare or buy the NaCl standard for preparation.

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4.1.2.1 Dry about 2 grams of NaCl at 110 °C for 2 hours.

4.1.2.2 Place in desiccator until cooled to room temperature.

4.1.2.3 Weigh out exactly 0.759 grams of the dried NaCl. If this needs to be exact, then it should specify 0.7590 to prevent rounding

4.1.2.4 Add the salt to a one-liter volumetric flask and dilute with DI water to the line.

4.1.2.5 After the salt is completely dissolved pipette one milliliter of the solution into another clean one-liter volumetric flask and dilute with DI water to the line.

4.1.3 A single point calibration should be run prior to running test specimens. No more than one per day is required.

4.1.4 Set-up the ionograph following the manufacturer's recommendations.

4.1.5 Record the calibration results.

4.2 Test specimen preparation and testing

4.2.1 Again, use clean gloves or forceps when handling test specimens.

4.2.2 Measure the surface area of a test specimen in square centimeters and multiply it by the number to be tested.

4.2.3 Enter that surface area into the ionograph.

4.2.4 Immerse the test specimen(s) in the extraction solution.

4.2.4.1 The ionograph will measure the conductivity of the solution. When it becomes stable the test will be terminated. A test time of about 10 minutes is typical, depending on the level of test specimen contamination.

4.2.4.2 If the conductivity of the solution does not stabilize, increase the number of test specimens being tested. This doesn't appear to be an adequate solution to a stability problem. The same problem may also be present in the two additional samples.

4.2.5 Repeat the analysis two additional times using a new test specimen(s). If the only way to resolve this is to run additional specimens, then this paragraph needs to state the procedure needs to be performed on as many samples as required to achieve a stabilized conductivity reading.

4.2.6 The ionograph will calculate the results in total micrograms of NaCl equivalent per square centimeter using the conductivity of the test specimen(s) and the surface area entered into the instrument at the start of the test.

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4.2.7 Record each result.

4.3 Calculation

4.3.1 To determine the total amount of ionic contamination from one specimen divide each total micrograms NaCl equivalent per square centimeter by the number of specimens tested. If this does become a component specification requirement, then averaging should not be allowed, especially if the concern is the contamination level/limit for all samples. Averaging can allow high levels to go unnoticed when tested with lower level samples.

4.3.2 Record each result.

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 Test specimen description

5.3 Specific contaminants to be measured and acceptable limits for each contaminate, and/or the required limit for the total contamination level.

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 Test equipment used, and date of last and next calibration

6.3 Extraction solution concentration (determined with an hydrometer), and calibration results

6.4 Specimen identification (including part number, date/lot code, material information, manufacturing information, etc.)

6.5 Surface area of specimen

6.6 Extraction temperature

6.7 Test duration

6.8 Results from each analysis

6.9 Name of operator and start/finish date(s) of test

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Annex

A Ion chromatography (normative)

A.1 Object

The object of this analysis is to identify the ionic species present and their concentration. It is accomplished by separating the ions in an extraction solution by charge and size.

A.2 Test resources

A.2.1 Equipment

A.2.1.1 Ion chromatograph (IC)

A.2.1.2 Analytical columns capable of resolving each ion of interest; one column for each, anion, cation, and weak organic acid separation

A.2.1.3 Analytical balance (capable of milligram measurement)

A.2.1.4 Miscellaneous glass or plastic ware

A.2.1.5 Clean gloves or forceps

A.2.1.6 Clean, sealable, heat resistant bags (polypropylene is appropriate)

A.2.1.7 Water bath (capable of maintaining a constant temperature of $80\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.)

A.2.2 Material

A.2.2.1 Aqueous buffer solutions recommended for each column used for ionic separation

A.2.2.2 Certified standards for ions to be tested

A.2.2.3 Isopropanol, reagent grade (IPA)

A.2.2.4 Deionized water (DI water)

A.3 Test specimen

A.3.1 Description

Connector or socket assembly or component

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A.3.2 Preparation

CAUTION — Use clean gloves or forceps when handling test specimens and clean glass or plastic ware to contain solutions.

A.4 Test procedure

A.4.1 Specimen preparation

A.4.1.1 Again, use clean gloves or forceps when handling test specimens.

A.4.1.2 Measure the surface area of a test specimen in square centimeters and multiply it by the number to be tested.

A.4.1.3 Record the surface area.

A.4.1.4 Set the temperature of the water bath to 80 °C (needs tolerance) and pre-heat for at least 1 hour.

A.4.1.5 Prepare an extraction solution of 75% / 25% volume / volume isopropanol (needs tolerance) to DI water.

A.4.1.6 Place the test specimen(s) into a bag.

A.4.1.7 Using a pipette, put enough extraction solution into the bag to just cover the test specimen(s)

A.4.1.8 Record the volume of extraction solution.

A.4.1.9 Remove most of the air and seal the bag.

A.4.1.10 Put the same volume of extraction solution into a bag with no test specimen(s).

A.4.1.11 Remove most of the air and seal the bag.

A.4.1.12 Place the bags into the water bath and let them stand for 1 hour ± 5 minutes.

A.4.1.13 The seal of the bags should be above the water line to prevent accidental contamination of the extraction solution.

A.4.1.14 Remove the bags from the water bath and let them cool to room temperature.

A.4.1.15 Remove all of the extraction solution from the bag containing the test specimen(s) using a pasture pipette and transfer it to a 100 milliliter volumetric flask. Repeat for the extraction solution from the bag with no test specimens and transfer it to a different 100 milliliter volumetric flask.

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A.4.1.16 Rinse each bag with DI water and add each rinse solution to the appropriate volumetric flask.

A.4.1.17 Bring the volume of each flask to 100 milliliters (needs tolerance) by adding DI water.

A.4.1.18 Repeat this procedure two additional times using a new test specimen(s).

A.4.2 IC analysis

A.4.2.1 Calibrate the instrument per the manufacturer's recommendations, using the ionic standards to be eluted by the selected column.

A.4.2.2 The cations, anions, and weak organic ions are separated using different analytical columns. The instrument manufacturer's recommendations should be followed for which analytical column is appropriate for each separation.

A.4.2.3 Dilute, if necessary, each extraction solution with the aqueous buffer solution that will be used in the separation of the ionic species. Dilution will depend on the cleanliness of the specimen(s) being tested.

A.4.2.4 Record the total dilution volume; that is, the extraction volume times any dilution required.

A.4.2.5 Inject each extraction solution onto the appropriate IC analytical column.

A.4.2.6 A separate analytical column is required for separation of each ionic species; therefore, each extract must be run on each column for total ionic contamination.

A.4.2.7 The instrument will report each ion detected and its concentration in ppm.

A.4.3 Calculation

Use the following formula to get the ppm of the ion normalized by the surface area of the test specimen(s).

$$\frac{[(\text{ppm results from sample} \times \text{total dilution volume}) - (\text{ppm results from blank} \times \text{total dilution volume})]}{10^{-6} \text{ surface area of the test specimen(s)}}$$

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A.5 Documentation

A.5.1 Title of test

A.5.2 Test equipment used, and date of last and next calibration, extraction solution concentration (determined with an hydrometer), and calibration results

A.5.3 Specimen identification (including part number, date/lot code, material information, manufacturing information, etc.)

A.5.4 Surface area of specimen

A.5.5 Number of specimens tested

A.5.6 Extraction temperature and time

A.5.7 Final dilution volume of extraction solution

A.5.8 Results from each analysis, with and without test specimen, in ppm for each ion detected

A.5.9 Name of operator and start/finish dates of test

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B Ions that IC is capable of detecting (informative)

Table B.1 – Ions IC capable of detecting

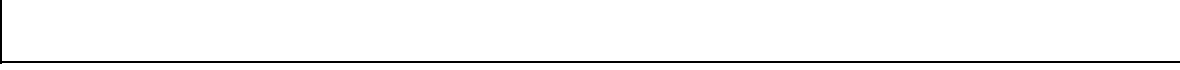
Anions (in order of elution)	Cations (in order of elution)	Weak organic acid (in alphabetical order)
Fluoride (F ⁻)	Lithium (Li ⁺)	Acetate
Chloride (Cl ⁻)	Sodium (Na ⁺)	Adipate
Nitrite (NO ₂ ⁻)	Ammonium (NH ₄ ⁺)	Formate
Bromide (Br ⁻)	Potassium (K ⁺)	Glutamate
Nitrate (NO ₃ ⁻)	Magnesium (Mg ⁺²)	Malate
Phosphate (PO ₄ ⁻³)	Calcium (Ca ⁺²)	Methane Sulfonate
Sulfate (SO ₄ ⁻²)		Succinate
		Phthalate

EIA Document Improvement Proposal

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Revision History

Revision letter	Project number	Additions, changes and deletions
	SP-5164	