



ANSI/EIA-364-1000B-2019
Approved: February 27, 2019

EIA-364-1000B

EIA STANDARD

TS-1000B

**Environmental Test Methodology
for Assessing the Performance
of Electrical Connectors and
Sockets Used in Controlled
Environment Applications**

EIA-364-1000B

Revision of EIA-364-1000A)

February 2019



Electronic Components Industry Association

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(From Standards Proposal No. SP-5402 formulated under the cognizance of the EIA CE-2.0 Committee on National Connector and Socket Standards).

Published by

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EIA Standards & Technology Department
13873 Park Center Road, Suite 315
Herndon, VA 20171

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TEST SEQUENCE No. 1000B

ENVIRONMENTAL TEST METHODOLOGY FOR ASSESSING
THE PERFORMANCE OF ELECTRICAL CONNECTORS AND SOCKETS
USED IN CONTROLLED ENVIRONMENT APPLICATIONS

(From EIA Standards Proposal No. 5402, formulated under the cognizance of EIA CE-2.0 Committee on National Connector Standards, and previously published in EIA-364-1000A.)

1 Introduction

1.1 Scope

This standard establishes the test procedures and test sequences to be followed when evaluating the performance of electrical connectors and sockets used in controlled environments.¹⁾ Furthermore, it applies to contacts operating under low level circuit conditions.²⁾ The assumption is made that the contacts are metal. Polymer contacts, or other contact types, may require a different test methodology.

2 Test specimen

2.1 Condition

Connectors or sockets to be tested may be prototype parts to assess their design, or production parts to evaluate against an end user's criteria. In either case, preparation of them for testing should consider board carrier or cable assembly processes. To simulate exposure to solvents used to clean components see EIA-364-11 (Resistance to Solvents Test Procedure for Electrical Connectors). To simulate exposure to soldering heat from initial attach see EIA-364-56 (Resistance to Soldering Heat Test Procedure for Electrical Connectors). To simulate exposure to soldering heat from rework see EIA-364-61 (Resistance to Soldering Heat from Rework Test Procedure for Electrical Connectors or Sockets Mounted on Printed Circuit Boards).

1) Controlled environments are classified as no more severe than class number G1.2, according to the latest revision of EIA-364 (Electrical Connector/Socket Test Procedures Including Environmental Classifications).

2) The applied voltage, generally < 50 millivolts, is not sufficient to break through any surface film. For contacts not operating under low level circuit conditions, such as those used in power applications; see the latest revision of EIA-364-70 (Test Procedure for Current vs. Temperature Rise of Electrical Connectors).

NOTE — Board carrier assembly operations are typically setup to attach all solderable components before press-fit connectors. Even so, those connectors may still be subjected to manual or automated soldering conditions during component rework. This circumstance should be considered by the test engineer when preparing test specimens.

2.2 Sample size

2.2.1 For the test sequences in each of the test groups of clause 3, at least 100 separable contact interfaces from at least 5 connector or socket systems (plug/receptacle) should be evaluated. For low contact counts, at least 10 connector or socket systems should be tested. Additional samples are required under the following circumstances:

— If one set of test samples is used to monitor low level contact resistance in test group 3 and another set is used to monitor discontinuity then twice the sample size for that test sequence is required;

— If Option 1 of test group 4 is chosen, then twice the sample size for that test sequence is required;

— If one set of test samples is used to monitor low level contact resistance in test group 7 and another set is used to monitor dielectric withstanding voltage then twice the sample size for that test sequence is required.

2.2.1.1 If the connector or socket contains contacts that differ in the design of the critical area, then the sample size requirement should be applied to each design and the test results should be distinguishable.

2.2.2 When a failure rate is desired, a significantly larger sample size for the test sequence in test group 4 should be tested. The user may require a larger sample size for other test groups, as well. The increase is dictated by the method of calculation chosen by the user.

3 Test groups

For an understanding of the objective of each test contained in the test groups; see annex B.

Table 1 – Test Group 1 (required for all connectors or sockets)

Test order	Test	Test procedure	Condition of test specimens	Test criteria
1	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	None (base line measurements)
2	Durability (preconditioning)	EIA-364-09 (perform 5 unplug/plug cycles if the application requires up to 25 over the life of the connector or socket; 20 cycles if the application requires 26-200; or, 50 cycles if the application requires 201 or greater)		No evidence of physical damage
3	Temperature life	EIA-364-17, method A (see table 8 for durations and temperatures)	Mated	None
4	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	Change in measurements evaluated against criteria specified by user
5	Reseating	Manually unplug/plug the connector or socket. Perform 3 such cycles.		No evidence of physical damage
6	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	Change in measurements evaluated against criteria specified by user
Note — See 2.1 for preparation of test specimens.				

Table 2 – Test Group 2 (required for all connectors and sockets)

Test order	Test	Test procedure	Condition of test specimens	Test criteria
1	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	None (base line measurements)
2	Durability (preconditioning)	EIA-364-09 (perform 5 unplug/plug cycles if the application requires up to 25 over the life of the connector or socket; 20 cycles if the application requires 26-200; or, 50 cycles if the application requires 201 or greater)		No evidence of physical damage
3	Thermal shock	EIA-364-32, method A, test condition I, test duration A-4	Mated	None
4	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	Change in measurements evaluated against criteria specified by user
5	Cyclic temperature & humidity	EIA-364-31 method VIII Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles.	Mated	None
6	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	Change in measurements evaluated against criteria specified by user
7	Reseating	Manually unplug/plug the connector or socket. Perform 3 such cycles.		No evidence of physical damage
8	Low level contact resistance	EIA-364-23 (termination of connector or socket to board carrier or cable shall be included in measurements)	Mated	Change in measurements evaluated against criteria specified by user
Note — See 2.1 for preparation of test specimens.				