INCH-POUND
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# DEPARTMENT OF DEFENSE

## TEST METHOD STANDARD

## ELECTRONIC AND ELECTRICAL COMPONENT PARTS

AMSC N/A

FSC 59GP

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# FOREWORD

1. This military standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or emailed to STD202@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.



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SUMMARY OF REVISON H MODIFICATIONS

1. The individual test methods are now each a separate document. They are numbered in the following method (using method 106 as an example), MIL-STD-202-106.

2. The preferred method to reference a test method is MIL-STD-202-xxx, where the xxx represents the test method number.

3. Paragraph 6.3 is now “Cancelled methods”. This paragraph contains guidance for cancelled test methods and test conditions and the appropriate superseding method and conditions.



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CONTENTS


| PARAGRAPH | | Page |
|---|---|---|
| 1. | SCOPE | 1 |
| 1.1 | Purpose | 1 |
| 1.2 | Test method numbering system | 1 |
| 1.2.1 | Class of tests | 1 |
| 1.2.2 | Revision of test methods | 1 |
| 1.3 | Method of reference | 1 |
| 2. | APPLICABLE DOCUMENTS | 1 |
| 2.1 | General | 1 |
| 2.2 | Government documents | 1 |
| 2.2.1 | Specifications, standards, and handbooks | 1 |
| 2.2.2 | Other government documents, drawings, and publications | 2 |
| 2.3 | Non-Government publications | 2 |
| 2.4 | Order of precedence | 2 |
| 3. | DEFINITIONS | 2 |
| 4. | GENERAL REQUIREMENTS | 2 |
| 4.1 | Test requirements | 2 |
| 4.2 | Test conditions | 2 |
| 4.2.1 | Permissible temperature variation in environmental chambers | 2 |
| 4.3 | Reference conditions | 2 |
| 4.4 | Calibration requirements | 2 |
| 5. | DETAILED REQUIREMENTS | 3 |
| 6. | NOTES | 3 |
| 6.1 | Intended use | 3 |
| 6.2 | Sequence of tests | 3 |
| 6.3 | Cancelled methods | 3 |
| 6.4 | Chemical listing | 4 |
| 6.5 | Subject term (key word) listing | 4 |
| 6.6 | Numerical index of test methods | 5 |
| 6.7 | Change notations | 6 |




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## 1. SCOPE

1.1 Purpose. This standard establishes uniform methods for testing electronic and electrical component parts, including basic environmental tests to determine resistance to deleterious effects of natural elements and conditions surrounding military operations, and physical and electrical tests. For the purpose of this standard, the term "component parts" includes such items as capacitors, resistors, switches, relays, transformers, inductors, and others. This standard is intended to apply only to small component parts, weighing up to 300 pounds or having a root mean square test voltage up to 50,000 volts unless otherwise specifically invoked. The test methods described herein have been prepared to serve several purposes:

a. To specify suitable conditions obtainable in the laboratory that give test results equivalent to the actual service conditions existing in the field, and to obtain reproducibility of the results of tests. The tests described herein are not to be interpreted as an exact and conclusive representation of actual service operation in any one geographic location, since the only true test for operation in a specific location is an actual service test at that point.

b. To describe in one standard (1) all of the test methods of a similar character which appeared in the various joint or single-service electronic and electrical component parts specifications, (2) those test methods which are feasible for use in several specifications, and (3), the recognized extreme environments, particularly temperatures, barometric pressures, etc., at which component parts will be tested under some of the presently standardized testing procedures. By so consolidating, these methods may be kept uniform and thus result in conservation of equipment, man-hours, and testing facilities. In achieving these objectives, it is necessary to make each of the general tests adaptable to a broad range of electronic and electrical component parts.

c. The test methods described herein for environmental, physical, and electrical tests shall also apply, when applicable, to parts not covered by an approved military specification, military sheet form standard, specification sheet, or drawing.

1.2 Test method numbering system. The test methods are designated by numbers assigned in accordance with the following system:

1.2.1 Class of tests. The tests are divided into three classes: Test methods numbered 101 to 199 inclusive, cover environmental tests; those numbered 201 to 299 inclusive, cover physical characteristics tests; and those numbered 301 to 399 inclusive, cover electrical characteristics tests. Within each class, test methods are serially numbered in the order in which they are introduced into this standard.

1.2.2 Revision of test methods. Revisions of test methods are indicated by a letter following the method number. For example, the original number assigned to the moisture resistance test method is -106; the first revision of that method “-106A”, the second revision, “-106B”, etc.

1.3 Method of reference. When applicable, test methods contained herein shall be referenced in the individual specification by specifying this standard with the dash number(-xxx) or this standard with the method number, and the details required in the summary paragraph of the referenced method. To avoid the necessity for changing specifications which refer to this standard, the revision letter following the method number shall not be used when referencing test methods. The preferred wording to reference a method starting with revision H is “MIL-STD-202-106”; “MIL-STD-202, method 106” is still acceptable.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, 5, and individual test methods of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4, 5, and the individual test methods of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

This section is not applicable to this standard.



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2.2.2 Other government documents, drawings, and publications. The following other government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

This section is not applicable to this standard.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCSL)

NCSL Z540.3 - Requirements for the Calibration of Measuring and Test Equipment

(Copies of this document are available online at www.ncsli.org)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

This section is not applicable to this standard.

4. GENERAL REQUIREMENTS

4.1 Test requirements. The requirements which must be met by the component parts subjected to the test methods described herein are specified in the individual specifications. Whenever this standard conflicts with the individual specification, the latter shall govern.

4.2 Test conditions. Unless otherwise specified herein, or in the individual specification, all measurements and tests shall be made at temperatures of 15°C to 35°C (59°F to 95°F) and at ambient air pressure and relative humidity. Whenever these conditions must be closely controlled in order to obtain reproducible results, for referee purposes, a temperature of 25°C, +0°C, -2°C (77°F, +0°F, -3.6°F), relative humidity of 50 ±2 percent, and atmospheric pressure of 650 to 800 millimeters of mercury shall be specified.

4.2.1 Permissible temperature variation in environmental chambers. When chambers are used, specimens under test shall be located only within the working area defined as follows:

a. Temperature variation within working area: The controls for the chamber shall be capable of maintaining the temperature of any single reference point within the working area within ±2°C (3.6°F).

b. Space variation within working area: Chambers shall be so constructed that, at any given time, the temperature of any point within the working area shall not deviate more than 3°C (5.4°F) from the reference point except for the immediate vicinity of specimens generating heat.

4.3 Reference conditions. Reference conditions as a base for calculations shall be 25°C (77°F) for temperature, or an alternate temperature of 20°C (68°F), 760 millimeters of mercury for air pressure, and a relative humidity of 50 percent.

4.4 Calibration requirements. Calibration shall be applied to those items of measuring and test equipment used to assure product compliance with specifications and contractual requirements. Calibration shall be performed in accordance with the requirements of NCSL Z540.3 or equivalent. Calibrated items shall be controlled, used, and stored in a manner suitable to protect calibration integrity. Test equipment requiring calibration shall be identified and labeled in accordance with NCSL Z540.3 or equivalent.



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5. DETAILED REQUIREMENTS

This section is not applicable to this standard.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory).

6.1 Intended use. This test method standard specifies uniform procedures for the environmental, physical, and electrical testing of electronic and electrical component piece parts. It is intended as a reference document for test requirements called out in military component specifications and when specified, in other procurement specifications and drawings.

6.2 Sequence of tests. The sequence of tests that follow is provided for guidance to specification writers to emphasize the philosophy that parts be mechanically and thermally stressed prior to being subjected to a moisture resistance test. Within any of the three groups and subgroups, the order is preferred but not mandatory. It is recommended that this sequence be followed in all new specifications and when feasible, in revisions of existing specifications. In the case of hermetically sealed parts, when a moisture resistance test is not required, a high sensitivity seal test may be used in lieu of the moisture resistance test.

Group I (all samples)
- Visual inspection
- Mechanical inspection
- Electrical measurements
- Hermetic seal test (if applicable)

Group IIa (part of a sample)
- Shock
- Acceleration
- Vibration

Group IIb (part of a sample)
- Resistance to soldering heat
- Terminal Strength
- Thermal Shock

Group III (all units which have passed group II tests)
- Moisture resistance or seal test on hermetically sealed parts

6.3 Cancelled methods

Method 102, Temperature Cycling is cancelled, when specified Method 107 is used.

| 102 test condition | 107 test condition |
|---|---|
| A, B, and D | A |
| C | B |

Methods 202 (Shock, specimens weighing not more than 4 pounds) and 205 (Medium Impact) are cancelled, when specified use Method 213.

| 202 or 205 test condition | | 213 test condition | |
|---|---|---|---|
| A | 15g (pk) | K | 30g (sawtooth) |
| B | 30g (pk) | H | 75g (sawtooth) |
| C | 50g (pk) | I | 100g (sawtooth) |

Method 216 (Resistance to Solder Wave Heat) is cancelled, when specified Method 210 is used.

| 216 test condition | 210 test condition |
|---|---|
| A | C |
| B | D |
| C | E |



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6.4 Chemical listing. The following is a list of chemicals and their chemical abstracts service (CAS) registry number identified for use in MIL-STD-202 test methods:

| Material | CAS number | Test method |
|---|---|---|
| ethylbenzene | 100-41-4 | 215 |
| fluorocarbon/perfluorocarbon | ---------- | 107, 112, 210 |
| helium | 7440-59-7 | 112 |
| hydrochloric acid | 47-01-0 | 101 |
| isopropyl alcohol | 67-63-0 | 215 |
| kerosene | 8008-20-6 | 215 |
| krypton-85 | 13983-27-2 | 112 |
| mineral oil | 8012-95-1 | 112 |
| mineral spirits | 8052-41-3 | 215 |
| monoethanolamine | 141-43-5 | 215 |
| n-hexane | 110-54-3 | 109 |
| peanut oil | 8002-03-7 | 112 |
| propane | 74-98-6 | 111 |
| propylene glycol monomethylether | 107-98-2 | 215 |
| silicone oil | 63148-58-3 | 112 |
| sodium chloride | 7647-14-5 | 104 |
| sodium hydroxide | 1310-73-2 | 101 |
| terpene | ---------- | 215 |

6.5 Subject term (key word) listing.

| | | |
|---|---|---|
| Barometric pressure | Humidity | Resistance to soldering heat |
| Contact chatter/resistance | Immersion | Resistance to solvents |
| Current noise | Insulation resistance | Salt atmosphere |
| Current switching | Life | Sand and dust |
| DC resistance | Moisture resistance | Solderability |
| Dielectric withstanding voltage | PIND | Terminal strength |
| Explosion | Radiographic inspection | Thermal shock |
| Flammability | Random drop | Vibration |



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6.6 Numerical index of test methods

| Test Method Number | Title |
|---|---|
| | Environmental tests |
| -101 | Salt atmosphere (corrosion) (formerly called salt spray) |
| -102 | Superseded by Method 107 (see 6.3) |
| -103 | Humidity (steady state) |
| -104 | Immersion |
| -105 | Barometric pressure (reduced) |
| -106 | Moisture resistance |
| -107 | Thermal shock |
| -108 | Life (at elevated ambient temperature) |
| -109 | Explosion |
| -110 | Sand and dust |
| -111 | Flammability (external flame) |
| -112 | Seal |
| | Physical characteristics tests |
| -201 | Vibration |
| -202 | Superseded by Method 213 (see 6.3) |
| -203 | Random drop |
| -204 | Vibration, high frequency |
| -205 | Superseded by Method 213 (see 6.3) |
| -206 | Life (rotational) |
| -207 | High-impact shock |
| -208 | Solderability |
| -209 | Radiographic inspection |
| -210 | Resistance to soldering heat |
| -211 | Terminal strength |
| -212 | Acceleration |
| -213 | Shock (specified pulse) |
| -214 | Random vibration |
| -215 | Resistance to solvents |
| -216 | Superseded by Method 210 (see 6.3) |
| -217 | Particle impact noise detection (PIND) |
| | Electrical characteristics tests |
| -301 | Dielectric withstanding voltage |
| -302 | Insulation resistance |
| -303 | DC resistance |
| -304 | Resistance temperature characteristic |
| -305 | Capacitance |
| -306 | Quality factor (Q) |
| -307 | Contact resistance |
| -308 | Current-noise test for fixed resistors |
| -309 | Voltage coefficient of resistance determination procedure |
| -310 | Contact-chatter monitoring |
| -311 | Life, low level switching |
| -312 | Intermediate current switching |



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6.7 Changes from previous issue. The margins of this standard are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

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Army - CR
Navy - EC
Air Force - 85
DLA - CC

Review activities:
Army - AR, AT, AV, CR4, MI, SM, TE
Navy - AS, OS, SH
Air Force - 19, 99
NSA - NS

Preparing activity:
DLA – CC

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