

INCH-POUND

MIL-DTL-83502E
 14 December 2007
 SUPERSEDING
 MIL-DTL-83502D
 10 February 2004

DETAIL SPECIFICATION

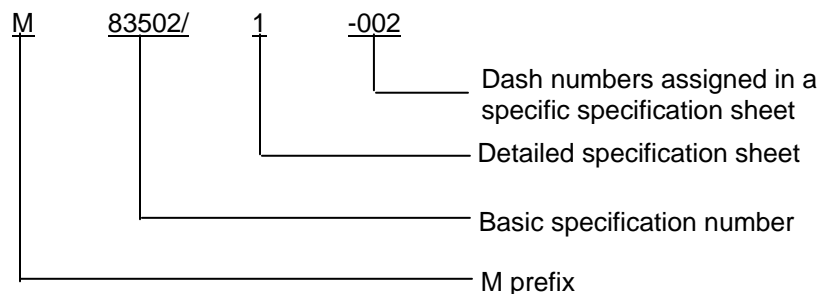
SOCKETS, PLUG-IN ELECTRONIC COMPONENTS, ROUND STYLE, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers round, plug-in electronic component sockets for use on panel boards, printed circuit boards, and microelectronic components (see 6.1).

1.2 Part or Identifying Number (PIN). The PIN consists of the letter M (see 3.8), the basic specification number, a forward slash, a detail specification number, a dash, and a number for the socket arrangement shown in the following example:



1.2.1 Classification. Sockets covered by this specification are of the following types as specified (see 3.1). For the purpose of clarification in this document and the references cited herein the socket's mounting types are defined as follows.

- a. Type I - Wrappost (see figure 1).
- b. Type II - Printed circuit terminals (see figure 1).
- c. Type III - Wire turret terminals (see figure 1).
- d. Type IV - Solder-cup terminals (see figure 1).

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or emailed to RectangularConnector@dsccl.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

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2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 or 5 of this specification. This section does not include documents cited in other sections of this specification 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 or 5 of this specification, 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.

DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-202 - Tests Methods for Electronic and Electrical Component Parts.
- MIL-STD-810 - Environmental Test Methods.
- MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

ASTM INTERNATIONAL

- ASTM B16/B16M - Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
- ASTM B139/B139M - Rod, Phosphor Bronze, Bar, and Shapes
- ASTM B194 - Plate, Copper Beryllium Alloy, Sheet, Strip, and Rolled Bar
- ASTM B196/B196M - Rod and Bar, Copper Beryllium Alloy
- ASTM D1710 - Tubing, Extruded and Compression Molded Polytetrafluoroethylene (PTFE) Rod and Heavy-Walled
- ASTM D4066 - Standard Specification for Nylon Injection and Extrusion Materials (PA)
- ASTM D5948 - Standard Specification for Molding Compounds, Thermosetting

(Copies of these documents are available online at <http://www.astm.org> or from the ASTM International, P.O. Box C700, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

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ELECTRONIC INDUSTRY ALLIANCE (EIA)

- EIA-364 - Electrical Connector/Socket Test Procedures Including Environmental Classifications
- EIA-364-06 - Contact Resistance Test Procedure for Electrical Connectors
- EIA-364-20 - Withstanding Voltage Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts
- EIA-364-21 - Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts
- EIA-364-23 - Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets
- EIA-364-27 - Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors
- EIA-364-28 - Vibration Test Procedure for Electrical Connectors and Sockets
- EIA-364-30 - Capacitance Test Procedure for Electrical Connectors and Sockets
- EIA-364-31 - Humidity Test Procedure for Electrical Connectors and Sockets
- EIA-364-32 - Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets

(Copies of these documents are available online at <http://www.eia.org> or from the Electronic Industries Alliance, Technology Strategy & Standards Department, 2500 Wilson Boulevard, Arlington, VA 22201.)

IPC - ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES

- J-STD-004 - Soldering Fluxes Requirements For
- J-STD-006 - Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications Requirements For

(Copies of these documents are available online at <http://www.ipc.org> or from the IPC - Association Connecting Electronics Industries, 3000 Lakeside Drive, Suite 309 S, Bannockburn, IL 60015-1249.)

SAE INTERNATIONAL

- SAE-AMS-P-81728 - Plating, Tin-Lead (Electrodeposited).
- SAE-AMS-QQ-N-290 - Nickel Plating (Electrodeposited).

(Copies of these documents are available online at <http://www.sae.org> or from the SAE World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), 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. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

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3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.3 Materials. Materials shall be as identified herein or as approved by the qualifying activity. However, when a definite material is not specified, a material shall be used which will enable the sockets and accessories to meet the requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guarantee of acceptance of the finished product.

3.3.1 Reference materials, plating, and processes. The materials, plating and processes identified in this specification assure that sockets will properly interface to similar industry standard and government specified connector systems, without problems such as electrochemical contamination or deterioration, electrolytic corrosion, or excessive surface wear. Manufacturers may be allowed minor variations from these exact requirements upon written request to, and subsequent written approval from DSCC-VAI. Significant variations from this specification, especially those which could affect short or long term reliability or performance, must undergo the normal coordination and approval process. Any short or long term failures or reliability problems due to such deviation shall be the responsibility of the supplier.3.3.1

3.3.1.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle cost.

3.3.1.2 Pure tin. The use of pure tin is prohibited (see 6.4). The maximum amount of pure tin is 97 percent and the alloy material shall inhibit the growth of tin whiskers.

3.3.2 Body. The socket insulator body (and removable insulator, when applicable), shall be manufactured with polytetrafluoroethylene in accordance with ASTM D1710, type I, grade 1, class D or diallyl phthalate in accordance with ASTM D5948, type SDG-F, glass filled polyamide (nylon) in accordance with ASTM D4066 type PA110 and as specified (see 3.1).

3.3.3 Socket spring contact and socket sleeve. The socket spring contact member shall be beryllium copper in accordance ASTM B139/B139M, ASTM B194, or ASTM B196/B196M. The socket sleeve shall be brass in accordance with ASTM B16/B16M.

3.3.4 Contact finish. The contact finish shall be gold applied overall or localized. When contacts are provided in strip form, the absence of plating in the area where the contact was removed from the strip is acceptable, provided it is a non-functional area and any corrosion formed as a result of salt spray testing does not creep into the contact engaging area.

3.3.4.1 Overall finish. Contacts shall be gold plated in accordance with ASTM B488, type I, code C, class 0.76 (30 microinches) minimum over a nickel underplate in accordance with SAE-AMS-QQ-N-290, class 2, 30 microinches (0.76 μm) to 150 microinches (3.81 μm) thick. Silver shall not be used as an underplate (see 3.3.1).

3.3.4.2 Localized finish. Socket contacts shall be overall nickel plated in accordance with SAE-AMS-QQ-N-290, class 2, 30 microinches (0.76 μm) to 150 microinches (3.81 μm) thick. Localized gold plating applied over the nickel by means of selective plating, inlay, welded dot, or other similar localization systems is permitted in lieu of overall plating, provided the conditions specified herein are met.

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3.3.4.3 Contact mating area. The contact mating area shall be gold in accordance with ASTM B488, type II, code C, class 0.76 (30 microinches) minimum, over a nickel underplate in accordance with SAE-AMS-QQ-N-290, class 2, 50 microinches (1.25 μm) to 150 microinches (3.81 μm) thick. Silver shall not be used as an underplate (see 3.3.1).

3.3.4.4 Terminations. Terminations shall be plated with gold in accordance with ASTM B488, type II, code C, class 0.51 (20 microinches) minimum tin-lead in accordance with SAE-AMS-P-81728, .001 inch (25.4 μm) minimum, over nickel (see 3.3.1). The following conditions shall apply:

- a. Type II termination: Tin-lead shall be 50 to 70 percent tin.
- b. Types III and IV terminations: Tin-lead shall be 50 to 95 percent tin.

3.3.4.5 Tinning solder cups. Where pretinned solder cups are required, the interior surface of solder cups shall be completely tinned over 100 percent of the full circle portion and for at least 50 percent of the remainder of the solder well area with solder conforming to composition Sn60 of J-STD-006. Only fluxes meeting J-STD-004, shall be used, any excess of which shall be removed. Solder cup terminals shall be so constructed that liquid solder cannot leak through to the front of the socket and prevent insertion of the pin. No excess solder shall be on the exterior of the solder cup.

3.4. Fungus. Materials used in the construction of these sockets shall be fungus inert and shall be capable of meeting the fungus resistant testing of MIL-STD-810, method 508.

3.5 Interface and physical construction. Sockets shall be of the interface and physical construction specified (see 3.1). The socket assembly consists of the socket insulator body, a socket spring contact member, and a socket sleeve. The entry to the socket contact shall be beveled, chamfered, or tapered to facilitate the engagement of the component lead into the socket. The sleeve shall be machined one-piece construction. The socket termination shall be part of the sleeve member. Part or Identifying Number (PIN) applicable to tin/lead finished sleeves shall have a temperature rating of -40°C to $+105^{\circ}\text{C}$. PIN's applicable to gold finished spring contacts and gold finished sleeves shall have a temperature rating of -55°C to $+125^{\circ}\text{C}$.

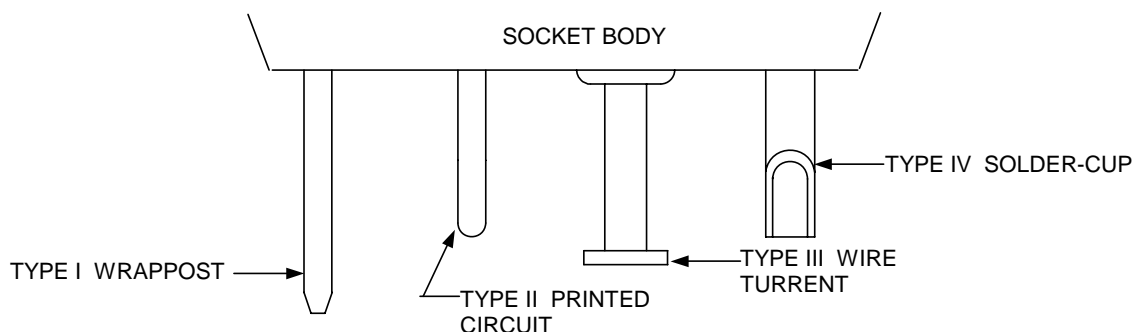


FIGURE 1. Terminal type configurations.

3.5.1 Wire terminations. The form factor and dimensions of wire terminations shall be as specified (see 3.1 and figure 1).

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3.5.2 Body. The body shall be constructed with proper sections and radii so that it will not crack, chip, or break in assembly or in normal service. Depressions, when used to achieve longer creepage paths, shall not cause structural weakness, or moisture entrapment.

3.5.3 Polarization. A polarization feature (mechanical or visual) shall be incorporated in each socket and shall be so designed that the mating lead is guided into the contact opening.

3.5.4 Alignment. The socket shall be so designed that the mating lead is guided into the contact opening.

3.5.5 Mounting. When applicable, sockets shall be mounted as specified (see 3.1).

3.5.6 Contact wire wrappost. Unless otherwise specified, (see 3.1), the wire wrappost shall be:

- a. Square 0.0225 inch (0.572 mm) minimum.
- b. Cross-section diagonal: 0.0325 inch (0.826 mm) minimum.
0.0355 inch (0.902 mm) maximum.
- c. Edge radius shall not exceed 0.003 inch (0.08 mm).
- d. Edge burrs 0.0015 inch (0.038 mm), maximum.
- e. Parallel within 0.002 inch (0.05 mm).
- f. Straight within 0.005 inch (0.13 mm).
- g. Minimum wrappable length of 0.465 inch (11.81 mm) shall be maintained after allowing for insertion into a size 2 (.054-0.070 inch (1.37-1.78 mm)) circuit board, (where applicable).
- h. Tip of wire wrappost shall terminate in a radius, bevel, or chamfer to facilitate insertion into the wire wrapping tool.

3.6 Mating force. When sockets are tested as specified in 4.8.3, the maximum mating force shall be 4 pound (17.8 N) max.

3.7 Contact withdrawal force. When sockets are tested as specified in 4.8.4, the withdrawal force shall be not less than .5 ounce (0.14 N).

3.8 Contact retention. When unmated sockets are tested as specified in 4.8.5, there shall be no damage or loosening of the contacts.

3.9 Insulation resistance. When unmated sockets are tested as specified in 4.8.6, the initial insulation resistance shall be not less than 5,000 megohms.

3.10 Dielectric withstanding voltage. When sockets are tested as specified in 4.8.7, there shall be no evidence of breakdown of insulation or flashover.

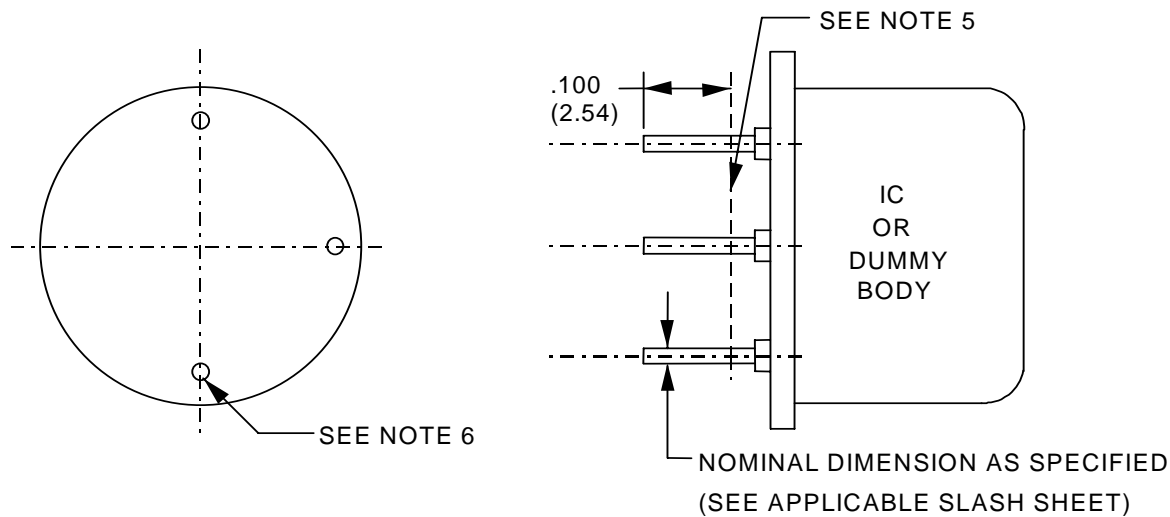
3.11 Contact resistance. When sockets are tested as specified in 4.8.8, the initial contact resistance shall not exceed 20 milliohms, and after the durability and corrosive atmosphere tests, the contact resistance shall not exceed the initial value by more than 10 milliohms.

3.12 Capacitance. When sockets are tested as specified in 4.8.9, the capacitance shall not exceed 2 picofarads.

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3.13 Vibration. When sockets are tested as specified in 4.8.10, there shall be no physical or mechanical damage to the socket body contacts. During vibration there shall be no interruption in continuity greater than 1 microsecond of the test circuit, which incorporates mated contacts. After the test, the mounting hardware shall show no signs of loosening, fracture, or other deterioration, and the sockets shall meet the contact resistance and contact withdrawal force requirements of 3.8 and 3.7, respectively.

3.14 Shock (specified pulse). When sockets are tested as specified in 4.8.11, there shall be no physical damage to the socket. During the test there shall be no interruption in continuity greater than 1 microsecond of the test circuit, which incorporates mated contacts.



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Contacts shall be plated gold or tin/lead the same as the contacts of the socket under test.
4. Modifications to the leads such as attaching wires are allowable as long as the area of the lead engaging the socket is unmodified.
5. Minimum engagement length.
6. For pin configuration see individual specification sheets.

FIGURE 2. Mating test plug.

3.15 Durability. When sockets are tested as specified in 4.8.12, there shall be no evidence of cracking or breaking. The sockets shall meet the contact resistance and contact withdrawal force requirements of 3.11 and 3.7, respectively.

3.16 Thermal shock. When a socket with a suitable test plug (see figure 2) is tested as specified in 4.8.13, there shall be no evidence of cracking or crazing of the body or other physical damage to the socket. The socket component shall be capable of mating and unmating without damage to either component.

3.17 Humidity. When sockets are tested as specified in 4.8.14, insulation resistance shall be no less than 300 megohms.

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3.18 Low-signal level contact resistance. When tested in accordance with 4.8.15, the socket mated with a suitable test plug (see figure 2) shall show no electrical discontinuity and the contact resistance requirement of 3.11 shall not be exceeded.

3.19 Corrosive atmosphere (see 6.5.1). When sockets are tested as specified in 4.8.16, there shall be no evidence of porous plating or exposure of base metal on the contacting surfaces and the contact resistance requirement of 3.11 shall not be exceeded.

3.20 Solderability. When sockets are tested as specified in 4.8.17, terminations shall withstand the test without damage.

3.21 Resistance to soldering heat (except type I terminals). When sockets are tested as specified in 4.8.18, there shall be no damage.

3.22 Marking. Sockets should be marked in accordance with method I of MIL-STD-1285, and include the military PIN, the manufacturer's name or code symbol, and the date code, unless otherwise specified (see 3.1).

3.23 Workmanship. Sockets shall be processed in such a manner as to be uniform in quality and shall be free from burrs, crazing, cracks, voids, pimples, chips, blisters, pinholes, sharp cutting edges, and other defects that will adversely affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.7).

4.2 First article inspection. First article inspection, when specified (see 3.1), shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of EIA-364 and MIL-STD-202.

4.3.1 Verification testing. The following identified tests and test methods assure connector integrity within typical operating conditions and applications. The use of alternate commercial industry standard test methods is allowed, however when an alternate method is used, the alternate method must be coordinated with the qualifying activity prior to performance of the test. The test methods described herein are proven methods and shall be the referee method in cases of dispute.

4.3.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy qualify and quantity to permit performance of the required inspection shall be established and maintained by the contractor.

4.4 Materials. Materials used to fabricate these sockets shall be as specified in table I, and as required on the specification sheets (see 3.1, 3.5, 4.8.2, and 6.2). Material verification shall be available upon request.

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TABLE I. Materials.

Material	Specification	Paragraph
Beryllium copper	ASTM B139/B139M, ASTM B194, or ASTM B196/B196M	3.3.3
Brass	ASTM B16/B16M	3.3.3
Diallyl phthalate	ASTM D5948	3.3.2
Fluxes	J-STD-004	3.3.4.5
Glass filled polyamide (nylon)	ASTM D4066	3.3.2
Gold	ASTM B488	3.3.4.1 , 3.3.4.3 , 3.3.4.4
Nickel	SAE-AMS-QQ-N-290	3.3.4.1 , 3.3.4.2 , 3.3.4.3
Polytetrafluoroethylene	ASTM D1710	3.3.2
Solder	J-STD-006	3.3.4.5
Tin-lead	SAE-AMS-P-81728	3.3.4.4

4.5 Sample size.

4.5.1 Group submission. For each specification sheet, ten samples shall be selected of the socket having the largest number of contacts, which shall qualify sockets with a lesser number of contacts of the same design, construction and materials. Two samples of each socket with the lesser number of contacts shall be submitted to visual and mechanical inspection, dimensions and withstanding voltage. Alternate terminal types specified by a single specification sheet may be qualified by submitting two samples of each type of groups I and II in [table II](#). When different termination finishes are being qualified simultaneously sample sockets of each finish shall be selected so that there are equal, groups of each finish. Where there is a low profile socket at the same design, to the same specification sheet, it may be qualified at the same time by submitting two samples of the largest number of contacts to groups I and II of [table II](#).

4.5.2 Inspection routine. The sample shall be subjected to the inspections specified in [table II](#), in the order shown. All sample units shall be subjected to the inspections of group I. The sample shall be divided into five groups of two units each and subjected to the inspections for their particular group.

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TABLE II. First article inspection. ^{1/}

Inspection	Requirement paragraph	Method paragraph
<u>Group I</u> (10 samples)		
Visual and mechanical	3.1, 3.3, 3.5, 3.22, and 3.23	4.8.2
Mating force	3.6	4.8.3
Contact withdrawal force	3.7	4.8.4
Contact retention ^{2/}	3.8	4.8.5
Insulation resistance	3.9	4.8.6
Withstanding voltage (sea level)	3.10	4.8.7
Contact resistance	3.11	4.8.8
Capacitance	3.12	4.8.9
<u>Group II</u> (2 sample units)		
Vibration	3.13	4.8.10
Shock (specified pulse)	3.14	4.8.11
Durability	3.15	4.8.12
Insulation resistance	3.9	4.8.6
<u>Group III</u> (2 sample units)		
Thermal shock	3.16	4.8.13
Insulation resistance	3.9	4.8.6
Humidity	3.17	4.8.14
Withstanding voltage (sea level)	3.10	4.8.7
<u>Group IV</u> (2 sample units)		
Low level contact resistance	3.18	4.8.15
Corrosive atmosphere	3.19	4.8.16
<u>Group V</u> (2 sample units)		
Solderability	3.20	4.8.17
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.22, and 3.23	4.8.2
<u>Group VI</u> (2 sample units)		
Resistance to soldering heat	3.21	4.8.18
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.22, and 3.23	4.8.2

^{1/} Sockets with inserted terminals shall not be considered the same design as those with the terminals molded in place.

^{2/} Not applicable to molded socket contacts.

4.5.3 Failures. One or more failures shall be cause for refusal to grant first article approval.

4.6 Disposition of first article samples. First article samples shall not be delivered on the contract.

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4.7 Conformance inspection.4.7.1 Acceptance inspection. Acceptance inspection shall consist of group A inspections.

4.7.1.1 Inspection lot. An inspection lot shall consist of all sockets produced under essentially the same conditions, and offered for inspection at one time.

4.7.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in [table III](#), on the same set of sample units in the order shown.

TABLE III. Group A inspection.

Inspection	Requirement paragraph	Method paragraph
Visual and mechanical inspection	3.1 , 3.3 , 3.4 , 3.22 , and 3.23	4.8.2
Mating force	3.6	4.8.3
Contact withdrawal force	3.7	4.8.4

4.7.1.2.1 Sampling plan (group A). The tests in [table III](#) shall be performed on a production run basis. Samples shall be selected as specified in [table IV](#). If one or more defects are found, the lot shall be screened for that particular defect and defects removed. A new sample of parts shall be selected as specified in [table IV](#) and all group A tests again performed. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE IV. Lot and sample size.

Lot size	Sample size
2 to 5	100 percent
6 to 50	5
51 to 90	7
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1200	19
1201 to 3200	23
3201 to 10000	29
10001 and over	35

4.7.1.2.2 Rejected lots. If an inspection lot is rejected, the manufacturer may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using the next higher lot size specified in [table IV](#) and shall not thereafter be tendered for acceptance unless the former rejection or requirement of correction is disclosed. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots.

4.7.1.2.3 Disposition of conformance sample units. Sample units which have passed all the group A inspections may be delivered on the contract if the lot is accepted and the sample units are still within the specification tolerances.

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4.8 Methods of inspection.

4.8.1 Test methods. The following identified tests and test method assures socket integrity within typical operating conditions and applications. Alternate commercial industry stand test method are allowed, however when and alternate method is used, the qualifying activity must be notified prior to performance of the test. The test methods described herein are proven methods and shall be the referee method in cases of dispute.

4.8.2 Visual and mechanical inspection. Sockets shall be examined to verify that the dimensions, materials, design construction, marking, and workmanship are in accordance with the applicable requirements (see [3.1](#), [3.3](#), [3.5](#), [3.22](#), and [3.23](#)).

4.8.3 Mating force (see [3.6](#)). The initial force required to fully insert the test gage (see [figure 3](#)) shall be measured. The measuring equipment shall conform to the following:

- a. The vertical axis of the test gage shall coincide with the vertical axis of the socket.
- b. The test gage shall travel along the vertical axis of the socket.
- c. The speed of insertion of the test gage into the socket contacts shall not exceed 2 inches (51 mm) per minute for consistent-speed machines, or the rate of loading shall not exceed 80 pounds (36.29 kg) per minute for contact-rate-of-force machines.
- d. Scale mechanism shall have no dashpots or other damping devices.
- e. Scales shall be calibrated in .125 pound (56.7 grams) steps or less, and shall be accurate to within ± 5 percent.

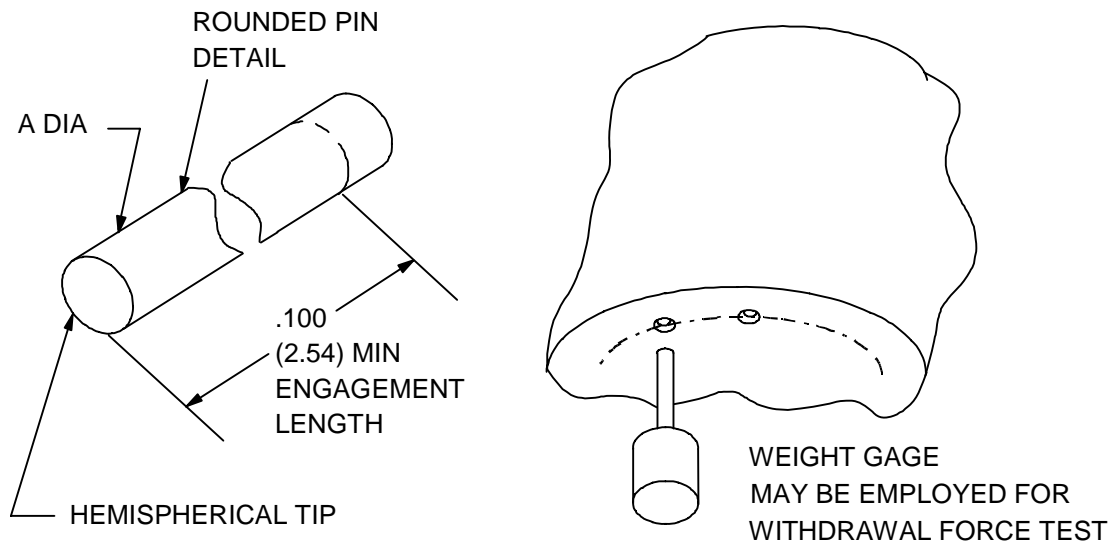
4.8.4 Contact withdrawal force (see [3.7](#)). After two unmonitored insertions and withdrawals of the maximum mating test gage (see [figure 3](#)), the individual withdrawal force shall be measured using the minimum thickness single blade pin (see [figure 3](#)). Test pin shall be inserted to a depth of .100 inch (2.54 mm) minimum and the withdrawal force shall be measured.

4.8.5 Contact retention (see [3.8](#)). With the socket mounted to an appropriate fixture, the following details and exceptions shall apply:

- a. Solderless wrap: 7.5 pound (3.40 kg) axial load shall be applied in both directions, to terminals similar to that applied by the wrapping tool.
- b. Solder cup: .75 pound (0.34 kg) axial load shall be applied in both directions to terminals.

4.8.6 Insulation resistance (see [3.9](#)). Unmated sockets shall be tested in accordance with test procedure EIA-364-21.

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Contacts to accept mating leads		Max min gage	A dia	
Inches	mm		Inches	mm
.017 +.003 -.001	0.43 +.08 -.03	Max	.0200 +.0000 -.0002	0.501 +.000 -.005
		Min	.0160 +.0002 -.0002	0.406 +.005 -.003
.030 ±.005	0.76 ±.13	Max	.0350 +.0000 -.0002	0.889 +.000 -.005
		Min	.250 +.0020 -.0020	.0635 +.051 -.000
.040 ±.005	1.02 ±.13	Max	.0450 +.0002 -.0020	1.143 +.005 -.051
		Min	.0350 +.0002 -.0000	0.889 +.005 -.000

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified tolerance is $\pm .0005$ inch (0.013 mm).
4. Material: All pins carbon steel, finish 4 microinch (0.10 μm) maximum.

FIGURE 3. Insertion and withdrawal gages.

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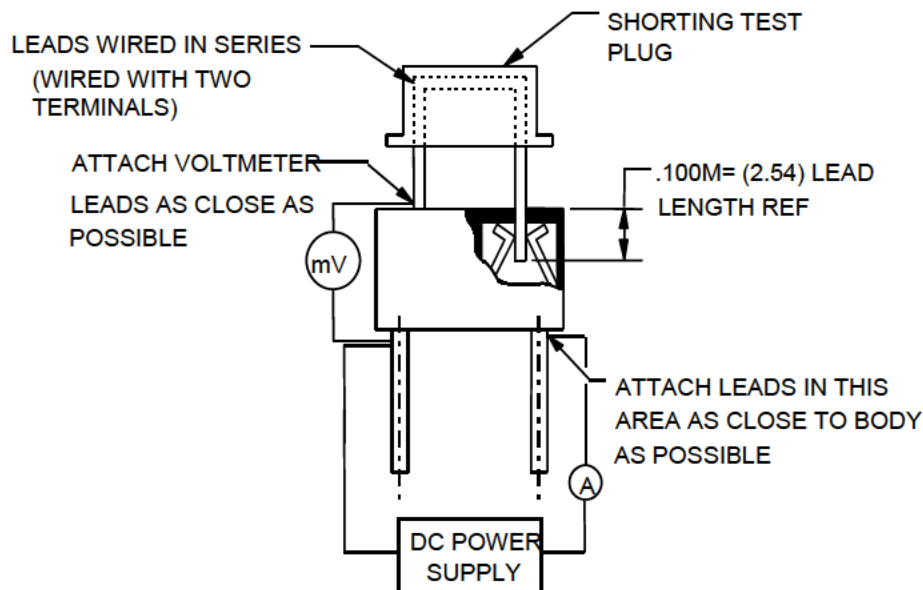
4.8.7 Dielectric withstanding voltage (see [3.10](#)). Sockets shall be tested in accordance with test procedure EIA-364-20. The following details and exceptions shall apply:

- a. Preparation - Mated with suitable test plug (see [figure 2](#)) but not mounted on a printed circuit board.
- b. Magnitude of test voltage - 600 volts, unless otherwise specified (see [3.1](#)).
- c. Nature of potential - AC (rms).
- d. Barometric pressure - Sea level.
- e. Points of application of test voltage - The test voltage shall be applied between all odd-numbered contacts connected together and all even-numbered contacts and all other metallic parts connected together, unless otherwise specified (see [3.1](#)).
- f. Method of connection of test voltage to specimen - Affix test probes to terminations described in 4.8.7e, by clips or solder.

4.8.8 Contact resistance (see [3.11](#)). The contact resistance shall be measured as specified on [figure 4](#). A minimum of three contacts shall be measured on each test specimen in accordance with test procedure EIA-364-06. The following shall apply:

- a. Single contact.
- b. Brass or copper base alloy gage.
- c. Plating to be the same generic materials.
- d. Final measurements. Durability (see [4.8.12](#)) and corrosive atmosphere (see [4.8.16](#)) shall be measured followed by contact resistance (see [4.8.8](#)).

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NOTES:

1. Dimensions are in inches. Metric equivalents are in parentheses.
2. Metric equivalents are given for information only.
3. The measured resistance includes a portion of the terminal and test socket leads as well as the voltmeter test leads. These resistances are to be subtracted from the total resistance to obtain the contact resistance.
4. A shorting wire may be soldered between leads in lieu of use of a special shorting plug.

FIGURE 4. Contact resistance (low-level and rated current) test setup.

4.8.9 Capacitance (see 3.12). The socket shall be tested in accordance with test procedure EIA-364-30. The following details shall apply:

- a. Test frequency - 1 kHz.
- b. Test voltage: The alternating-current (ac) voltage actually impressed across the specimen shall be as low as possible.
- c. Polarization - Not applicable.
- d. Unmounted.
- e. Adjacent pins.
- f. Seven readings.

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4.8.10 Vibration (see 3.13). Sockets shall be tested in accordance with test procedure EIA 364-28. The following details shall apply:

- a. Test condition - III.
- b. Preparation - Mated with test plugs (see figure 2). See figure 5 for further details.
- c. Following the test, contact resistance and contact withdrawal force shall be measured in accordance with 4.8.8 and 4.8.4, respectively.

4.8.11 Shock (specified pulse) (see 3.14). The socket shall be tested in accordance with test procedure EIA 364-27. The following details shall apply:

- a. Mounting method and detection circuit - Mounted by normal means monitoring equipment used shall be capable of detecting circuit interruptions greater than 1 microsecond.
- b. Preparation - Mated with a test plug (see figure 2).
- c. Test setup: See figure 5.
- d. Acceleration requirements - Test condition G.
- e. Number of blows - One blow in both directions along each of three mutually perpendicular axes for a total of six shocks.

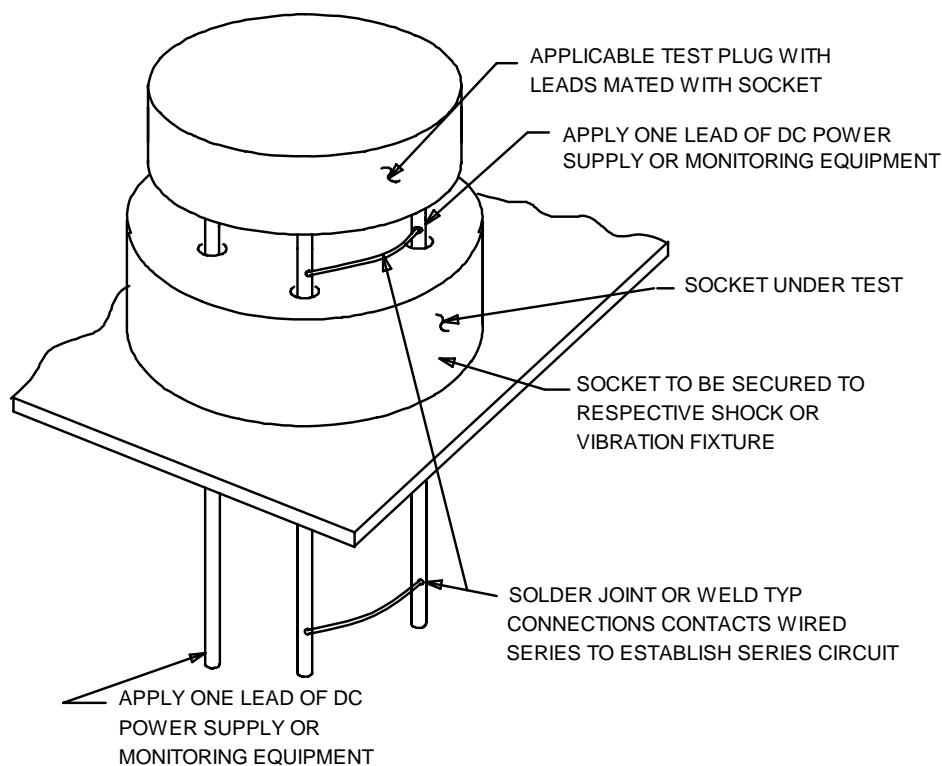


FIGURE 5. Vibration and shock test setup.

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4.8.12 Durability (see 3.15). Each unit shall be subjected to 50 mating and unmating cycles using the test plug (see [figure 2](#)). Following the test, contact resistance and contact withdrawal force shall be measured in accordance with [4.8.8](#) and [4.8.4](#) respectively.

4.8.13 Thermal shock (see 3.16). Sockets shall be tested in accordance with test procedure of EIA-364-32. The following details shall apply:

- a. Test condition letter: A.
- b. Test measurement: The sockets shall be capable of mating and unmating at the temperature extremes (force shall be unmonitored) during the fifth cycle without damage to either component.

4.8.14 Humidity (see 3.17). Sockets shall be tested in accordance with test procedure EIA-364-31, method IV. Unmounted sockets shall be connected as specified in [4.8.6](#). Insulation resistance shall be measured in accordance with [4.8.6](#), within 5 minutes of completion of step 6 of final cycle.

4.8.15 Low-signal level contact resistance (see 3.18). The low-level circuit shall be tested in accordance with test procedure EIA-364-23.

- a. Environmental conditioning not required.
- b. Seven readings.
- c. Final measurements - Contact resistance (see [3.11](#)).

4.8.16 Corrosive atmosphere (see 3.19 and 6.5.1). Mated sockets shall be exposed to a concentrated sulphur atmosphere. The following details shall apply:

- a. Sockets that have been mated with a suitable test gage and preconditioned by being subjected to two unmonitored insertions of the insertion force gage (see [figure 3](#)) shall be exposed to a 10-25 PPM atmosphere of ammonium polysulfide at a relative humidity of 60 percent or higher at room temperature for 4 hours in an enclosed chamber.
- b. At the conclusion of the sulphur atmosphere exposure, the contact resistance of the undisturbed mated socket shall be measured in accordance with [4.8.8](#).

4.8.17 Solderability (see 3.20). Each terminal shall be subjected to method 208 of MIL-STD-202.

4.8.18 Resistance to soldering heat (see 3.21). Sockets shall be tested in accordance with method 210 of MIL-STD-202, condition B. Sockets may be mounted on a glass epoxy wiring board.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see [6.2](#)). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's System Commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

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

6.1 Intended use. The sockets covered by this specification are intended for use on a printed circuit board or mounting into chassis. Terminals may be soldered to the printed circuit board unless otherwise noted (see 3.1). Only plug-in component leads with similar finishes to the mating socket contacts should be mated, reference MIL-HDBK-454, General Guidelines for Electronic Equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. PIN see 1.2.
- c. Quantity required.
- d. First article inspection waiver.
- e. Name and address of the first article inspection test facility to which first article samples (if required) are to be forwarded and the name and address of the Government activity responsible for conducting the first article inspection program.

6.3 First article. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Tin whisker growth. The use of pure tin may exhibit tin whisker growth problems (days to months to years) after manufacture. Tin whiskers can develop under typical operating conditions on any product type that uses lead-free pure tin coatings. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead have shown to inhibit the growth of tin whiskers.

6.5 Definition.

6.5.1 Corrosive atmosphere. The corrosive atmosphere test is intended to reveal imperfections in the plated contacting surfaces such as pores, scratches, or incomplete plating coverage. It will also reveal defects such as low contact pressure. However, it is not intended to correlate directly with long term atmospheric contamination.

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6.6 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals is available on their website at:

<http://www.epa.gov/epaoswer/hazwaste/minimize/chemlist.htm>

Further information is available at the following EPA site:

<http://www.epa.gov/epaoswer/hazwaste/minimize/>

Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of the materials on the list should be minimized or eliminated unless needed to meet the requirements specified herein.

6.7 Subject term (keyword listing).

Beryllium
Contacts
Current
Dielectric
Finish
Heat
Humidity
Inspection
Lead
Materials
Mounting
Mating force
Nickel
Polarization
Qualification
Sampling
Solder
Terminals
Turrent
Wrappost

6.8 Changes from previous issue. The margins of this specification 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 and relationship to the last previous issue.

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CONCLUDING MATERIAL

Custodians:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:

DLA - CC

(Project 5935-2008-016)

Review activities:

Army - AT, AV, MI
Navy - AS, MC, SH
Air Force - 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.