

INCH-POUND

MIL-DTL-83734H  
30 April 2007  
SUPERSEDING  
MIL-DTL-83734G  
7 July 1998

## DETAIL SPECIFICATION

### SOCKETS, PLUG-IN ELECTRONIC COMPONENTS, DUAL-IN-LINE (DIPS) AND SINGLE-IN-LINE PACKAGES (SIPS), 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 plug-in electronic component sockets for use on panel boards, printed circuit boards, and microelectronic components (see 6.1).

1.2 Classification. Sockets covered by this specification are of the following types, styles and configurations, as specified (see 3.1).

##### 1.2.1 Termination types.

- Type I - Solderless wrap terminals (see figure 1).
- Type II - Printed circuit terminals (see figure 1).

##### 1.2.2 Contact styles.

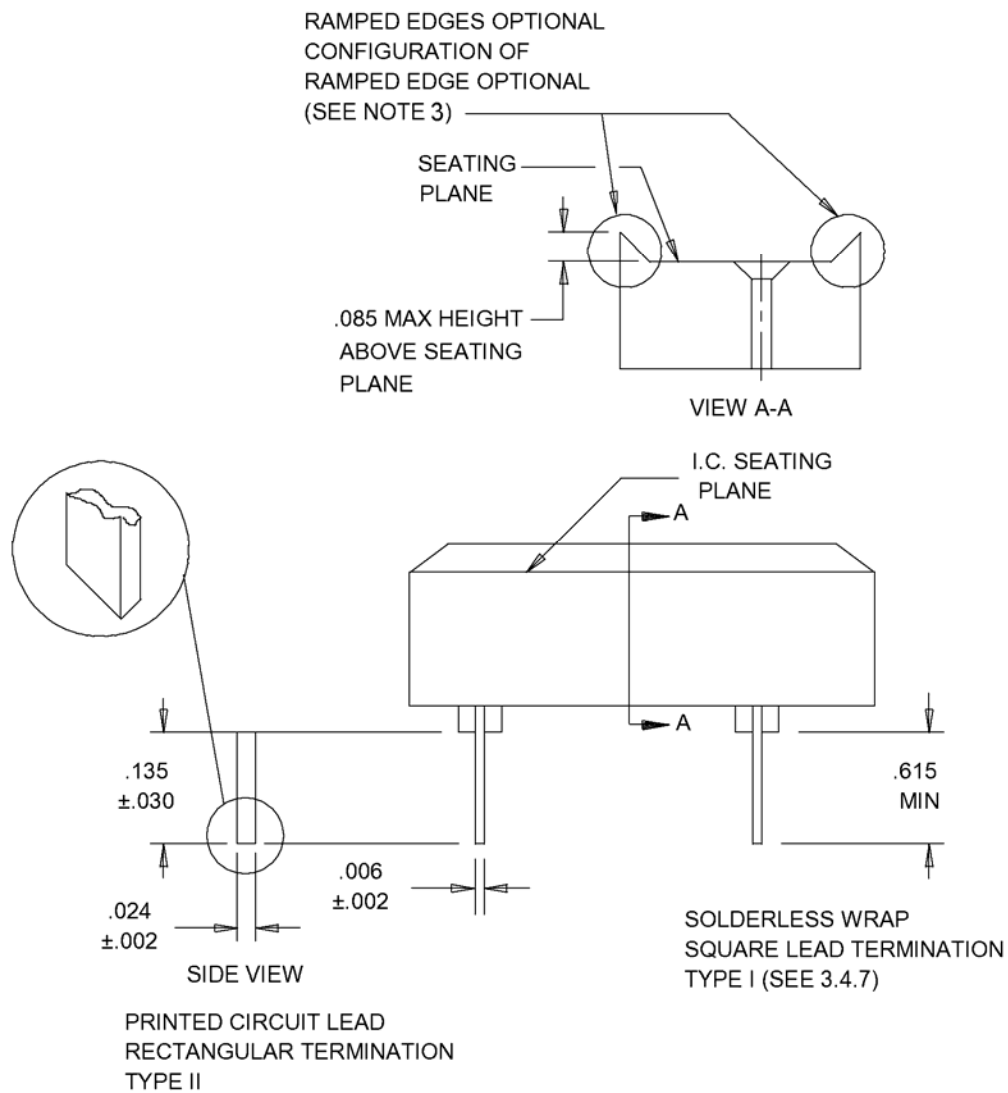
- Style A: 2-piece contact. A 2-piece contact assembly with a closed bottom seamless outer sleeve and a multi-finger inner spring contact (4 maximum)
- Style B: Stamped and formed contact. A contact which, in its entirety, is made by stamping conforming

##### 1.2.3 Insulator body configurations.

- Configuration 1- Solid body without mounting holes.
- Configuration 2- Open frame.
- Configuration 3- Solid body with mounting holes.

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@dla.mil](mailto:RectangularConnector@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>.

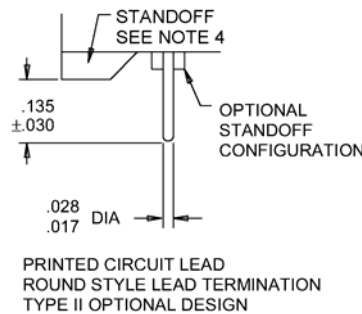
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Inches	mm
.002	0.05
.006	0.15
.017	0.43
.024	0.61
.028	0.71
.030	0.76
.085	2.16
.135	3.43
.615	15.62

FIGURE 1. Terminal types.

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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. May be raised edges, used as guide.
4. Configuration and location are optional (minimum of 2).
5. Recommended hole size (for type II terminals only)  $.035$  inch ( $0.89$  mm)  $.003$  inch ( $0.076$  mm).

FIGURE 1. Terminal types - Continued.

## 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 of 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 of 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 SPECIFICATIONS

- |                 |   |  |
|-----------------|---|--|
| MIL-M-24519     | - | Molding Plastics, Electrical, Thermoplastic                      |
| MIL-DTL-83505/1 | - | Sockets (Lead, Electronic Components) (Type I, Solderless Wrap)  |
| MIL-S-83505/2   | - | Sockets (Lead, Electronic Components) (Type II, Printed Circuit) |

(See supplement 1 for list of specification sheets.)

## DEPARTMENT OF DEFENSE STANDARDS

- |              |   |   |
|--------------|---|---|
| MIL-STD-202  | - | Test Methods for Electronic and Electrical Component Parts  |
| MIL-STD-790  | - | Established Reliability and High Reliability Qualified Products List (QPL) Systems For Electrical, Electronic, and Fiber Optic Parts Specifications |
| MIL-STD-810  | - | Environmental Engineering Considerations and Laboratory Tests   |
| 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.)

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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.

## ASTM INTERNATIONAL

- ASTM B16\B16M - Rod, Bar, and Shapes for use in Screw Machines, Free Cutting Brass
- ASTM B103\B103M - Bronze Plate, Sheets, Strip, and Rolled Bar, Phosphor
- ASTM B122\B122M - Plate, Sheet, Strip, and Rolled Bar, Copper, Nickel-Tin Alloy, Copper Nickel Zinc Alloy (Nickel Silver), and Copper Nickel Alloy
- ASTM B139\B139M - Rod, Phosphor Bronze, Bar, and Shapes
- ASTM B194 - Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar
- ASTM B196\B196M - Rod and Bar, Copper Beryllium Alloy
- ASTM B488 - Electrodeposited Coatings of Gold for Engineering Uses
- ASTM B579 - Alloy, Tin-Lead (Solder Plate) Electrodeposited Coatings of
- ASTM B740 - Copper-Nickel-Tin Spinodal Alloy Strip, Standard Specification for
- ASTM D4067 - Reinforced and Filled Poly (Phenylene Sulfide) (PPS) Injection Molding and Extrusion Materials
- ASTM-D5948 - 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.)

## ELECTRONIC INDUSTRIES ALLIANCE (EIA)

- EIA-364 - Electrical Connector/Socket Test Procedures Including Environmental Classifications
- 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-364-31 - Humidity Test Procedure for Electrical Connectors and Sockets
- EIA-364-32 - Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets
- EIA-364-71 - Solder Wicking (Wave Solder Technique) 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.)

## INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 10012-1 - Equipment, Quality Assurance Requirements for Measuring – Part 1: Metrological Confirmation System for Measuring Equipment.

(Copies of these documents are available online at <http://www.iso.ch> or from the International Organization for Standardization American National Standards Institute, 11 West 42<sup>nd</sup> Street, 13<sup>th</sup> Floor, New York, NY 10036.)

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### NCSL INTERNATIONAL

NCSL-Z540.1 - Calibration Laboratories and Measuring and Test Equipment, General Requirements

(Copies of these documents are available online at <http://www.ncsli.org> or from the National Conference of Standards Laboratories (NCSL), 2995 Wilderness Place, Suite 107, Boulder, CO 80301-5404.)

### SAE INTERNATIONAL

SAE-AMS-QQ-N-290 - Nickel Plating (Electrodeposited).

(Copies of these documents are available online at <http://www.sae.org> or from the Society of Automotive Engineers, 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.

3.2 Qualification. Sockets and accessories furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time of award of contract (see 4.3 and 6.3).

3.2.1 Reliability. The contractors' reliability program for assembled sockets and assembly procedures shall meet the requirements of MIL-STD-790 with the exception that the failure reporting period shall be twelve months in lieu of six months.

3.3 Materials requirements. The materials used to manufacture these connectors shall be as specified herein. When a definite material is not identified, a material shall be used which will enable the connectors to meet all requirements of this specification. Acceptance or approval of a constituent material shall not be construed as a guaranty of acceptance of the finished product.

3.3.1 Recycled, recovered, or environmentally preferable material. 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 costs.

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3.3.2 Reference materials, plating, and processes. The materials, plating and processes identified in this specification assure that connectors 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.

3.4 Design and construction. Sockets shall be of the design, construction, and physical dimensions specified (see 3.1).

3.4.1 Body (and removable insulator, when applicable). Unless otherwise specified, the body shall be a diallyl phthalate in accordance with ASTM-D5948, type SDG-F (nylon-glass filled, type I, grade A); polyester-glass filled, type GPT-15F, GPT-20F, GPT-30F and GPT-30F in accordance with MIL-M-24519; polyphenylene sulfide-glass filled in accordance with ASTM D4067, type PPS000G40A43443E1 1 (see 3.1).

3.4.2 Socket contacts (including termination). Unless otherwise specified, the socket contacts (including termination) shall be brass in accordance with ASTM B16\B16M; beryllium-copper in accordance with ASTM B139\B139M, ASTM B194, or ASTM B196\B196M; copper-nickel-tin (C72900) in accordance with ASTM B740; phosphor bronze in accordance with ASTM B103\B103M; copper-nickel alloy (C72500); or nickel-silver (CA77000) in accordance with ASTM B122\B122M and shall meet the applicable requirements herein and as specified (see 3.1).

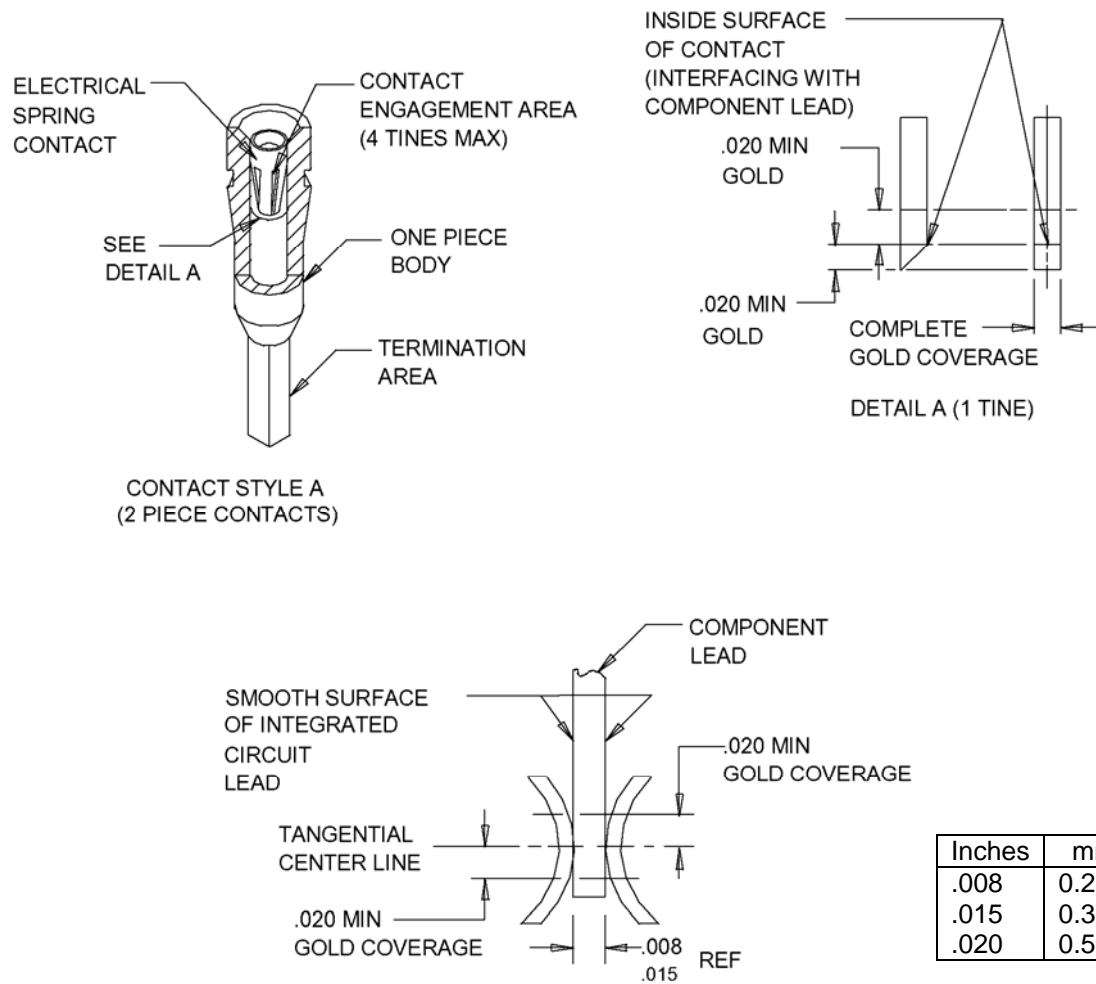
3.4.3 Contact plating guidelines. Electrical contact plating shall be gold in accordance ASTM B488, code C, type 2, class 0.75, .00003 inch (0.0008 mm) thickness.

3.4.4 Contact finish. All contact finishes shall have an underplate of nickel in accordance with SAE-AMS-QQ-N-290, class 2, .00003 to .00015 inch (0.0008 to 0.0038 mm) thick. When contacts have been provided in strip form, the absence of plating in the area where the contact was removed from the strip is acceptable provided it is in a nonfunctional area and any corrosion formed as a result of salt spray testing does not creep into the contact engagement area.

3.4.4.1 Overall finish. All parts of the contact finish shall be gold in accordance with ASTM B488, code C, type 2, class 0.75, or tin-lead in accordance with ASTM B579, .0001 inch (0.003 mm) thick minimum (5 percent minimum lead) for those contacts having a solderless wrap termination and .0001 inch (0.003 mm) thick minimum (50 to 70 percent tin) for those contacts having wave solder tail termination's (see 3.1 and 3.4.3).

3.4.4.2 Localized finish contact engagement area. The finish shall be gold in accordance with ASTM B488, code C, type 2, class 0.75, or tin-lead in accordance with ASTM B579, .0001 inch (0.003 mm) thick minimum (5 percent minimum lead) (see figure 2 and 3.4.3).

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FIGURE 2. Localized finish for contact styles A and B.3.4.4.3 Localized finish termination area.

3.4.4.3.1 Solderless wrappost. The finish shall be gold in accordance with ASTM B488, type 2, code C, type 1.25 or tin-lead in accordance with ASTM B579, .0001 inch thick minimum (5 percent minimum lead) (see 3.1 and 3.4.3).

3.4.4.3.2 Wave solder tail. The finish shall be gold or tin-lead in accordance with ASTM B579, .0001 inch (0.003 mm) thick minimum (50 to 70 percent tin) (see 3.1 and 3.4.3).

3.4.4.3.3 Nonfunctional areas. Any portion of the contact other than the contact engagement or termination area shall be as specified in 3.4.4 or 3.4.4.1 (see 3.1).

3.4.5 Termination. The form factor and dimensions of the terminals shall be as specified (see figure 1).

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3.4.6 Contact identification. Contact identification shall be as specified (see 3.1).

3.4.7 Body design. The body shall be designed and 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.

3.4.8 Polarization. A polarization feature (mechanical or visual) shall be incorporated in each socket to assist correct insertion.

3.4.9 Alignment. Sockets shall have a feature which will insure proper alignment of mating component leads.

3.4.10 Mounting. Sockets shall be mounted as specified (see 3.1).

3.4.11 Mounting standoffs. Socket bodies intended to be soldered to a printed circuit board shall be provided with mounting bosses so that a minimum of .012 inch (0.30 mm) clearance is maintained between the mounting board and the socket body at each terminal location.

3.5 Performance. Connectors shall be designed to meet the performance requirements specified herein.

3.5.1 Test gauge mating force. When tested in accordance with 4.6.2, the maximum mating force shall be .75 pound (0.34 kg) times the number of contact positions.

3.5.2 Test gauge withdrawal force. When tested in accordance with 4.6.3, the withdrawal force shall be not less than .5 ounce (14.7 grams).

3.5.3 Contact retention. When tested in accordance with 4.6.4, there shall be no damage or loosening of the contacts. For type II terminals (printed circuit), distortion of the solder tail shall not be considered damage.

3.5.4 Insulation resistance. When tested in accordance with 4.6.5, the initial insulation resistance shall be not less than 5,000 megohms.

3.5.5 Dielectric withstanding voltage. When tested in accordance with 4.6.6, there shall be no evidence of breakdown of insulation or flashover.

3.5.6 Low-signal level contact resistance. When tested in accordance with 4.6.7, the socket contacts shall not exceed 20 milliohms initially. After exposure, the socket contacts shall not exceed the initial value by more than 10 milliohms.

3.5.7 Capacitance. When tested in accordance with 4.6.8, the capacitance shall not exceed two picofarads.

3.5.8 Terminal strength (applicable to type I). Testing of terminals as specified in 4.6.9.1 and 4.6.9.2 shall not result in damage to the terminal.

3.5.9 Vibration. When tested in accordance with 4.6.10, there shall be no physical or mechanical damage to the socket body or 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 requirement of 3.5.6 and the test gauge withdrawal force of 3.5.2.



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3.5.10 Mechanical shock. When tested in accordance with 4.6.11, 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.

3.5.11 Socket durability. When tested in accordance with 4.6.12, the sockets shall show no evidence of cracking or breaking. The contact resistance requirement of 3.5.6 shall not be exceeded, and the test gauge withdrawal force requirement of 3.5.2 shall be met.

3.5.12 Temperature cycling. When a socket with a dummy plug-in fixture is tested in accordance with 4.6.13, 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.

3.5.13 Humidity. When tested in accordance with 4.6.14, insulation resistance shall be not less than 300 megohms.

3.5.14 Corrosive atmosphere. When tested in accordance with 4.6.15, there shall be no evidence of porous plating or exposure of base metal on the contacting surfaces and the contact resistance requirement of 3.5.6 shall not be exceeded.

3.5.15 Solderability. Terminations shall withstand the test specified in 4.6.16.

3.5.16 Solder wicking. Socket bodies and terminals intended for soldering to a printed circuit board shall be tested in accordance with 4.6.17. The anti-wicking feature shall be an integral part of the socket design.

3.5.17 Resistance to soldering heat. Sockets shall withstand the test specified in 4.6.18.

3.5.18 Fungus. When tested in accordance with 4.6.19, there shall be no evidence of fungus growth on the external surfaces.

3.6 Marking. Sockets shall be marked in accordance with method I of MIL-STD-1285, and shall include the military PIN (see 3.1), the manufacturer's name or code symbol, and date code. Sockets with 12 or less contacts the military PIN shall be marked on the package. Sockets with 14 contacts or more shall be marked with the military PIN (as a minimum).

3.6.1 JAN brand. The United States Government has adopted, and is exercising legitimate control over the certification marks "JAN" "J", respectively, to indicate that items so marked or identified are manufactured to, and meet all the requirements of specifications. Accordingly items acquired to, and meeting all the criteria specified herein and in applicable specifications shall bear the certification mark "JAN" except that items too small to bear certification mark "JAN" shall bear the letter "J". The "JAN" or "J" shall be placed immediately before the part number except that if such location would place a hardship on the manufacturer in connection with such marking, the "JAN" or "J" may be located on the first line above or below the part number. Items furnished under contracts or orders which either permit or require deviation from the conditions or requirements specified herein or in applicable specifications shall not bear "JAN" or "J". In the event an item fails to meet the requirements of this specification and the applicable specification sheet or associated specifications, the manufacturer shall remove completely the military part number and "JAN" or the "J" from the sample tested and also from all items represented by the sample. The "JAN" or "J" certification mark shall not be used on products acquired to contractor drawings or specifications. The United States Government has obtained Certificate of Registration Number 504,860 for the certification mark "JAN" and Registration Number 1,586,261 for the certification mark "J".

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3.7 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 (see 4.6.1).

#### 4. Verification

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

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).
- c. Material inspection (see 4.4).

4.1.1 Verification Program. Requirements for the verification program shall be as identified in the qualification instructions (see 6.3).

4.1.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment (i.e. NCSL-Z540.1, ISO 10012-1, or equivalent) shall be required.

4.2 Qualification inspection. Qualification inspection shall be in accordance with table I. Test shall be performed at a laboratory acceptable to the Government on sample units produced with equipment and procedures normally used in production (see 6.3).

##### 4.2.1 Sample size.

4.2.1.1 Single submission. Fourteen sockets shall be subjected to qualification inspection.

4.2.1.2 Group submission. To qualify sockets, 10 samples shall be selected from the specification sheet listing the largest number of contacts and shall qualify sockets listed on other specification sheets having a lesser number of contacts that are of the same design, construction, and materials. Two samples of each smaller size socket shall be submitted to visual and mechanical inspection, dimensions, mating and withdrawal force, and dielectric withstanding voltage. Alternate terminals shall be qualified by submitting two samples of each style to group I and group II of table I. Sockets with inserted terminals will not be considered the same design as those with the terminals molded in place.

4.2.2 Inspection routine. The sample shall be subjected to the inspections specified in table I, in the order shown. The sample shall be divided into six groups of 4, 2, 2, 2, 2, and 2 units each and then subjected to the inspections for their particular group.

4.2.2.1 Extension of qualification: Manufacturers that use MIL-DTL-83505/1 or MIL-S-83505/2 qualified sockets shall be exempt from performing specified tests in groups I and III, and table II group A inspection, except for visual and mechanical examination, specified in MIL-DTL-83734. Conversely manufacturers that qualify MIL-DTL-83734 sockets "style A" shall perform visual and mechanical examination and group II tests in the qualification table of MIL-DTL-83505 to be listed in QPL-83505.

4.2.3 Failures. One or more failures shall be cause for refusal to grant qualification approval.

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### 4.3 Conformance inspection.

4.3.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection.

4.3.1.1 Inspection lot. An inspection lot shall consist of all sockets of the same configuration (other than number of pins), produced under essentially the same conditions, and offered for inspection at one time.

4.3.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table II, in the order shown.

4.3.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with table II. The sample sizes shall be as specified in table III.

4.3.1.2.2 Reinspected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.3.2 Periodic inspection. Periodic inspection shall consist of group B inspection. Except where the results of this inspection show noncompliance with the applicable requirements (see 4.3.2.1.4), delivery of products which have passed group A shall not be delayed pending the results of these periodic inspections.

4.3.2.1 Group B inspection. Group B inspection shall consist of the inspections specified in table I, in the order shown. Group B inspection shall be made on sample units which have been subjected to and have passed the group A inspection.

4.3.2.1.1 Sampling plan. Fourteen sample sockets of the largest size for which the manufacturer is qualified and which have been produced during this period shall be selected at random every 36 months. Sample units shall be divided into six groups of 4, 2, 2, 2, 2, and 2 units each and then subjected to the inspections for their particular group (see 4.3.1.2).

4.3.2.1.2 Failures. If any sample units fail to pass group B inspection, the entire sample shall be considered to have failed.

4.3.2.1.3 Disposition of sample units. Sample units which have been subjected to group B inspection shall not be delivered on the contract.

4.3.2.1.4 Noncompliance. If a sample fails to pass group B Inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action; acceptable to the qualifying activity has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional sample units (all inspections, or the inspection which the original sample failed, at the option of the qualifying activity). Group A inspection may be reinstituted; however, final acceptance and shipment shall be withheld until the group B inspection has shown that the corrective action was successful. In the event of failure after re-inspection, information concerning the failure shall be furnished to the inspection activity and the qualifying activity.

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4.4 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials, as specified herein and on the specification sheet (see 3.1), used in fabricating the sockets, and are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

4.4.1 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in EIA-364 and MIL-STD-202.

4.5 Retention of qualification. To retain qualification, the manufacturer shall verify in coordination with the qualifying activity the capability of manufacturing products which meet the performance requirements of this specification. Refer to the qualifying activity for the guidelines necessary to retain qualification to this particular specification. The manufacturer shall immediately notify the qualifying activity at any time that the inspection data indicates failure of the qualified product to meet the performance requirements of this specification.

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TABLE I. Qualification inspection.

Inspection <sup>1/</sup>	Requirement paragraph	Test method paragraph	Mating
Group I (4 sample units)			
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.6, and 3.7	4.6.1	Unmated
Test gauge mating force	3.5.1	4.6.2	Unmated
Terminal strength (applicable to type I)	3.5.8	4.6.9	Unmated
Socket durability	3.5.11	4.6.12	Mated
Vibration	3.5.9	4.6.14	Mated
Mechanical shock	3.5.10	4.6.11	Mated
Low-signal level contact resistance	3.5.6	4.6.7	Mated
Test gauge withdrawal force	3.5.2	4.6.3	Test gauge
Insulation resistance	3.5.4	4.6.5	Mated
Dielectric withstanding voltage	3.5.5	4.6.6	Mated
Group II (2 sample units) <sup>2/</sup>			
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.6, and 3.7	4.6.1	Unmated
Temperature cycling	3.5.12	4.6.13	Unmated
Insulation resistance	3.5.4	4.6.5	Mated
Humidity	3.5.13	4.6.14	Mated
Low-signal level contact resistance-	3.5.6	4.6.7	Mated
Insulation resistance-	3.5.10	4.6.13	Unmated
Dielectric withstanding voltage	3.5.5	4.6.6	Unmated
Group III (2 sample units) <sup>3/</sup>			
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.6, and 3.7	4.6.1	Unmated
Corrosive atmosphere	3.5.14	4.6.15	Mated
Low-signal level contact resistance-	3.5.6	4.6.7	Mated
Group IV (2 sample units)			
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.6, and 3.7	4.6.1	Unmated
Solderability	3.5.15	4.6.16	Unmated
Solder wicking	3.5.16	4.6.17	Unmated
Group V (2 sample units)			
Visual and mechanical inspection	3.1, 3.3, 3.5, 3.6, and 3.7	4.6.1	Unmated
Capacitance	3.5.7	4.6.8	Unmated
Resistance to soldering heat	3.5.17	4.6.18	Unmated
Contact retention	3.5.3	4.6.4	
Group VI (2 sample units)			
Fungus	3.5.18	4.6.19	Unmated

<sup>1/</sup> The number of contacts tested shall be 50% but not less than 10 each or 100% for sockets with 8 or less contact positions. Dimensional check performed group I only.

<sup>2/</sup> If a unit fails a test it may be removed from the board and retested to determine if failure was due to the board or socket.

<sup>3/</sup> See 4.3.2.1.

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TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method
Visual and mechanical inspection <sup>1/</sup>	3.1, 3.3, 3.5, 3.6 and 3.7	4.6.1
Test gauge mating force	3.5.1	4.6.2
Test gauge withdrawal force	3.5.2	4.6.3

<sup>1/</sup> Only two samples each, for physical dimensions. If one or more of the two samples fail, the complete lot sample shall be inspected for physical dimensions.

TABLE III. Sampling plan.

Lot size	Sample size
1 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

4.6 Methods of inspection.

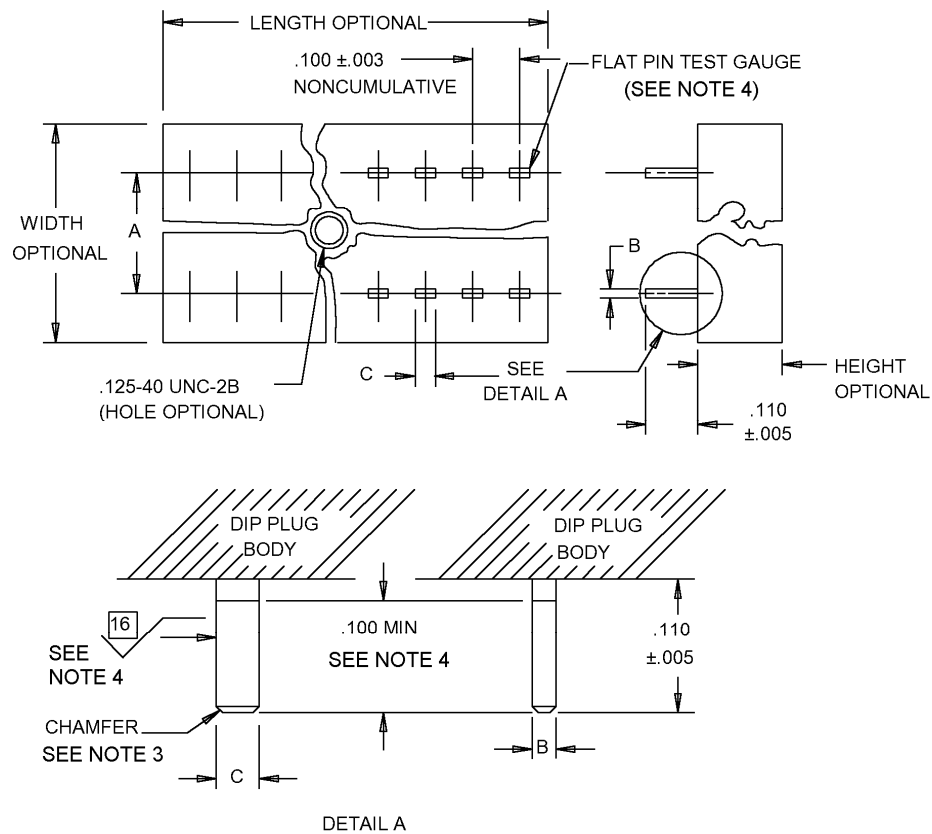
4.6.1 Visual and mechanical inspection. Sockets shall be inspected to verify that the dimensions, materials, design, construction, marking, and workmanship are in accordance with the applicable requirements (3.1, 3.3, 3.4, 3.6 and 3.7).

4.6.2 Test gauge mating force (see 3.5.1). The initial force required to fully insert the test gauge (see figure 3 for dual-in-line packages and figure 4 for single-in-line packages) shall be measured. The measuring equipment shall conform to the following:

- a. The vertical axis of the test gauge shall coincide with the vertical axis of the socket.
- b. The test gauge shall travel along the vertical axis of the socket.
- c. The speed of insertion of the test gauge into the socket contacts shall not exceed 2 inches per minute for constant-speed machines, or the rate of loading shall not exceed 80 (36.29 kg) pounds 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.

4.6.3 Test gauge withdrawal force (see 3.5.2). After two unmonitored insertions and withdrawals of the mating test gauge (see figure 3 and figure 4), the individual withdrawal force shall be measured using the minimum thickness single blade pin (see figure 5). Test pin shall be inserted to a depth of .100 inch (2.54 mm) minimum and the withdrawal force shall be measured.

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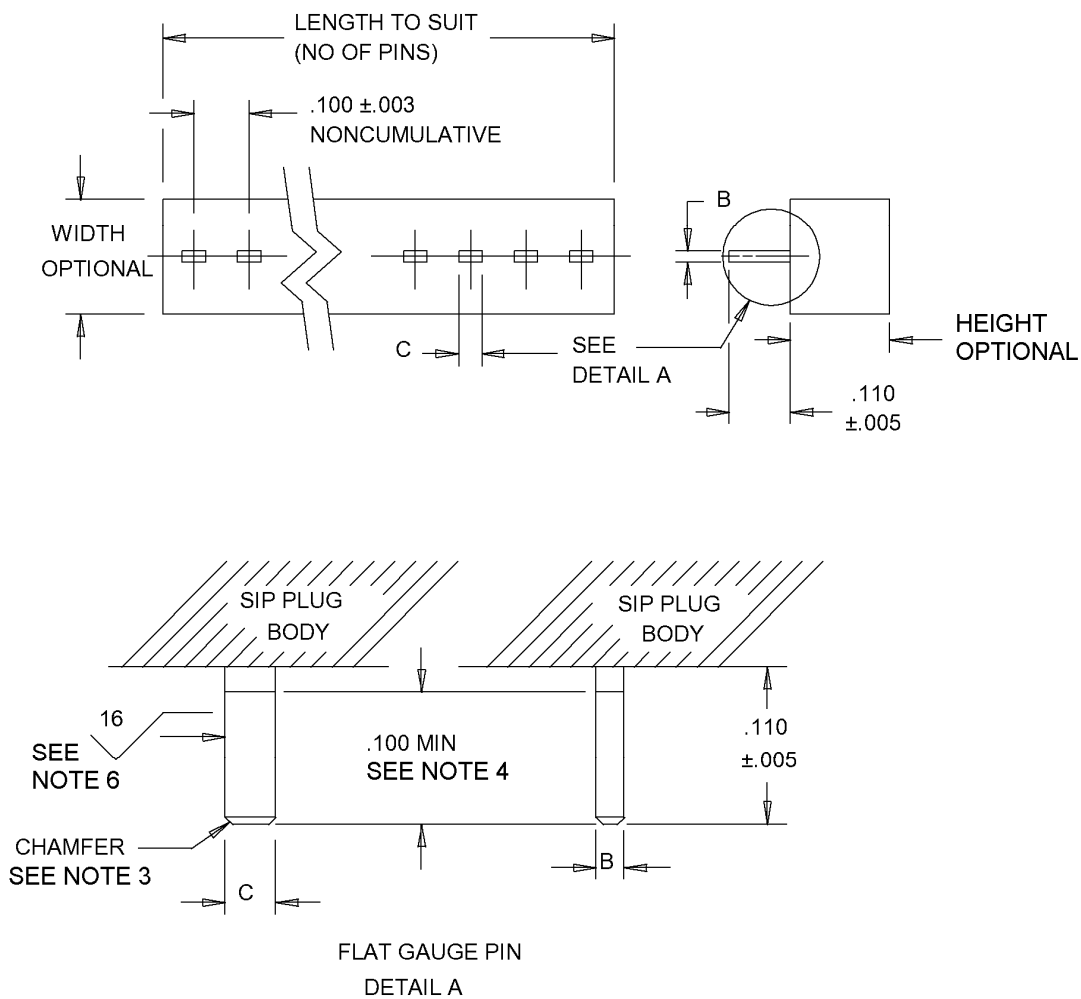
Inches	mm
.003	0.08
.005	0.13
.100	2.54
.110	2.79
.125	3.81

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Acceptable chamfer on flat pin to be .003/.005 x 05E all sides.
4. Flat pin test gauge material shall be carbon steel, finish 16 microinches maximum, all four sides.

FIGURE 3. Mating test gauge pins (for dual-in-line sockets).

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Dimension	
B	C
.130 +.0000 -.0005	.0200+.0000 -.0005

Inches	mm
.003	0.08
.005	0.13
.100	2.54
.110	2.79
.125	3.81

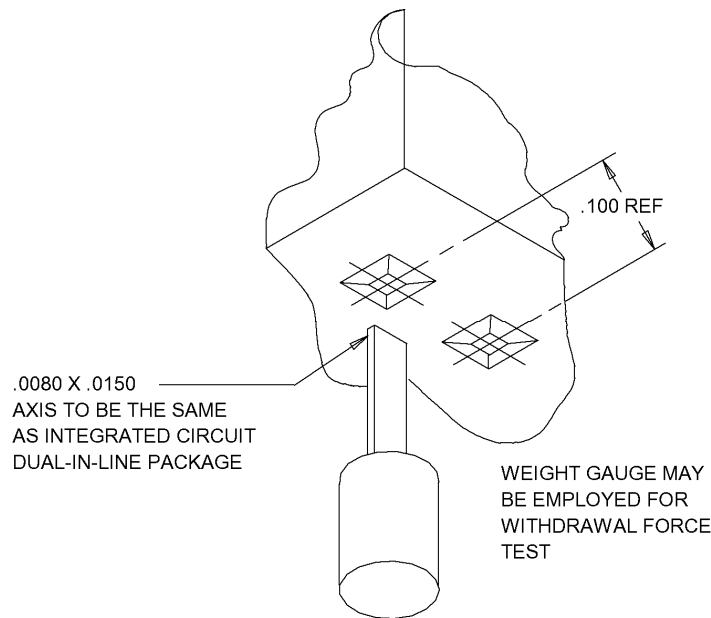
## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Acceptable chamfer on flat pin to be .003/.005 x .05E all sides.
4. Number of leads to correspond to number of contacts in socket.
5. Grinding of blades shall be in a longitudinal direction.
6. Flattest gauge material shall be carbon steel, finish 16 microinches maximum, all four sides.

FIGURE 4. Mating test gauge pin (for single-in-line packages).



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## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, tolerance is ".0005".
4. Material: All pins carbon steel, finish 16 microinches maximum.

FIGURE 5. Contact withdrawal force.4.6.4 Contact retention (see 3.5.3).

4.6.4.1 Solderless wrap, type I (applicable to style A). With the socket mounted to an appropriate fixture, a 7.5 pound (3.40 kg) axial load shall be applied to terminals intended for solderless wrap applications in the same direction as that applied by the wire wrapping tool. There shall be no damage or loosening of contacts.

4.6.4.2 Solder termination type II (applicable to style B). A .75 pound (34.02 kg) axial load shall be applied from the top as a pushing force for top loaded contacts and a .75 (34.02 kg) pound axial load shall be applied from the bottom as a pulling force for bottom loaded contacts. There shall be no damage or loosening of contacts.

4.6.4.3 Spring contact retention, type II (applicable to style A). A 7.5 pound (3.40 kg) axial force shall be applied against the spring fingers with the socket mounted in an appropriate fixture. Any separation of the spring contact from the sleeve shall be considered as damage to the contact.

4.6.5 Insulation resistance (see 3.5.4). Sockets shall be tested in accordance with test procedure EIA-364-21. While mated to a dummy plug and unwired, the resistance between individual contacts and the resistance between contacts and metal shell shall be measured.

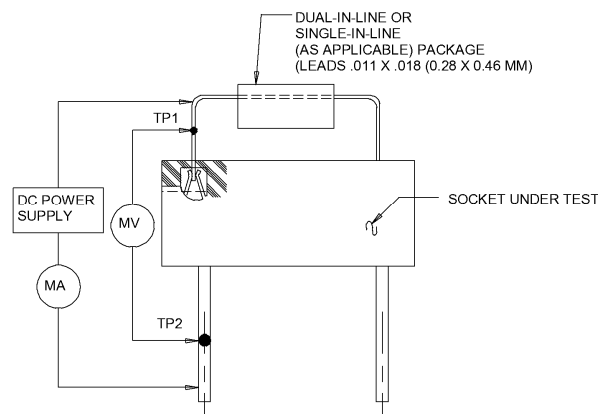
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4.6.6 Dielectric withstanding voltage (see 3.5.5). Sockets shall be tested in accordance with test procedure EIA-364-20. The following details and exceptions shall apply:

- a. Preparation: Mated with a dummy plug-in fixture, but not mounted on a printed circuit board.
- b. Wired with all odd-numbered contacts connected in parallel and all even-numbered contacts connected in parallel. Also, any metallic parts connected in parallel.
- c. Magnitude of test voltage: 600 volts.
- d. Nature of potential: AC (rms).
- e. Points of application of test voltage: Between all odd-numbered contacts connected together and all even-numbered contacts and all other metallic parts connected together.
- f. Method of connection of test voltage to specimen: Affix test probes to termination's described in "a" above by clips or solder.

4.6.7 Low-signal level contact resistance (see 3.5.6). The low-signal level contact resistance shall be measured as specified on [figure 6](#) (for dual-in-line sockets). A minimum of seven contacts shall be measured on each test specimen in accordance with test procedure EIA-364-23. For single-in-line package sockets with less than seven contacts, all contacts shall be measured. The following details shall apply:

- a. Mated with dual-in-line or single-in-line packages (as applicable) measure resistance between individual mated contacts (see [figure 6](#)). The dual-in-line or single-in-line package (as applicable) shall be inserted to a minimum depth of .100 inch (2.54 mm).
- b. Environmental conditioning not required.
- c. Lead and socket finishes shall be of the same generic material.



## NOTES:

1. Dimensions are inches.
2. Metric equivalents are given for information only.
3. TP1 and TP2 are the points at which the voltage drop is measured. The distance between TP1 and TP2 shall be maintained throughout qualification testing where low signal level contact is required to be performed.
4. The distance between TP1 and TP2 shall be submitted with low signal level contact resistance test data (e.g., .170 inch (4.32 mm) .010 inch (0.25 mm)).

FIGURE 6. Low-signal level contact resistance test set-up (for SIPS, DIPS, of style A or B).

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4.6.8 Capacitance (see [3.5.7](#)). The socket shall be tested in accordance with method 305 of MIL-STD-202. The following details shall apply:

- a. Test frequency: 1 kHz.
- b. Polarization: Not applicable.
- c. Unmounted.
- d. Adjacent pins.
- e. Seven readings.

4.6.9 Terminal strength (applicable to type I (see [3.5.8](#))).

4.6.9.1 Bend test. The contact terminals shall be soldered to a printed circuit board and then tested in accordance with method 211 of MIL-STD-202, test condition C, with test load of 1 pound. The bend for type I shall be only 30° each side of center.

4.6.9.2 Torque test. Sockets shall be tested in accordance with method 211 of MIL-STD-202, test condition E, with 2.5 (17.6 milliNewton meters) ounce-inches torque.

4.6.10 Vibration (see [3.5.9](#)). Sockets shall be tested in accordance with test procedure EIA-364-28. Two samples shall be monitored and two unmonitored for discontinuities. The following details shall apply:

- a. Test condition: III.
- b. Preparation: Dual-in-line sockets shall be mated with a dummy plug-in fixture (see [figure 7](#)). Single-in-line package units shall be mated with a dummy plug-in fixture (see [figure 8](#)).
- c. At the conclusion of this test, the contact resistance shall be measured in accordance with [4.6.7](#) on the two unmonitored samples, and the test gauge withdrawal force shall be measured in accordance with [4.6.3](#) on all samples.

4.6.11 Mechanical shock (see [3.5.10](#)). The socket shall be tested in accordance with test procedure EIA-364-27. The following details shall apply:

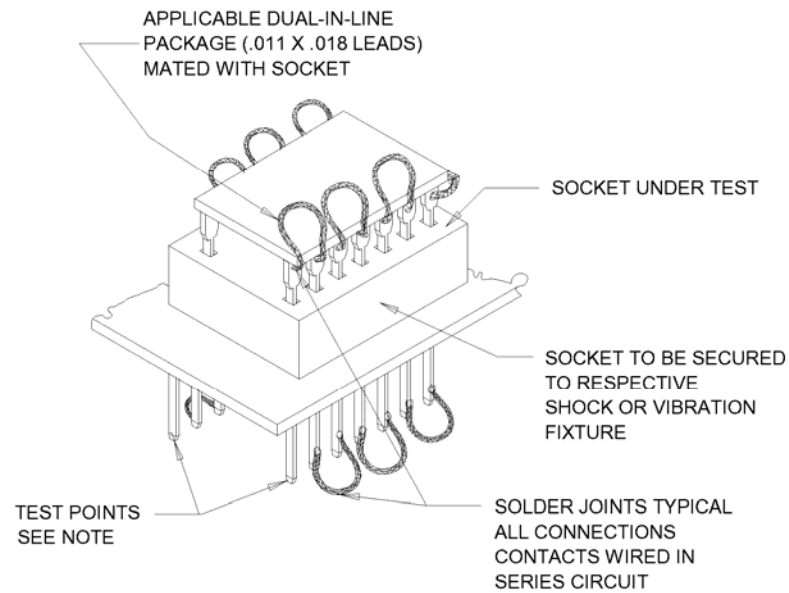
- a. Mounting method and accessories: Mounted by normal means and suitable monitoring circuit to detect any interruption greater than 1 microsecond.
- b. Acceleration requirements: Test condition G.
- c. Number of blows: One blow in both directions along each of three mutually perpendicular axes for a total of six shocks.
- d. Preparation: Dual-in-line sockets shall be mated with DIP plug-in fixture (see [figure 7](#)). Single-in-line packages shall be mated with SIP plug-in fixture (see [figure 6](#)).

4.6.12 Socket durability (see [3.5.11](#)). Each unit shall be subjected to 50 mating and unmating cycles using the test gauge (see [figure 3](#) and [figure 4](#)). At the conclusion of the test, the contact resistance shall be measured in accordance with [4.6.7](#) and the test gauge withdrawal force shall be measured in accordance with [4.6.3](#).

4.6.13 Temperature cycling (see [3.5.12](#)). Sockets shall be tested in accordance with test procedure EIA-364-32. The following details shall apply:

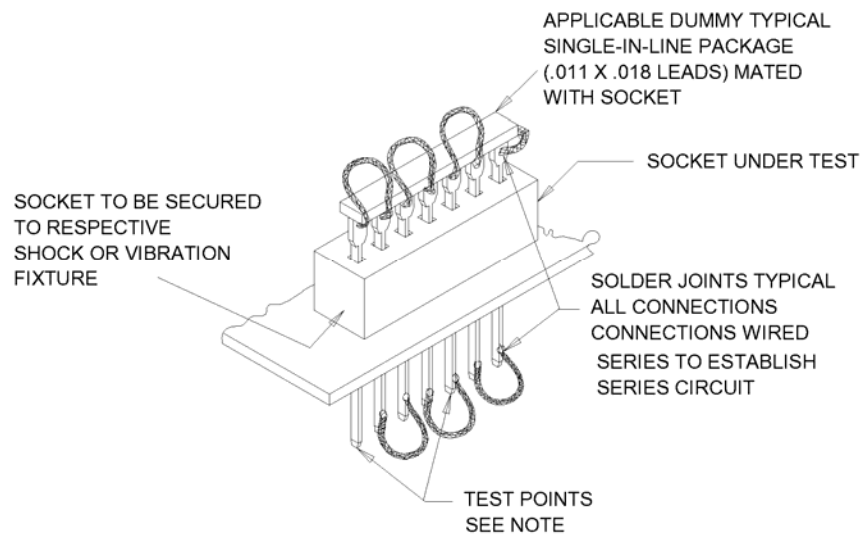
- a. Unmated, unwired: No measurement.
- b. Test temperature: Gold plating: -55° to +125°. Tin-lead plating: -55° to +105°.
- c. Test condition A (with temperatures shown in b).
- d. Upon completion of test, the dummy plug-in fixture shall be mated and unmated.

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NOTE: Points of electrical connection of power supply and monitoring equipment.

FIGURE 7. Vibration and mechanical shock test set-up for dual-in-line package sockets.



NOTE: Points of electrical connection of DC power supply and monitoring equipment.

FIGURE 8. Vibration and mechanical shock test set-up for single-in-line package sockets.

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4.6.14 Humidity (see 3.5.13). Unwired sockets shall be tested in accordance with test procedure EIA-364-31, Method IV, except step 7a shall be omitted.

4.6.15 Corrosive atmosphere (see 3.5.14). Mated sockets shall be exposed to a concentrated sulfur atmosphere. The following details shall apply:

- a. Sockets which have been preconditioned by being subjected to two unmonitored insertions of the mating force test gauge (see figure 3 and figure 4) shall be mated with a dummy plug-in fixture and then exposed to a 10-25 ppm solution of ammonium polysulfide at a relative humidity of 60 percent or higher at room temperature for four hours in an enclosed chamber.
- b. At the conclusion of the sulfur atmosphere exposure, the low-signal level contact resistance of the undisturbed mated socket shall be measured in accordance with 4.6.7.

4.6.16 Solderability (see 3.5.15). Each terminal shall be subjected to method 208 of MIL-STD-202.

4.6.17 Solder wicking (see 3.5.16). Sockets shall be tested in accordance with test procedure EIA-364-71, using the following time duration of exposure to the solder wave:

$$\text{a defined by: } T = \frac{5D}{S}$$

Style A contacts: 5 seconds

Style B contacts: 3 seconds

4.6.18 Resistance to soldering heat (see 3.5.17). Sockets shall be tested in accordance with method 210 of MIL-STD-202, test condition B. Sockets may be mounted on a glass epoxy wiring board.

4.6.19 Fungus (see 3.5.18). The sockets shall either be certified as containing fungus resistant external material or tested in accordance with MIL-STD-810 method 508.

## 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.

## 6. NOTES

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

6.1 Intended use. Sockets covered by this specification are intended for use on a printed circuit board and terminals may be soldered to the printed circuit board unless otherwise noted in the specification sheets. Only sockets and integrated circuits with similar contact finish are to be mated. Mounting may be accomplished with standard mechanical fasteners, unless otherwise noted in the specification sheets.

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6.1.1 Application restrictions. Sockets will not to be used in applications requiring use of integrated circuits that have been screened to class A reliability level of MIL-STD-883, Test Methods and Procedures for Microelectronics, and they will not be used in applications requiring integrated circuits screened to class B levels other than fixed ground installations for which they have been specifically approved by the acquiring activity.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Title, number, and date of the applicable specification sheet, and the complete PIN (see [1.2.1](#) and [3.1](#)).
- c. Packaging (see [5.1](#))

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL No. 83734 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from the Defense Supply Center Columbus (DSCC-VQ), Document Control Unit Columbus, P. O. Box 3990, Columbus, OH 43218-3990.

6.4 Definitions.

6.4.1 Dummy plug-in fixture. A dummy plug-in fixture is one with leads which meets all component lead finish B or C requirements of MIL-PRF-38535, Appendix A. External modifications such as attaching wires or strapping together leads are allowable as long as the lead engaging the socket is unmodified (see [4.6.6](#), [4.6.7](#), [4.6.10](#), and [4.6.15](#)).

6.4.2 Corrosive atmosphere. The corrosive atmosphere tests 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.

6.5 Replacement parts. PIN's in this specification have the provision for specifying termination type, contact style, body configuration, and contact plating. This ability to specify options is primarily for use by original equipment manufacturers. For field replacement purposes, the Government will stock, store, and issue only a limited number of these parts which are identified on the specification sheets.

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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. Table IV lists the Environmental Protection Agency (EPA) top seventeen hazardous materials targeted for major usage reduction. Use of these materials should be minimized or eliminated unless needed to meet the requirement specified herein (see Section 3).

TABLE IV. EPA top seventeen hazardous materials.

Benzene	Dichloromethane	Tetrachloroethylene
Cadmium and compounds	Lead and compounds	Toluene
Carbon Tetrachloride	Mercury and compounds	1,1,1 - Trichloroethane
Chloroform	Methyl Ethyl compounds	Trichloroethylene
Chromium and compounds	Methyl Isobutyl Ketone	Xylenes
Cyanide and compounds	Nickel and compounds	

6.7 Subject term (key word) listing.

Alignment  
Beryllium copper  
Contacts  
Gauge pin  
Lead  
Nickel  
Polarization

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.

## CONCLUDING MATERIAL

Custodians:  
Army - CR  
Navy - EC  
Air Force - 99  
DLA - CC

Preparing activity:  
DLA - CC  
(Project 5935-2006-107)

Review activities:  
Navy - AS, MC, OS, SH, TD  
Air Force - 19

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>.