

INCH-POUND

MIL-S-83734F  
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SUPERSEDING  
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5 September 1986

## MILITARY 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 shall be of the following types, styles and configurations, as specified (see 3.1):

##### 1.2.1 Termination type.

- 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 configuration

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

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to 645 Logistics and Operations Group, Electronic Support Division, Gentile Air Force Station, Dayton OH 45444-5400, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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MIL-S-83734F

SPECIFICATIONS

FEDERAL

QQ-N-290 - Nickel Plating (Electrodeposited)

MILITARY

MIL-M-14 - Molding Plastics And Molded Plastic Parts, Thermosetting  
MIL-M-24519 - Molding Plastics, Electrical, Thermoplastic  
MIL-G-45204 - Gold Plating, Electrodeposited.  
MIL-C-55330 - Connectors, Electrical and Fiber Optic, Packaging of  
MIL-P-81728 - Plating, Tin-Lead (Electrodeposited).  
MIL-S-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 associated specifications.)

STANDARDS

MILITARY

MIL-STD-129 - Marking for Shipment and Storage  
MIL-STD-202 - Test Methods For Electronic and Electrical Component Parts  
MIL-STD-790 - Reliability Assurance Program for Electronic Parts Specifications  
MIL-STD-810 - Environmental Test Methods  
MIL-STD-1130 - Connections, Electrical, Solderless Wrapped  
MIL-STD-1189 - Bar Code Symbology, Stand Department of Defense  
MIL-STD-1285 - Marking of Electrical And Electronic Parts  
MIL-STD-1344 - Test Methods For Electrical Connectors  
MIL-STD-2073/1 - DOD Material Procedures for Development and Application of Packaging Requirements  
MIL-STD-2073/2 - Packaging Requirement Codes  
MIL-STD-45662 - Calibration Systems Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 )

2.2 Non-Government publications The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the document cited in the solicitation (see 6.2)

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA-557 - EIA Standard Implementation of Statistical Process Control (SPC) in Manufacturing Process

(Application for copies should be addressed to the Electronic Industries Association, 2001 Eye Street, N.W., Washington, DC 20006.)

COPPER DEVELOPMENT ASSOCIATION, INC

Copper Alloy No. CA725  
Copper Alloy No. CA770

(Application for copies should be addressed to the Copper Development Association, Inc., 405 Lexington Avenue, New York, NY 10017 )

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B16	-	Rod, Bar, and Shapes for use in Screw Machines, Free Cutting Brass
ASTM B103	-	Bronze Plate, Sheets, Strip, and Rolled Bar, Phosphor
ASTM B122	-	Plate, Sheet, Strip, and Rolled Bar, Copper, Nickel-Tin Alloy, Copper Nickel Zinc Alloy (Nickel Silver), and Copper Nickel Alloy, Standard Specification for.
ASTM B139	-	Rod, Phosphor Bronze, Bar, and Shapes.
ASTM B194	-	Plate, Copper Beryllium Alloy, Sheet, Strip, and Rolled Bar.
ASTM B196	-	Rod and Bar, Copper Beryllium Alloy
ASTM B740	-	Copper-Nickel-Tin Spinodal Alloy Strip, Standard Specification for
ASTM D4067	-	Reinforced and Filled Polyphenylene Sulfide Injection Molding and Extrusion Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 )

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets or MS standards), 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 (see 6.1)

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 4.5 and 6.3)

3.2.1 Reliability The contractor's 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 12 months in lieu of 6 months.

#### 3.2.2 Quality

3.2.2.1 Statistical process control (SPC) The contractor shall implement and use statistical process control techniques in the manufacturing process for parts covered by this specification. SPC program shall be developed and maintained in accordance with EIA-557. The SPC program shall be documented and maintained as part of the overall reliability assurance program as specified in MIL-STD-790. Evidence of such compliance shall be verified by the qualifying activity as a prerequisite for qualification and continued qualification effective 12 months after the date of this document.

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

3.3.1 Body (and removable insulator, when applicable) Unless otherwise specified (see 3.1), the body shall be a diallyl phthalate in accordance with MIL-M-14, type SDG-F (nylon-glass filled, type I, grade A); polyester-glass filled, type GPT-15F, GPT-20F, GPT-30F and GET-30F in accordance with MIL-M-24519, polyphenylene sulfide-glass filled in accordance with ASTM D4067, type PPS000G40A43443E11

RAMPED EDGES OPTIONAL  
CONFIGURATION OF  
RAMPED EDGE OPTIONAL  
(SEE NOTE 1)

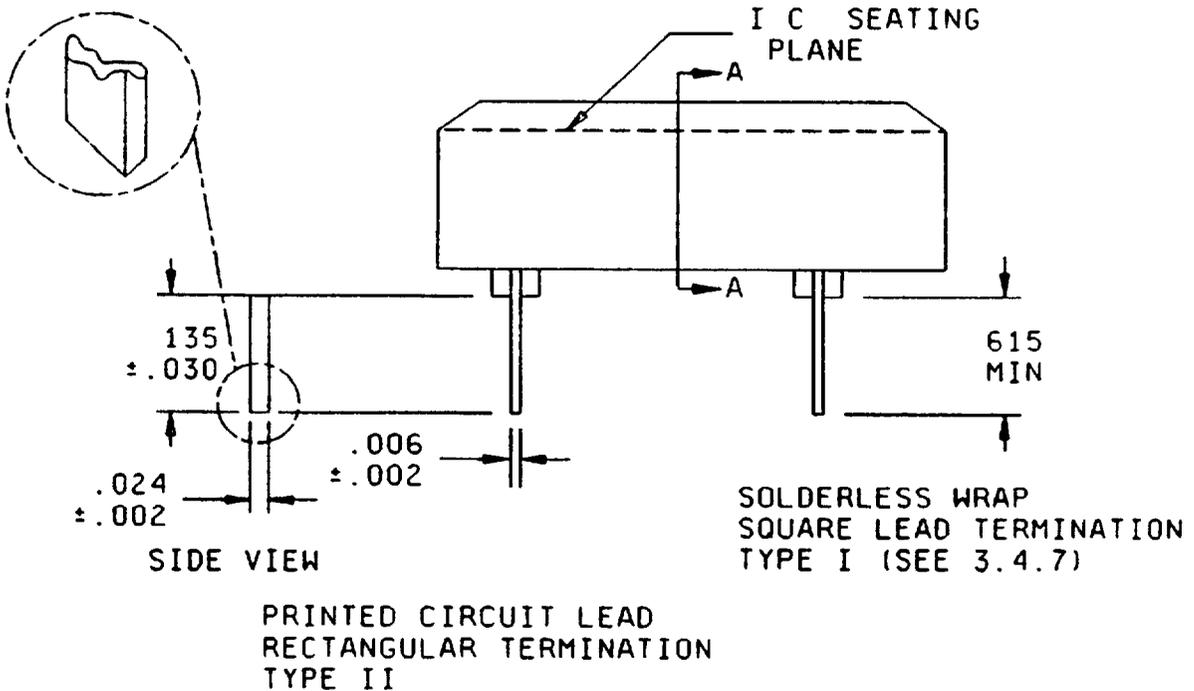
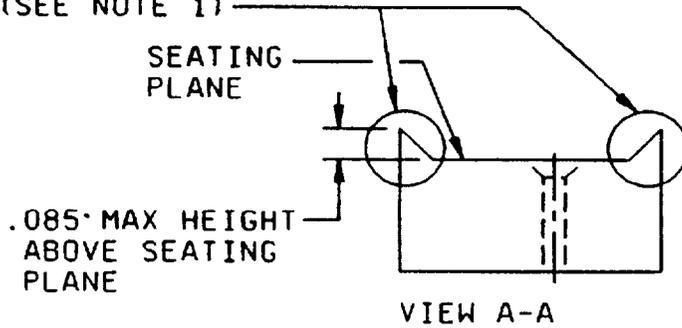
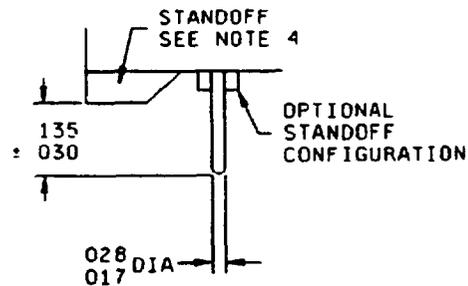


FIGURE 1 Terminal types



PRINTED CIRCUIT LEAD  
ROUND STYLE LEAD TERMINATION  
TYPE II OPTIONAL DESIGN

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

NOTES

1. May be raised edges, used as guide
2. Dimension are in inches
3. Metric equivalents are given for general information only
4. Configuration and location are optional (minimum of 2)
5. Recommended hole size (for type II terminals only) .035 (0 89 mm) inch ± 003 (0 008 mm)

FIGURE 1 Terminal types - Continued

FIGURE 1 Terminal types - Continued

3.3.2 Socket contacts (including termination) Unless otherwise specified (see 3.1), the socket contacts (including termination) shall be brass in accordance with ASTM B16, beryllium-copper in accordance with ASTM B139, ASTM B194, or ASTM B196, copper-nickel-tin alloy C72900 in accordance with ASTM B740; phosphor bronze in accordance with ASTM B103, copper-nickel alloy in accordance with CA725, or nickel-silver in accordance with CA770 or ASTM B122 and shall meet the applicable requirements herein and as specified (see 3.1)

3.3.3 Contact finish All contact finishes shall have an underplate of nickel in accordance with QQ-N-290, class 2, .0003 to .00015 inch thick

NOTE: 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

3.3.3.1 Overall finish All parts of the contact shall be plated in accordance with MIL-G-45204, type II, grade C, class 0 or tin-lead in accordance with MIL-P-81728, .0001 inch thick minimum (5 percent minimum lead) for those contacts having a solderless wrap termination and .0001 inch thick minimum (50 to 70 percent tin) for those contacts having wave solder tail terminations (see 3.1)

3.3.3.2 Localized finish contact engagement area The finish shall be gold in accordance with MIL-G-45204, type II, grade C, class 0, or tin-lead in accordance with MIL-P-81728, .0001 inch thick minimum (5 percent minimum lead) (see figure 2)

3.3.3.3 Localized finish termination area

3.3.3.3.1 Solderless wrappost The finish shall be gold in accordance with MIL-G-45204, type II, grade C, class 0, or tin-lead in accordance with MIL-P-81728, .0001 inch thick minimum (5 percent minimum lead) (see 3.1)

3.3.3.3.2 Wave solder tail The finish shall be gold in accordance with MIL-G-45204, type II, grade C, class 0 or tin-lead in accordance with MIL-P-81728, .0001 inch thick minimum (50 to 70 percent tin) (see 3.1).

3.3.3.3.3 Nonfunctional areas Any portion of the contact other than the contact engagement or termination area shall be as specified in 3.3.3 or 3.3.3.1 (see 3.1)

3.4 Design and construction Sockets shall be of the design, construction, and physical dimensions specified (see 3.1). Part or Identifying Numbers (PIN's) applicable to tin-lead finished contacts shall have a temperature rating of -55°C to +105°C. PIN's applicable to entirely gold finished contacts shall have a temperature rating of -55°C to +125°C

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

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

3.4.3 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

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

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

3.4.6 Mounting Sockets shall be mounted as specified (see 3.1)

3.4.7 Contact wrappost The wrappost geometry, parallelism, and tip configuration shall be in accordance with MIL-STD-1130

3.4.8 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 clearance is maintained between the mounting board and the socket body at each terminal location.

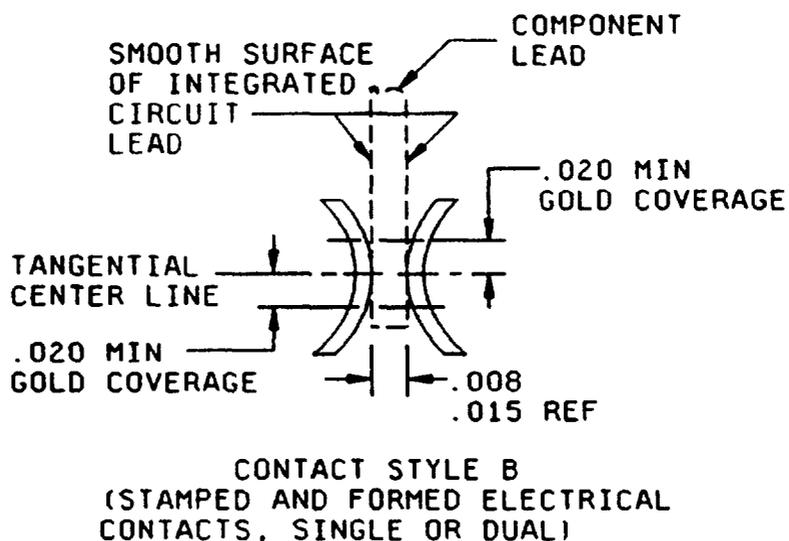
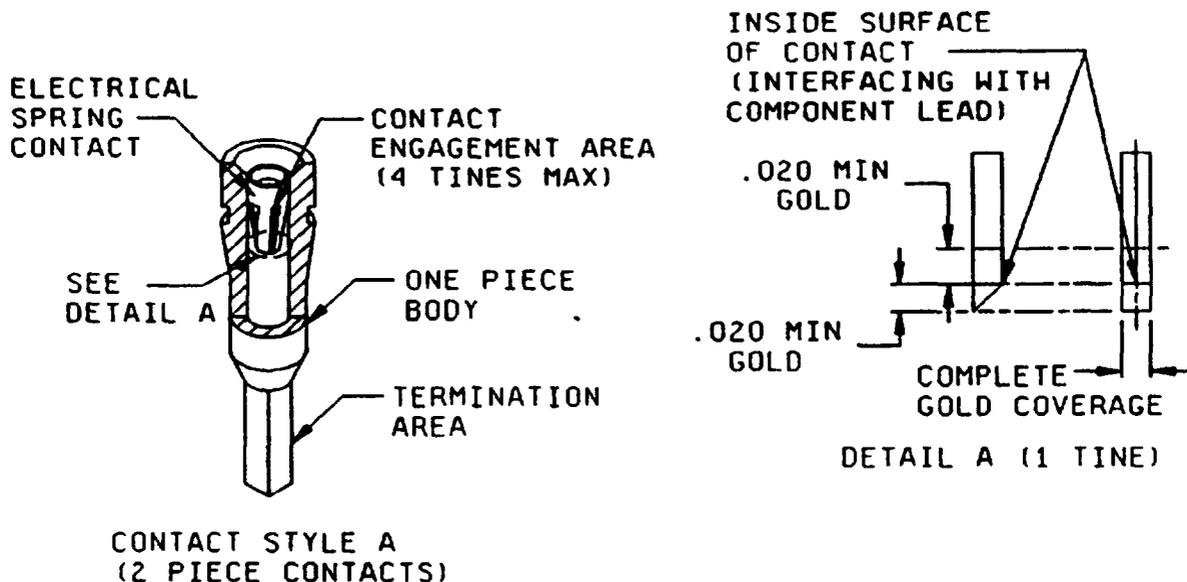


FIGURE 2 Localized finish for contact styles A and B

3.5 Performance

- 3.5.1 Test gauge mating force When tested in accordance with 4.7.2, the maximum mating force shall be 75 pound times the number of contact positions
- 3.5.2 Test gauge withdrawal force When tested in accordance with 4.7.3, the withdrawal force shall be not less than 5 ounce
- 3.5.3 Contact retention When tested in accordance with 4.7.4, 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 4.7.5, the initial insulation resistance shall be not less than 5,000 megohms
- 3.5.5 Dielectric withstanding voltage When tested in accordance with 4.7.6, there shall be no evidence of breakdown of insulation or flashover
- 3.5.6 Low-signal level contact resistance When tested in accordance with 4.7.7, 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 4.7.8, the capacitance shall not exceed two picofarads
- 3.5.8 Terminal strength (applicable to type I) Testing of terminals as specified in 4.7.9.1 and 4.7.9.2 shall not result in damage to the terminal
- 3.5.9 Vibration When tested in accordance with 4.7.10, 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
- 3.5.10 Mechanical shock When tested in accordance with 4.7.11, 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 4.7.12, 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 4.7.13, 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 4.7.14, insulation resistance shall be not less than 300 megohms
- 3.5.14 Corrosive atmosphere When tested in accordance with 4.7.15, 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 4.7.16
- 3.5.16 Solder wicking Socket bodies and terminals intended for soldering to a printed circuit board shall be tested in accordance with 4.7.17. 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 4.7.18

3.5.18 Fungus When tested in accordance with 4.7.19, 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 14 contacts or less shall be marked with the military PIN (as a minimum)

3.6.1 JAN brand All products acquired to and meeting the requirements of this specification and the applicable associated detail specification, and which are approved for listing on QPL-83734 shall bear the "JAN" certification mark (if manufactured in the U. S.) preceding the PIN except for small devices, where the abbreviation "J" may be used. For products manufactured outside the U. S., the quality conformance certification mark of the country in which the product was manufactured shall be used in place of the JAN brand. The JAN certification mark or the abbreviation "J" shall not be used for any product acquired under contracts or orders which permit or require any changes to this specification or in the applicable detail specification which may affect the form, fit, or function of the product or adversely affect quality or reliability. The JAN certification mark is registered as a U. S. Government certification mark as number 504860 by the U. S. Patent Office, and its application shall constitute certification by the manufacturer that all tests of the applicable detail specification and this specification have been satisfactorily completed, that verification test data will be retained in files for not less than five years; and that within the specified time period, test data will be made available for on-site review by government representatives upon request. In the event that a lot fails to pass inspection, the manufacturer shall remove or obliterate the JAN or "J" certification mark, the military PIN and all reference to this specification from the sample tested and also from all devices represented by the sample. The JAN or "J" certification mark shall be used on products acquired to contractor-prepared drawings or specifications.

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 4.7.1)

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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 shall be in accordance with MIL-STD-45662.

4.1.2 Reliability assurance program A reliability assurance program shall be established and maintained in accordance with MIL-STD-790. Evidence of such compliance shall be verified by the contracting activity of this specification as a prerequisite for qualification and continued qualification.

4.1.3 Statistical process control (SPC). A SPC program shall be established and maintained in accordance with EIA-557. Evidence of such compliance shall be verified by the qualifying activity as a prerequisite for qualification and retention of qualification.

4.2 Classification of inspections The inspections specified herein are classified as follows

- a Materials inspection (see 4.3)
- b Qualification inspection (see 4.5)
- c Quality conformance inspection (see 4.6)

4.3 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, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

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

4.5 Qualification inspection. Qualification inspection shall be in accordance with table I. Test 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

4.5.1 Sample size

4.5.1.1 Single submission Fourteen sockets shall be subjected to qualification inspection

4.5.1.2 Group submission To qualify sockets, 14 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.

4.5.2 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

4.5.2.1 Extension of qualification Manufacturers that use MIL-S-83505/1 or /2 qualified sockets shall be exempt from performing group III of table I

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

4.5.4 Retention of qualification To retain qualification, the contractor shall forward a report on group A inspection at 12-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of

- a A summary of the results of the tests performed for inspection of product for delivery (group A), indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for
- b A summary of the results of tests performed for periodic inspection (group B), including the number and mode of failures. The summary shall include results of all periodic inspection tests performed and completed during the 36-month period. If the summary of the test results indicates nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list
- c In the event that the qualified product is moved or produced by other plants, the requirements necessary to retain qualification listing shall be determined by the qualifying agency. If sufficient documentation can be shown to verify that the design, processes, and assembly operations will be at least equal in all respects to the qualified product, extension of qualification shall be granted to these plants without further testing

Failure to submit either report within 90 days after the end of each reporting period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the 36-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during the 36-month reporting period there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the product to testing in accordance with the qualification inspection requirements.

#### 4.6 Quality conformance inspection.

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

4.6.1.1 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.

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

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

4.6.1.2.2 Rejected 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 using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.2 Periodic inspection Periodic inspection shall consist of group B inspection. Except where the results of this inspection show noncompliance with the applicable requirements (4.6.2.1.4), delivery of products which have passed group A shall not be delayed pending the results of these periodic inspections.

4.6.2.1 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.

4.6.2.1.1 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 4.5.1.2).

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

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

4.6.2.1.4 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 reinstated, 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 reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

TABLE I Qualification inspection

Inspection <u>1/</u>	Requirement paragraph	Test method paragraph	Mating
<u>Group I (4 sample units)</u>			
Visual and mechanical inspection - - - - -	3 1, 3.3, 3.4, 3.6, and 3 7	4.7 1	Unmated
Test gauge mating force - - - - -	3 5 1	4 7 2	Unmated
Terminal strength (applicable to type I) -	3.5.8	4.7.9	Unmated
Low-signal level contact resistance- - - -	3.5.6	4 7 7	Mated
Socket durability- - - - -	3.5.11	4 7 12	Mated
Vibration- - - - -	3 5 9	4 7 10	Mated
Low-signal level contact resistance- - - -	3 5.6	4 7 7	Mated
Mechanical shock - - - - -	3 5.10	4.7.11	Mated
Low-signal level contact resistance- - - -	3 5 6	4.7.7	Mated
Test gauge withdrawal force - - - - -	3 5 2	4.7 3	Test gauge
Insulation resistance- - - - -	3.5 4	4.7 5	Mated
Dielectric withstanding voltage- - - - -	3.5.5	4.7 6	Mated
<u>Group II (2 sample units) 2/</u>			
Visual and mechanical inspection - - - - -	3 1, 3 3, 3 4, 3 6, and 3 7	4.7 1	Unmated
Temperature cycling- - - - -	3 5 12	4.7.13	Unmated
Insulation resistance- - - - -	3 5 4	4 7 5	Mated
Low-signal level contact resistance- - - -	3 5 6	4 7 7	Mated
Humidity - - - - -	3 5 13	4 7 14	Mated
Low-signal level contact resistance- - - -	3 5 6	4 7 7	Mated
Insulation resistance- - - - -	3 5 12	4 7 13	Unmated
Dielectric withstanding voltage- - - - -	3 5 5	4 7 6	Unmated
<u>Group III (2 sample units) 3/</u>			
Visual and mechanical inspection - - - - -	3 1, 3 3, 3 4, 3 6, and 3 7	4 7 1	Unmated
Low-signal level contact resistance- - - -	3 5 6	4.7.7	Mated
Corrosive atmosphere - - - - -	3 5 14	4 7 15	Mated
Low-signal level contact resistance- - - -	3 5.6	4 7.7	Mated
<u>Group IV (2 sample units)</u>			
Visual and mechanical inspection - - - - -	3 1, 3 3, 3.4, 3.6, and 3.7	4 7 1	Unmated
Solderability- - - - -	3 5 15	4 7 16	Unmated
Solder wicking - - - - -	3 5.16	4.7 17	Unmated
<u>Group V (2 sample units)</u>			
Visual and mechanical inspection - - - - -	3 1, 3.3, 3.4, 3.6, and 3.7	4.7 1	Unmated
Capacitance- - - - -	3 5.7	4 7 8	Unmated
Resistance to soldering heat - - - - -	3.5.17	4.7 18	Unmated
Contact retention- - - - -	3 5 3	4 7 4	Unmated
<u>Group VI (2 sample units)</u>			
Fungus - - - - -	3 5.18	4.7 19	Unmated

1/ 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

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

3/ See 4 5 2 1

TABLE II Group A inspection

Inspection	Requirement paragraph	Test method paragraph
Visual and mechanical inspection <sup>1/</sup> - - - - -	3.1, 3.3, 3.4 3.6 and 3.7	4.7.1
Test gauge mating force- - - - -	3.5.1	4.7.2
Test gauge withdrawal force- - - - -	3.5.2	4.7.3

<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 to	35

4.6.3 Inspection of packaging The sampling and inspection of the preservation, packing, and container marking shall be in accordance with the requirements of MIL-C-55330.

#### 4.7 Methods of inspection

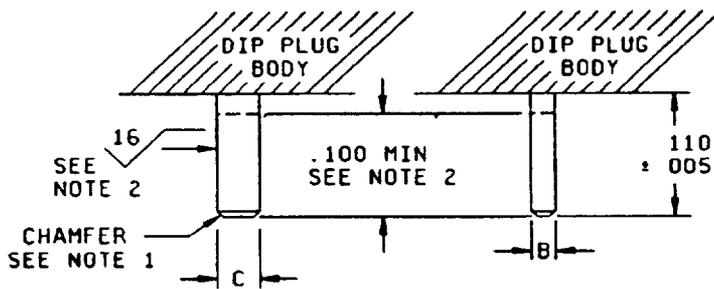
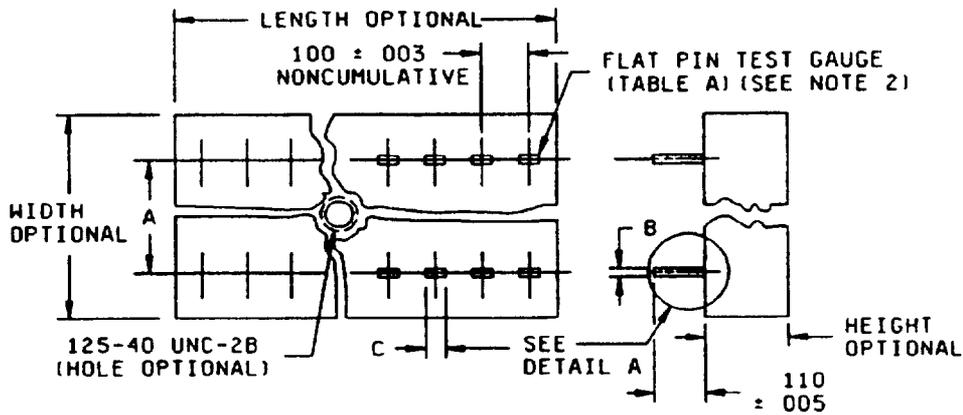
4.7.1 Visual and mechanical inspection Sockets shall be inspected to verify that the dimensions, materials, design, construction, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3, 3.4, 3.6, and 3.7).

4.7.2 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 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 steps or less, and shall be accurate to within 5 percent.

4.7.3 Test gauge withdrawal force (see 3.5.2) After two unmonitored insertions and withdrawals of the mating test gauge (see figures 3 and 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 minimum and the withdrawal force shall be measured.

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DETAIL A

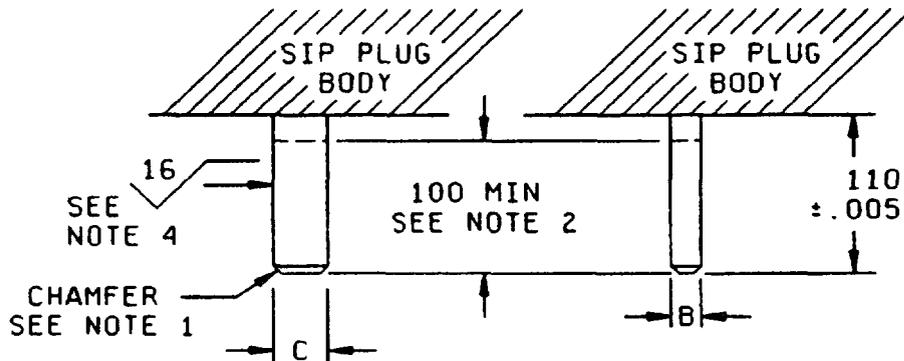
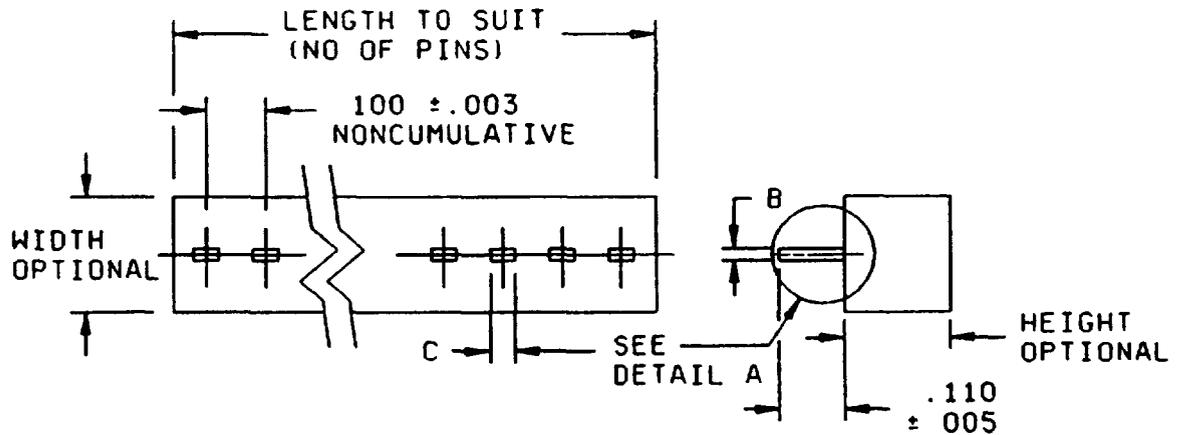
TABLE A For flat pin test gauge (see note 2)

No. of Leads	Leads per row	A	B	C
		± .005	+ .0000 - .0005	+ .0000 - .0005
6	3	.300	.0130	.0200
8	4	.300	"	"
14	7	.300	"	"
16	8	.300	"	"
18	9	.300	"	"
22	11	.400	"	"
24	12	.600	"	"
28	14	.600	"	"
36	18	.600	"	"
40	20	.600	"	"
64	32	.900	"	"

NOTES

- 1 Acceptable chamfer on flat pin to be .003/ .005 x 45° all sides
- 2 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)



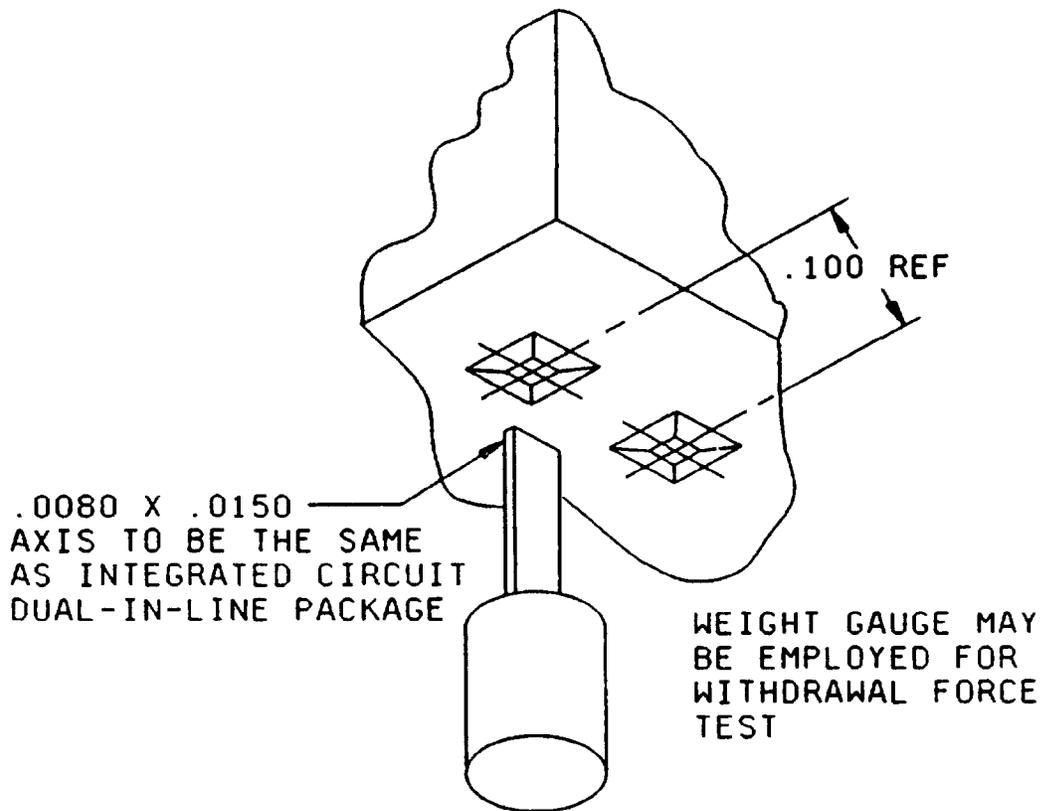
FLAT GAUGE PIN  
DETAIL A

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

## NOTES

- 1 Acceptable chamfer on flat pin to be .003/.005 x 45° all sides.
- 2 Number of leads to correspond to number of contacts in socket
- 3 Grinding of blades shall be in a longitudinal direction
- 4 Flat test gauge material shall be carbon steel, finish 16 microinches maximum, all four sides

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



## NOTES

- 1 Unless otherwise specified, tolerance is  $\pm .0005$
- 2 Material All pins carbon steel, finish 16 microinches maximum

FIGURE 5 Contact withdrawal force4 7 4 Contact retention (see 3 5 3)

4 7 4 1 Solderless wrap, type I (applicable to style A) With the socket mounted to an appropriate fixture, a 7 5 pound 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 7 4 2 Solder termination, type II (applicable to style B) A 7 5 pound axial load shall be applied from the top as a pushing force for top loaded contacts and a 7 5 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 7 4 3 Spring contact retention, type II (applicable to style A) A 7 5 pound 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.

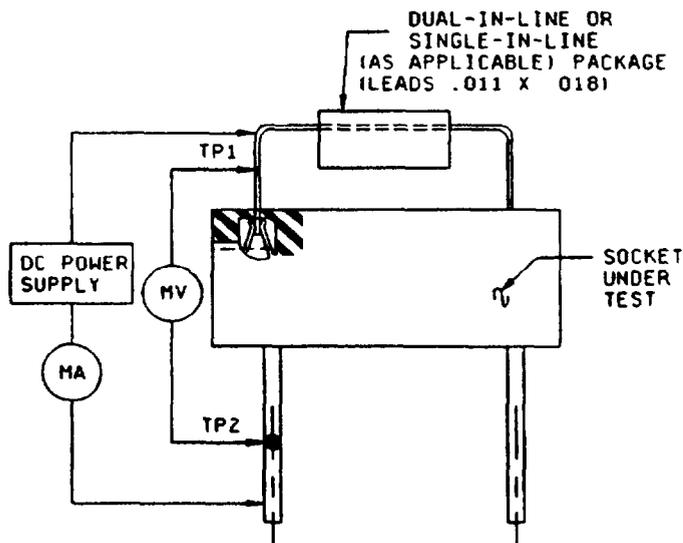
4 7 5 Insulation resistance (see 3 5 4) Test in accordance with test method 3003 of MIL-STD-1344. While mated to a dummy plug and unwired, measure resistance between individual contacts, and measure resistance between contacts and metal shell.

4.7.6 Dielectric withstanding voltage (see 3.5.5) Sockets shall be tested in accordance with method 3001 of MIL-STD-1344. 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 terminations described in "e" above by clips or solder.

4.7.7 Low-signal 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 method 3002 of MIL-STD-1344. 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.
- b. Environmental conditioning not required.
- c. Lead and socket finishes shall be of the same generic material.



Notes:

1. 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.
2. The distance between TP1 and TP2 shall be submitted with low signal level contact resistance test data (e.g.,  $.170 \pm .010$ ).

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

4.7.8 Capacitance (see 3.5.7) The socket shall be tested in accordance with method 305 of

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4 7 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 7 9 Terminal strength (applicable to type I (see 3.5 8)).

4.7.9 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.

4.7.9 2 Torque test Sockets shall be tested in accordance with method 211 of MIL-STD-202, test condition E, with 2.5 ounce-inches torque.

4 7 10 Vibration (see 3 5 9) Sockets shall be tested in accordance with method 2005 of MIL-STD-1344. 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 7 7 on the two unmonitored samples, and the test gauge withdrawal force shall be measured in accordance with 4 7 3 on all samples.

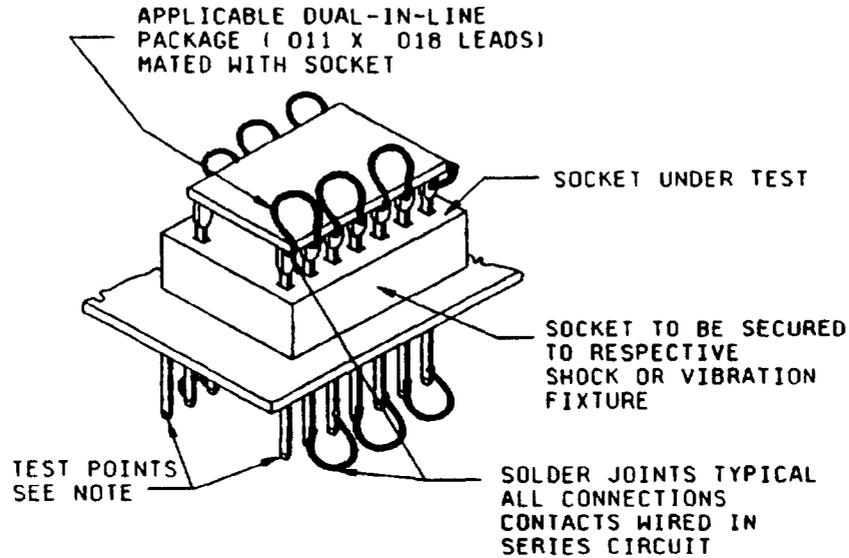
4 7 11 Mechanical shock (see 3 5 10) The socket shall be tested in accordance with method 2004 of MIL-STD-1344. The following details shall apply

- 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 8).

4 7 12 Socket durability (see 3 5 11) Each unit shall be subjected to 50 mating and unmating cycles using the test gauge (see figures 3 and 4). At the conclusion of the test, the contact resistance shall be measured in accordance with 4 7 7 and the test gauge withdrawal force shall be measured in accordance with 4 7 3.

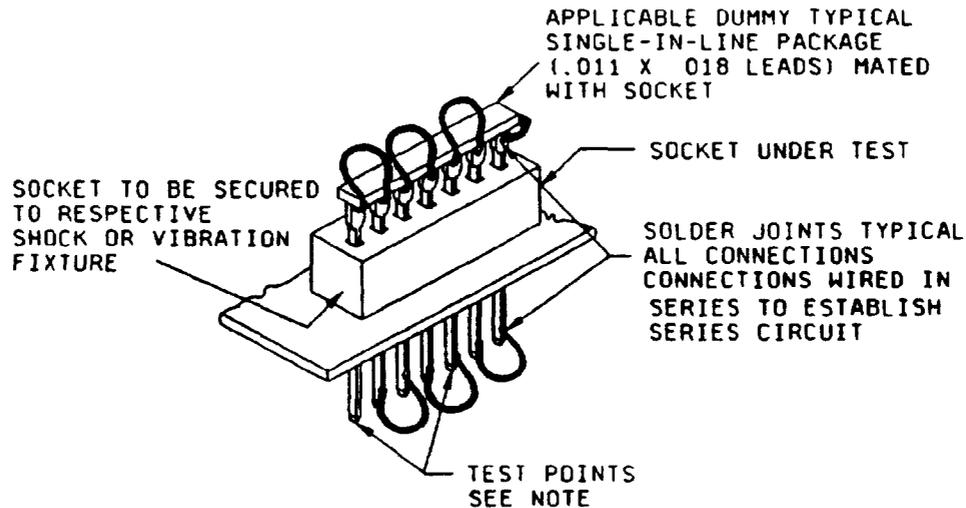
4 7 13 Temperature cycling (see 3 5 12) Sockets shall be tested in accordance with method 1003 of MIL-STD-1344. The following details shall apply.

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



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 D C power supply and monitoring equipment

FIGURE 8 Vibration and mechanical shock test set-up for single-in-line package sockets  
 4 7 14 Humidity (see 3.5 13) Unwired sockets shall be tested in accordance with type II, method 1002 of

MIL-STD-1344 except step 7a shall be omitted

4.7.15 Corrosive atmosphere (see 3.5.14) Mated sockets shall be exposed to a concentrated sulphur 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 figures 3 and 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 sulphur atmosphere exposure, the low-signal level contact resistance of the undisturbed mated socket shall be measured in accordance with 4.7.7.

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

4.7.17 Solder wicking (see 3.5.16) Sockets shall be tested in accordance with MIL-STD-1344, method 2019, using the following time duration of exposure to the solder wave:

(a defined by  $T = \frac{50}{S}$ )

Style A contacts 5 seconds  
Style B contacts 3 seconds

4.7.18 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.

4.7.19 Fungus (see 3.5.18) The manufacturer shall certify that all external materials are fungus resistant or test the material in accordance with method 508 of MIL-STD-810.

## 5 PACKAGING

5.1 Packaging requirements Preservation and packaging shall be level A, B, or C, in accordance with MIL-STD-2073/1 or MIL-STD-2073/2 as specified in the acquisition document. Marking shall be in accordance with MIL-STD-129 and bar coding in accordance with MIL-STD-1189.

## 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 shall be mated. Mounting may be accomplished with standard mechanical fasteners, unless otherwise noted in the specification sheets.

6.1.1 Application restrictions Sockets shall not 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 shall 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 must 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. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1 and 2.2).

6.3 Qualification With respect to products requiring qualification, awards will be made only for

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 purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is 645 Logistics and Operations Group, Electronic Support Division, Gentile Air Force Station, Dayton OH 45444-5400, however, information pertaining to qualification of products may be obtained from Defense Electronics Supply Center, ATTN. DESC-EQP, 1507 Wilmington Pike, Dayton, Ohio 45444.

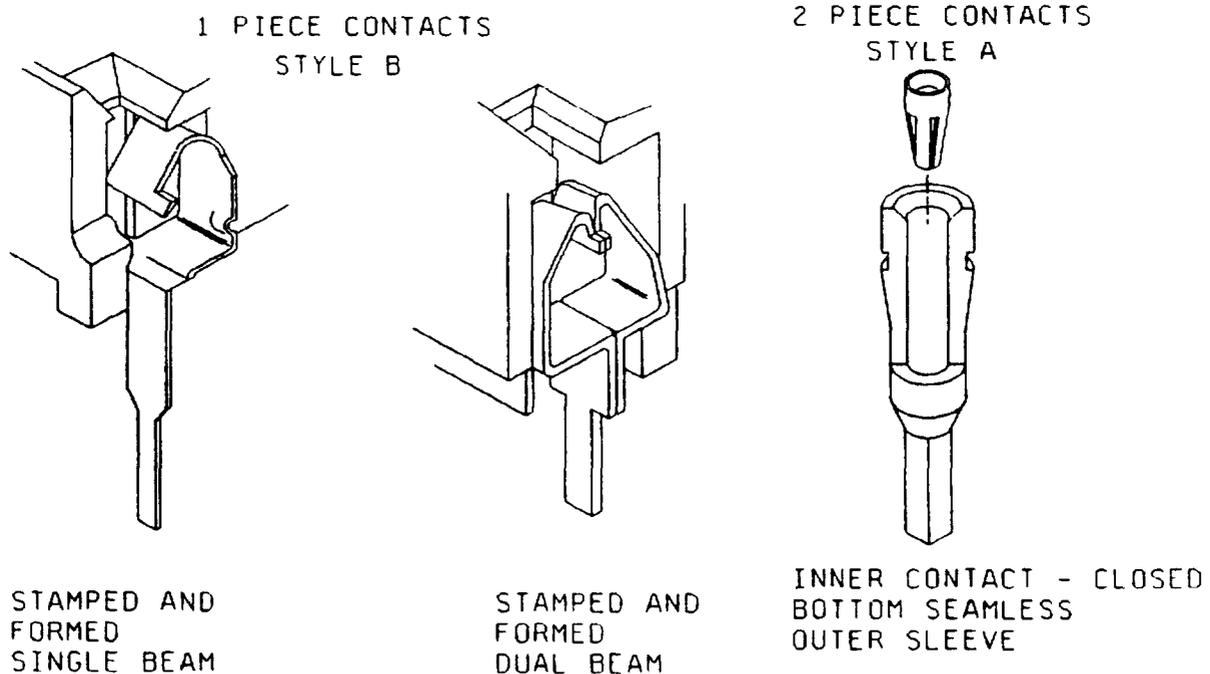
#### 6.4 Definitions.

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-M-38510. External modifications such as attaching wires or strapping together leads are allowable as long as the lead engaging the socket is unmodified (see 4.7.6, 4.7.7, 4.7.10, and 4.7.15).

6.4.2 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.

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.

#### 6.6 Contact styles



6 7 Changes from previous issue Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

CONCLUDING MATERIAL

Custodians

Army - CR  
Navy - EC  
Air Force - 85

Review activities

Navy - AS, OS, SH, TD  
Air Force - 11, 99  
DLA - ES

User activities

Navy - MC  
Air Force - 19

Preparing activity  
Air Force - 85

Agent  
DLA - ES

(Project 5935-3827)

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

### INSTRUCTIONS

- 1 The preparing activity must complete blocks 1, 2, 3, and 8 In block 1, both the document number and revision letter should be given
- 2 The submitter of this form must complete blocks 4, 5, 6, and 7
- 3 The preparing activity must provide a reply within 30 days from receipt of the form

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<b>I RECOMMEND A CHANGE:</b>	1. DOCUMENT NUMBER MIL-S-83734F	2. DOCUMENT DATE (YYMMDD) 93/02/08
3. DOCUMENT TITLE SOCKETS, PLUG-IN ELECTRONIC COMPONENTS, DUAL-IN-LINE (DIPS) AND SINGLE-IN-LINE PACKAGES (SIPS), GENERAL SPECIFICATION FOR		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed )		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME 645 LOG/ES	b. TELEPHONE (Include Area Code) (1) Commercial (513) 296-5530 (2) AUTOVON 986-5530	
c. ADDRESS (Include Zip Code) GENTILE AFS 1060 Hamilton Street Dayton, OH 45444-5400	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	