

|            |
|------------|
| INCH-POUND |
|------------|

MIL-PRF-83502C  
7 Apr 1997  
SUPERSEDING  
MIL-S-83502B  
30 September 1983

## PERFORMANCE SPECIFICATION

SOCKETS PLUG-IN ELECTRONIC COMPONENTS ROUND STYLE  
GENERAL SPECIFICATION FOR

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

## 1 SCOPE

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

1.2 Classification Sockets covered by this specification are of the following types as specified (see 3.1)

- a Type II - Printed circuit terminals (see figure 1)
- b Type III - Wre turret terminals (see figure 1)
- c Type IV - Solder-cup terminals (see figure 1)

## 2 APPLICABLE DOCUMENTS

2.1 General The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2)

|   |
|---|
| Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, 3990 East Broad Street, Columbus, Ohio 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter. |
|---|

MIL-PRF-83502C

SPECIFICATIONS

FEDERAL

QQ-N-290 - Nickel Plating (Electrodeposited)

STANDARDS

MILITARY

MIL-STD-202 - Tests Methods for Electronic and Electrical Component Parts  
MIL-STD-810 - Environmental Test Methods  
MIL-STD-1285 - Marking of Electrical and Electronic Parts  
MIL-STD-1344 - Test Methods for Electrical Connectors

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

2.2 Other publications The following documents(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue stated in the current DoDISS and the supplement thereto if applicable.

(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 information services.)

AMERICAN NATIONAL STANDARDS INSTITUTE INC

ANSI/NCSL Z540-1-1994 - Calibration Laboratories and Measurement and Test Equipment General Requirements

(Application for copies should be addressed to the American National Standards Institute Inc 1430 Broadway 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 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 D1710 - Standard Specification for Polytetrafluoroethylene (PTFE) Basic Shapes Rods and Heavy-Walled Tubing  
ASTM D4066 - Standard Specification for Nylon Injection and Extrusion Materials (PA)  
ASTM D5948 - Standard Specification for Molding Compounds Thermosetting

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

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 )

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO-100012 - Equipment Metrology Configuration System for Measurement

(Application for copies should be addressed to the International Organization for Standardization 1 Rue De Varembé Case Postale 56 CH-1211 Geneva 20 Switzerland )

## MIL-PRF-83502C

2.3 Order of precedence In the event of a conflict between the text of this specification and the reference cited herein the text of this document takes precedence. Nothing in this document however supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3 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 furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.4 and 6.3).

3.3 Materials Example reference materials are identified herein. However, when an example reference material is not identified a material shall be used which will enable the sockets and accessories to meet the performance 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 Reference criteria interface materials, plating and processes The identified reference material, plating and processes have been established to provide assurances that connectors manufactured to this specification will properly interface to similar industry standard or government specified connector systems without problems of electrochemical contamination of critical electrical or mechanical interfaces or generation of incompatible mechanical interface surface wear products. The manufacturer of connectors supplied to this specification are allowed to use alternate recognized industry standard materials, plating and processes from those identified in paragraph 3.3 of this specification. Alternate materials, plating and processes used must be coordinated with the qualifying activity as part of the qualification process. Use of alternates to those referenced guidance items by the supplier must not result in inferior or short or long term performance or reliability of supplied connectors as compared with connectors manufactured using the referenced materials, plating or processes. Short or long term failures or reliability problems due to use of these alternates shall be the responsibility of the supplier.

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

3.3.3 Socket spring contact and socket sleeve The socket spring contact member shall be beryllium copper in accordance with ASTM B139, ASTM B194, ASTM B196 or an equivalent industry standard. The socket sleeve shall be brass in accordance with ASTM B16 or an equivalent industry standard.

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

3.3.3.1.1 Overfinish Contacts shall have been overplated over a nickel underplate. Silver shall not be used as an underplate (see 3.3.1).

3.3.3.1.2 Localized finish Socket contacts shall be overplated in accordance with QQ-N-290 class 2, 000030 to 000150 thickness or an equivalent industry standard. Localized gold plating applied over the nickel by means of selective plating may be used for other similar coating systems, provided the conditions specified herein are met.

3.3.3.1.2.1 Contact mating area The contact mating area shall be gold plated, 000050 thickness over nickel, 000050 to 000150 thickness (see 3.3.3.1.2). Silver shall not be used as an underplate (see 3.3.1).

3.3.3.1.2.2 Termination Terminations shall be plated with either gold, 00002 thickness minimum or tin-lead, 001 thickness minimum as specified over nickel (see 3.3.1). The following conditions shall apply:

- a. Tin-lead shall be 50 to 70 percent tin for type II termination.
- b. Tin-lead shall be 50 to 95 percent tin for all other termination types.

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

## MIL-PRF-83502C

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

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

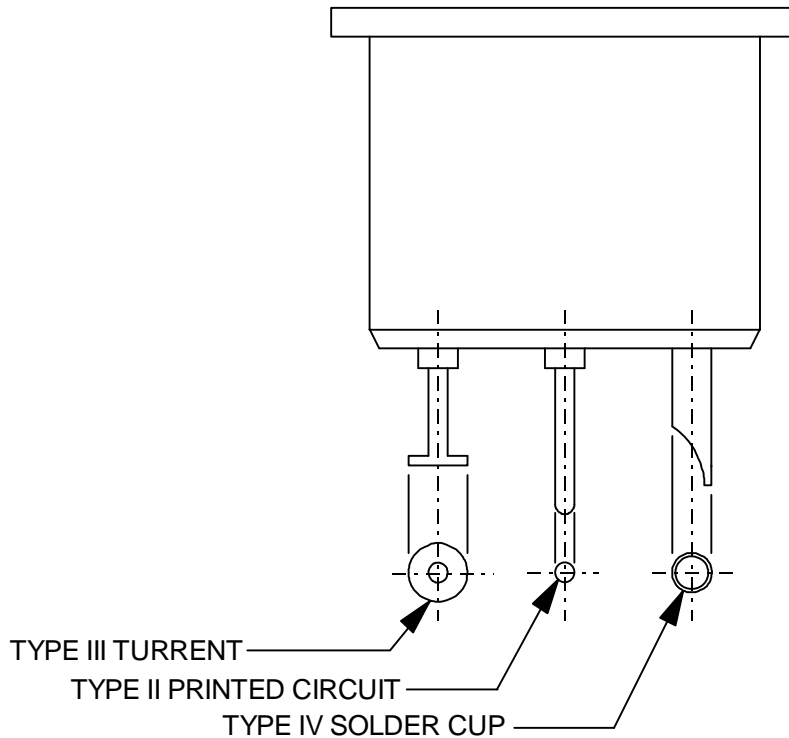


FIGURE 1 Termination type configurations

## MIL-PRF-83502C

3 5 2 Body The body sha be constructed w th proper sect ons and rad so that t w not crack ch p or break n assembly or n norma serv ce Depress ons when used to ach eve onger creepage paths sha not cause structura weakness or moisture entrapment

3 5 3 Po ar zat on A po ar zat on feature (mechan ca or v sua) sha be ncorporated n each socket sha be so des gned that the mat ng ead s gu ded nto the contact open ng

3 5 4 A gnment The socket sha be so des gned that the mat ng ead s gu ded nto the contact open ng

3 5 5 Mount ng When app cab e sockets sha be mounted as spec f ed (see 3 1)

3 5 6 Contact w re wrap post Un ess otherw se spec f ed (see 3 1) the w re wrap post sha be: 0 0225 nch (0 75 mm)square m n mum w th a cross-sect on d agona 0 0355 nch (0 90 mm) max mum to 0 0325 nch (0 83 mm) m n mum W re wrap post edge rad us sha not exceed 0 003 nch (0 08 mm) Edge burrs sha be 0 0015 nch (0 04 mm) max mum The w re wrap post sha be para e w th n 0 002 nch (0 05 mm) and sha be stra ght w th n 0 005 nch (0 13 mm) A m n mum wrappab e length of 0 515 nch (13 08 mm) sha be ma nta ned after a ow ng for nsert on nto a s ze 2 (0 054-0 070 nch (1 37-1 78 mm)) c rcu t board (where app cab e) T p of w re wrap post sha term nate n a rad us beve or chamfer to fac tate nsert on nto the w re wrapp ng too

3 5 7 Mount ng standoffs (when spec f ed see 3 1) Socket bod es ntended to be so dered to a pr nted c rcu t board sha be prov ded w th mount ng bosses so that a m n mum of 0 012 nch (0 30 mm) ce arance s ma nta ned between the mount ng board and the socket body at each term na ocat on

3 6 Mat ng force When sockets are tested as spec f ed n 4 7 3 the max mum mat ng force sha be 3/4 pound (3 34 N)

3 7 Contact w thdrawa force When sockets are tested as spec f ed n 4 7 4 the w thdrawa force sha be not ess than one-ha f ounce (0 14 N)

3 8 Contact retent on When unmated sockets are tested as spec f ed n 4 7 5 there sha be no damage or oosen ng of the contacts

3 9 Insu at on res stance When unmated sockets are tested as spec f ed n 4 7 6 the n ta nsu at on res stance sha be not ess than 5 000 megohms

3 10 De ectr c w thstand ng vo tage When sockets are tested as spec f ed n 4 7 7 there sha be no ev dence of breakdown of nsu at on or f ashover

3 11 Contact res stance When sockets are tested as spec f ed n 4 7 8 the n ta contact res stance sha not exceed 20 m ohms and after the durab ty and corros ve atmosphere tests the contact res stance sha not exceed the n ta va ue by more than 10 m ohms

3 12 Capac tance When sockets are tested as spec f ed n 4 7 9 the capac tance sha not exceed 2 p cofarads

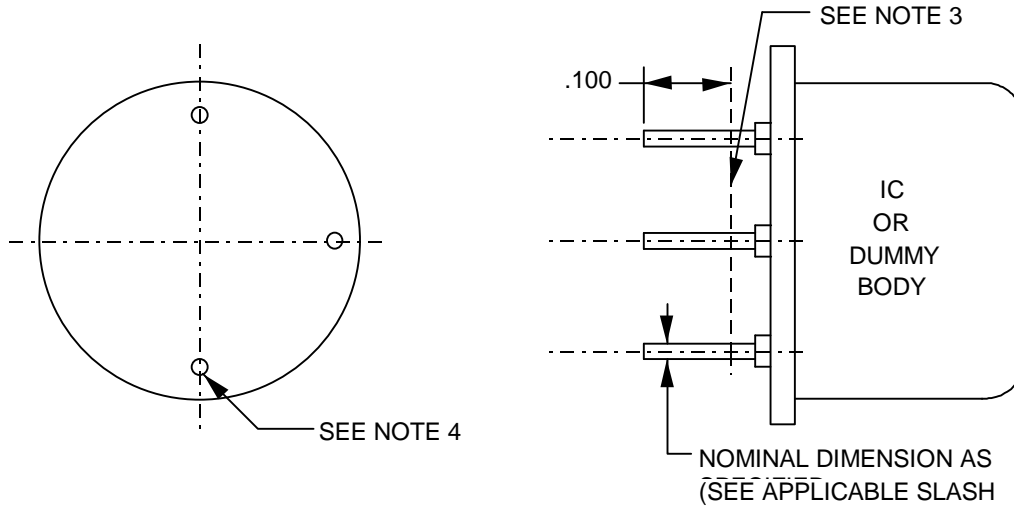
3 13 V brat on When sockets are tested as spec f ed n 4 7 10 there sha be no phys ca or mechan ca damage to the socket body contacts Dur ng v brat on there sha be no nterrupt on n cont nu ty greater than 1 m crosecond of the test c rcu t wh ch ncorporates mated contacts After the test the mount ng hardware sha show no s gns of oosen ng fracture or other deter orat on and the sockets sha meet the contact res stance and contact w thdrawa force requ rements of 3 8 and 3 7 respect ve y

3 14 Shock (spec f ed pu se) When sockets are tested as spec f ed n 4 7 11 there sha be no phys ca damage to the socket Dur ng the test there sha be no nterrupt on n cont nu ty greater than 1 m crosecond of the test c rcu t wh ch ncorporates mated contacts

3 15 Durab ty When sockets are tested as spec f ed n 4 7 12 there sha be no ev dence of crack ng or break ng the sockets sha meet the contact res stance and contact w thdrawa force requ rements of 3 10 and 3 6 respect ve y

## MIL-PRF-83502C

3.16 Thermal shock When a socket with a substitute test plug (see figure 2) is tested as specified in 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.



## NOTES

- 1 Contacts shall be plated gold or tin/lead the same as the contacts of the socket under test
- 2 Modifications to the leads such as attaching wires shall be as long as the area of the lead engaging the socket is unmodified
- 3 Minimum engagement length
- 4 For pin configuration see individual specification sheets

FIGURE 2 Mating test plug

3.17 Humidity When sockets are tested as specified in 4.7.14 insulation resistance shall be no less than 300 megohms.

3.18 Low-signal level contact resistance When tested in accordance with 4.7.15 the socket mated with a substitute test plug (see figure 2) shall show no electrical contact resistance and the contact resistance requirement of 3.11 shall not be exceeded.

3.19 Corrosive atmosphere (see 6.5.1) When sockets are tested as specified in 4.7.16 there shall be no evidence of porous plating or exposure of base metal on the contacting surfaces and the low-level circuit requirement of 3.18 shall not be exceeded.

3.20 Solderability When sockets are tested as specified in 4.7.17 terminal leads shall withstand the test without damage.

3.21 Resistance to soldering heat (except type I terminals) When sockets are tested as specified in 4.7.18 there shall be no damage.

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

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

## MIL-PRF-83502C

## 4 VERIFICATION

4.1 Qualification inspection Qualification inspection 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.

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

4.1.2 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 (see ANSI/NCSL Z540-1-1994, ISO 10012-1 part 1, or comparable standards) shall be required.

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

- a. Material inspection (see 4.3)
- b. Qualification inspection (see 4.4)
- c. Verification of qualification (see 4.5)

4.3 Material inspection Material inspection shall consist of certification supported by verifying data that the material as specified by example in table I and on the specification sheets (see 3.1) used in fabricating the sockets are in accordance with the applicable referenced specifications or requirements prior to such fabrication (see 3.5, 4.7.2, and 6.2).

4.4 Qualification inspection Qualification inspection 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. Use of alternate material, plant, and processes (see 3.3.1) shall be defined for inclusion in the product test documentation.

4.5 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-1344 and MIL-STD-202, or an equivalent industry standard.

4.5.1 Sample size

4.5.1.2 Group submissions For each specification sheet, ten samples shall be selected of the socket having the largest number of contacts, which shall qualify sockets with a lesser number of contacts of the same design, construction, and material. Two samples of each socket with the lesser number of contacts shall be submitted to visual and mechanical inspection dimensions and electrical withstand voltage. Alternate terminal types specified by a single specification sheet may be qualified by submitting two samples of each type of groups I and II of table I. When different terminal finishes are being qualified simultaneously, sample sockets of each finish shall be selected so that there are equal groups of each finish.

Where there is a low profile socket at the same design to the same specification sheet, it may be qualified at the same time by submitting two samples of the largest number of contacts to groups I and II of table I.

## MIL-PRF-83502C

TABLE I Qualification inspection 1/

| Inspection                               | Requirement paragraph     | Method paragraph |
|--|---------------------------|------------------|
| <u>Group I</u> (10 sample units)         |                           |                  |
| Vibration and mechanical -----           | 3 1 3 3 3 5 3 22 and 3 23 | 4 7 2            |
| Mating force -----                       | 3 6                       | 4 7 3            |
| Contact withdrawal force -----           | 3 7                       | 4 7 4            |
| Contact retention -----                  | 3 8                       | 4 7 5            |
| Insulation resistance -----              | 3 9                       | 4 7 6            |
| Dielectric withstand voltage -----       | 3 10                      | 4 7 7            |
| Contact resistance -----                 | 3 11                      | 4 7 8            |
| Capacitance -----                        | 3 12                      | 4 7 9            |
| <u>Group II</u> (2 sample units)         |                           |                  |
| Vibration -----                          | 3 13                      | 4 7 10           |
| Shock (specified pulse) -----            | 3 14                      | 4 7 11           |
| Durability -----                         | 3 15                      | 4 7 12           |
| Insulation resistance -----              | 3 9                       | 4 7 6            |
| <u>Group III</u> (2 sample units)        |                           |                  |
| Thermal shock -----                      | 3 16                      | 4 7 13           |
| Insulation resistance -----              | 3 9                       | 4 7 6            |
| Humidity -----                           | 3 17                      | 4 7 14           |
| Dielectric withstand voltage -----       | 3 10                      | 4 7 7            |
| <u>Group IV</u> (2 sample units)         |                           |                  |
| Low-signal level contact resistance -    | 3 18                      | 4 7 15           |
| Corrosive atmosphere -----               | 3 19                      | 4 7 16           |
| <u>Group V</u> (2 sample units)          |                           |                  |
| Solderability -----                      | 3 20                      | 4 7 17           |
| Vibration and mechanical inspection ---- | 3 1 3 3 3 5 3 22 and 3 23 | 4 7 2            |
| <u>Group VI</u> (2 sample units)         |                           |                  |
| Resistance to soldering heat -----       | 3 21                      | 4 7 18           |
| Vibration and mechanical inspection ---- | 3 1 3 3 3 5 3 22 and 3 23 | 4 7 2            |

1/ sockets with inserted terminals shall not be considered the same design as those with the terminals mated in place

4 5 2 Inspection routine The sample shall be subjected to the inspections specified in table I in the order shown. A sample unit shall be subjected to the inspections of group I. The sample shall be divided into five groups of two units each and subjected to the inspections for the respective group.

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 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 contractor 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.

#### 4 6 Conformance inspection

4 6 1 Inspection of product for delivery Inspection of product for delivery shall consist of group A inspection. Except as specified in 4 6 2 1 2, delivery of products which have passed the group A inspection shall not be delayed pending the results of group B inspection.



## MIL-PRF-83502C

4.6.1.1 Inspect on lot An inspect on lot as far as practicable shall consist of a 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 inspect on Group A inspect on shall consist of the inspections specified in table II on the same set of sample units in the order shown

TABLE II Group A inspect on

| Inspect on                       | Requirement paragraph        | Method paragraph |
|----------------------------------|------------------------------|------------------|
| Visual and mechanical inspect on | 3.1, 3.3, 3.4, 3.22 and 3.23 | 4.6.1            |
| Mating force -----               | 3.6                          | 4.7.3            |
| Contact withdrawal force -----   | 3.7                          | 4.7.4            |

4.6.1.2.1 Sampling plan (group A) Table II tests shall be performed on a production run basis. Samples shall be selected in accordance with table III. If one or more defects are found, the lot shall be screened for that particular defect and defects removed. A new sample of parts shall be selected in accordance with table III and a group A tests again performed. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

TABLE III Lot and sample size

| 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          |

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

4.6.1.2.3 Disposition of sample units Sample units which have passed all the group A inspections may be delivered on the contract if the lots are accepted and the sample units are within the specification tolerances.

4.6.2 Periodic inspection Periodic inspection shall consist of group B. Except where the results of these inspections show nonconformance with the applicable requirements (see 4.6.2.1.2), delivery of products which have passed group A inspection shall not be delayed pending the results of these periodic inspections.

4.6.2.1 Group B inspect on Group B inspect on shall consist of the tests specified in table I in the order shown. Group B inspect on shall be made on sample units selected from inspect on lots which have passed the group A inspect on.

4.6.2.1.1 Sampling plan Ten sample sockets of the largest size for which the manufacturer is qualified and which have been produced on a continuous basis shall be selected at random every 36 months. The sample units shall be divided into five groups of two units each and subjected to the inspections for the particular group.

## MIL-PRF-83502C

4.6.2.1.2 Nonconformance If a sample fails to pass group B inspection, the contractor shall 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 conditions with essentially the same materials, processes, etc., and which are considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action acceptable to the Government has been taken. After the corrective action has been taken, group B inspection shall be repeated on additional sample units (a inspection or the inspection which the original sample failed, at the option of the Government). Group A inspections may be reinstated; however, final acceptance shall be withheld until the group B reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action shall be made available to the cognizant inspection activity and to the qualifying activity.

4.7 Methods of inspection

4.7.1 Test methods The following defined tests and test methods assure socket integrity with typical operating conditions and applications. A ternate commercial industry standard test method are allowed, however, when and a ternate method is used, the qualifying activity must be notified prior to performance of the test. The test methods described herein are proven methods and shall be the referee method in cases of dispute.

4.7.2 Visual and mechanical inspection Sockets shall be examined to verify that the dimensions, materials, design, construction, marking, and workmanship are in accordance with the applicable requirements (see 3.1.3.3, 3.5.3.22, and 3.23).

4.7.3 Mating force (see 3.6) The mating force required to fully insert the test gage (see figure 3) shall be measured. The measuring equipment shall conform to the following:

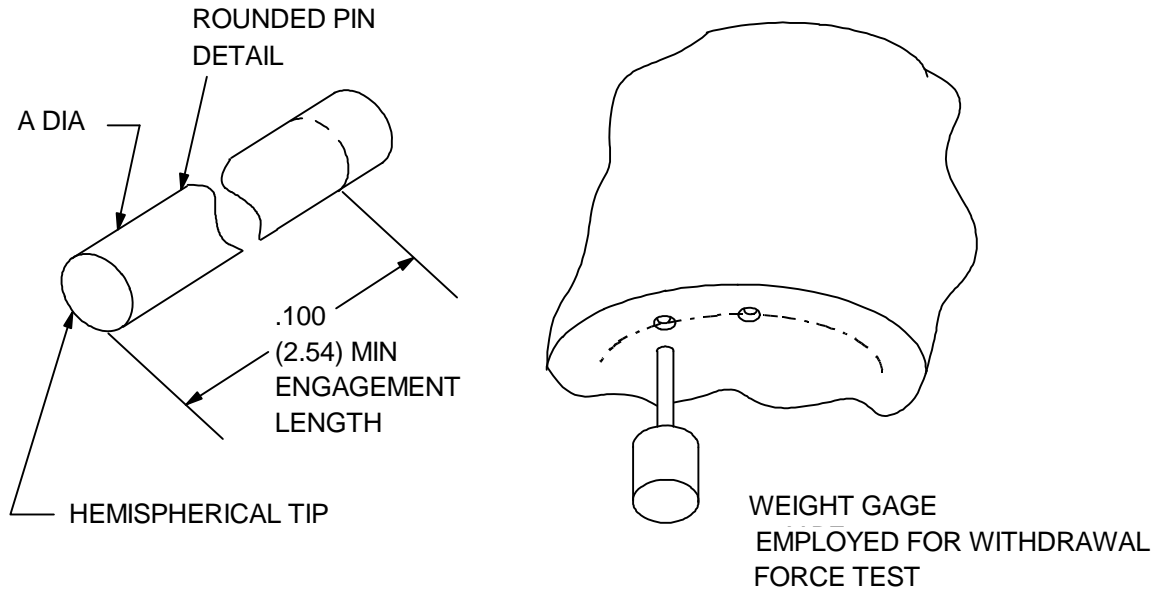
- a. The vertical axis of the test gage shall coincide with the vertical axis of the socket.
- b. The test gage shall travel along the vertical axis of the socket.
- c. The speed of insertion of the test gage into the socket contacts shall not exceed 2 inches per minute for constant-speed machines, or the rate of load 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 1/8 pound steps or less, and shall be accurate to within  $\pm 5$  percent.

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

4.7.5 Contact retention (see 3.8) With the socket mounted to an appropriate fixture, a 7-1/2 pound (3.40 kg) axial load shall be applied to terminals intended for solderless wrap applications in both directions as that applied by the wrapping tool. A 3/4-pound (0.34 kg) axial load shall be applied in both directions to terminals intended for solder cup applications.

4.7.6 Insulation resistance (see 3.9) Unmated sockets shall be tested in accordance with method 3003 of MIL-STD-1344 or an equivalent industry standard.

MIL-PRF-83502C



| Contacts to accept mating leads |                         | Max Mn Gage | A D a                    |                        |
|---------------------------------|-------------------------|-------------|--------------------------|------------------------|
| Inch                            | mm                      |             | Inch                     | mm                     |
| .017<br>+ .003<br>- .001        | 0.043<br>+ .08<br>- .03 | Max         | 0.200 + .0000<br>- .0002 | 0.501 + .000<br>- .005 |
|                                 |                         | Mn          | 0.160 + .0002<br>- .0002 | 0.406 + .005<br>- .003 |
| .030<br>▽ .005                  | 0.76<br>▽ .13           | Max         | 0.350 + .0000<br>- .0002 | 0.889 + .000<br>- .005 |
|                                 |                         | Mn          | 0.250 + .0020<br>- .0020 | 0.635 + .051<br>- .000 |
| .040<br>▽ .005                  | 1.02<br>▽ .13           | Max         | 0.450 + .0002<br>- .0020 | 1.143 + .005<br>- .051 |
|                                 |                         | Mn          | 0.350 + .0002<br>- .0000 | 0.889 + .005<br>- .000 |

NOTES

- 1 Dimensions are in inches
- 2 Metric equivalents are given for general information only and are based upon 1.00 inch = 25.4 mm
- 3 Unless otherwise specified to tolerance  $\nabla$  .0005 (0.013 mm)
- 4 Metric equivalents are in parentheses
- 5 Material: A pins carbon steel finish 4 microinch maximum

FIGURE 3 Insertion and withdrawal gages

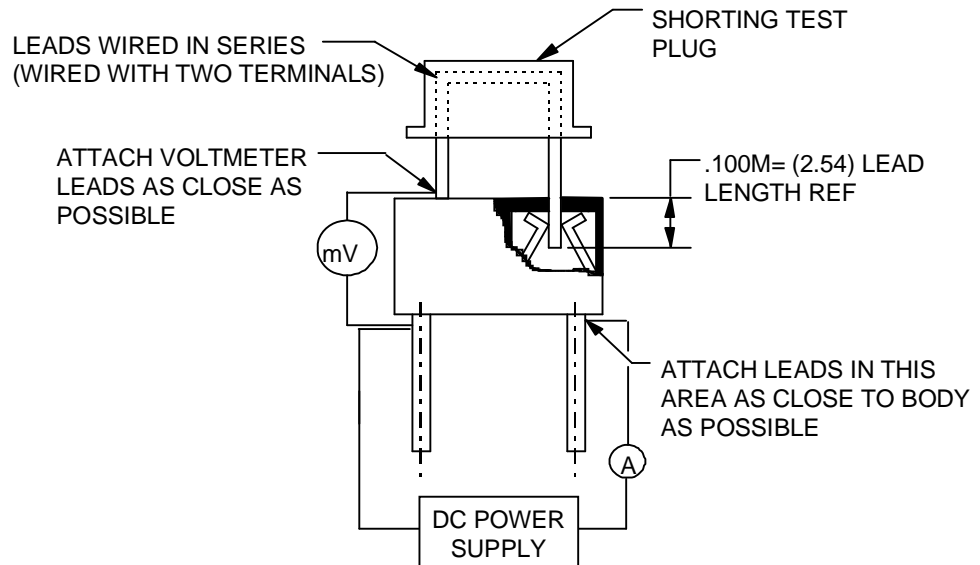
## MIL-PRF-83502C

4.7.7 Dielectric withstand voltage (see 3.10) Sockets shall be tested in accordance with method 3001 of MIL-STD-1344 or an equivalent industry standard. The following details and exceptions shall apply:

- a. Preparation - Mated with suitable test plug (see figure 2) but not mounted on a printed circuit board
- b. Magnitude of test voltage - 600 volts unless otherwise specified (see 3.1)
- c. Nature of potential - AC (rms)
- d. Points of application of test voltage - The test voltage shall be applied between all odd-numbered contacts connected together and all even-numbered contacts and all other metallic parts connected together unless otherwise specified (see 3.1)
- e. Method of connection of test voltage to specimens - Affix test probes to terminations described in 4.7.7d by clips or solder

4.7.8 Contact resistance (see 3.11) The contact resistance shall be measured as specified on figure 4. A minimum of three contacts shall be measured on each test specimen in accordance with method 3004 of MIL-STD-1344 or an equivalent industry standard. The following shall apply:

- a. Single contact
- b. Brass or copper base alloy gage
- c. Plating to be the same generic materials
- d. Final measurements - Durability (see 4.7.12) and corrosive atmosphere (see 4.7.16) shall be measured followed by contact resistance (see 4.7.7)



## NOTES

1. Dimensions are in inches
2. Metric equivalents are given for general information only and are based upon 1.00 inch = 25.4 mm
3. The measured resistance includes a portion of both the terminal and test socket leads as well as the voltmeter test leads. These resistances are to be subtracted from the total resistance to obtain the contact resistance.
4. A shorting wire may be soldered between leads in lieu of use of a special shorting plug.
5. Metric equivalents are in parentheses.

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

## MIL-PRF-83502C

4.7.9 Capacitance (see 3.12) The socket shall be tested in accordance with method 305 of MIL-STD-202 or an equivalent industry standard. The following details shall apply:

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

4.7.10 Vibration (see 3.13) Sockets shall be tested in accordance with method 2005 of MIL-STD-1344 or an equivalent industry standard. The following details shall apply:

- a Test condition - III
- b Preparation - Mated with test plugs (see figure 2) (see figure 5 for further details)
- c Following the test, contact resistance and contact withdrawal force shall be measured in accordance with 4.7.8 and 4.7.4 respectively.

4.7.11 Shock (specified pulse) (see 3.14) The socket shall be tested in accordance with method 2004 of MIL-STD-1344 or an equivalent industry standard. The following details shall apply:

- a Mounting method and detection circuit - Mounted by normal means monitoring equipment used shall be capable of detecting circuit interruptions greater than 1 microsecond
- b 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 - Mated with a test plug (see figure 2) (see figure 5 for test setup)

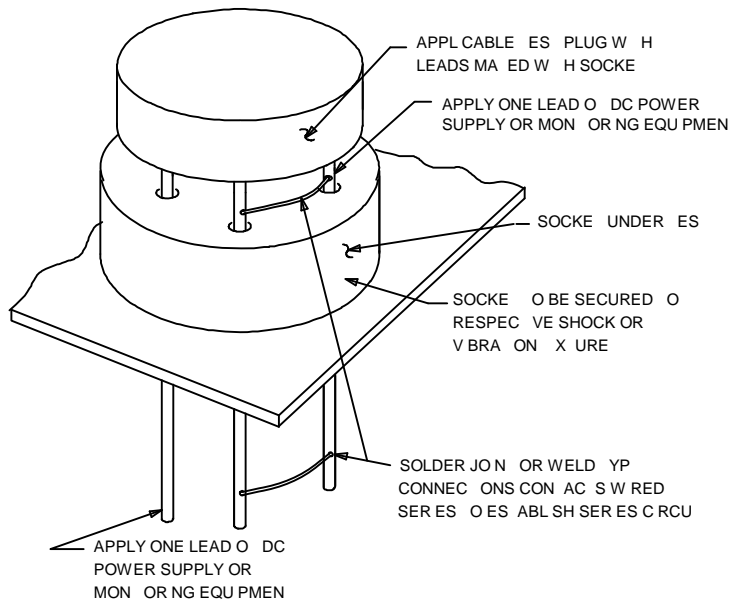


FIGURE 5 Vibration and shock test setup

## MIL-PRF-83502C

4.7.12 Durability (see 3.15) Each unit shall be subjected to 50 mating and unmating cycles using the test plug (see figure 2). Following the test, contact resistance and contact withdrawal force shall be measured in accordance with 4.7.7 and 4.7.3 respectively.

4.7.13 Thermal shock (see 3.16) sockets shall be tested in accordance with method 1003 of MIL-STD-1344 or an equivalent industry standard. The following details shall apply:

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

4.7.14 Humidity (see 3.17) Sockets shall be tested in accordance with method 1002, type II, MIL-STD-1344 or an equivalent industry standard. Unmounted sockets shall be connected as specified in 4.7.6. Insulation resistance shall be measured in accordance with 4.7.6 within 5 minutes of completion of step 6 of final cycle.

4.7.15 Low-signal/eve contact resistance (see 3.18) The low-signal/eve contact shall be tested in accordance with MIL-STD-1344 Method 3002 or an equivalent industry standard.

- a. Environmental condition not required
- b. Seven readings
- c. Final measurements - Contact resistance (see 3.10)

4.7.16 Corrosive atmosphere (see 6.4.1 and 3.11) Mated sockets shall be exposed to a concentrated sulfur atmosphere. The following details shall apply:

- a. Sockets that have been mated with a suitable test gage and preconditioned by being subjected to two unmounted insertions of the insertion force gage (see figure 3) shall be exposed to a 10-25 PPM atmosphere of ammonium polysulfide at a relative humidity of 60 percent or higher at room temperature for 4 hours in an enclosed chamber.
- b. At the conclusion of the sulfur atmosphere exposure, the low-signal/eve contact of the undisturbed mated socket shall be measured in accordance with 4.7.15.

4.7.17 Solderability (see 3.20) Each terminal shall be subjected to method 208 of MIL-STD-202 or an equivalent industry standard.

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

## 5 Packaging

5.1 Packaging requirements For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materials is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points packaging activity within the Military Department or Defense Agency or within the Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## MIL-PRF-83502C

## 6 Notes

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

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

6.2 Acquisition requirements Acquisition documents 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. Certificate of compliance covering materials when required
- d. Issue of DODISS to be cited in the solicitation and forwarded the specification and individual documents referenced (see 2.1 and 2.2)
- e. Packaging requirement (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. 83502 whether or not such products have actually been so tested 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. Information pertaining to qualification of products may be obtained from the Defense Supply Center Columbus ATTN: DSCC-VQ 3990 East Broad Street Columbus Ohio 43216-5000. Application procedures should conform to the "Provisions Governing Qualification" (see 6.3.1).

6.3.1 Provisions governing qualification Copies of "Provisions Governing Qualification" may be obtained upon application to Standardization Document Order Desk Building 4D 700 Robbins Avenue Philadelphia PA 19111-5094

6.4 Definition

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

6.5 GUIDANCE INFORMATION

6.5.1 Overlapped finish Based on past experience to meet the performance of this specification contacts have been fabricated with overlapped plated in accordance with MIL-G-45204 type I grade C class 0 for the socket spring contact and class 00 for the socket sleeve. Finish was overlapped in accordance with QQ-N-290 000030 to 000150 which check. Silver was not allowed as an underplate.

6.5.2 Contact mating area Based on past experience to meet the performance of this specification the contact mating area have been fabricated with gold plating in accordance with MIL-G-45204 type II grade C class 0 overlapped. Silver was not allowed to be used as an underplate.

6.5.3 Termination Based on past experience to meet the performance of this specification terminations have been fabricated with either gold per MIL-G-45204 type II grade C class 00 or tin-lead per MIL-P-81728 0001 which minimum as specified (see 3.1) over nickel (see 3.3.2.1.2). The following conditions do apply:

- a. Tin-lead should be 50 to 70 percent tin for type II termination
- b. Tin-lead should be 50 to 95 percent tin for all other termination types

6.6 Changes from previous issue Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MIL-PRF-83502C

6.7 Subject term (keyword string)

Contacts  
Current  
D e e c t r i c  
F n s h  
Heat  
Hum d t y  
Inspect on  
Mater a s  
Mount ng  
Mat ng force  
Po ar zat on  
Qua f cat on  
Samp ng  
Socket  
So der  
Turrent

CONCLUDING MATERIAL

Custodians:

Army - CR  
Navy - EC  
A r Force - 85

Preparing activity:  
DLA -CC

(Project 5935-4034)

Review activities:

Army - AT AV MI  
Navy - AS SH MC  
A r Force - 17 19 99



## 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

NOTE: This form may not be used to request copies of documents nor to request waivers or clarification of requirements on current contracts Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements

### I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER  
MIL-PRF-83502C

2. DOCUMENT DATE (YYMMDD)  
970407

3. DOCUMENT TITLE SOCKETS PLUG-IN ELECTRONIC COMPONENTS ROUND STYLE 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)

7 DATE SUBMITTED  
(YYMMDD)

(1) Commercial

(2) DSN (If applicable)

### 8. PREPARING ACTIVITY

a NAME  
Defense Supply Center Columbus

b TELEPHONE (Include Area Code)  
(1) Commercial 614-692-0573 (2) DSN 850-0573  
(3) Fax 614-692-3969

c ADDRESS (Include Zip Code)  
DSCC-VAI  
3990 East Broad Street  
Columbus, Ohio 43216-5000

**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 DSN 289-2340