

INCH-POUND

MIL-DTL-642E  
 4 April 2014  
 SUPERSEDING  
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## DETAIL SPECIFICATION

### PLUGS, TELEPHONE, AND ACCESSORY SCREWS 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 telephone plugs used in telephone (including telephone switchboard consoles), telegraph, and teletype circuits, and for connecting headsets, handsets, and microphones into communications circuits.

1.2 Classification. Plugs will be of the types specified (see 3.1).

#### 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 of 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 cited in the solicitation or contract (see 6.2).

#### DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-W-76	-	Wire and Cable, Hookup, Electrical, Insulated, General Specification for.
MIL-I-24768/10	-	Insulation, Plastic, Laminated, Thermosetting, Paper-base, Phenolic-resin (PBE).
MS35430	-	Terminal Lug, Solder Type, Copper Stamping, One Hole.
MIL-DTL-55330	-	Connectors, Electrical and Fiber Optic, Packaging of.

(See supplement 1 for a list of specification sheets.)

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Attn: VAI, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to [RFConnector@dla.mil](mailto:RFConnector@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

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## DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-202 - Test Method Standard, Electronic and Electrical Component Parts.
- MIL-STD-1285 - Marking of Electrical and Electronic Parts.
- MIL-STD-1353 - Electrical Connectors, Plug-in Sockets and Associated Hardware, Selection and Use of.
- MIL-STD-1916 - DOD Preferred Methods for Acceptance of Product.

(Copies of these documents are available online at <http://quicksearch.dla.mil/>.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

## ASME INTERNATIONAL

- ASME B107.100 - Flat Wrenches.

(Copies of these documents are available online at <http://www.asme.org>.)

## ASTM INTERNATIONAL

- ASTM D787 - Standard Specification for Ethyl Cellulose Molding and Extrusion Compounds
- ASTM D4066 - Standard Classification System for Nylon Injection and Extrusion Materials (PA)
- ASTM D4673 - Standard Classification System for Acrylonitrile–Butadiene–Styrene (ABS) Plastics and Alloys Molding and Extrusion Materials

(Copies of these documents are available online at <http://www.astm.org>.)

## ELECTRONIC COMPONENTS INDUSTRY ASSOCIATION (ECIA)

- EIA-364-28 - Vibration Test Procedures for Electrical Connectors and Sockets.

(Copies of these documents are available online at <http://eciaonline.org>.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exception 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 sheets. In the event of conflict between requirements of this specification and the specification sheet, the latter shall govern.

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3.2 Classification of requirements. The requirements for the plugs are classified herein as follows:

Requirement	Paragraph
Qualification - - - - -	3.3
Materials - - - - -	3.4
Design and construction - -	3.5
Performance - - - - -	3.6

3.3 Qualification. Plugs 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 6.4).

3.4 Materials. The materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which enables the plugs to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.4.1 Fungus-inert. Materials used in the construction of these plugs shall be fungus-inert.

3.4.2 Shells. Unless otherwise specified (see 3.1), shells shall be plastic in accordance with ASTM D4066, molded rods or molded tubes, type PBE, of MIL-I-24768/10; type II of ASTM D787; a substituted polyarylether material, such as a polysulfone; or acrylonitrile-butadiene-styrene (ABS) in accordance with ASTM D4673.

3.4.3 Screws, nuts and washers. Screws nuts and washers shall be made of corrosion-resistant material, or shall be suitably protected against corrosion to permit compliance with the salt spray requirement of 3.6.9.

3.4.4 Plating of metal parts. When specified (see 3.1), the plating shall be sufficient to prevent corrosion of the basis metal.

3.5 Design and construction.

3.5.1 Plugs. Plugs shall be of the design and construction specified (see 3.1).

3.5.2 Shell screws, terminal screws, and lugs. Shell screws, terminal screws, and terminal lugs (MS35430-1) shall be supplied unassembled and packaged with each plug.

3.5.3 Screw threads. Screw threads on removable or replaceable threaded parts shall be in accordance with ASME B107.100.

3.5.4 Cable clamp (see 3.1). A cable clamp for anchoring the electrical cable to the frame of the plug shall be supplied with the plug. If the cable clamp is not made as an integral part of the plug, the clamp shall be loosely assembled to or packaged with the plug. Twine serving is not acceptable for this service.

3.5.5 Conductor strain relief (see 3.1). Provisions for anchoring the stay cord to provide strain relief for the conductors of the electrical cable shall be included in the plug. All edges of the anchor in contact with the stay cord shall be rounded off.

3.6 Performance.

3.6.1 Torque (unless otherwise specified (see 3.1)). When plugs are tested as specified in 4.6.2, the torque applied between the separate metal parts of the plug finger shall cause no damage to, or loosening of, any parts thereof.

3.6.2 Dielectric withstanding voltage. When tested as specified in 4.6.3, plugs shall withstand a minimum of 500 volts root mean square (rms) without dielectric breakdown or flashover.

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3.6.3 Contact resistance. When plugs are tested as specified in 4.6.4, the contact resistance shall not exceed 0.02 ohm, except following the salt spray test, the contact resistance shall not exceed 0.10 ohm.

3.6.4 Insulation resistance. When plugs are tested as specified in 4.6.5, the insulation resistance shall be 1,000 megohms or greater.

3.6.5 Moisture resistance. When plugs are tested as specified in 4.6.6, the initial insulation resistance shall be not less than 1,000 megohms, and the initial dielectric withstanding voltage shall be as specified in 3.6.2. Following step 6 of the final cycle, at a relative humidity of 90 to 95 percent, the insulation resistance shall be not less than 5 megohm. Following the 24-hour conditioning period, the insulation resistance shall be not less than 1,000 megohms, the dielectric withstanding voltage and contact resistance shall be as specified in 3.6.2 and 3.6.3 respectively. Shells and other insulation shall not be cracked, warped, or delaminated. There shall be no excessive corrosion (see 3.6.9) of metal parts. All marking shall remain legible and it shall be possible to remove and replace screw-on shells (where used) without the use of tools. The outside diameter of the insulating spacer(s) between the tip and sleeve shall be as specified (see 3.1).

3.6.6 Thermal shock. When plugs are tested as specified in 4.6.7, shells and other insulation shall not be cracked, warped, or delaminated. The electrical continuity shall not be affected. All marking shall remain legible and it shall be possible to remove and replace screw-on shells (where used) without the use of tools.

3.6.7 Vibration, high frequency. When plugs are tested as specified in 4.6.8, there shall be no damage or loosening of parts, the mating jack shall not separate from the plug, and the contact resistance shall be as specified in 3.6.3.

3.6.8 Shock (specified pulse). When plugs are tested as specified in 4.6.9, there shall be no visual evidence of mechanical damage, rupture of dielectric materials, or loosening of parts.

3.6.9 Salt spray (corrosion). When plugs are tested as specified in 4.6.10, there shall be no excessive corrosion of metal parts. The insulation shall not be cracked, warped, or delaminated and the contact resistance shall be as specified in 3.6.3. Excessive corrosion shall be construed as any corrosion which interferes with electrical or mechanical performance or, in the case of plated metals, when the corrosive action has passed through the plating and attacked the basis metal. Exposed screw threads may be protected with a suitable coating.

3.6.10 Insertion and withdrawal forces. When plugs are tested as specified in 4.6.11, the insertion and withdrawal forces shall be as specified (see 3.1).

3.6.11 Strain relief (see 3.1). When tested in accordance with 4.6.12, there shall be no evidence of damage or cutting of the conductors or stay cord.

3.6.12 Longitudinal pull (see 3.1). When tested in accordance with 4.6.13, there shall be no damage or loosening of parts, loss of electrical continuity for more than a period of ten microseconds with a current of  $100 \pm 2$  milliamperes dc, the mating jack shall not separate from the plug, and the contact resistance shall be as specified in 3.6.3.

3.6.13 Static load (see 3.1). When plugs are tested as specified in 4.6.14, there shall be no damage or loosening of parts.

3.6.14 Stack assembly strength (see 3.1). When plugs are tested as specified in 4.6.15, there shall be no damage or loosening of parts.

3.6.15 Controlled drop (see 3.1). When plugs are tested as specified in 4.6.16, there shall be no damage or loosening of parts.

3.7 Marking. Plugs shall be marked in accordance with method I of MIL-STD-1285, and shall include the manufacturer's name, trademark, or source code and the part number (see 3.1).

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3.8 Workmanship. Plugs shall be processed in such a manner as to be uniform in quality and shall be free from defects that will affect life, serviceability, and appearance. There shall be no evidence of loose contacts; poor or improper molding or fabrication; damaged or improperly assembled contacts; peeling, flaking, or chipping of plating or finish; mechanical damage due to testing environment; nicks or burrs of metal parts or surfaces; improper or incorrect marking; or improper tinning of solder cups, terminals, pins, or contacts.

## 4. VERIFICATION

4.1 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.

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

- a. Qualification inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

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

4.3.1 Mating jacks. Mating jacks used for inspections of plugs shall have been listed on, or approved for listing on, the applicable qualified products list.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.4) on sample units produced with equipment and procedures normally used in production.

4.4.1 Sample size. Twelve plugs of each type shall be subjected to qualification inspection.

4.4.2 Inspection routine. The sample shall be subjected to the inspections specified in table I, in the order shown. All sample units shall be subjected to the inspections of group I. The sample shall then be divided equally into two groups of six units each and subjected to the inspection for their particular group.

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

4.4.4 Retention of qualification. To retain qualification, the contractor shall forward a report to the qualifying activity at the end of 24 months. The qualifying activity shall establish the initial reporting date. Subsequent reporting periods will be 36 months each. The report shall consist of:

- a. A summary of the results of the tests performed for inspection of product for delivery, groups A and B, 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 verification of qualification inspection, group C, including the number and mode of failures. The summary shall include results of all verification of qualification inspection tests performed and completed during the 24- or 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.

Failure to submit the report within 30 days after the end of each 24- or 36-month 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 24- or 36-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

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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 2 consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit a representative product of each type to testing in accordance with the qualification inspection requirements.

4.4.5 Extension of qualification. Plugs of the same type shall be qualified for any permissible color other than that tested during qualification inspection, provided that the material and design and construction used are identical. Plugs shall be qualified for types with both plastic shells and metal shells by submitting a sample of six plugs fabricated with plastic shells and six plugs of the same type fabricated with metal shells. Plug type PJ-054 and PJ-540 shall both be qualified upon satisfactory completion of qualification inspection of either type.

TABLE I. Qualification inspection.

Inspection	Requirement paragraph	Test paragraph
<u>Group I (all sample units)</u>		
Visual and mechanical examination <u>1/</u> - - - - -	3.1, 3.4, 3.5, 3.7, 3.8	4.6.1
Torque (when applicable) - - - - -	3.6.1	4.6.2
Dielectric withstanding voltage- - - - -	3.6.2	4.6.3
Contact resistance- - - - -	3.6.3	4.6.4
Insulation resistance- - - - -	3.6.4	4.6.5
Insertion and withdrawal forces- - - - -	3.6.10	4.6.11
Strain relief - - - - -	3.6.11	4.6.12
Longitudinal pull- - - - -	3.6.12	4.6.13
Static load- - - - -	3.6.13	4.6.14
<u>Group II (6 sample units)</u>		
Moisture resistance- - - - -	3.6.5	4.6.6
<u>Group III (6 sample units)</u>		
Thermal shock - - - - -	3.6.6	4.6.7
Vibration, high frequency- - - - -	3.6.7	4.6.8
Shock (specified pulse) - - - - -	3.6.8	4.6.9
Salt spray (corrosion)- - - - -	3.6.9	4.6.10
Stack assembly strength - - - - -	3.6.14	4.6.15
Controlled drop - - - - -	3.6.15	4.6.16

1/ Marking will be considered defective only if it is illegible at the completion of any of the required tests.

#### 4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections.

4.5.1.1 Inspection lot. An inspection lot shall consist of all plugs of the same basic type, produced under essentially the same conditions, and offered for inspection at one time. An inspection lot may include plugs of the same basic type having shells of different colors, provided that the plugs are otherwise mechanically and dimensionally identical.

4.5.1.2 Group A inspection. Group A inspection shall consist of visual and mechanical examination (see 4.6.1).

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4.5.1.2.1 Sampling plan. The acceptable quality levels (AQL) shall be 1.0 and 2.5 (percent defective) for major or minor defects, respectively. Major and minor defects shall be as defined in MIL-STD-1916.

4.5.1.2.2 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 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.

4.5.1.3 Group B inspection. Group B inspection shall consist of the inspections specified in [table II](#), in the order shown, and shall be made on sample units which have been subjected to and have passed the group A inspection.

4.5.1.3.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-1916 for special inspection level S-4. The sample size shall be based on the inspection lot size from which the sample was selected for group A inspection. The AQL shall be 4.0 percent defective.

4.5.1.3.2 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 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.

TABLE II. Group B inspection.

Inspection	Requirement paragraph	Test paragraph
Contact resistance - - - - -	<a href="#">3.6.3</a>	<a href="#">4.6.4</a>
Insulation resistance- - - - -	<a href="#">3.6.4</a>	<a href="#">4.6.5</a>
Dielectric withstanding voltage- - - - -	<a href="#">3.6.2</a>	<a href="#">4.6.3</a>
Torque - - - - -	<a href="#">3.6.1</a>	<a href="#">4.6.2</a>

4.5.1.3.3 Disposition of sample units. Sample units which have passed all the group B inspection may be delivered on the contract, if the lot is accepted and the sample units are still within specified electrical tolerances.

4.5.2 Verification of qualification inspection. Verification of qualification inspection shall consist of group C. Except where the results of these inspections show noncompliance with the applicable requirements (see [4.5.2.1.4](#)), delivery of products which have passed groups A and B shall not be delayed pending the results of these verification of qualification inspections.

4.5.2.1 Group C inspection. Group C inspection shall consist of the inspections specified in [table III](#), in the order shown. Group C inspection shall be made on sample units selected from inspection lots which have passed the groups A and B inspections.

4.5.2.1.1 Sampling plan. Twelve sample units of each basic type shall be selected at random from items produced every 24- or 36-months, as applicable (see [4.4.4](#)). The sample units shall be subdivided as specified for each subgroup in [table III](#).

4.5.2.1.2 Failures. If any sample units fail to pass group C inspection, the entire sample shall be considered to have failed and if the contractor has been inspecting on a 36-month basis as permitted in [4.4.4](#), he shall revert to a 24-month testing basis. The contractor can return to a 36-month inspection basis by meeting requirements of [4.5.2.1.1](#).



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TABLE III. Group C inspection.

Inspection	Requirement paragraph	Test paragraph
<u>Subgroup 1</u> (sample units 1-6)		
Moisture resistance - - - - -	3.6.5	4.6.6
Torque (when applicable)- - - - -	3.6.1	4.6.2
<u>Subgroup 2</u> (sample units 7-12)		
Thermal shock - - - - -	3.6.6	4.6.7
Vibration - - - - -	3.6.7	4.6.8
Shock (specified pulse)- - - - -	3.6.8	4.6.9
Torque (when applicable)- - - - -	3.6.1	4.6.2
Salt spray (corrosion) - - - - -	3.6.9	4.6.10

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

4.5.2.1.4 Noncompliance. If a sample fails to pass group C 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 conditions, with essentially the same materials, processes, etc, 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 C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the qualifying activity). Groups A and B inspection may be reinstituted; however, final acceptance and shipment shall be withheld until the group C 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.

4.5.3 Inspection of packaging. Sample packages and packs and the inspection of the preservation packing and marking for shipment and storage shall be in accordance with the requirements of MIL-DTL-55330.

#### 4.6 Methods of inspection.

4.6.1 Visual and mechanical inspection (see 3.1, 3.4, 3.5, 3.7, and 3.8). Plugs shall be inspected to verify that the materials, screw threads, physical dimensions, marking, and workmanship are in accordance with the applicable requirements.

4.6.2 Torque (unless otherwise specified (see 3.1 and 3.6.1). With the sleeve of the plug held rigid, a twisting force of 2 pound-inches shall be applied for at least one minute to the tip of the plug assembly in a direction intended to loosen the tip of the plug. On three-element plugs having a dead collar between the tip and the ring, a twisting force of 1 ½ pound-inches shall also be applied to the dead collar, in a direction intended to loosen it from the assembly.

4.6.3 Dielectric withstanding voltage (see 3.6.2). Plugs shall be tested in accordance with method 301 of MIL-STD-202. The following details shall apply:

- Magnitude of test voltage and nature of potential – 500 volts ac.
- Duration of application – For qualification inspection, the test voltage shall be applied at a rate of 100 volts per second. For quality conformance inspection, the voltage may be applied instantaneously and shall be maintained for at least 5 seconds.
- Points of application – Between mutually insulated terminals of the plug.



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4.6.4 Contact resistance (see [3.6.3](#)). Plugs shall be tested in accordance with method 307 of MIL-STD-202. The following details shall apply:

- a. Method of connection – Applicable mating jack (see [table IV](#)).
- b. Test current –  $100 \pm 2$  milliamperes direct current.
- c. Maximum open-circuit test voltage – Approximately 6 volts.
- d. Number of activations prior to measurement – Six, using applicable mating jack (see [table IV](#)).
- e. Number of test activations – One.
- f. Number of measurements per activation – Measure between each plug terminal and the corresponding jack terminal, at the point of normal connection.

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TABLE IV. Plugs and mating jacks.

Plugs		Jacks	
Part number	Type designation	Part number	Type designation
M642/1-1	PJ-047B	M641/1-1	JJ-015
M642/1-2	PJ-047R	M641/1-2	JJ-019
M642/4-1	PJ-055B	M641/2-1	JJ-016
M642/4-2	PJ-055R	M641/2-2	JJ-017
M642/4-3	PJ-055M	M641/2-3	JJ-024
M642/11-1	PJ-636	M641/2-4	JJ-035
		M641/2-5	JJ-072
		M641/2-6	JJ-084
		M641/2-7	JJ-085
		M641/2-8	JJ-086
		M641/2-9	JJ-087
		M641/6-1	JJ-034
		M641/12-1	JJ-089
		M641/13-1	JJ-092
		M641/13-2	JJ-093
		M641/13-3	JJ-096
		M641/13-4	JJ-097
		M641/15-1	JJ-098
		M641/15-2	JJ-099
		M651/15-3	JJ-102
		M641/16-1	JJ-104
		M641/16-2	JJ-105
		M641/16-3	JJ-107
		M641/18-1	JJ-134
M642/2-1	PJ-051B	M641/3-1	JJ-022
M642/2-2	PJ-051R	M641/3-2	JJ-042
		M641/3-3	JJ-073
		M641/3-4	JJ-074
		M641/3-5	JJ-075
		M641/3-6	JJ-077
		M641/3-7	JJ-078
		M641/9-1	JJ-079
		M641/9-2	JJ-081
		M641/9-3	JJ-082
		M641/9-4	JJ-106
		M641/14-1	JJ-095
		M641/14-2	JJ-101
		M641/14-3	JJ-103
M642/3-1	<u>1/</u> PJ-054B	M641/4-1	JJ-026
M642/3-2	<u>1/</u> PJ-054R	M641/4-2	JJ-026
M642/10-1	PJ-540B		
M642/10-2	PJ-540R		
M642/5-1	PJ-068	M641/5-1	JJ-033
M642/8-1	PJ-309	M641/10-1	JJ-083
		M641/17-1	JJ-133
M642/6-1	PJ-291	M641/7-1	JJ-048
M642/7-1	PJ-292	M641/7-2	JJ-048
		M641/8-1	JJ-055
		M641/8-2	JJ-055
M642/9-1	PJ-327	M641/2-8	<u>2/</u> JJ-086
		M641/11-1	JJ-088

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TABLE IV. Plugs and mating jacks. – Continued.

Plugs		Jacks	
Part number	Type designation	Part number	Type designation
M642/13-1 M642/13-2 M642/13-3 M642/13-4	PJ-711 PJ-711 PJ-778 PJ-778	M641/19-1 thru M641/19-12 M641/20-1 thru M641/20-8 M641/21-1 thru M641/21-12	N/A
M642/14-1	U-384/U	M641/22-1	U-385/U

- 1/ Types PJ-054B and PJ-054R can be replaced by types PJ-540B and PJ-540R, respectively. The cord-entrance dimension for PJ-054B and PJ-054R is 0.250 inch, for PJ-540B and PJ-540R, the cord-entrance dimension is 0.281 inch.
- 2/ Two JJ-086 are needed for use with PJ-327.

4.6.5 Insulation resistance (see 3.6.4). Plugs shall be tested in accordance with method 302 of MIL-STD-202. The following details shall apply:

- Special preparation – Use applicable test jack (see 3.1).
- Electrification time – Shall not exceed one minute.
- Test condition letter – B.

4.6.6 Moisture resistance (see 3.6.5). Plugs shall be tested in accordance with method 106 of MIL-STD-202. The following details and exceptions shall apply:

- Mounting – Polyvinylchloride-insulated wires conforming to type MW of MIL-W-76 shall be connected in the normal manner to the plug terminals. The plugs shall then be held in an approximately vertical position, with the finger pointed upward, by means of a nylon cord fastened to the sleeve, or by other suitable means simulating this condition.
- Initial measurements – The insulation resistance shall be measured with a direct-current potential of 500 volts applied between mutually insulated terminals of the plugs. The dielectric withstanding voltage shall then be measured as specified in 4.6.3.
- Subcycle (steps 7a and 7b) – Not applicable.
- Polarization – A direct-current potential of 100 volts shall be applied between the terminals on 50 percent of the plugs. For plugs having tip-and-sleeve connections, the sleeve shall be negative, and the tip positive. For plugs having tip-ring-and-sleeve connections, the sleeve and tip shall be negative and the ring positive. No potential shall be applied to the remaining 50 percent of the plugs.
- Final measurements – After completion of step 6 of the final cycle and not sooner than ½-hour nor later than 3 hours after the sample plugs shall have been removed from the chamber the insulation resistance shall be measured as specified in 4.6.5. The plugs shall then be conditioned at a relative humidity of  $50 \pm 5$  percent for 24 hours, after which the insulation resistance, contact resistance and dielectric withstanding voltage shall be measured as specified in 4.6.5, 4.6.4, and 4.6.3, respectively.

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4.6.7 Thermal shock (see [3.6.6](#)). Plugs shall be tested in accordance with method 107 of MIL-STD-202. The following details shall apply:

- a. The plug shall be inserted into the applicable mating jack (see [table IV](#)) and shall remain inserted in the jack throughout the test.
- b. Measurements before and after test - None.
- c. Test condition letter – A.

4.6.8 Vibration, high frequency (see [3.6.7](#)). Plugs shall be tested in accordance with EIA-364-28. The following details and exceptions shall apply:

- a. Method of mounting: Plugs shall be mounted with their longitudinal axis in a horizontal plane.
- b. Test condition: I.
- c. Direction of motion: Along the axis of the plug, and then perpendicular to the axis of the plug.
- d. Measurements during vibration: Each plug shall be monitored for electrical continuity, using a test current of  $100 \pm 2$  milliamperes, dc. Loss of continuity for a period longer than 10 microseconds constitutes a failure.
- e. Measurements after vibration: Contact resistance shall be measured as specified in [4.6.2](#).
- f. The vibration test shall be performed on plugs, both unmated (without the mating jack) and mated (with the mating jack).
- g. Mating jack: The applicable mating jack (see [table IV](#)) shall have a 3 foot  $\pm 3$  inch length of cord, of the type normally used with the jack, attached and hanging free. The plug shall be inserted into the mating jack and shall remain inserted in the jack throughout the mated portion of the test.

4.6.9 Shock (specified pulse) (see [3.6.8](#)). Plugs shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply:

- a. Test condition letter: H (75 G's).
- b. Six blows in three planes (total 18 blows).
- c. Mounting: Plugs shall be mounted on a rigid test plate and tested in the vertical position.
- d. The test shall then be repeated with the plugs mounted on a horizontal plate.

4.6.10 Salt spray (corrosion) (see [3.6.9](#)). Plugs shall be tested in accordance with method 101 of MIL-STD-202. The following details shall apply:

- a. Test condition letter – B (48 hrs.).
- b. Measurements after test: Contact resistance shall be measured as specified in [4.6.4](#).
- c. Unless otherwise specified, 5 percent salt solution.

4.6.11 Insertion and withdrawal forces (see [3.6.10](#)). The specified mating jack conforming to the applicable specification sheet (see [table IV](#)) shall be used. The maximum force required to insert and withdraw the plug shall be measured as follows: The axis of the plug shall be aligned with the axis of the jack bushing. A straight thrust shall then be applied gradually in a direction along the axis of the plug until it is completely inserted into the jack; a straight pull shall then be applied gradually in a direction along the axis of the plug until it is completely separated from the jack.

4.6.12 Strain relief (see [3.6.11](#)). While terminated to the specified cable, a force of 50 pounds minimum shall be applied in a longitudinal direction for a minimum of five minutes.

4.6.13 Longitudinal pull (see [3.6.12](#)). The specified mating jack conforming to the applicable specification sheet (see [table IV](#)) shall be used. The plug, when inserted in the jack and subjected to a longitudinal pull of one pound less than the measured withdrawal force shall not render the jack inoperative or cause an open contact (discontinuity) between the plug and jack.

4.6.14 Static load (see [3.6.13](#)). A static load of 150 pounds minimum shall be applied to the plug at approximately midpoint for one minute minimum. The plug shall be resting in a horizontal position on a

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concrete floor or rigid metal surface. The load shall be applied perpendicular to the longitudinal axis of the plug through a rigid bar  $0.50 \pm 0.25$  wide placed tangent to the shell surface and parallel to the floor or surface supporting the plug.

4.6.15 Stack assembly strength (see [3.6.14](#)). With the frame of the plug in the horizontal position the plug shall be subjected to a static load of eight pounds minimum, on the number one contact, for a minimum period of 24 hours.

4.6.16 Controlled drop (see [3.6.15](#)). With the frame of the plug in the horizontal position each contact shall be subjected to the impact of a 0.5 ounce (min) brass weight dropped from a vertical distance of 6 feet minimum. The weight shall be dropped through a tube 6 feet (min) long having an internal diameter of  $7/16 \pm 1/16$  inch. Each contact shall be subjected to three consecutive blows with the plug being rotated  $120^\circ \pm 10^\circ$  between each blow.

## 5. PACKAGING

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

## 6. NOTES

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

6.1 Intended use. The telephone plugs covered by this specification are primarily for use in ground support and shipboard communications equipment. Those connectors which form an integral part of a headset and do not encounter a high vibration environment may be used for aerospace applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

6.3 Definitions. See MIL-STD-1353, "Electrical connectors and hardware."

6.4 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. 642 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DLA Land and Maritime, Attn: VQP, P.O. Box 3990, Columbus, OH 43218-3990, email: [vqp.cr@dla.mil](mailto:vqp.cr@dla.mil). An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.daps.dla.mil>.

6.5 Mating jacks. Information on mating jacks is shown in [table IV](#). All plugs listed in the same block of column 1 are applicable for mating with all jacks listed in the corresponding block of column 2.

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6.6 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website at <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see Section 3).

6.7 Subject term (keyword) listing.

Accessories  
Cable  
Jacks  
Jumper  
Receptacles

6.8 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  
DLA – CC

## Preparing activity:

DLA – CC

## Review activities:

Army – AR, AV, CR4, MI  
Navy – AS, MC, OS, SH  
Air Force – 19, 99

(Project 5935-2014-002)

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