

INCH - POUND

MIL-DTL-83723G
7 December 2009
SUPERSEDING
MIL-DTL-83723F
20 October 2000

DETAIL SPECIFICATION

CONNECTORS, ELECTRICAL, (CIRCULAR, ENVIRONMENT RESISTING),
RECEPTACLES AND PLUGS, 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 the general requirements for environment resisting, circular, electrical connectors and their associated contacts and accessories. These connectors must utilize crimp or solder contacts and be capable of operation within the specified range (see [3.4.6.1](#)).

1.1.1 Series description. Basic series of connectors are as follows:

- a. Series I - Type B bayonet coupling. Transferred to MIL-DTL-26482 series II, as applicable (see [6.5.1](#)).
- b. Series II - Type T threaded coupling, intermateable with MIL-DTL-5015. (Inactive for new design, use: MS3450, MS3451, MS3452, MS3456, and MS3459 of MIL-DTL-5015, as applicable.)
- c. Series III - Type T threaded and type B bayonet coupling connectors, intermateable with applicable MIL-DTL-26500 connectors (see section 6). In addition, requirements for hermetic receptacles with nonremovable contacts are included. The hermetic receptacle must mate with the appropriate bayonet or threaded type connector and must meet the same temperature requirements.

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

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1.2 Classification. The classes and types (either bayonet or threaded coupling) are as follows:

Class	Type	Applicable series	Description
A	B T	III II, III	Aluminum shell, anodize, nonconductive finish, fluid resistant insert.
F			Cancelled, superseded by class R.
G	B T	III II, III	Stainless steel shell, passivated, fluid resistant insert.
H (Hermetic)	B T	III II, III	Steel shell, tin finish, fluid resistant, interfacial sealing gasket, solder cup contacts and feed thru (straight pin) contacts.
J (Hermetic)	B T	III II, III	Steel shell, tin finish, fluid resistant interfacial sealing gasket, eyelet contacts.
K (Firewall)	T	II, III	Stainless steel shell, passivated, fluid resistant insert.
L (Hermetic)	T	III	Receptacles, electrodeposited nickel finish, fluid resistant insert, eyelet contacts.
M	B T	III II, III	Aluminum shell, electrodeposited aluminum, conductive, finish, nonreflective, 500 hours salt spray, fluid resistant insert.
N (Hermetic)	T	III	Plugs, electrodeposited nickel finish, fluid resistant insert, RFI grounding, firewall, self locking. Receptacles, electrodeposited nickel finish, fluid resistant insert, hermetic, solder cup contacts.
P (Hermetic)	B T	III III	Stainless steel shell, passivated, fluid resistant interfacial sealing gasket, eyelet contacts.
R	B T	III II, III	Aluminum shell, electroless nickel, conductive finish, fluid resistant insert.
S	T	III	Stainless steel shell, passivated, fluid resistant insert, firewall (plug and receptacle), RFI grounding, self locking (plug).
T	B T	III II, III	Aluminum shell, nickel fluorocarbon polymer, conductive finish, nonreflective, 500 hours salt spray, fluid resistant insert.
W	B T	III II, III	Aluminum shell, cadmium, conductive finish 500 hours salt spray, fluid resistant insert.
Y (Hermetic)	B T	III III	Stainless steel shell, passivated, fluid resistant interfacial sealing gasket, solder cup contacts and feed thru (straight pin) contacts.
Z	B T	III II, III	Aluminum shell, zinc nickel alloy, conductive finish, nonreflective, 500 hours salt spray, fluid resistant insert.

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1.2.1 Connector classes physical features. Physical features of the connector classes are specified in table I.

TABLE I. Connector classes physical feature.

Class	A	G	H <u>1/</u>	J <u>1/</u>	K <u>2/</u>	L <u>1/</u>	M	N <u>2/</u>	N <u>1/</u>	P <u>1/</u>	R	S	T	W	Y <u>1/</u>	Z
Series II	X	X	X	X	X		X				X		X	X		X
Series III	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bayonet coupling	X	X	X	X			X			X	X		X	X	X	X
Threaded coupling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Solder hermetic			X						X						X	
Eyelet				X		X				X						
Crimp	X	X			X		X	X			X	X	X	X		X
Grounding fingers							X	X			X	X	X	X		X
Firewall					X			X				X				
Temperature °C	200	200	150	150	200	200	175	200	200	200	200	200	175	175	200	175
Self-locking coupling nut series III, type T	X <u>3/</u>	X			X		X	X			X <u>3/</u>	X <u>3/</u>	X	X		X

1/ Hermetic

2/ Firewall

3/ See the applicable specification sheets for self-locking feature availability.

1.3 Shell sizes and insert arrangements. Shell sizes and insert arrangements will be in accordance with MIL-STD-1651 for series II and MIL-STD-1554 for series III.

1.4 Insert position. For all series II and III, positions N through 5, the insert position is the angular position of the insert relative to the master key or keyway of the shell. For series III, positions 6 through Y, the centerline of the insert is aligned on the centerline of the master key/keyway and the angular positions of the minor key/keyway are rotated in reference to the master key/keyway of the shell. Insert positions other than normal must be indicated by the letter shown in MIL-STD-1651 for series II, and by the numeral or letter shown in MIL-STD-1554 for series III.

1.5 Accessories. Accessories must consist of the items as specified in the supplement to this document.

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2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-DTL-5015 - Connectors, Electrical, Circular Threaded, AN Type, General Specification for.
- MIL-S-7742 - Screw Threads, Standard, Optimum Selected Series: General Specification for.
- MIL-A-8625 - Anodic Coatings for Aluminum and Aluminum Alloys.
- MIL-DTL-14072 - Finishes for Ground Based Electronic Equipment.
- MIL-DTL-22520 - Crimping Tools, Wire Terminal, General Specification for.
- MIL-R-25988/3 - Rubber, Fluorosilicone Elastomer, Oil and Fuel Resistant, O-Rings, Class I, Grade 60.
- MIL-I-81969/14 - Installing and Removal Tools, Connector, Electrical Contact, Type III, Class 2 Composition B.
- MIL-I-81969/15 - Installing and Removal Tools, Connector, Electrical Contact, Type II, Class 2, Composition A.
- MIL-I-81969/29 - Installing and Removal Tools, Connector, Electrical Contact, Type II, Class 1, Composition B.
- MIL-DTL-83488 - Coating, Aluminum, High Purity.
- MS3155 - Connector, Electric, Rear Accessory Design Standard.
- MS3186 - Connector Mounting to Connectors, Mounting Nuts, Plain Hexagon.
- MS3461 - Test Gage, MIL-C-0026482 Series 2 or MIL-C-81703 Series 3 Contact Retention Feature.

(See supplement 1 for list of specification sheets.)

DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-790 - Standard Practice for Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts.
- MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests.
- MIL-STD-889 - Dissimilar Metals.
- MIL-STD-1285 - Marking of Electrical and Electronic Parts.
- MIL-STD-1554 - Insert Arrangements for MIL-DTL-83723 Series III and MIL-DTL-26500 Environment Resisting, Circular, Electrical Connectors.
- MIL-STD-1651 - Insert Arrangements for MIL-C-5015, MIL-C-22992 (Classes C, J, and R), and MIL-C-83723 (Series II) Electrical Connectors.

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DEPARTMENT OF DEFENSE HANDBOOK

MIL-HDBK-454 - General Guidelines for Electronic Equipment.

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

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

ASME INTERNATIONAL (ASME)

ASME-B46.1 - Surface Texture (Surface Roughness, Waviness and Lay).

(Copies of these documents are available online at <http://www.asme.org> or from ASME International, Three Park Avenue, New York, NY 10016-5990.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-B488 - Gold for Engineering Uses, Electrodeposited Coating of.
ASTM-B545 - Standard Specification for Electrodeposited Coatings of Tin.
ASTM-B841 - Standard Specification for Electrodeposited Coatings of Zinc Nickel Alloy Deposits.

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

ELECTRONIC INDUSTRIES ALLIANCE (EIA)

EIA-359 - EIA Standard Colors for Color Identification and Coding.
EIA-364 - Electrical Connector/Socket Test Procedures including Environmental Classifications.
EIA-364-02 - Air Leakage Test Procedure for Electrical Connectors.
EIA-364-03 - Altitude Immersion Test Procedure for Electrical Connectors.
EIA-364-06 - Contact Resistance Test Procedure for Electrical Connectors.
EIA-364-10 - Fluid Immersion for Test Procedure for Electrical Connectors and Sockets.
EIA-364-14 - Ozone Exposure Test Procedure for Electrical Connectors.
EIA-364-20 - Withstanding Voltage Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts.
EIA-364-21 - Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts.
EIA-364-24 - Maintenance Aging Test Procedure for Electrical Connectors.
EIA-364-26 - Salt Spray Test Procedures for Electrical Connectors, Contacts and Sockets.
EIA-364-27 - Mechanical Shock (Specified Pulse) Test Procedures for Electrical Connectors.
EIA-364-28 - Vibration Test Procedure for Electrical Connectors and Sockets.
EIA-364-29 - Contact Retention Test Procedure for Electrical Connectors.
EIA-364-31 - Humidity Test Procedure for Electrical Connectors and Sockets.
EIA-364-32 - Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets.

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- EIA-364-35 - Insert Retention Test Procedure for Electrical Connectors.
- EIA-364-45 - Firewall Flame Test Procedure for Electrical Connectors.
- EIA-364-54 - Magnetic Permeability Test Procedure for Electrical Connectors, Contacts and Sockets.
- EIA-364-78 - Cavity-to-Cavity Leakage Bonding Integrity Test Procedure for Electrical Connectors.
- EIA-364-83 - Shell-to-Shell and Shell-to-Bulkhead Resistance Test Procedure for Electrical Connectors.
- EIA-364-105 - Altitude – Low Temperature Test Procedure for Electrical Connectors.
- EIA-557 - EIA Statistical Process Control Systems.

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

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 17025 - General Requirements for the Competence of Testing and Calibration Laboratories.

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

NCSL INTERNATIONAL

- NCSL Z540.3 - Requirements for the Calibration of Measuring and Test Equipment.

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

SAE INTERNATIONAL

- SAE AMS-C-26074 - Coatings, Electroless Nickel, Requirements for.
- SAE-AMS-QQ-P-416 - Plating, Cadmium (Electrodeposited).
- SAE-AMS-QQ-N-290 - Plating, Nickel (Electrodeposited).
- SAE-AS39029 - Contacts, Electrical Connector, General Specification for.
- SAE-AS39029/4 - Contacts, Electrical Connector, Pin, Crimp Removable (for MIL-DTL-26482 Series 2, MIL-C-81703 Series 3, MIL-DTL-83723 Series I and III, and MIL-C-83733 Connectors).
- SAE-AS39029/5 - Contacts, Electrical Connector, Socket, Crimp Removable (for MIL-DTL-26482 Series 2, AS81703 Series 3, MIL-DTL-83723 Series I and III, and MIL-C-83733 Connectors and MIL-S-12883/40 and /41 Relay Sockets).
- SAE-AS39029/7 - Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (for MIL-DTL-26482 Series 2 and MIL-C-81703 Series 3 Connectors).
- SAE-AS39029/8 - Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, for MIL-DTL-26482 Series 2 and Mil-C-81703 Series 3 Connectors).
- SAE-AS39029/9 - Contacts, Electrical Connector, Pin, Crimp Removable, Thermocouple, (for MIL-DTL-26482 Series 2, MIL-C-81703 Series 3, MIL-DTL-83723 Series 3, and MIL-C-83733 Connectors).

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SAE-AS39029/10	-	Contacts, Electrical Connector, Socket, Crimp Removable, Thermocouple, (for MIL-DTL-26482 Series 2, MIL-C-81703 Series 3, MIL-DTL-83723 Series 3, and MIL-C-83733 Connectors).
SAE-AS39029/29	-	Contacts, Electrical Connector, Pin, Crimp Removable, (for MIL-DTL-5015, Series MS3450 and MIL-DTL-83723 Series 2 Connectors).
SAE-AS39029/30	-	Contacts, Electrical Connector, Socket, Crimp Removable, (for MIL-DTL-5015, MS3450 Series and MIL-DTL-83723 Series II Connectors).
SAE-AS39029/73	-	Contacts, Electrical Connectors, Socket, Solder, Removable, Shielded, Size 12 (for MIL-DTL-83723 Series III, MIL-DTL-26482 Series 2, MIL-C-83733, and DoD-C-83527 Connectors).
SAE-AS39029/74	-	Contacts, Electrical Connectors, Pin, Solder, Removable, Shielded, Size 12 (for MIL-DTL-83723 Series III, MIL-DTL-26482 Series 2, MIL-C-83733 and DoD-C-83527 Connectors).
SAE-AS85049	-	Connector Accessories, Electrical General Specification for.
SAE-AS85049/138	-	Cap, Dust, Plastic, Electric Connector.

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

2.4 Order of precedence. 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 related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Qualification. Connectors and accessories 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).

3.2.1 Qualified Products List (QPL) system. The manufacturer shall establish and maintain a quality system that allows its parts that are covered by this specification to be listed on the QPL. Requirements for this system are specified in MIL-STD-790. In addition, the manufacturer shall establish a Statistical Process Control (SPC) system that meets the requirements of EIA-557.

3.3 Materials. Materials which are not specified (see 3.1), or which are not specifically described herein shall be of the lightest practical weight and suitable for the purpose intended.

3.3.1 Dissimilar metals. When dissimilar metals are employed in intimate contact with each other, protection against galvanic corrosion shall be provided. The use of dissimilar metals in contact, which tend toward active galvanic corrosion (particularly brass, copper, or steel metals in contact with aluminum or an aluminum alloy) is not acceptable. However, metal plating of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. The use of dissimilar metals separated by a suitable insulating material is also permitted. Dissimilar metals and compatible couples are specified in MIL-STD-889.

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3.3.2 Nonmagnetic materials (except classes H, K, N, S, and Y). The relative permeability of the wired, assembled and fully mated connector assembly shall be less than 2.0μ in accordance with test procedure EIA-364-54.

3.3.3 Contact materials and plating.

3.3.3.1 Hermetic receptacle contacts. Unless otherwise specified (see 3.1), contacts shall be of ferrous alloy which shall be plated in accordance with ASTM-B488 over a suitable underplate to the thickness specified (see 3.1). Wire marks on the back of the contacts around the nonfunctional outside diameter of the pins, caused by electrical contact for plating, is permissible.

3.3.3.2 Contact plating thickness (hermetic). When tested as specified in 4.6.35, contacts used in hermetic connectors shall be gold plated to a minimum thickness of .000050 inch (0.00127mm) (see figure 1).

3.3.3.3 Solder contacts (hermetics only). Solder contact material shall be as specified in 3.3.3.1. Solder contacts shall be nonremovable from the insert. Solder contacts shall be so designed that during soldering utilizing recommended soldering techniques and observing applicable temperature ranges, no components shall be damaged nor shall liquid solder escape from the solder cups. The solder cups shall be designed to contain liquid solder when recommended soldering techniques are utilized.

3.3.3.4 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of connectors, their components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.15).

3.3.4 Dielectric materials.

3.3.4.1 Seals and grommets. The resilient material used for seals and grommets shall have a shore hardness, electrical, and mechanical characteristics suitable for the purpose intended.

3.3.4.2 Inserts. The nonresilient material used for inserts shall be a high grade rigid dielectric having electrical and mechanical characteristics suitable for the purpose intended. The impact strength shall be such that the material shall not chip, crack or break during assembly or normal service.

3.3.4.2.1 Fungus resistance. Materials used in the construction of these connectors shall be fungus inert. (see 4.6.40).

3.3.4.2.2 Hydrolytic stability. Nonmetallic materials used in the construction of these connectors shall be resistant to hydrolytic reversion. Reference the hydrolytic physical test guidelines in MIL-HDBK-454 for comparable materials.

3.3.4.2.3 Hermetic receptacles. Vitreous material shall be used for fusing to metal to insulate contacts and seal contacts.

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3.3.5 Shells and connector components. The materials used for shells and connector components shall be as follows:

3.3.5.1 Classes A, M, R, T, W and Z.

- a. Shell: Series II and III - Impact extruded or machined aluminum alloy.
- b. Coupling ring and jam nut:
Series II - Machined or die cast aluminum alloy.
Series III – Impact extruded or machined aluminum alloy.
- c. Insert - Reinforced epoxy resin or other suitable rigid dielectric material.
- d. Bayonet pins - Corrosion-resistant steel.
- e. Spring fingers (for classes M, R, T, W and Z plugs) - Heat-treated beryllium copper or corrosion-resistant steel. Spring fingers shall be permanently retained.
- f. Gaskets, grommet, and interface seals - Silicone or fluorosilicone elastomer.

3.3.5.2 Classes G, K, N, S, and Y.

- a. Shell - Corrosion-resistant steel (stainless).
- b. Coupling ring and jam nut - Corrosion-resistant steel (stainless).
- c. Insert - Reinforce epoxy resin or other suitable rigid dielectric material. Fused vitreous material for classes Y, N, L and P (hermetic).
- d. Bayonet pins - Corrosion-resistant steel.
- e. Spring fingers (for classes G, N, and S plug) - Heat-treated beryllium copper or corrosion-resistant steel. Spring fingers shall be permanently retained.
- f. Gaskets, grommet, and interface seals - Silicone or fluorosilicone elastomer.

3.3.5.3 Class H and J.

- a. Shell - Cold rolled steel.
- b. Coupling ring and jam nut - Cold rolled steel.
- c. Insert - Fused vitreous material.
- d. Bayonet pins - Corrosion-resistant steel.
- e. Gaskets, grommet, and interface seals - Silicone or fluorosilicone elastomer.

3.4 Design and construction. The connector shall be designed and constructed to withstand handling and maintenance functions incident to installation and service. Rear accessory interchangeability control dimensions of series III connectors shall be as specified on [figure 2](#).

3.4.1 Configuration. The connectors, contacts, and inserts shall conform to the configuration specified (see [3.1](#)).

3.4.2 Shell design. The connectors shall be of a single piece shell design of a homogeneous material. No bonding or joining of any shell ancillary feature is permitted. The shells for the connectors shall be designed to accept and retain a cable support or accessory as specified (see [3.1](#)).

3.4.2.1 Connector shell. The connector shall be designed to incorporate either a static or dynamic peripheral seal, or both a static and dynamic seal (see 3.4.3.2). For series III connectors, a seal shall be located within the receptacle. For series II, the seal shall be located between the plug shell and the coupling ring of the plug. RFI plug shells shall be designed so that electrical contact is assured between the spring fingers and the receptacle prior to full engagement of the contacts.

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3.4.2.2 Shell polarization. The polarization of the connector shall be accomplished by means of integral key(s) and keyway(s) on the mating connectors. The polarization of the counterpart connector shall occur before the pin contacts enter the socket insert and coupling ring starts to engage. Series II connectors shall have shell polarization in accordance with MIL-DTL-5015. Series III connectors shall have shell polarization in accordance with MIL-STD-1554.

3.4.2.3 Single hole mounting receptacles. The single hole mounting receptacle shall be provided with a mounting nut in accordance with MS3186 with provision for locking the nut and O-ring as specified in [table II](#).

3.4.2.4 Screw threads. Screw threads shall be in accordance with MIL-S-7742. Out of roundness is not objectionable provided threads can be checked without forcing thread gauges.

3.4.2.5 Lubrication. The internal coupling ring threads on type T connectors, and the coupling ring bayonet grooves on the type B connectors, shall be coated with a suitable lubricant to comply with the performance requirements of this specification.

3.4.2.6 Connector engagement. Connectors shall be coupled and uncoupled by means of a coupling ring on the plug shell. Engagement of the coupling ring shall occur after the plug and receptacle shells are polarized. Coupling rings of series III connectors shall be permanently mounted on the plug.

TABLE II. O-ring replacement PIN.

Shell size	MIL-R-25988/3 dash numbers		
	Series II flange	Series III flange (applies to the following specification sheets: MIL-DTL-83723/73, /74, /84, /85 and /89)	Series III flange (applies to the following specification sheets: MIL-DTL-83723/81 and /94)
8		017	017
8S	020		
10S, 10SL	022		
10		019	019
12	024	022	022
12S	024		
14	026	023	024
14S	026		
16	028	025	026
16S	028		
18	029	027	028
20	030	029	029
22		030	130
24	134	031	132
28	138	033	
32	142		
36	146		
40	150		
44	152		
48	153		

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3.4.2.6.1 Type B connectors. The type B plug shall be coupled to its mating receptacle by means of a grooved coupling ring. The coupling ring shall be designed to enable the pin and socket contacts to engage as the coupling ring is tightened in a clockwise direction and to disengage as the coupling ring is loosened in a counterclockwise direction. A free rotating coupling ring, mechanically retained, shall be required to fully mate or unmate the type B plug to the receptacle by rotating the coupling ring through 120° maximum as specified (see 3.1). The ring shall be knurled to aid gripping.

3.4.2.6.2 Type T connectors. The type T plug shall be coupled to the mating receptacle by means of a threaded coupling ring. The coupling ring shall be designed to enable the pin and socket contacts to engage as the coupling ring is tightened in a clockwise direction and to disengage as the ring is loosened in a counterclockwise direction. The coupling ring on other than self locking types shall have at least two .03 inch (.76 mm) diameter safety wire holes, equally spaced about the periphery (see 3.1). The ring shall be knurled to aid gripping, and the ring on series II connectors shall be retained by the rear accessory or other mechanical means.

3.4.2.7 Coupling assurance (series III).

3.4.2.7.1 Type B connectors. The coupling method shall be designed to ensure the connectors remain fully mated without the need to attach safety wiring to the coupling ring. Visual indicators, which indicate that the coupling ring is in the locked position, shall be provided as follows: The end surfaces of the coupling bayonet pins on connector receptacles, dummy storage receptacles and protective caps for plugs shall be a contrasting color of blue, yellow or orange. The ends of the bayonet pins shall be visible through suitable holes or slots in the coupling ring.

3.4.2.7.2 Type T connectors (series III).

3.4.2.7.2.1 Plugs (with self-locking coupling rings, series III only). The coupling mechanism shall be designed such that safety wiring of the coupling ring will not be required. Plugs shall include an anti-rotation coupling ring.

3.4.2.7.2.2 Receptacles. A red band shall be located on the receptacle so as to be visible when unmated and fully covered when completely mated.

3.4.2.8 Backshell accessories. Backshells shall be in accordance with specified requirements (see 3.1). In addition, they shall have wire sealing grommet compression capability. To prevent twisting the wire sealing grommet, a grommet ferrule of suitable material shall be supplied for compression sealing on all series II connectors requiring threaded back shell accessories. Backshell assemblies for series III connectors shall be in accordance with MS3155 and SAE-AS85049.

3.4.2.9 Color band. The shells of crimp contact connectors shall have blue color bands in accordance with the standards specified in EIA-359, indicating a rear release contact retention system. The location of the color bands on the receptacle shall be in front of the flange and behind the flange, or it can be on the flange in the case of the single hole mount receptacle. The location of the color band on the plug shell shall be on the coupling ring. Location shall be such that at least one color band is clearly visible when the connector is mounted, and in either the mated or unmated condition.

3.4.2.10 Bayonet pins. Bayonet pin positioning shall be as specified on figure 3.

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3.4.3 Seals.

3.4.3.1 Pin insert interfacial seal. The face of the pin seal shall be of a resilient material bonded to the insert to provide an interfacial seal.

3.4.3.2 Peripheral seals. A resilient material, static or dynamic type peripheral seal, or both static and dynamic seal shall be provided around the receptacle inserts for series III connectors. Type B, series III connectors shall have a dynamic peripheral seal. Type T, series III connectors shall have a static/dynamic seal or a peripheral seal. The peripheral seal on the series II connectors shall be provided as shown on applicable specification sheet (see 3.1).

3.4.3.3 Wire sealing members (rear grommet). The wire sealing member shall provide suitable sealing for overall wire diameters listed in table III and shall not be removable from the shell.

3.4.3.4 Sealing plugs (except hermetics). Grommet sealing plugs shall be used in the grommet cavities corresponding to all unwired contacts. Unless otherwise specified on the purchase order, connectors shall be shipped with sealing plugs. Total quantity shall be 15 percent of size 12 and smaller, or one sealing plug, whichever is greater.

TABLE III. Wire range accommodations.

Contact size	Minimum OD (inch)	Maximum OD (inch)
20	.040 (1.02 mm)	.083 (2.11 mm)
16	.053 (1.35 mm) ^{1/}	.103 (2.62 mm)
12	.097 (2.46 mm)	.158 (4.01 mm)
8	.164 (4.17 mm)	.255 (6.48 mm)
4	.288 (7.32 mm)	.370 (9.40 mm)
0	.415 (10.54 mm)	.550 (13.97 mm)

^{1/} .068 (1.73 mm) for series II only.

3.4.4 Inserts. The entire insert and wire sealing or wire supporting member of the environment resisting assemblies shall be essentially one integral part, designed to be nonremovable and to also provide suitable sealing and support around the wires. The rigid dielectric shall be one molded piece or no more than two pieces bonded so as to form essentially one integral piece. Inserts shall be designed to permit the removal and replacement of individual contacts into their connector inserts with MIL-I-81969/14, MIL-I-81969/15 and MIL-I-81969/29 installing and removal tools as applicable. The contact locking device shall be contained in the rigid dielectric insert and shall meet the contact retention requirements of this specification. Inserts shall be secured to prevent rotation. All pin contact inserts shall have a resilient interface seal bonded to the front face in accordance with applicable standards. Socket entry holes and pin "donut" rings shall conform to dimensions specified on figures 4 and 5 for series II connectors and to the dimensions specified on the applicable specification sheet for series III connectors. Sealing for coaxial cables terminated to shielded contacts may be accomplished by means of separate resilient bushings. If separate resilient bushings are required, they shall be furnished with the connector.

3.4.4.1 Insert arrangements. Insert arrangements shall be in accordance with the following standards:

MIL-STD-1651 - Series II.
MIL-STD-1554 - Series III.

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3.4.4.2 Inserts (hermetics). Hermetic receptacle inserts shall be designed and constructed with sections and radii that will not readily chip, crack, or break during normal assembly or service. Socket insert entry holes shall conform to dimensions specified on [figure 6](#). The inserts shall be nonremovable from the shell and shall meet the requirements of this specification.

3.4.4.3 Contact installation and removal (except hermetics). The connector design shall permit individual installation and removal of contacts without removing the insert or sealing members. Installation of the contacts into and removal of the contacts from the insert contact cavities shall be accomplished from the rear of the connector and with the aid of tools specified in [3.4.5.5](#).

3.4.4.4 Contact arrangement identification. The contact positions shall be permanently designated in contrasting color on the front face of the insert material and on the rear face of the wire sealing grommet in accordance with insert arrangements specified in MIL-STD-1554 or MIL-STD-1651, as applicable. The interfacial marking of the inserts shall not be raised or recessed on any sealing surfaces and shall be in accordance with [3.7.2](#).

3.4.4.5 Insert position. The inserts shall be positioned with respect to the shell within the specified tolerance (see [3.1](#)).

3.4.4.6 Alternate insert position. Alternate insert positions shall be in accordance with MIL-STD-1651 or MIL-STD-1554, as applicable.

3.4.4.7 Contact alignment. The alignment of the pin contact assembled in either plug or receptacle shall be within the true alignment position in accordance with MIL-STD-1554 or MIL-STD-1651, as applicable.

3.4.4.7.1 Contact alignment (except hermetics). Socket contacts assembled in either plug or receptacle shall allow for contact float of .0025 to .0085 inches (0.06 to 0.22 mm) from true alignment position.

3.4.4.7.2 Contact alignment (hermetics only). The alignment of the pin contact of classes H, J, L, N, P and Y receptacles shall be as specified (see [3.1](#)).

3.4.5 Contacts. Contacts shall be designed for crimp termination, except for classes H, J, L, N, P and Y, which shall be designed for solder termination. Crimp type contacts for series II shall be in accordance with SAE-AS39029/29 and SAE-AS39029/30. Crimp type contacts for series III connectors shall be in accordance with SAE-AS39029/4, SAE-AS39029/5, SAE-AS39029/7, SAE-AS39029/8, SAE-AS39029/9, SAE-AS39029/10, SAE-AS39029/73 and SAE-AS39029/74. Quantity of contacts shall be a full complement plus one spare for arrangements having 26 contacts or less. For arrangements having more than 26 contacts, a full complement plus two spares shall be required. No spares shall be supplied with 0, 4, 8 or shielded contacts. Unless otherwise specified on the purchase order, connectors shall be shipped with contacts. For indirect shipment, environmental resisting connectors may be ordered without contacts (see [6.2](#)).

3.4.5.1 Spring engagement (series II). The point of spring engagement for series II connectors shall be as shown on figures 4 and 5.

3.4.5.2 Pin engaging end (hermetics only). The engaging end of pins shall be rounded or of a suitable configuration to allow for directing and centering of the pin in a mating socket contact and shall be as specified (see [3.1](#)).

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3.4.5.3 Contact termination. Hermetic connectors are designed for solder termination. All other classes are designed for crimp contacts (see 3.1).

3.4.5.4 Surfaces roughness (hermetics only). The roughness height rating of all contact mating surfaces, specified on figure 1, shall be less than the value specified (see 3.1 and 4.7.34).

3.4.5.5 Installing and removal tools. Both MIL-I-81969/14 and MIL-I-81969/29 tools as applicable shall be utilized to assemble and disassemble pin and socket contacts into connector inserts. Provide M81969/14-xx tools for connectors with contact sizes 20, 16, 12, and 8. Provide M81969/29-xx tools for connectors with contact sizes 4 and 0. One MIL-I-81969/14 or MIL-I-81969/29 tool as applicable shall be enclosed in the unit package. For indirect shipments, connectors may be ordered without installing and removal tools (see 6.2).

3.4.5.6 Crimping tools. Crimping tools required to crimp contacts shall be in accordance with MIL-DTL-22520.

3.4.6 Plating.

3.4.6.1 Shells and accessory hardware. The finish on shells and accessory hardware shall be in accordance with the following letter designations:

A	-	-65°C to 200°C hard, anodic nonconductive in accordance with MIL-DTL-14072, finish E514, or hard anodic, nonconductive in accordance with MIL-A-8625, type III, .0008 inch (.02 mm) minimum thickness.
G, J, K, P, S and Y-	-	-65°C to 200°C electrically conductive stainless steel, passivated.
H	-	-65°C to 150°C, electrically conductive fused or bright tin in accordance with ASTM B545.
M	-	-65°C to 175°C, pure dense electrodeposited aluminum in accordance with MIL-DTL-83488, to withstand 500 hours salt spray. Final finish shall be electrically conductive and nonreflective.
N and L	-	-65°C to 200°C, electrodeposited nickel in accordance with SAE-AMS-QQ-N-290, class 2, .0001 to .0002 inch thick.
R	-	-65°C to 200°C, electrically conductive electroless nickel in accordance with SAE AMS-C-26074, class 3 or 4, grade B.
T	-	-65°C to 175°C, nickel fluorocarbon polymer over a suitable underplate to withstand 500 hours salt spray. Final finish shall be electrically conductive and nonreflective.
W	-	-65°C to 175°C, olive drab, cadmium in accordance with SAE-AMS-QQ-P-416 over a suitable underplate to withstand 500 hours salt spray test. Final finish shall be electrically conductive.
Z	-	-65°C to 175°C, zinc nickel alloy in accordance with ASTM-B841, type D (black) over a suitable underplate to withstand 500 hours salt spray. Color shall be nonreflective. Final finish shall be electrically conductive.

NOTE: The maximum operating temperature is the combination of the environment and current load.

3.5 Performance requirements. Connectors, contacts, and accessories shall be designed to meet the performance requirements specified herein when tested in accordance with the specified methods of section 4.

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3.5.1 Visual and mechanical examination. Contacts, connectors, and accessories shall be examined as specified in 4.6.1, and shall meet the requirements indicated herein.

3.5.2 Gauge location. The axial location of contacts shall be measured as specified in 4.6.2, using test gauges simulating the contacts at minimum material conditions as specified (see 3.1). Gauge location measurements shall fall within the range specified for series II connectors on figures 4 and 5, and on series III specification sheets.

3.5.3 Gauge retention. The test gauges (see 3.5.2) shall be retained in the contact cavities of crimp contact connectors when subjected to the test of 4.6.3. The axial displacement of the test gauges while under load shall not exceed .012 inch (.30 mm).

3.5.4 Maintenance aging (except hermetics). When tested as specified in 4.6.4, connectors shall be capable of meeting the performance requirements of this specification. Failure to complete these operations shall be cause for rejection.

3.5.5 Contact retention. When tested as specified in 4.6.5, the axial displacement of the contacts shall not exceed .012 inch (.30 mm). No damage to contacts or inserts shall result.

3.5.6 Altitude-low temperature. After stabilizing the connector at an altitude of 80,000 feet and a low temperature of -50°C $+0^{\circ}\text{C}$ -4°C as specified in 4.6.6, the connector shall withstand 625 V rms/60 Hz for one minute applied between adjacent contacts and between contacts and shell. There shall be no evidence of dielectric breakdown. With the test voltage removed and the temperature and pressure stabilized at ambient conditions, the connector shall meet the insulation resistance requirements as specified in 3.5.16.1 and the dielectric withstanding voltage requirements at sea level as specified in 3.5.17.

3.5.7 Thermal shock (hermetics only). When tested as specified in 4.6.7, there shall be no damage detrimental to the operation of the connector. Any evidence of damage resulting from this test shall be cause for rejection.

3.5.8 Temperature cycling (except hermetics). When tested as specified in 4.6.8, there shall be no damage detrimental to the operation of the connector. Any evidence of damage resulting from this test shall be cause for rejection.

3.5.9 Air leakage (hermetics only). When tested as specified in 4.6.9, any evidence of leakage in excess of 0.01 micron ft^3/h ($1 \times 10^{-7} \text{cm}^3/\text{s}$) during the test shall be cause for rejection.

3.5.10 Coupling torque.

3.5.10.1 Coupling torque (type B only). When tested as specified in 4.6.10, the coupling torque for mating and unmating of counterpart connectors, protective covers, and dummy storage receptacles shall be as specified in table IV.

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TABLE IV. Coupling torque (type B only).

Shell size	Torque (pound inches)	
	Maximum engagement and disengagement	Minimum disengagement
8	8	2
10	12	2
12	14	2
14	20	4
16	24	4
18	28	4
20	32	6
22	36	7
24	44	7

3.5.10.2 Coupling torque (type T). When tested as specified in 4.6.10, the torque required to couple and uncouple the connectors, protective covers, and dummy storage receptacles shall be as specified in table V.

TABLE V. Coupling and uncoupling torque (type T).

Series	Shell size MIL-DTL-83723	Shell size MIL-DTL-5015 (Reference)	Coupling torque pound-inches (Max)	Uncoupling torque pound-inches	
				(Min)	(Max)
II	8	8S	12	8	20
	10	10S	14	8	25
	11	10SL	14	8	25
	12	12	16	10	28
	13	12S	16	10	28
	14	14	20	12	35
	15	14S	20	12	35
	16	16	24	16	40
	17	16S	24	16	40
	18	18	30	22	45
	20	20	40	28	52
	22	22	46	35	65
	24	24	55	40	75
	28	28	66	50	90
	32	32	78	60	105
	36	36	93	65	115
40	40	106	70	125	
III	8	8	11	5	18
	10	10	13	6	23
	12	12	14	6	25
	14	14	18	8	32
	16	16	21	9	36
	18	18	27	11	40
	20	20	31	13	45
	22	22	32	13	59
	24	24	46	19	63

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3.5.11 Altitude immersion (firewall). When tested as specified in 4.6.11, the mated connector shall meet a minimum insulation resistance of 1,000 megohms. Any evidence of dielectric breakdown or flashover shall be cause for rejection.

3.5.12 Insert retention. When tested as specified in 4.6.12, assemblies shall retain their inserts in their proper location in the shell. Evidence of cracking, breaking, separation from the shell or loosening of parts shall be cause for rejection.

3.5.13 Salt spray (corrosion). When tested as specified in 4.6.13, unmated connectors and individual contact samples shall show no exposure of base metal due to corrosion, which will adversely affect performance.

3.5.14 Contact resistance (hermetics only). When tested as specified in 4.6.14, contacts in the mated condition shall meet the contact resistance requirements in table VI.

TABLE VI. Contact resistance.

Class	Contact size	Wire size	Test amps	Millivolt drop maximum	
				Initial	After conditioning
H, J, L, P and Y	20	20	5.0	105	165
	16	16	10.0	95	165
	12	12	17.0	95	165

3.5.15 Coupling pin strength (type B receptacles only). When tested as specified in 4.6.15, bayonet coupling pins shall withstand a load of 50 ± 5 pounds without displacement or perceptible loosening of the coupling pin.

3.5.16 Insulation resistance.

3.5.16.1 Insulation resistance at ambient temperature. When tested as specified in 4.6.16.1, the insulation resistance between any pair of contacts and between any contact and the shell shall be greater than 5,000 megohms.

3.5.16.2 Insulation resistance at elevated temperature. When tested as specified in 4.6.16.2, the insulation resistance between any pair of contacts and between any contact and the shell shall be greater than 200 megohms.

3.5.17 Dielectric withstanding voltage. When tested as specified in 4.6.17, connectors shall show no evidence of flashover or breakdown when subjected to the test voltages and altitudes in table VII.

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TABLE VII. Test voltages, ac rms, 60 Hz.Series II

Altitude	Inst	A	D	E	B	C
Sea level	1000	2000	2800	3500	4500	7000
50000 ft	400	600	675	750	825	975
70000 ft	260	360	400	440	480	560
110000 ft	200	200	200	200	200	200

Series III

Altitude	Service rating I	Service rating II
Sea level	1500	2300
50000 ft	500	750
70000 ft	375	500
110000 ft	200	200

3.5.18 Durability. When tested as specified in 4.6.18, connectors shall show no damage detrimental to the operation of the connector. Failure to complete this test because of mechanical malfunction of the connector shall be cause for rejection.

3.5.19 Random vibration. When tested as specified in 4.6.19, a current discontinuity of 1 microsecond or more, disengagement of the mated connectors, evidence of cracking, breaking, or loosening of parts shall be cause for rejection.

3.5.20 Mechanical shock. When tested as specified in 4.6.20, a current discontinuity of 1 microsecond or more, disengagement of the mated connectors, evidence of cracking, breaking, or loosening of parts shall be cause for rejection.

3.5.21 Shell-to-shell conductivity (except class A). When tested as specified in 4.6.21, the probes shall not puncture or otherwise damage the connector finish and the maximum measured potential drop across assemblies shall be as follows:

- a. Connectors with grounding fingers - 5 millivolts.
- b. Connectors without grounding fingers - 200 millivolts.

3.5.22 Humidity. When tested as specified in 4.6.22, wired, mated connectors shall show no deterioration and the insulation resistance shall be 100 megohms or greater.

3.5.23 Shell spring finger forces. When tested as specified in 4.6.23, the forces necessary to engage and separate grounding plugs with receptacle shells shall be within the values specified in table VIII.

TABLE VIII. Shell spring finger forces.

Shell size	Axial force in pounds	
	Maximum	Minimum
8 through 10	15	2
12 through 14	20	2
16 through 24	30	2

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3.5.24 RFI shielding. When tested as specified in 4.6.24, the RFI shielding capabilities of mated shells with spring fingers shall not be less than specified in table IX at the specified frequencies.

TABLE IX. RFI shielding effectiveness.

Frequency (MHz)	Leakage attenuation min (db)	Frequency (MHz)	Leakage attenuation min (db)
100	65	600	50
200	60	800	45
300	55	1000	45
400	55	1000	45

3.5.25 Ozone exposure. When tested as specified in 4.6.25, the connectors shall show no evidence of cracking of dielectric material or other damage due to ozone exposure that will adversely affect performance.

3.5.26 Fluid immersion. When tested as specified in 4.6.26, connectors shall meet specified coupling torque and dielectric withstanding voltage requirements.

3.5.27 Retention system fluid immersion. When tested as specified in 4.6.27, the insert assemblies shall meet the requirements of subsequent tests specified herein. Effects of the fluids on resilient sealing members shall not be a consideration of this test.

3.5.28 Contact walk-out. When tested as specified in 4.6.28, contacts shall not become dislodged from their normal position.

3.5.29 Installing and removal tool abuse. When tested as specified in 4.6.29, there shall be no evidence of damage to the contacts, the connector inserts or the contact retaining mechanism.

3.5.30 External bending moment. When tested as specified in 4.6.30 and utilizing the applicable bending moment shown in table X, connectors shall show no evidence of damage detrimental to their normal operation, nor shall there be any interruption of electrical continuity.

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TABLE X. External bending moment.

Series	Shell size MIL-DTL-83723	Shell size MIL-DTL-5015 (Reference)	Bending moment (pound-inch)
II	8	8S	40
	10	10S	90
	11	10SL	90
	12	12	180
	13	12S	180
	14	14	200
	15	14S	200
	16	16	250
	17	16S	250
	18	18	280
	20	20	300
	22	22	350
	24	24	380
	28	28	420
	32	32	500
	36	36	540
III	40	40	580
	44	44	620
	48	48	660
	8	8	59
	10	10	230
	12	12	290
	14	14	350
	16	16	419
18	18	433	
20	20	450	
22	22	475	
24	24	500	

3.5.31 Pin contact stability (sizes 20, 16, and 12 crimp contacts). When tested as specified in 4.6.31, the total displacement of the contact tip end shall not exceed the amount shown in table XI.

3.5.32 Temperature life with contact loading. When tested as specified in 4.6.32, contacts shall maintain their specified locations as shown on figures 4 and 5 for series II, and in accordance with the specification sheets for series III, as applicable, and there shall be no electrical discontinuity of 1 microsecond or more.

TABLE XI. Contact stability.

Contact size	Total displacement (inch)
20	.038 (0.97 mm)
16	.062 (1.57 mm)
12	.062 (1.57 mm)

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3.5.33 Firewall (classes K, N (firewall), and S). Mated connectors shall prevent the passing of a flame through the connector for a period of at least 20 minutes when tested as specified in 4.6.33. During this period, there shall be no flame from outgassing or other causes on the end of the connector protected by the firewall. The current specified in table XII shall be applied for the first 5 minutes without a break in continuity. During the next minute, the connectors shall not draw more than 2 amperes when a potential of 125 volts rms, 60 Hz is applied between adjacent contacts and between contacts and the shell.

TABLE XII. Firewall test currents.

Contact size	DC test current (amperes)
20	7.5
16	22
12	41
8	73
4	135
0	245

3.5.34 Contact plating adhesion (hermetics only). The adhesion of the gold plating on the contact shall be tested as specified in 4.6.36. Flaking or peeling of the plating shall be considered a failure.

3.5.35 Accessory thread strength. When tested as specified in 4.6.37, accessory threads and the section of the connector that accepts accessory hardware shall be capable of withstanding the torques specified in table XIII. Damage to the connector shall be considered a failure.

3.5.36 Electrolytic erosion. When tested as specified in 4.6.38, pin contacts shall show no exposure to base metal due to electrolytic erosion. Corrosion deposits shall not be considered as defects.

3.5.37 Cavity-to-cavity leakage bonding integrity. When tested as specified in 4.6.39, there shall be no air leakage between contact cavities.

3.5.38 Dust caps. Dust caps in accordance with SAE-AS85049/138 (or equivalent cap) shall be placed on the mating end of each connector. For RFI connectors, dust caps must be assembled externally over the coupling ring. Hermetic connectors require caps on both ends.

TABLE XIII. Accessory thread strength.

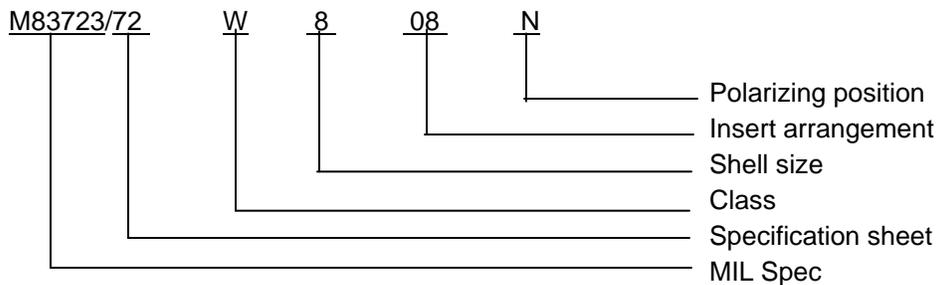
Shell size MIL-DTL-83723	Shell size MIL-DTL-5015 (reference)	Minimum torque (pound-inch)
8	8S	75
10	10S	100
12	12	140
14	14	150
16	16	150
18	18	150
20	20	175
22	22	175
24	24	175

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3.6 Interchangeability. The connector plugs, receptacles, contacts, and accessories supplied to this specification shall meet the requirements of the applicable specification sheet and shall be completely interchangeable with the components having the same Part or Identifying Number (PIN) but supplied by a different manufacturer.

3.7 Marking.

3.7.1 Connectors and accessories. Connectors and accessories shall be metal or ink stamped with the manufacturer's name or trademark, military PIN, and date code. Location shall be as shown on the specification sheets (see 3.1). The characters shall be a minimum of .037 inch in height. Stamping shall be in accordance with MIL-STD-1285 where space permits. Metal stamping shall be accomplished before plating. The following examples are illustrative of PIN identification:



3.7.2 Contact location identification. Contact locations shall be designated with identifiable characters as indicated in MIL-STD-1554 and MIL-STD-1651, as applicable. All positions shall be identified on the front and rear faces of the insert except where space limitations make this impracticable. Location of contact identifying characters shall be in close proximity to the holes but need not be placed exactly where indicated on the standard. On the outer row of contacts, individual cavity identification may be deleted from those cavities where space precludes its application, or they may be located 120° to either side of the vertical center line above or beside the contact cavity, provided that the insert pattern can be easily determined and legibility is not impaired.

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3.7.3 JAN brand. The United States Government has adopted, and is exercising legitimate control over the certification marks "JAN" and "J", respectively, to indicate that items so marked or identified are manufactured to, and meet all the requirements of military specification. Accordingly, items acquired to, and meeting all of the criteria specified herein and in applicable specifications shall bear the certification mark "JAN" except that items too small to bear the certification mark "JAN" shall bear the letter "J". The "JAN" or "J" shall be placed immediately before the PIN except that if such location would place a hardship on the manufacturer in connection with such marking, the "JAN" or "J" may be located on the first line above or below the PIN. Items furnished under contracts or orders which either permit or require deviation from the conditions or requirements specified herein or in applicable specifications shall not bear "JAN" or "J". In the event an item fails to meet the requirements of this specification and the applicable specification sheets or associated detail specifications, the manufacturer shall remove the "JAN" or the "J" from the sample tested and also from all items represented by the sample. The "JAN" or "J" certification mark shall not be used on products acquired to contractor drawings or specification. The United States Government has obtained Certificate of Registration No. 504,860 for the certification mark "JAN" and Registration Number 1,586,261 for the certification mark "J".

Note: The "JAN" or "J" is not part of the PIN but indicates a certification.

3.8 Workmanship. Connectors shall be fabricated in a manner such that the criteria for appearance, fit and adherence to specified tolerances are observed. Particular attention shall be given to neatness and thoroughness of marking parts, plating, welding, soldering, riveting, staking, and bonding. Connectors shall be free from crazing, cracks, voids, pimples, chips, blisters, pinholes, sharp cutting edges, burrs, and other defects that will adversely affect life, serviceability, or appearance.

3.9 Change effectivity. Unless otherwise specified by the preparing activity and/or the qualifying activity, all changes from the previous revision of MIL-DTL-83723 shall become effective within 90 days of the date of publication of the latest revision. If unable to implement changes within the 90 day time period, additional time shall be requested from the qualifying activity. Manufacturers that are QPL listed and have concerns regarding possible changes to retention reporting requirements should contact the qualifying activity for clarification.

3.10 Disposition of stock. Unless otherwise specified by the qualifying activity and coordinated with the preparing activity, qualified manufacturers and their selling agents or distributors may continue to ship connectors and accessories which were manufactured in accordance with the previous revision of MIL-DTL-83723 for a period of 18 months from the date of the latest revision, provided that form, fit and function requirements are not affected.

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

4. VERIFICATION

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

- a. Qualification inspection (see 4.4).
- b. Conformance inspection (see 4.5).

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4.2 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 ISO 17025 and NCSL Z540.3.

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in EIA-364.

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.

4.4.1 Sample size. For each series II or series III connector, the following test samples shall be provided:

- a. Two mating pairs, classes A, G, K, N (Firewall), M, R, S, T, W and Z straight plugs and wall mounting receptacles of each shell size. All service ratings shall be represented. Each arrangement in a given shell size shall be the densest contact arrangement for that particular service rating. One sample of each shell size shall have pin contacts in the receptacle and socket contacts in the plug. The other sample shall have socket contacts in the receptacle and pin contacts in the plug. All samples shall be provided with strain relief cable clamps.
- b. Two class H or J, two class N or L and two class Y or P jam nut receptacles and class R or G mating straight plugs, of each shell size. All service ratings shall be represented. Each arrangement in a given shell size shall be densest contact arrangement for that particular service rating.
- c. One class S straight plug and one class G and R straight plugs with grounding fingers and counterpart wall mounting receptacle in at least three shell sizes; small, medium, and large. Specimens shall be less inserts and contacts, but with RFI backshells, if applicable.
- d. One wall mounting receptacle counterpart for each of the shell sizes selected for 4.4.1c. Specimens shall be less inserts and coupling pins (type B).
- e. One mating pair of connectors in each class for each fluid specified in any representative insert arrangement.
- f. One mating pair of connectors for each fluid specified in classes A, G, M, R, T, W and Z and classes K, N (firewall), or S straight plugs and wall mounting receptacles of various representative shell sizes and insert arrangement.
- g. Thirty-five pin contacts, classes H, J, N, L, P or Y of each size. Hermetic contacts shall be in shell/insert assemblies.
- h. Three mating pairs of class K, N, or S plugs and wall mounting receptacles of various representatives shell sizes.

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4.4.2 Preparation of samples.

4.4.2.1 Connector samples. Connector samples with crimp contacts under 4.4.1a, 4.4.1b, and 4.4.1e shall be terminated to a workable length of suitable wire. Half the samples shall utilize wire with outer diameters approaching the maximum limit in [table III](#), and the remainder shall utilize wire with outer diameters approaching the minimum limit in [table III](#). Connector samples with solder contacts (classes H, N, or Y) shall have 3 feet of suitable nominal gauge terminated thereto. Guidelines for soldering are referenced in MIL-HDBK-454.

4.4.3 Inspection routine.

- a. Samples provided under 4.4.1a shall be divided into two numerically equal groups. Each group shall contain roughly the same number of samples with the larger diameter wire as with the smaller diameter wire. One group shall be subjected to the tests of group 1, [table XIV](#), in the sequence indicated. The other group shall be subjected to the tests of group 2, [table XIV](#) in the sequence indicated.
- b. Samples provided under 4.4.1b shall be divided into two similar groups. One group shall be subjected to the tests of group 1, [table XIV](#), in the sequence indicated. The other group shall be subjected to the tests of group 3, [table XIV](#), in the sequence indicated.
- c. Samples provided under 4.4.1c shall be subjected to the tests of group 4, [table XIV](#), in the sequence indicated.
- d. Samples provided under 4.4.1d shall serve as counterparts for the tests in group 4, [table XIV](#).
- e. Samples provided under 4.4.1e shall be subjected to the tests of group 5 [table XIV](#), in the sequence indicated.
- f. Samples provided under 4.4.1f shall be subjected to the tests of group 6, [table XIV](#), in the sequence indicated.
- g. Samples provided under 4.4.1g shall be divided and subjected to the tests of group 7, [table XIV](#), in the quantities indicated therein. No sample group shall be subjected to more than one test.
- h. Samples provided under 4.4.1h shall be subjected to the tests of group 8, [table XIV](#), in the sequence indicated.

4.4.4 Failures. Any failure shall be cause for refusal to grant qualification approval.

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TABLE XIV. Qualification and group C.

Inspection <u>Group 1 (all classes)</u>	Requirement paragraph	Test paragraph
Visual and mechanical examination	3.5.1	4.6.1
Cavity-to-cavity leakage bonding integrity	3.5.37	4.6.39
Maintenance aging <u>1/</u>	3.5.4	4.6.4
Thermal shock (hermetics only)	3.5.7	4.6.7
Temperature cycling <u>1/</u>	3.5.8	4.6.8
Air leakage (hermetics only)	3.5.9	4.6.9
Coupling torque	3.5.10	4.6.10
Altitude immersion <u>1/</u>	3.5.11	4.6.11
Insert retention	3.5.12	4.6.12
Salt spray (corrosion)	3.5.13	4.6.13
Coupling torque (to mate)	3.5.10	4.6.10
Contact resistance (hermetic only)	3.5.14	4.6.14
Uncoupling torque (type T)	3.5.10.2	4.6.10
Coupling pin strength (type B receptacles only)	3.5.15	4.6.15
External bending moment	3.5.30	4.6.30
Electrolytic erosion	3.5.36	4.6.38
Visual and mechanical examination	3.5.1	4.6.1

See footnotes at end of table.

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TABLE XIV. Qualification and group C - Continued.

Inspection	Requirement paragraph	Test paragraph
<u>Group 2 (classes A, G, K, N (Firewall), M, R, S, T, W and Z)</u>		
Visual and mechanical examination	3.5.1	4.6.1
Gauge location	3.5.2	4.6.2
Gauge retention	3.5.3	4.6.3
Maintenance aging	3.5.4	4.6.4
Contact retention	3.5.5	4.6.5
Altitudes – low temperature	3.5.6	4.6.6
Temperature cycling <u>1/</u>	3.5.8	4.6.8
Coupling torque	3.5.10	4.6.10
Insulation resistance at elevated temperature	3.5.16.2	4.6.16.2
Dielectric withstanding voltage at sea level	3.5.17	4.6.17.1
Dielectric withstanding voltage at altitude <u>2/</u>	3.5.17	4.6.17.2
Durability	3.5.18	4.6.18
Random vibration <u>2/</u>	3.5.19	4.6.19
Mechanical shock	3.5.20	4.6.20
Shell-to-shell conductivity (except class A)	3.5.21	4.6.21
Humidity	3.5.22	4.6.22
Contact retention	3.5.5	4.6.5
Accessory thread strength	3.5.35	4.6.37
Visual and mechanical examination	3.5.1	4.6.1

See footnotes at end of table.

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TABLE XIV. Qualification and group C - Continued.

Inspection	Requirement paragraph	Test paragraph
<u>Group 3 (hermetic receptacles)</u>		
Visual and mechanical examination	3.5.1	4.6.1
Contact resistance	3.5.14	4.6.14
Thermal shock	3.5.7	4.6.7
Air leakage (hermetics only)	3.5.9	4.6.9
Durability	3.5.18	4.6.18
Coupling torque	3.5.10	4.6.10
Random vibration <u>2/</u>	3.5.19	4.6.19
Mechanical shock	3.5.20	4.6.20
Insert retention	3.5.12	4.6.12
Insulation resistance at ambient temperature	3.5.16.1	4.6.16.1
Humidity	3.5.22	4.6.22
Contact resistance	3.5.14	4.6.14
Visual and mechanical examination	3.5.1	4.6.1
<u>Group 4 (shells with spring fingers)</u>		
Visual and mechanical examination	3.5.1	4.6.1
Shell spring finger forces	3.5.23	4.6.23
Shell-to-shell conductivity	3.5.21	4.6.21
RFI Shielding	3.5.24	4.6.24
Visual and mechanical examination	3.5.1	4.6.1
<u>Group 5 (dielectrics, all classes)</u>		
Visual and mechanical examination	3.5.1	4.6.1
Temperature life with contact loading <u>1/</u>	3.5.32	4.6.32
Ozone exposure	3.5.25	4.6.25
Insulation resistance at ambient temperature	3.5.16.1	4.6.16.1
Dielectric withstanding voltage at sea level	3.5.17	4.6.17.1
Fluid immersion	3.5.26	4.6.26
Insert retention	3.5.12	4.6.12
Visual and mechanical examination	3.5.1	4.6.1

See footnotes at end of table.

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TABLE XIV. Qualification and group C - Continued.

Inspection	Requirement paragraph	Test paragraph
<u>Group 6 (retention system)</u>		
Visual and mechanical examination	3.5.1	4.6.1
Contact walkout	3.5.28	4.6.28
Installing and removal tool abuse	3.5.29	4.6.29
Pin contact stability (sizes 20, 16 and 12 crimp contacts)	3.5.31	4.6.31
Retention system fluid immersion	3.5.27	4.6.27
Contact retention	3.5.5	4.6.5
Visual and mechanical examination	3.5.1	4.6.1
<u>Group 7 (unwired hermetic contacts)</u>		
Surface roughness <u>3/</u>	3.4.5.4	4.6.34
Plating thickness <u>3/</u>	3.3.3.2	4.6.35
Plating adhesion <u>3/</u>	3.5.34	4.6.36
<u>Group 8 (firewall, class K, N or S)</u>		
Firewall	3.5.33	4.6.33

1/ Not applicable to hermetics.

2/ Qualification only.

3/ Sample quantity – 5 total of each size contact. No failures permitted.

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4.4.5 Retention of qualification. To retain qualification, the contractor shall forward a report at least every 12 months to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall provide the following documentation:

a. Connectors:

1. 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.
2. A summary of the results of tests performed for qualification verification inspection including the number and mode of failures. The summary shall include results of all group C inspection tests performed and completed during the reporting 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.

b. Protective caps and dummy stowage receptacles.

1. 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.

Failure to submit the report within 30 days after the end of each reporting period may result in the loss of qualification for the product. In addition, if at any time during the reporting period the inspection data indicates failure of the qualified product to meet the requirements of the specification, the contractor shall immediately notify the qualifying activity.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the manufacturer still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the products (a representative product of each series, type, and class, etc.) to testing in accordance with the qualification inspection requirements.

4.4.6 Qualification of additional connectors. For connectors which differ only in minor details from those which have been qualified, the contractor's test report need only provide inspection and test data necessary to validate the difference with information on identical features for which no inspection or test was performed. Manufacturers who qualify class R connectors and pass the requirements for class A connectors shall be granted qualification for all class A connectors which have the same insert arrangements and shell style as class R connectors. Manufacturers who qualify class S receptacles and plugs shall be granted qualification for all class N connectors which have the same insert arrangements and shell style provided additional requirements affecting plating are met. These requirements shall be determined by the qualifying activity.

4.4.7 Qualification of contacts. (except hermetics) Crimp contacts supplied with MIL-DTL-83723 connectors must be qualified for listing on the QPL for SAE-AS39029.

4.5 Conformance inspection.

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

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4.5.1.1 Inspection lot. An inspection lot shall consist of all connectors covered by the same specification sheets, produced under essentially the same conditions and offered for inspection at one time. In-process controls, unrelated to lot sizes of finished connectors, may be used, provided an inspection method equivalent to the actual testing level is maintained.

4.5.2 Group A inspection. Connectors shall be subjected to the individual tests shown in [table XV](#). Protective caps and dummy stowage receptacles shall be subjected to the individual tests shown in [table XVI](#). For group A inspection, the documentation and standard test conditions of EIA-364 do not apply.

TABLE XV. Group A inspection (connectors).

Inspection	Requirement paragraph	Test paragraph
Visual examination <u>1/</u>		4.5.2.1
Insulation resistance (ambient temperature) <u>1/ 2/ 3/</u>	3.5.16.1	4.6.16.1
Dielectric withstanding voltage (sea level) (except hermetics, style P) <u>1/ 2/ 3/</u>	3.5.17	4.6.17.1
Air leakage (hermetics only) <u>1/ 3/</u>	3.5.9	4.6.9
Coupling torque <u>3/</u>	3.5.10	4.6.10

1/ One hundred percent inspection.

2/ Test between two adjacent contacts and between two peripheral contacts and the shell.

3/ The contractor may use in-process controls for this requirement.

TABLE XVI. Group A inspection, (Protective caps and dummy stowage receptacles).

Inspection	Requirement paragraph	Test paragraph
Visual examination <u>1/</u>		4.5.2.1
Coupling torque <u>2/</u>	3.5.10	4.6.10

1/ One hundred percent inspection.

2/ The contractor may use in-process controls for this requirement.

4.5.2.1 Visual examination. Each connector shall be visually examined for completeness, workmanship, and identification requirements. Assemblies that require a gasket shall be examined, and connectors with gaskets that are missing, twisted, buckled, kinked, or damaged in any way shall be rejected.

4.5.3 Group B inspection. Group B inspection shall consist of the examinations and tests specified in [table XVIIa](#), in the order shown, and shall be made on sample units which have been subjected to, and have passed the group A inspection. For group B inspection, the documentation and standard test conditions of EIA-364 do not apply.

4.5.3.1 Sampling plan. A sample lot shall be randomly selected as specified in [table XVIIb](#). If one or more defects are found, the lot shall be rescreened and defects removed. If one or more defects are found, a new sample lot shall be randomly selected from the sampling plan specified in [table XVIIb](#). If one or more defects are found in the new sample lot, the lot shall not be supplied to this specification.

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TABLE XVIIa. Group B inspection (connectors).

Test	Requirement paragraph	Test paragraph
Visual and mechanical examination <u>1/</u>	3.5.1	4.6.1
Shell spring finger forces (plugs with spring fingers only) <u>1/ 2/</u>	3.5.23	4.6.23

1/ The contractor may use in-process controls for this requirement.

2/ Test 5 pieces - No failures permitted.

TABLE XVIIb. Sampling plan for group B.

Lot size	Sample size
1 to 13	100 percent
14 to 150	13 units
151 to 280	20 units
281 to 500	29 units
501 to 1200	34 units
1200 to 3200	42 units

4.5.3.2 Lot definition (group B inspection). The production lot is further defined as follows:

- a. A production lot consists of all connectors covered under one military specification or standard, manufactured from the specified raw materials, processed under the same specification and procedures, produced by the same type of equipment, and submitted for inspection at one time. Each production lot of assembled connectors shall be a group identified by a common manufacturing record through all significant assembly operations.
- b. Common manufacturing records and traceability shall begin with machining and molding and shall include connector assembly. Traceability of connectors to specific physical/chemical test reports of incoming material is not required.

4.5.3.3 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 in accordance with 4.5.3.1. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots.

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

4.5.4 Periodic inspection. Periodic inspection shall consist of group C inspection. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.4.1.4), delivery of products which have passed groups A and B inspections shall not be delayed pending the results of these periodic inspections.

4.5.4.1 Group C inspection. Group C inspection shall be performed every 24 months. The first inspection period must be accomplished within the 24 month period after notification of qualification. Samples submitted for group C inspection shall have passed groups A and B inspections.

4.5.4.1.1 Twenty-four-month inspection. During the 24-month inspections, mating connector sample units shall be selected and tested in accordance with a, b, c and d, as applicable. Twenty-four-month inspection for class A connectors need not be performed provided class R connectors are inspected.

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- a. Two mating classes A, K, N, M, R, S, T, W and Z plugs and receptacles (i.e. two class A pairs, two class K pairs, etc.) in each type (bayonet and threaded) shall be provided. These samples shall include at least three shell sizes, small, medium, and large, manufactured during the period. One mating sample of each configuration shall be fully wired with the maximum diameter wire in [table II](#) and subjected to the applicable tests in [table XIV](#), group 1. The remaining samples shall be fully wired with the minimum diameter wire in [table III](#) and subjected to the applicable tests in [table XIV](#), group 2.
- b. Two mating class G plugs and classes H or J, N (hermetic) or L, and P or Y receptacles (i.e. two class G and H or J pairs, two class G and N or L pairs, etc.) in each type (bayonet and threaded) shall be provided. These samples shall include at least three shell sizes, small, medium, and large, manufactured during the period. Half the plugs shall be wired with maximum diameter wire as specified in [table II](#) and the other half with minimum wire as specified in [table II](#). The receptacles shall be wired with nominal gauge wire. One mating pair of each shell size shall be subjected to the tests in [table XIV](#), group 1, and the remainder to the tests in [table XIV](#), group 3.
- c. Sufficient quantities of classes H or J, N or L, and P or Y shall be provided to furnish a minimum of 15 pin contacts of each mating end size. These samples shall be subjected to the tests in [table XIV](#), group 7.
- d. Temperature life (see [4.7.32](#)) - One mating pair of connectors of any representative size and arrangement shall be provided. The mated pair shall be subjected to temperature life for a time period of 250 hours.

4.5.4.1.2 Failures. If any sample units fail to pass group C inspection, the sample shall be considered to have failed. Corrective action shall be taken in accordance with [4.5.4.1.4](#).

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

4.5.4.1.4 Noncompliance. If a sample fails to pass group C 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 (related lots) 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 inspections, or the inspection which the original sample failed, at the option of the qualifying activity). Groups A and B inspections may be reinstated; however, final acceptance shall be withheld until the group C reinspection has shown that corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6 Methods of examination and test.

4.6.1 Visual and mechanical examination.

4.6.1.1 Connectors, protective caps and dummy stowage receptacles. The connectors, accessories, and piece parts shall be visually and mechanically examined to ensure product is in accordance with the specification and the applicable military standards (see [3.1](#), [3.3](#), [3.4](#), [3.6](#), [3.7](#), [3.8](#)). The contractor may use in-process controls to satisfy these requirements.

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4.6.1.2 Contacts (hermetics only). The contacts shall be visually examined for mechanical defects (see 3.1, 3.3, 3.4, 3.6, and 3.8). The contacts shall be inspected through a device having approximately three power (3X) magnification. The contractor may use in-process controls to satisfy these requirements.

4.6.2 Gauge location (see 3.5.2). Applicable test gauges conforming to the requirements specified in 3.5.2 shall be installed in three randomly selected cavities in each connector, with the necessary rear hardware removed. With the test gauges fully seated back against the contact retention device, the axial location of the front end of the gauges shall be measured relative to the reference point indicated on figures 4 and 5, as applicable.

4.6.3 Gauge retention (see 3.5.3). Applicable test gauges shall be installed in three randomly selected cavities in each connector, with the accessory rear hardware removed. The axial load specified in table XVIII shall be applied to individual test gauges in both directions. The load shall be applied at a rate of 1 pound per second until the specified load has been reached. Gauge displacement shall be measured with respect to the connector shell after an initial load of 2 pounds has been applied to assure that all slack has been taken up. The measured displacement shall meet the requirements specified in 3.5.3.

TABLE XVIII. Axial load for contact retention test (all except hermetics).

Contact size	Axial load +3, -0 lbs
20	20
16	25
12	30
8	50
4	60
0	75

4.6.4 Maintenance aging (except hermetics) (see 3.5.4). Connectors shall be tested as specified in test procedure EIA-364-24. After installing all contacts, each connector shall be mated and unmated 10 times. Measurements shall be made after the first and tenth cycle. A minimum of 20 percent, but not less than three of the contacts in each connector shall then be removed and reinserted 10 times with the aid of appropriate tools. A simulated socket contact conforming to the requirements on figure 7 shall be used in place of three of the socket contacts.

4.6.5 Contact retention (see 3.5.5).

4.6.5.1 Contact retention (procedure I). Contact retention shall be tested as specified in test procedure EIA-364-29. The following details and exceptions shall apply:

- a. Number of samples - The test shall be performed on 20 percent of the contact complement, but not less than three contacts in each connector half.
- b. Applied axial load - Preload to 2 pounds maximum. Apply load as specified in table XVIII.
- c. Special requirements - Where the test sequence requires maintenance aging prior to contact retention, the contacts which were subjected to maintenance aging shall also be selected for contact retention.
- d. Axial direction - The applicable forces shall be applied along the longitudinal axis of individual contacts in the direction tending to the contacts to the rear.
- e. Only the contacts to be tested shall be required to be installed in the connector.

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4.6.5.2 Contact retention (procedure II). Contact retention shall be tested as specified in test procedure EIA-364-29. Unwired contacts may be installed in the cavities to be tested. The following details and exceptions shall apply:

- a. Number of samples - Same as 4.6.5.1a.
- b. Applied axial load - Same as 4.6.5.1b.
- c. Special requirements - Same as 4.6.5.1c.
- d. Axial direction - Same as 4.6.5.1d, except the direction shall tend to displace the contacts to the front.
- e. Only the contacts to be tested shall be required to be installed in the connector.

4.6.6 Altitude-low temperature (see 3.5.6). Wired, mated assembled connectors shall be tested as specified in test procedure EIA-364-105. The following details apply:

- a. No wire ends or splices shall be permitted inside the chamber.
- b. The chamber internal pressure shall be reduced to simulate an altitude of 80,000 feet prior to application of 625 Vrms, 60 Hz.
- c. After return to ambient conditions, conduct dielectric withstanding voltage as specified in 4.6.17.1 and insulation resistance as specified in 4.6.16.1.

4.6.7 Thermal shock (hermetics only) (see 3.5.7). Unmated receptacles shall be subjected to 10 cycles of thermal shock in the following manner:

- a. The receptacle shall be suspended for 10 +1,-0 minutes in the center of a cold water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water temperature shall not exceed 4°C (39°F).
- b. The receptacle shall be suspended for 10 +1, -0 minutes in the center of a hot water bath with a volume of approximately 1 cubic foot. No dimension of the bath shall be less than 10 inches. The water temperature shall not be less than 90°C (194°F).

The time of transfer from one bath to the other shall not exceed 5 seconds. At the end of the tenth cycle, the receptacle shall have excess moisture shaken off, and then it shall be dried in a forced air oven at 66°C ± 5°C (151°F ± 9°F) for 15 ± 1 minutes.

4.6.8 Temperature cycling (except hermetics) (see 3.5.8). Mated connectors shall be subjected to temperature cycling as specified in test procedure EIA-364-32, condition I, 5 cycles, except that steps 2 and 4 shall be of 2 minutes maximum duration. The temperature of step 1 shall be -65°C +0°C, -5°C (-85°F +0°F, -9°F) and the temperature of step 3 shall be 175°C +5°C, -0°C (347°F +9°F, -0°F) for classes M, T, W and Z, and 200°C +5°C, -0°C (392°F +9°F, -0°F) for classes A, G, K, R, S, and N.

4.6.9 Air leakage (hermetics only) (see 3.5.9). The connector shall be tested as specified in test procedure EIA-364-02, except minimum period of measurement is 10 seconds. Pressure differential across the connector shall be one atmosphere.

4.6.10. Coupling torque (series III, type T, self-locking and type B plugs only) (see 3.5.10). For qualification testing, mating halves shall be coupled and uncoupled. The forces or torques which must be applied to facilitate full coupling and uncoupling shall be measured and recorded. For quality conformance testing, suitable gauges may be used instead of the appropriate counterparts.

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4.6.11 Altitude immersion (except hermetics) (see 3.5.11). Mated connectors shall be tested as specified in test procedure EIA-364-03. The following details shall apply:

- a. All wire ends shall be located within the chamber and exposed to the chamber atmosphere, but not submerged or sealed.
- b. At the end of the third cycle while the mated connectors are still submerged in the solution, the insulation resistance shall be measured as specified in 4.6.16.1 and the dielectric withstanding voltage test shall be performed as specified in 4.6.17.1.
- c. Paragraphs 4.3.3 and 6.5 shall not apply.

4.6.12 Insert retention (see 3.5.12). Connectors shall be tested as specified in test procedure EIA-364-35. Samples shall be wired. The load to be applied shall be as follows:

<u>Shell size</u>	<u>Test pressures lb/in² (kg/cm²)</u>
8 through 12	150 (10.5)
14 through 18	100 (7)
20 through 22	75 (5)
24 through 28	60 (4)
32 through 40	45 (3)
44 through 48	30 (2)

4.6.13 Salt spray (corrosion) (see 3.5.13).

4.6.13.1 Standard test (all classes except W). Unmated connectors and individual contact samples shall be tested as specified in test procedure EIA-364-26. The following details and exceptions shall apply:

- a. Test condition letter - B.
- b. The samples shall not be mounted but shall be suspended from the top using waxed twine or string, glass rods, or glass cord.

4.6.13.2 Dynamic test (classes M, T, W, and Z only). The wired, assembled plugs and receptacles shall be mated and unmated 50 cycles at a rate of 300 cycles per hour maximum. The mating and unmating shall be accomplished so that the plug and receptacle are completely separated during each cycle. The connectors shall then be subjected to the salt spray test as specified in test procedure EIA-364-26. The following details and exceptions shall apply:

- a. The connectors shall be tested for 452 hours mated followed by 48 hours unmated.
- b. The connectors shall not be mounted, but shall be suspended from the top of the chamber using waxed twine or string, glass rods, or glass cord.
- c. Wire ends must be protected to prevent salt migration. After the salt spray exposure, the remaining number of durability cycles specified in 4.6.18 shall be completed.

4.6.14. Contact resistance (hermetics only) (see 3.5.14). The contact resistance of mated contacts shall be measured as specified in test procedure EIA-364-06.

4.6.15 Coupling pin strength (type B receptacles only) (see 3.5.15). One coupling pin in each receptacle shall be subjected to a 50 +5,-0 (19 kg +3 kg, -0kg) pounds load applied to the swaged end along the major axis of the coupling pins on swaged pins, and perpendicular to the pin centerline on the exposed portion of welded or brazed pins. A steel test fixture contoured to the shape of the coupling pin shall be used for application of the load on the welded or brazed pins. Socket inserts may be removed from receptacles when necessary to admit the test tip.

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4.6.16 Insulation resistance.

4.6.16.1 Insulation resistance at ambient temperature (see 3.5.16.1). Unmated connectors shall be tested as specified in test procedure EIA-364-21. The following details and exceptions shall apply:

- a. For lot quality conformance testing, where it is undesirable to install actual contacts in connectors, simulated contacts and special techniques may be used in performing this test.
- b. The tolerance on the applied voltage shall be ± 10 percent.

4.6.16.2 Insulation resistance at elevated temperature (see 3.5.16.2). Unmated connectors shall be tested as specified in test procedure EIA-364-21. The following details and exceptions shall apply:

- a. The tolerance on the applied voltage shall be ± 10 percent.
- b. Connectors shall be exposed to a temperature of 150°C +5°C, -0°C (302°F +9°F, -0°F) for classes Y and H, 175°C +5°C, -0°C (347°F +9°F, -0°F) for classes M, T, W and Z, and 200°C +5°C, -0°C (392°F +9°F, -0°F) for all other classes for 30 minutes. Measurement shall be made while the connectors are still in the chamber at the specified temperature.

4.6.17 Dielectric withstanding voltage (see 3.5.17).

4.6.17.1 Dielectric withstanding voltage (sea level). Unmated connectors shall be tested as specified in test procedure EIA-364-20, method A, with the following details and exceptions:

- a. The magnitude of the test voltage shall be as specified in [table VII](#).
- b. The test voltage shall be applied between adjacent pairs of contacts and between peripheral contacts and the shell. Fifty percent of the contacts shall be tested, but not less than six applications made, unless the number of contacts is three or less in which case all must be tested.
- c. For quality conformance testing, simulated contacts and special techniques may be used.

4.6.17.2 Dielectric withstanding voltage (altitude). Mated connectors and unmated connector halves with pin contacts shall be tested as specified in test procedure EIA-364-20, method A, with the following details and exceptions:

- a. The magnitude of the test voltage shall be as specified in [table VII](#).
- b. The test voltage shall be applied between adjacent pairs of contacts and between peripheral contacts and the shell. Fifty percent of the contacts shall be tested, but not less than six applications made, unless the number of contacts is three or less in which case all must be tested.
- c. The leads of all test circuits shall be brought out through the walls of the chamber. There shall be no wire splices inside the chamber. The wire ends of all leads shall be unsealed.
- d. Only the engaging faces of hermetic connectors shall be subjected to the high altitude. The rear faces shall be suitably protected.
- e. The chamber shall be evacuated to each of the specified altitude pressure equivalents listed below:

<u>Altitude - ft</u>	<u>Equivalent Pressure – torr (PSI)</u>
50,000	87.3 (1.7)
70,000	33.6 (.65)
110,000	5.3 (.1)

4.6.18 Durability (see 3.5.18). Connector halves shall be mated and unmated 250 times for type "T" connectors and for assemblies with grounding fingers,; and 500 times for type "B" connectors without grounding fingers at a rate not exceeding 300 cycles per hour. The test may be performed by hand or by mechanical means, but the coupling ring shall be operated as in normal service.

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4.6.19 Random vibration (see 3.5.19). Wired, mated connectors shall be tested as specified in test procedure EIA-364-28. The connector shall be mounted on the table by normal means. The following details shall apply:

- a. Test condition VI - letter "J".
- b. The duration of test shall be 8 hours in the longitudinal direction and 8 hours in the perpendicular direction.
- c. Means may be provided to relieve hermetic solder terminations, and jumper wires may be used between contacts.

4.6.20 Mechanical shock (see 3.5.20). Connectors shall be tested as specified in test procedure EIA-364-27, test condition D. The following details shall apply:

- a. The pulse shall be an approximate half sine wave of $300\text{ G} \pm 15$ percent magnitude with a duration of 3 ± 1 milliseconds.
- b. The wire bundle shall be clamped to fixed points at least 8 inches (203.2 mm) from the rear of the connector.

4.6.21 Shell-to-shell conductivity (except class A) (see 3.5.21). Mated connectors shall be tested as specified in test procedure EIA-364-83.

4.6.22 Humidity (see 3.5.22). Wired, mated connectors, shall be tested as specified in test procedure EIA-364-31. The following details and exceptions shall apply:

- a. Test condition letter – Method IV.
- b. The mated connectors shall be mounted in a vertical position.
- c. Step 7a shall be performed during last 5 cycles.
- d. After a minimum of 3 hours of step 7a during the final cycle, and while the connectors are still subjected to high humidity, the insulation resistance shall be measured when the chamber temperature reaches $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($68^{\circ}\text{F} \pm 9^{\circ}\text{F}$) and when condensation has formed on the connectors.

4.6.23 Shell spring finger forces (see 3.5.23). Plugs without coupling rings shall be completely mated and unmated with receptacles without inserts. On the initial mating and unmating, the forces necessary to engage and separate shall be within the values specified in [table VIII](#).

4.6.24 RFI shielding (see 3.5.24). The RFI shielding effectiveness of mated connectors with RFI backshells shall be measured in a tri-axial radio frequency leakage fixture. The RFI leakage from the conductor inside the connector in the inner coaxial line into the outer coaxial line shall be measured at the frequencies specified in [table IX](#) within a frequency accuracy of ± 5 percent. The level of detected signal power shall be indicated by a tunable radio frequency field intensity meter isolated from the test circuit by a 3 to 10 dB isolation pad. Care shall be taken to ensure that the signal is a result of RFI leakage from within the mated connector and not due to a faulty termination inside the fixture. All terminations inside the fixture, whether to the RFI backshells or between internal conductors, shall have a leakage at least 10 dB less than the test requirement. The test arrangement shall be as shown on figures 8 and 9. The signal source shall be set to the desired frequency. The signal shall be fed through a 3 to 10 dB isolation pad to a parallel circuit consisting of a coaxial switch (DPDT) connected so that the signal may be manually or electronically fed alternately to the fixture and to a variable 100 dB reference attenuator. The attenuator shall be adjustable in 1 dB steps and calibrated to ± 3 dB.

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- a. The inserts may be removed from the connectors under test or the contacts removed and a hole drilled through the inserts to accommodate a center conductor of suitable geometry to provide a good 50 ohm impedance match with the inside diameter of the mated connector shells and RFI backshells. Tapered transitions may be used to provide a means of changing diameters without introducing significant discontinuities in the line. The maximum VSWR in the inner coaxial line shall be 1.5. The outer shell of the test fixture shall be so constructed as to provide a good 50 ohm impedance match with the outside diameter of the mated connector shells, coupling ring and RFI backshells. The maximum VSWR of the outer coaxial line shall be 1.5.
- b. A sliding circumferential short shall be positioned behind the connector on the signal-input end of the fixture to provide for tuning the outer coaxial line for maximum output at each test frequency. The allowable travel of this short shall be greater than 1/2 wave length at the lowest test frequency, for example 1.5 meters minimum for 100 MHz. The inner coaxial line shall be terminated in a fixed 50-ohm load impedance behind the connector at the output end of the fixture.
- c. Connectors utilized to couple together the various elements of the test system shall be of a low leakage type which have a nominal impedance of 50 ohms, a VSWR of less than 1.5, and a minimum leakage attenuation of 100 dB. The output impedance of the signal source and the input impedance of the detector shall be nominally 50 ohms with a maximum VSWR of 1.5. The input and output VSWR of the standard attenuator shall be less than 1.5 in the 20 to 100 dB range.
- d. The relative signal level in the variable attenuator shall be equaled to that through the leakage fixture by adjusting the attenuator. The signal loss in the fixture can then be read from the setting on the variable attenuator.

4.6.25 Ozone exposure (see 3.5.25). The connectors shall be tested as specified in test procedure EIA-364-14.

4.6.26 Fluid immersion (see 3.5.26). Connector samples shall be tested as specified in test procedure EIA-364-10 (one sample per fluid). Following the fluid immersion cycles, the connectors shall be tested for coupling torque as specified in 4.6.10 and dielectric withstanding voltage at sea level as specified in 4.6.17.1 within three hours.

4.6.27 Retention system fluid immersion (see 3.5.27). Connectors shall be unmated and contacts shall be removed. Connectors shall be immersed in the fluids of 4.6.26 (one sample per fluid) for twenty hours at room temperature. After removal, excess fluid shall be allowed to drain from the connectors for four hours and the contacts shall be reinstalled. The connectors shall then be subjected to the contact retention test of 4.6.5.

4.6.28 Contact walk-out (see 3.5.28). Two contacts in each plug and receptacle shall be tested. The contacts shall be crimped to stranded steel cable of an appropriate size and installed in the connector. The unmated connector shall be mounted in a test fixture as shown on figure 10. A three pound load shall be applied to the cable. One 360° rotation of the fixture with the connector mounted shall constitute one cycle. The connector shall be subjected to 100 cycles at a rate of 10 to 20 cycles per minute. Contact cavities used in this test shall be excluded from further testing.

4.6.29 Installing and removal tool abuse (see 3.5.29). Five contact cavities in each connector shall be subjected to each of the tests in 4.6.29.1 through 4.6.29.4. Different contact cavities shall be used for each test. Should a tool become damaged during any of the testing it shall be replaced. Failure of a tool shall not constitute a test failure. Contact cavities used in this test shall not be subject to further testing.

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4.6.29.1 Removal tool rotation. The applicable contact removal tool shall be inserted as if to remove a contact and an axial load of three pounds shall be applied. With the force applied, the tool shall be rotated 180° and then removed, also removing the contact. The contact shall be reinserted. These steps shall be repeated three times on each of the five contacts selected.

4.6.29.2 Installing tool rotation. The contact shall first be removed. With the applicable contact installing tool, the contact shall be reinstalled and an axial load of three pounds applied to the tool. With the force applied, the tool shall be rotated 180° and then removed. These steps shall be repeated three times on each of the five contacts selected.

4.6.29.3 Installing tool thrust. The contact shall first be removed. With the applicable contact installing tool, the contact shall be reinstalled and an axial load of 10 pounds (4 kg) applied to the tool. These steps shall be performed only once on each of the five contacts selected. A new tool shall be used for each contact.

4.6.29.4 Removal tool thrust. The applicable contact removal tool shall be inserted as if to remove the contact and an axial load of 10 pounds (4 kg) shall be applied to the tool. The tool shall then be removed, also removing the contact. These steps shall be performed only once on each of the five contacts selected. A new tool shall be used for each contact.

4.6.30 External bending moment (see 3.5.30). The receptacle connector shall be mounted as in normal service to a rigid panel. Before mating the plug connector to the receptacle, an adapter or test torque arm shall be attached as shown on [figure 11](#). After mating the plug and receptacle connectors, the distances "L" from the point of load application and "P" to the mounting panel shall be determined. The load to be applied at point "P" shall then be determined as the bending moment listed in [table X](#) divided by the lever arm "L". This load shall be applied at a rate of approximately 10 pounds (4 kg) per second until the required load is achieved. The load so applied shall be held for a period of one minute after which the load shall be released. Continuity of the contacts shall be monitored during the test. The test circuit used to monitor this test shall be capable of detecting any discontinuity of one microsecond or greater.

4.6.31 Pin contact stability (see 3.5.31). The unmated connectors shall have 10 percent (but not less than one) of their pin contacts subjected to this test. Gauge pins conforming dimensionally to the applicable military standard for the contacts shall be used. The connector shall be held in a holding device. A force of three pounds (4 kg) shall be applied to the exposed rod as shown on [figure 12](#). The rate of load application shall not exceed one inch (25 mm) per minute. The total pin tip displacement shall be measured as shown on [figure 12](#). Contact cavities use in this test shall be excluded from further testing.

4.6.32 Temperature life with contact loading (see 3.5.32). Connectors with removable contacts shall have one mating pair of contacts removed from an untested contact cavity and replaced with contacts crimped or otherwise attached to steel cable or steel-cored copper wire (copperweld, or equivalent) of an appropriate size. The axial location of these contacts shall be measured for conformance to the applicable dimensions on figures 4 and 5, or the applicable specification sheets, as applicable, with a load of 2 pounds approximately applied to seat the contact back against the retention device. The connector shall then be mounted in a fixture as shown on [figure 14](#). A weight equal to 50 percent of the axial load specified in [table XVIII](#) for the applicable contact size shall be suspended freely from each steel wire. A current of 100 milliamperes maximum, shall be applied to the test contacts and a suitable instrument shall be used to monitor the circuit for discontinuities in excess of one microsecond. The mounted connector shall then be exposed to 175°C +5°C, -0°C (347°F +9°F, -0°F) for classes M, T, W and Z, or 200°C +5°C, -0°C (392°F +9°F, -0°F) for all other classes (except hermetics) for a period of 1,000 hours minimum.

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After the connectors return to ambient temperature, they shall be unmated and the contact locations shall be remeasured with approximately two pounds axial load applied to seat the contact back against the retention device.

4.6.33 Firewall (classes K, N (firewall), and S connectors) (see 3.5.33). The mated, torqued, and wired connectors shall be tested as specified in test procedure EIA-364-45. The following detail and exception shall apply: Wire bundles to be clamped to fixed points at least 8 inches (203 mm) behind the connector.

4.6.34 Surface roughness (hermetics only) (see 3.4.5.4). The surface roughness of samples shall be measured with a suitable instrument.

4.6.35 Contact plating thickness (hermetic) (see 3.3.3.2). Contact plating thickness shall be measured by any method which will give results within ± 10 percent of the true thickness (see [figure 1](#)).

4.6.36 Plating adhesion (hermetics only) (see 3.5.34). Sizes 16 and 20 contacts shall be bent repeatedly through an angle of 90 degrees on a diameter equal to the outside diameter of the specimen until fracture of the basic metal occurs. Suitable equipment shall be used to cause the fracture to occur in the area where plating adhesion is to be determined, as indicated on [figure 1](#). A sharp pointed tool shall be used to determine if any area of the coating can be separated from the basic metal. The plating area shall be inspected through a device having approximately 3X magnification. The contact may be sectioned longitudinally for this test when necessary. Contact sizes 0, 4, 8, and 12 shall be maintained at their temperature limit of $200^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ($392^{\circ}\text{F} \pm 5.5^{\circ}\text{F}$) for a minimum of 30 minutes and inspected to the requirements of [3.5.34](#).

4.6.37 Accessory thread strength (see 3.5.35). The mated connector shall be mounted as in normal service to a rigid panel. The torque wrench shall be attached as shown on [figure 13](#). After mating the plug and receptacle connectors, a torque shall be applied to the accessory end of the plug at a rate of approximately 10 pounds (4 kg) per second until the required torque is achieved (table XIII). The load so applied shall be held for a period of one minute after which the load shall be released. The test shall be repeated on the accessory end of the receptacle. The connectors shall then be unmated and inspected through a device having approximately 3X magnification for damage or breakage.

4.6.38 Electrolytic erosion (see 3.5.36). The wired receptacle half of the connector containing the pin contacts shall be firmly mounted in a vertical position, pins facing up. A salt-water solution (5 percent salt by weight) shall be poured onto the pin interface until the solution level just reaches the pin tips. The solution shall remain in the connector for a minimum of 30 seconds and then poured out, lightly shaking excesses from the connector. The counterpart plug shall immediately be mated with the receptacle. One cell pattern, with all contacts adjacent to a central contact at a positive polarity and the center contact at a negative polarity, shall be set up at a location giving the most uniform distribution of contacts adjacent to the center contact. A potential of 60 volts dc shall be applied between the contacts adjacent to the center contact. The contacts shall be energized for 40 hours. Following this, with the voltage disconnected, the connectors shall be unmated. For hermetic connectors the interface seal shall be removed and for all other connectors the contact shall be removed. The contacts shall be inspected through a device having approximately 3X magnification for erosion to base metal.

4.6.39 Cavity-to-cavity leakage bonding integrity (see 3.5.37). Unmated unwired connectors shall be tested as specified in test procedure EIA-364-78.

4.6.40 Fungus resistance certification (see 3.3.4.2.1). Certification to method 508.6 of MIL-STD-810 is required

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5. PACKAGING

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

6. NOTES

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

6.1 Intended use (all classes).

- a. Connector backshells must be installed to meet the specified moisture sealing requirements.
- b. Class G connectors are stainless steel connectors intended for use in environment resisting applications that require a peripheral shield, 200°C (392°F) service temperature, and fluid resistance.
- c. Class R connectors are intended for use in environment resisting applications at 200°C (392°F) service temperature. They have conductive finish with fluid resistance requirements.
- d. Class H receptacles are intended for use in applications where pressures must be contained by the connectors across walls or panels on which they are mounted. They must have fluid resistance insert face seal. Class H receptacles are limited to 150°C (302°F) service temperature.
- e. Class S connectors are intended for use in firewall applications where RFI protection is required. These connectors have self-locking coupling nuts, which eliminates the need for safety wiring and are rated at 200°C (392°F) service temperature.
- f. Class A connectors are intended for use in applications where a conductive shell is not required. Class A connectors also provide excellent durability and resistance to salt spray.
- g. Class K connectors are intended for use in firewall applications where RFI protection is not required. Class K connectors are available with self-locking coupling nuts.
- h. Series II receptacles are to be used for maintenance replacement purposes only.
- i. Series II plugs are to be used for maintenance replacement purposes only.
- j. Mechanical strain reliefs are intended for use where a saddle type clamp is desired.
- k. Shrink strain reliefs are intended to provide wire support and vibration dampening when used.
- l. To remove unwired contacts, contact contractors for specific tools and instructions.
- m. Class Y receptacles are intended for use in applications where pressures must be contained by the connectors across walls or panels on which they are mounted. They must have fluid resistant insert face seals. Class Y receptacles are rated at 200°C (392°F) service temperature.
- n. Type T threaded are intermateable but not completely interchangeable with applicable MIL-DTL-26500 threaded connectors except for shell size 8. Type B bayonet connectors are completely interchangeable with applicable MIL-DTL-26500 bayonet connectors.
- o. Class N connectors are for the same use as class S or Y except they have electrodeposited nickel finish.
- p. Classes M, T, W and Z connectors are intended for use in environment resisting applications at 175°C (347°F) service temperature where extreme corrosion resistance requirements exist.

6.2 Acquisition requirements. Acquisition document should specify the following:

- a. Title, number, and date of the specification.

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- b. Issue specified in ASSIST to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- c. Procurement of items to this specification will be only from sources that prior to closing date of bids, have received qualification of the product within terms of the Armed Services Procurement Regulations, ASPR, (see 6.3).
- d. The PIN must be in accordance with the applicable specification sheet (see 3.1).
- e. Accessories.
- f. Special handling, if applicable.
- g. Special ordering instructions (see 3.4.3.4, 3.4.5, and 3.4.5.5).

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 Product List QPL No. 83723 whether or not such products have actually been so listed by that date. The attention of contractors is called to these requirements, and manufacturers are urged to arrange to have the products 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 Defense Supply Center Columbus (DSCC-VQ), Qualifications and Sourcing Division, Columbus, OH 43218-3990, or email vqchief@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>.

6.4 Assembly plants. Assembly plants must be listed on or approved for listing on the applicable QPL. The qualified connector contractor must certify that the assembly plant is approved for the distribution of the contractor's parts. The assembly plant must use only piece parts supplied by the qualified connector contractor. No testing other than visual examination is required of certified piece parts obtained from the qualified connector contractor, except when there is cause for rejection. All assemblies produced at the assembly plant must be subject to the quality assurance provisions specified herein. Quality control requirements, including Government inspection surveillance, must be the same as required for the qualified connector contractor.

6.5 Supersession data.

6.5.1 Series I connectors. Series I connectors are canceled or inactive for new design. Use the military standards associated with MIL-DTL-26482 or the specification sheets as listed below.

<u>Specification sheet</u>	<u>Superseded by</u>
MIL-C-83723/1 and /2	MS3470
MIL-C-83723/3 and /4	MS3472
MIL-C-83723/5 and /6	MS3474
MIL-C-83723/7 and /8	MS3471
MIL-C-83723/9 and /10	MS3440
MIL-C-83723/11 and /12	MS3443
MIL-C-83723/13 and /14	MS3476
MIL-C-83723/33	SAE-AS39029/4
MIL-C-83723/34	SAE-AS39029/5
MIL-C-83723/36, /38, /39, /40 and /41	No superseding documents
MIL-DTL-83723/37	No superseding document
MIL-C-83723/42 and /43	MS3475
MIL-C-83723/44	MS3181
MIL-C-83723/45	MS3115
MIL-C-83723/46	MS3180
MIL-C-83723/48 and /49	No superseding documents

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6.5.2 Series II connectors. Series II connectors are canceled or inactive for new design. Use the military standards associated with MIL-DTL-5015 or the specification sheet as listed below.

<u>Specification sheet</u>	<u>Superseded by</u>
MIL-C-83723/17 and /18	MS3451
MIL-C-83723/19 and /20	MS3450
MIL-C-83723/21 and /22	MS3452
MIL-C-83723/23 and MIL-C-83723/24	MS3456
MIL-C-83723/25	MS3142
MIL-C-83723/26	MS3143
MIL-DTL-83723/27	MS3109 or MS3117 and MS3158 or MS3416
MIL-C-83723/29	SAE-AS39029/29
MIL-C-83723/30	SAE-AS39029/30
MIL-DTL-83723/35	No superseding document
MIL-DTL-83723/50	No superseding document
MIL-C-83723/52 and /53	MS3459

6.6 Patent notice. The Government has a royalty-free license under the following listed patents for the benefit of manufacturers of the item either for the Government or for use in equipment to be delivered to the Government.

Patent numbers

3110093 expired November 12, 1980.

3158424 expired November 24, 1981.

6.7 PIN. The PIN should be constructed as specified in [3.7.1](#).

6.8 Copyright notice. All information disclosed in this specification and related specification sheets and military standards which is or may be copyrighted by the International Telephone and Telegraph Corporation is reproduced herein with the expressed permission of the copyright owner.

6.9 Replacement PIN for O-rings. For replacement PINs see 3.4.2.3 and [table II](#).

6.10 Subject term (key word) listing.

Bayonet coupling

Threaded coupling

6.11 Previous editions. Previous editions of some specification sheets used a "-" in lieu of a "/" in the PIN; Example: M83723/83XXXXXX is the same as M83723-83XXXXXX. These parts are identical, but new parts must be marked with a "/".

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

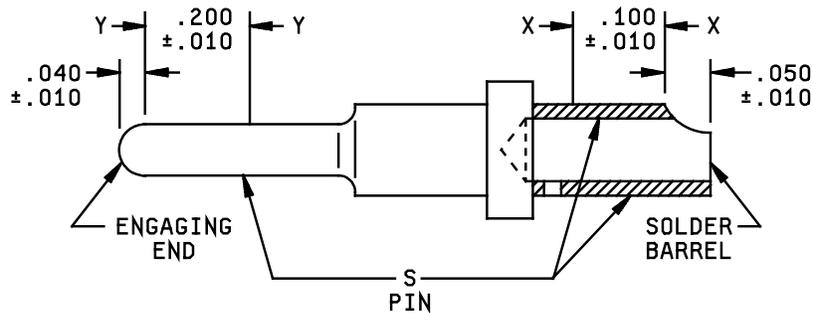
6.13 Guidance on the use of alternative parts with less hazardous or nonhazardous materials. This specification provides for a number of alternative plating materials via the PIN. Users should select the PIN with the least hazardous material that meets the form, fit and function requirements of their application.

6.14 Military unique statement. This connector is military unique because it is an environment resisting circular connector, capable of operating in high shock, high vibration and high temperature environments as well as meeting the salt spray corrosion requirements of this specification. It is designed to use crimp removable or fixed hermetic solder contacts. This connector is preferred for high vibration application environments (like a jet engine environment). A full commercial substitute is not available.

6.15 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM B545 (Standard Specification for Electrodeposited Coatings of Tin) (see 3.3.3.4).

6.16 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.

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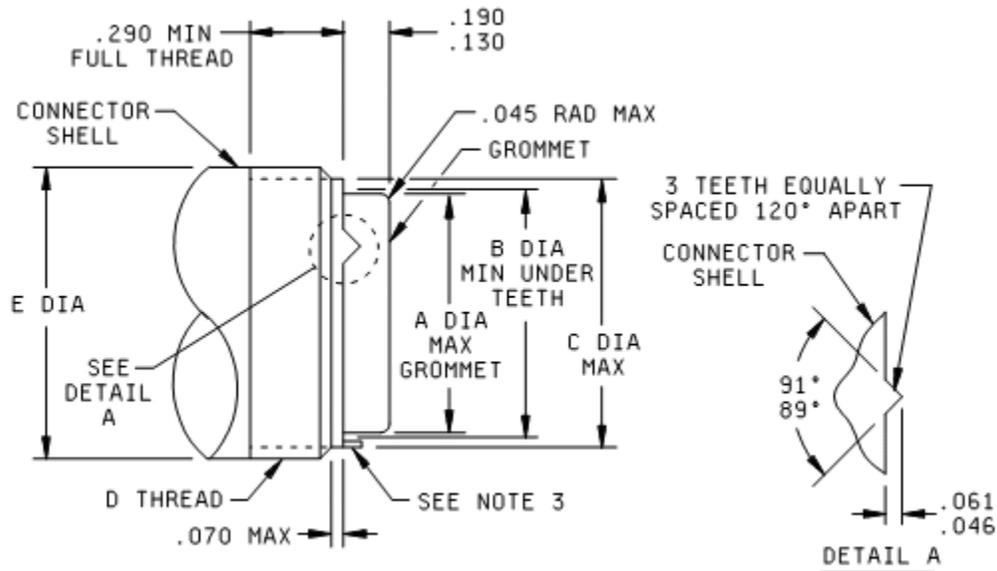
Inches	mm
.010	.025
.040	1.02
.050	1.27
.100	2.54
.200	5.08

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Surface roughness to be measured on surface S between Y-Y.
4. Plating thickness to be measured on surface S between Y-Y on pin contacts.
5. Plating adhesion to be determined on surface S between X-X and between Y-Y.
6. Pin contacts to be examined on surface S between Y-Y for exposure of basic metal.
7. Surface roughness in accordance with ANSI B46.1.

FIGURE 1. Surface details (see 3.3.3.2, 3.4.5.4, and 4.6.35).

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Shell size	A	B	C	D thread (class 2A)	E diameter	
					Min	Max
8	.305	.370	.437	.500-20 UNF	.470	.500
10	.405	.497	.572	.625-24 UNEF	.600	.625
12	.531	.613	.687	.750-20 UNEF	.724	.750
14	.665	.738	.812	.875-20 UNEF	.849	.875
16	.790	.863	.937	1.000-20 UNEF	.974	1.000
18	.869	.919	.992	1.062-18 UNEF	1.030	1.062
20	.994	1.044	1.117	1.188-18 UNEF	1.154	1.187
22	1.119	1.169	1.242	1.312-18 UNEF	1.279	1.312
24	1.244	1.294	1.367	1.438-18 UNEF	1.404	1.437

FIGURE 2. Rear accessory interchangeability control dimensions (series III only) (see 3.4).

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Inches	mm	Inches	mm	Inches	mm	Inches	mm
.045	1.14	.531	13.49	.869	22.07	1.169	29.69
.046	1.17	.572	14.53	.875	22.23	1.187	30.15
.061	1.55	.600	15.24	.919	23.34	1.188	30.18
.070	1.78	.613	15.57	.937	23.80	1.242	31.55
.130	3.30	.625	15.88	.974	24.74	1.244	31.60
.190	4.83	.665	16.89	.992	25.20	1.279	32.49
.290	7.37	.687	17.45	.994	25.25	1.294	32.87
.305	7.75	.724	18.39	1.000	25.40	1.312	33.32
.370	9.40	.738	18.75	1.030	26.16	1.367	34.72
.405	10.29	.750	19.05	1.044	26.52	1.404	35.66
.437	11.10	.790	20.07	1.062	26.97	1.437	36.50
.470	11.94	.812	20.62	1.117	28.37	1.438	36.53
.497	12.62	.849	21.56	1.119	28.42		
.500	12.70	.863	21.92	1.154	29.31		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. The centerline of indicated projection must be located on vertical centerline within 2°.

FIGURE 2. Rear accessory interchangeability control dimensions (series III only) (see 3.4) – Continued.

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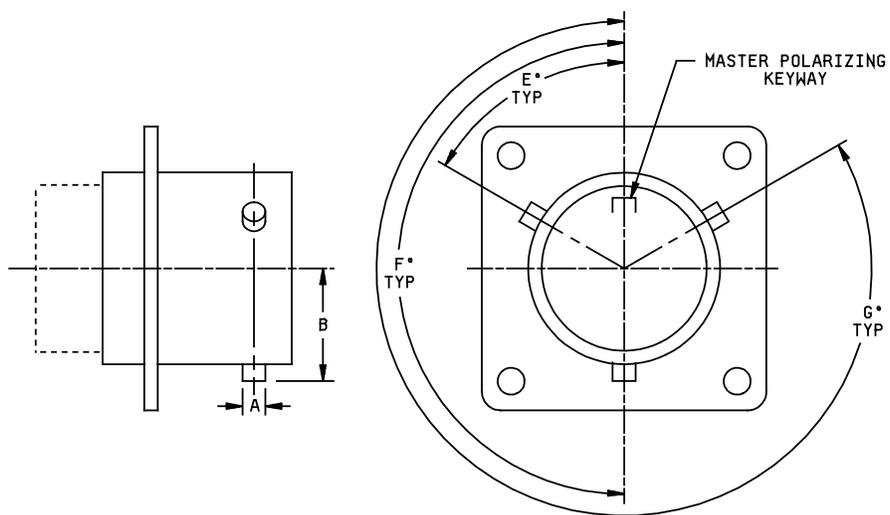


FIGURE 3. Bayonet pins.

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Shell size	Polarizing position <u>1/</u>	Bayonet positions		
		E°	F°	G°
8, 10	N	60	180	300
	1	60	180	300
	2	60	180	300
	3	60	180	300
	4	60	180	300
12, 14 16, 18 20, 22 24	5	60	180	300
	N	50	170	290
	1	50	170	290
	2	50	170	290
	3	50	170	290
8, 10	4	50	170	290
	5	50	170	290
	6	46	166	286
	7	46	166	286
10	8	60	180	300
	9	89	209	329
	Y	60	180	300
12, 14 16, 18 20, 22 24	6	50	170	290
	7	50	170	290
	8	50	170	290
	9	50	170	290
	Y	50	170	290

1/ Polarization positions 1, 2, 3, 4, and 5 are inactive for new design.

FIGURE 3. Bayonet pins - Continued.

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Shell size	A	B
8	.078	.310
	.075	.301
10	.093	.374
	.090	.365
12	.093	.459
	.090	.450
14	.093	.494
	.090	.485
16	.093	.557
	.090	.548
18	.093	.610
	.090	.601
20	.093	.673
	.090	.664
22	.093	.735
	.090	.726
24	.093	.798
	.090	.789

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.075	1.90	.301	7.65	.494	12.55	.726	18.44
.078	1.98	.310	7.87	.548	13.92	.735	18.67
.090	2.29	.365	9.27	.557	14.15	.789	20.04
.093	2.36	.374	9.50	.601	15.27	.798	20.27
.094	2.39	.450	11.43	.610	15.49		
.097	2.46	.459	11.66	.664	16.87		
.101	2.57	.485	12.32	.673	17.09		

NOTES:

1. Dimensions are inches.
2. Metric equivalents are given for information only.
3. Three bayonet pins equally spaced shall be within .004 inches (0.10 mm) either side of (TP) relative to master polarizing keyway.

FIGURE 3. Bayonet pins - Continued.

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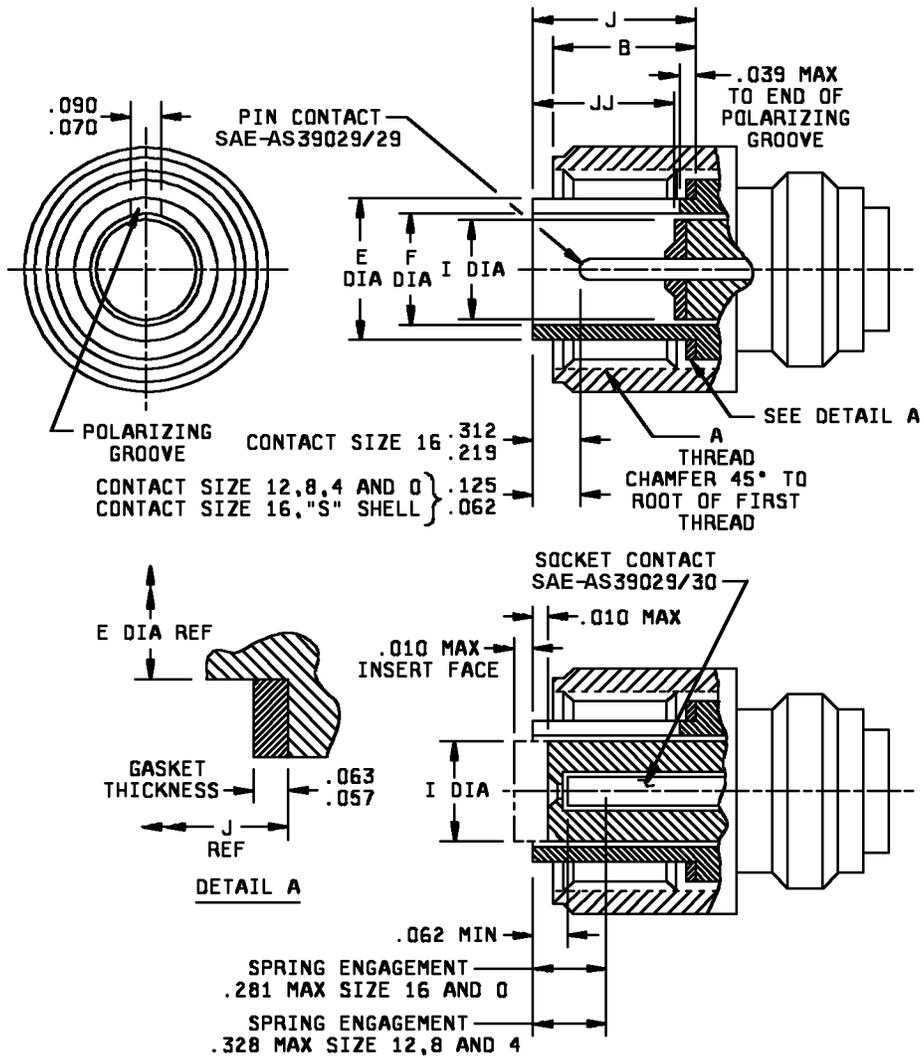


FIGURE 4. Plug, type T, rear release, interface dimensions (series II) (see 3.4.5.1, 3.5.2, 3.5.32, and 4.6.32).

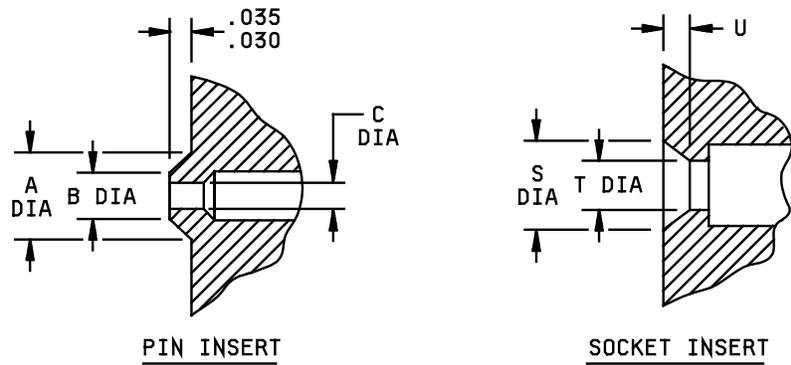
MIL-DTL-83723G

Shell size		A thread class 2B	B + .000 -.062	E dia +.000 -.010 1/	F dia +.015 -.000 1/	I + .000 -.020	J ± .005	JJ ± .011
MIL-DTL-83723	MIL-DTL-5015 Reference							
8	8S	.500-28 UNEF	.414	.365	.252	.250	.570	.510
10	10S	.625-24 UNEF		.440	.323	.320		
11	10SL 1/			.446	.398	.397		
12	12S	.750-20 UNEF	.664	.555	.450	.448	.757	.698
13	12							
14	14S	.875-20 UNEF	.414	.675	.526	.525	.757	.698
15	14							
16	16S							
17	16	1.000-20 UNEF	.664	.805	.651	.650	.757	.698
18	18	1.125-18 UNEF		.930	.776	.770		
20	20	1.250-18 UNEF		1.050	.932	.925		
22	22	1.375-18 UNEF		1.175	1.026	1.020		
24	24	1.500-18 UNEF		1.300	1.151	1.145		
28	28	1.750-18 UNS		1.520	1.370	1.365		
32	32	2.000-18 UNS		1.770	1.620	1.615		
36	36	2.250-16 UN		1.980	1.838	1.830		
40	40	2.500-16 UN		2.230	2.057	2.045		
44	44	2.750-16 UN		2.485	2.310	2.300		
48	48	3.000-16 UN		2.735	2.560	2.550		

1/ For shell size 10SL, the "E" diameter tolerance is +.000, -.006, and the "F" diameter tolerance is +.006, -.000.

FIGURE 4. Plug, type T, rear release, interface dimensions (series II)
(see 3.4.5.1, 3.5.2, 3.5.32, and 4.6.32) - Continued.

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INSERT ENTRY

Contact size	A dia	B dia	C dia	S dia	T dia	U
16	.150	.135	.061	.140	.079	.035
	.140	.131	.058	.130	.072	.031
12	.208	.188	.093	.204	.111	.040
	.198	.184	.090	.193	.104	.035
8	.310	.270	.141	.306	.159	.040
	.300	.265	.138	.295	.152	.035
4	.396	.355	.224	.392	.262	.033
	.386	.350	.221	.381	.234	.027
0	.578	.537	.356	.573	.414	.033
	.568	.533	.353	.563	.366	.027

FIGURE 4. Plug, type T, rear release, interface dimensions (series II)
(see [3.4.5.1](#), [3.5.2](#), [3.5.32](#), and [4.6.32](#)) - Continued.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.005	.13	.138	3.51	.323	8.20	.570	14.48	1.365	34.67
.006	.15	.140	3.56	.328	8.33	.573	14.55	1.370	34.80
.010	.25	.141	3.58	.350	8.89	.578	14.68	1.375	34.93
.011	.28	.150	3.81	.353	8.97	.625	15.88	1.500	38.10
.015	.38	.152	3.86	.355	9.02	.650	16.51	1.520	38.61
.020	.51	.159	4.04	.356	9.04	.651	16.54	1.615	41.02
.027	.69	.184	4.67	.365	9.27	.664	16.87	1.620	41.15
.031	.79	.188	4.78	.366	9.30	.675	17.15	1.750	44.45
.033	.84	.193	4.90	.381	9.68	.698	17.73	1.770	44.96
.035	.89	.198	5.03	.386	9.80	.750	19.05	1.830	46.48
.039	.99	.204	5.18	.392	9.96	.757	19.23	1.838	46.69
.040	1.02	.208	5.28	.396	10.06	.770	19.56	1.980	50.29
.057	1.45	.219	5.56	.397	10.08	.776	19.71	2.000	50.80
.058	1.47	.221	5.61	.398	10.11	.805	20.45	2.045	51.94
.061	1.55	.224	5.69	.414	10.52	.875	22.23	2.057	52.25
.062	1.57	.234	5.94	.440	11.18	.925	23.50	2.230	56.64
.063	1.60	.250	6.35	.446	11.33	.930	23.62	2.250	57.15
.070	1.78	.252	6.40	.448	11.38	.932	23.67	2.300	58.42
.072	1.83	.262	6.65	.450	11.43	1.000	25.40	2.310	58.67
.079	2.01	.265	6.73	.500	12.70	1.020	25.91	2.485	63.12
.090	2.29	.270	6.86	.510	12.95	1.026	26.06	2.500	63.50
.093	2.36	.281	7.14	.525	13.34	1.050	26.67	2.550	64.77
.104	2.64	.295	7.49	.526	13.36	1.125	28.58	2.560	65.02
.111	2.82	.300	7.62	.533	13.54	1.145	29.08	2.735	69.47
.125	3.18	.306	7.77	.537	13.64	1.151	29.24	2.750	69.85
.130	3.30	.310	7.87	.555	14.10	1.175	29.85	3.000	76.20
.131	3.33	.312	7.92	.563	14.30	1.250	31.75		
.135	3.43	.320	8.13	.568	14.43	1.300	33.02		

NOTES:

1. Dimensions are inches.
2. Metric equivalents are given for information only.

FIGURE 4. Plug, type T, rear release, interface dimensions (series II)
(see [3.4.5.1](#), [3.5.2](#), [3.5.32](#), and [4.6.32](#)) - Continued.

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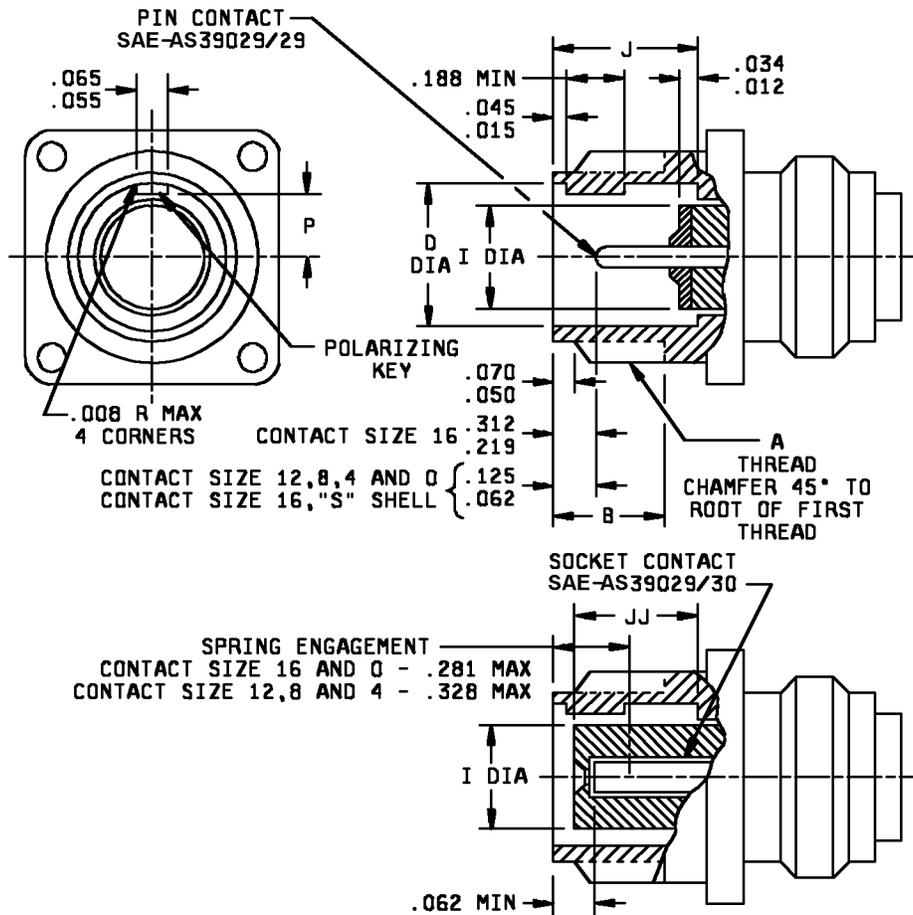


FIGURE 5. Receptacle, type T, rear release, interface dimensions (series II) (see 3.4.5.1, 3.5.2, 3.5.32, and 4.6.32).

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Shell size	A thread class 2A	B thread min	D dia +.015 -.000	I dia +.000 -.020	J ± .005	JJ ± .011	P +.010 -.000		
8S	.500-28 UNEF	.375	.370	.250	.536	.533	.130		
10S	.625-24 UNEF		.448	.320			.724	.721	.165
10SL				.397					
12	.750-20 UNEF	.625	.558	.448	.536	.533	.224		
12S		.375							
14		.625							
14S	.875-20 UNEF	.375	.678	.525	.536	.533	.263		
16		.625							
16S	1.000-20 UNEF	.375	.808	.650	.536	.533	.325		
18	1.125-18 UNEF	.625	.933	.770	.724	.721	.385		
20	1.250-18 UNEF		1.053	.925			.463		
22	1.375-18 UNEF		1.178	1.020			.510		
24	1.500-18 UNEF		1.303	1.145			.573		
28	1.750-18 UNS		1.523	1.365			.683		
32	2.000-18 UNS		1.773	1.615			.808		
36	2.250-16 UN		1.985	1.830			.915		
40	2.500-16 UN		2.237	2.045			1.023		
44	2.750-16 UN		2.492	2.300			1.150		
48	3.000-16 UN		2.742	2.550			1.275		

FIGURE 5. Receptacle, type T, rear release, interface dimensions (series II)
(see 3.4.5.1, 3.5.2, 3.5.32, and 4.6.32) - Continued.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.005	.13	.219	5.56	.525	13.34	.933	23.70	1.615	41.02
.008	.20	.224	5.69	.533	13.54	1.000	25.40	1.750	44.45
.010	.25	.250	6.35	.536	13.61	1.020	25.91	1.773	45.03
.012	.30	.263	6.68	.558	14.17	1.023	25.98	1.830	46.48
.015	.38	.281	7.14	.573	14.55	1.053	26.75	1.985	50.42
.020	.51	.312	7.92	.625	15.88	1.125	28.58	2.000	50.80
.034	.86	.320	8.13	.650	16.51	1.145	29.08	2.045	51.94
.045	1.14	.325	8.26	.678	17.22	1.150	29.21	2.237	56.82
.050	1.27	.328	8.33	.683	17.35	1.178	29.92	2.250	57.15
.055	1.40	.370	9.40	.721	18.31	1.227	31.17	2.300	58.42
.062	1.57	.375	9.53	.724	18.39	1.250	31.75	2.492	63.30
.065	1.65	.385	9.78	.750	19.05	1.303	33.10	2.500	63.50
.070	1.78	.397	10.08	.770	19.56	1.365	34.67	2.550	64.77
.125	3.18	.448	11.38	.808	20.52	1.375	34.39	2.742	69.65
.130	3.30	.468	11.89	.875	22.23	1.500	38.10	2.750	69.85
.165	4.19	.500	12.70	.915	23.24	1.523	38.68	3.000	76.20
.188	4.78	.510	12.95	.925	23.50				

NOTES:

1. Dimensions are inches.
2. Metric equivalents are given for information only.

FIGURE 5. Receptacle, type T, rear release, interface dimensions (series II)
(see [3.4.5.1](#), [3.5.2](#), [3.5.32](#), and [4.6.32](#)) - Continued.

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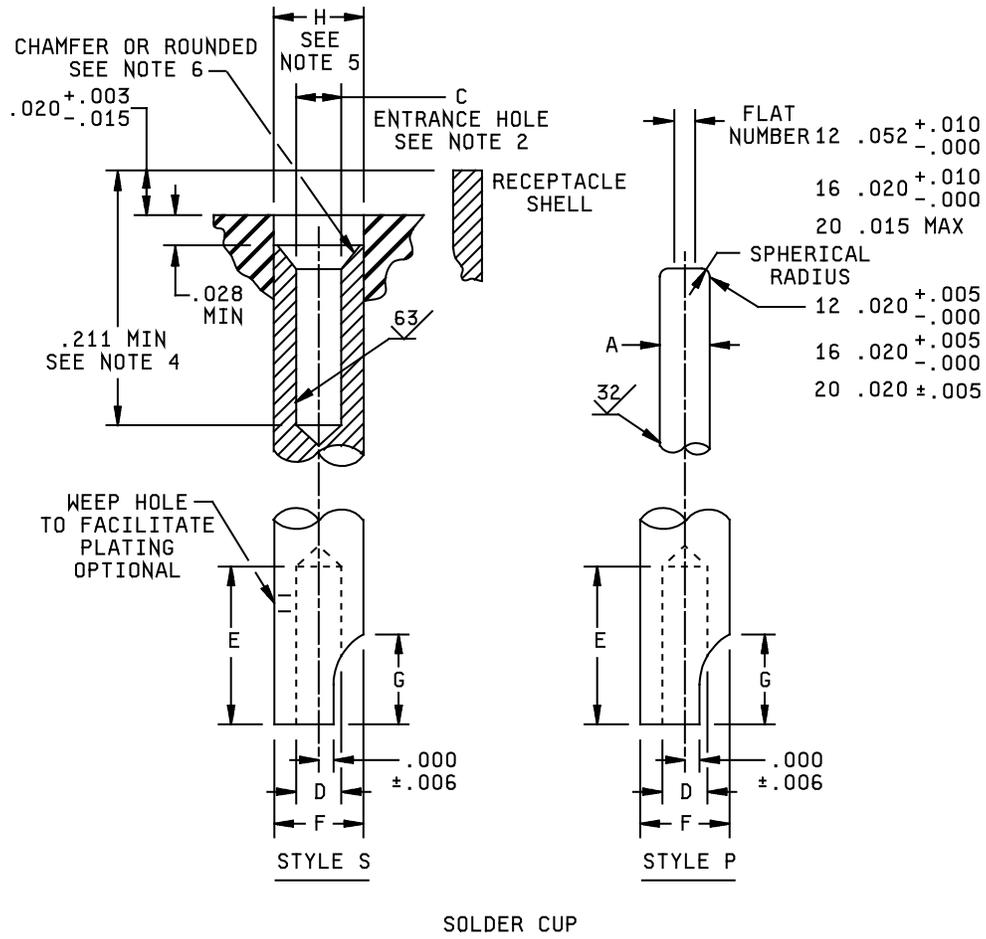


FIGURE 6. Hermetic contact configuration and dimensions.

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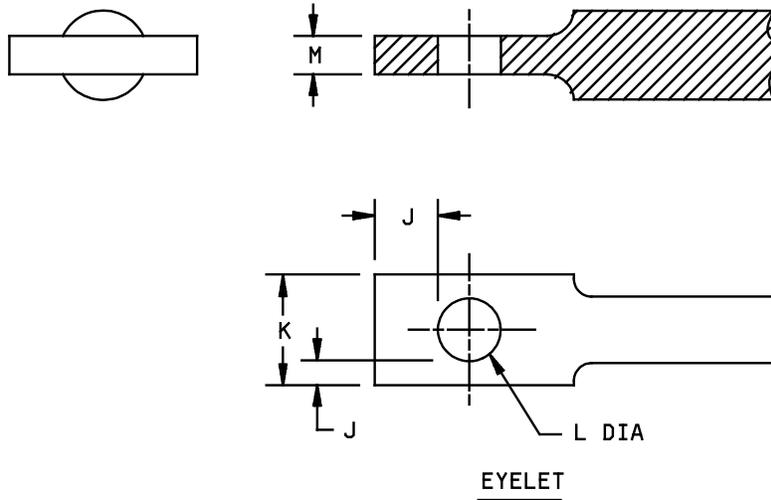
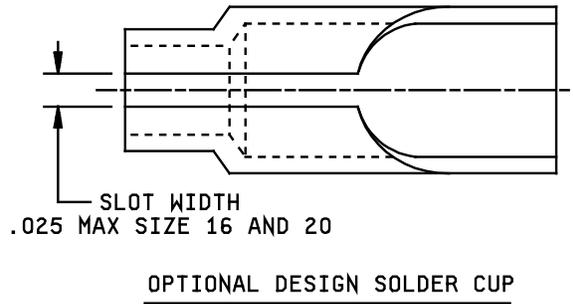


FIGURE 6. Hermetic contact configuration and dimensions - Continued.

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Contact size	A	C min	D	E	F	G	H + .005 - .000	J min	K max	L min	M min
20	.041 .039	.045	.048 .042	.188 .109	.088 .061	.114 .068	.071	.015	.085	.042	.012
16	.0635 .0615	.067	.082 .069	.251 .141	.103 .097	.141 .068	.104	.015	.118	.065	.020
12	.095 .093	.099	.120 .112	.251 .141	.142 .136	.141 .068	.140	.025	.190	.096	.020

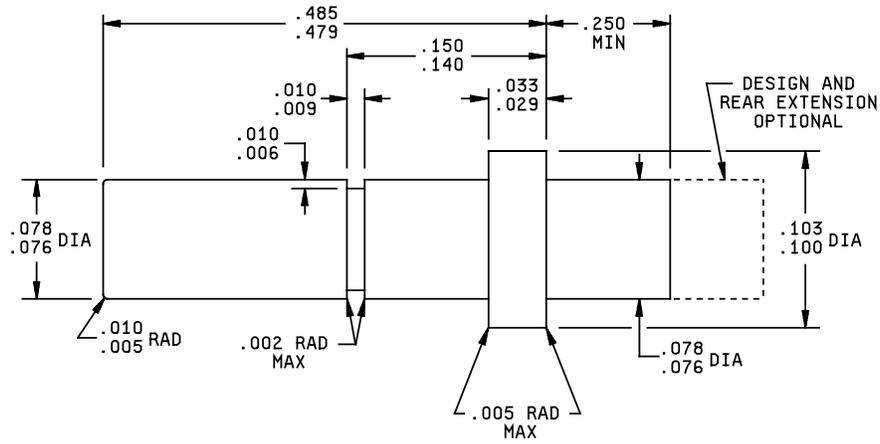
Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
.0005	.013	.0300	.762	.055	1.40	.083	2.11	.118	3.00
.001	.03	.0305	.775	.061	1.55	.088	2.24	.120	3.05
.003	.08	.035	.89	.0615	1.562	.093	2.36	.125	3.18
.005	.13	.036	.91	.062	1.57	.094	2.39	.136	3.45
.006	.15	.038	.97	.0625	1.588	.095	2.41	.140	3.56
.008	.20	.039	.99	.0635	1.613	.096	2.44	.141	3.58
.010	.25	.040	1.02	.065	1.65	.097	2.46	.142	3.61
.011	.28	.041	1.04	.067	1.70	.099	2.51	.156	3.96
.012	.30	.042	1.07	.068	1.73	.102	2.59	.172	4.37
.015	.38	.045	1.14	.069	1.75	.103	2.62	.188	4.78
.020	.51	.048	1.22	.071	1.80	.104	2.64	.190	4.83
.025	.64	.050	1.27	.075	1.91	.109	2.77	.211	5.36
.028	.71	.051	1.30	.080	2.03	.112	2.84	.251	6.38
.0295	.749	.052	1.32	.082	2.08	.114	2.90		

NOTES:

- Dimensions are in inches and over plating.
- Size 12 contacts shall refuse entry to a .102 minimum diameter pin.
Size 16 contacts shall refuse entry to a .071 minimum diameter pin.
Size 20 contacts shall refuse entry to a .048 minimum diameter pin.
C dimension to be maintained for .060 minimum.
- Dimensions shown effect interchangeability, function, and fit. Unless specified, other design features are optional.
- A $.040 \pm .001$ diameter pin for 20 contacts, $.0625 \pm .001$ diameter pin for 16 contacts, and $.094 \pm .001$ diameter pin for 12 contacts.
- Dimension H is the inside diameter of insert entry hole.
- Edges are not permissible.
- Metric equivalents are given for information only.

FIGURE 6. Hermetic contact configuration and dimensions - Continued.

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Inches	mm	Inches	mm
.002	.05	.078	1.98
.004	.10	.100	2.54
.005	.13	.103	2.62
.006	.15	.140	3.56
.009	.23	.150	3.81
.010	.25	.250	6.35
.029	.74	.479	12.17
.033	.84	.485	12.32
.076	1.93		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Material - Hardened tool steel.
4. Finish - 32 microinch polished.
5. Diameters to be concentric within .004 T.I.R.

FIGURE 7. Simulated size # 20 socket contact for maintenance aging test (see 4.6.4).

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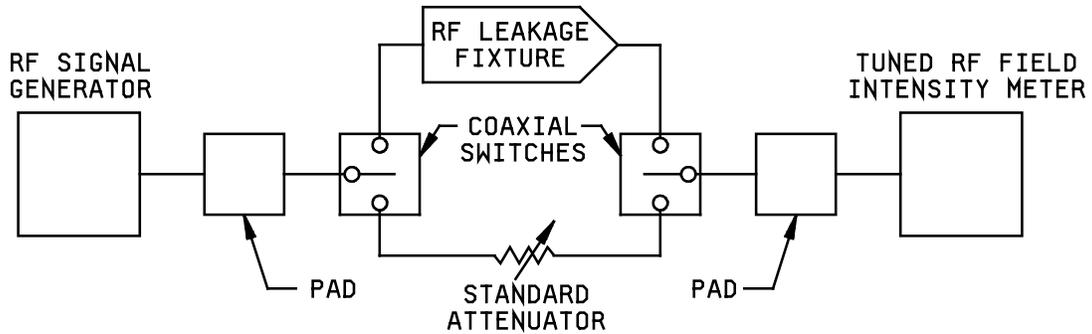


FIGURE 8. Test system for RFI leakage test (see 4.6.24).

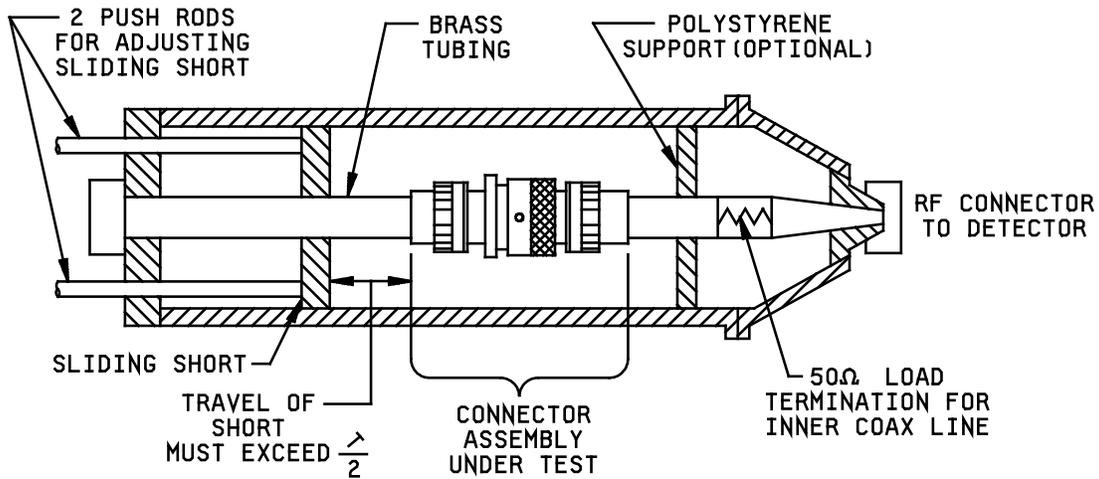


FIGURE 9. RFI leakage test fixture (see 4.6.24).

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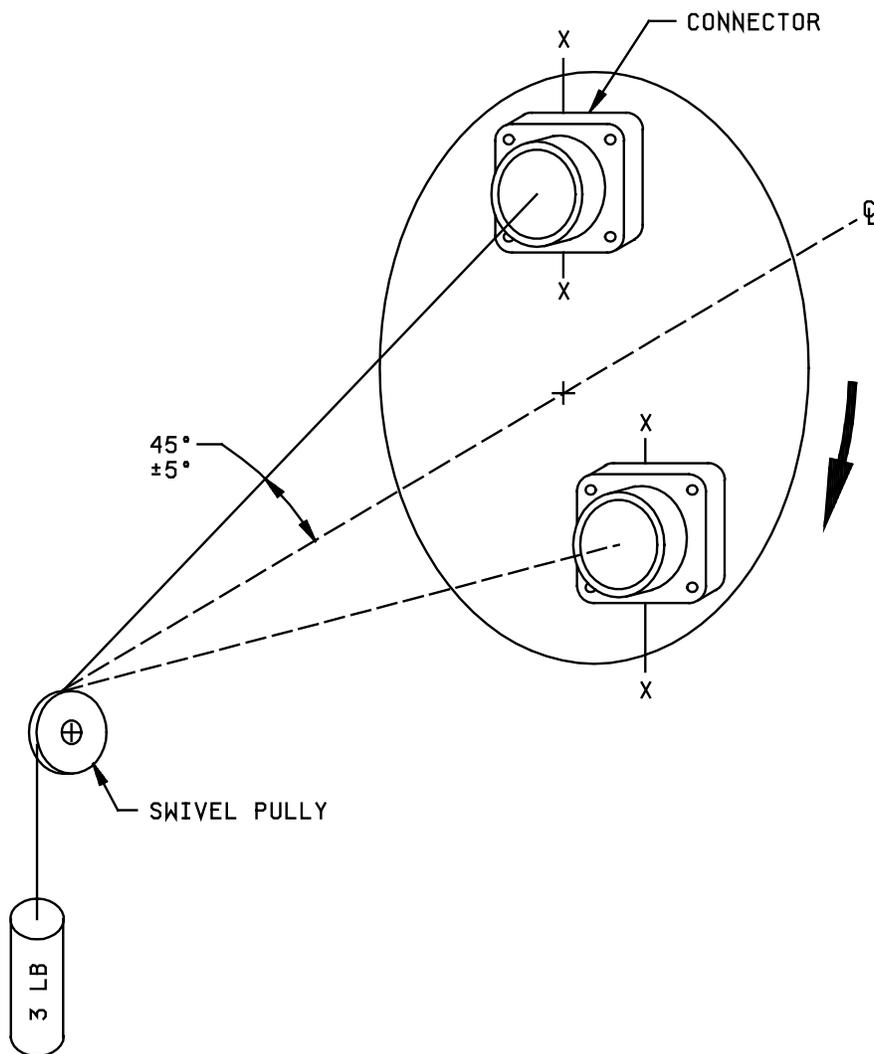


FIGURE 10. Contact walk-out test setup (see [4.6.28](#)).

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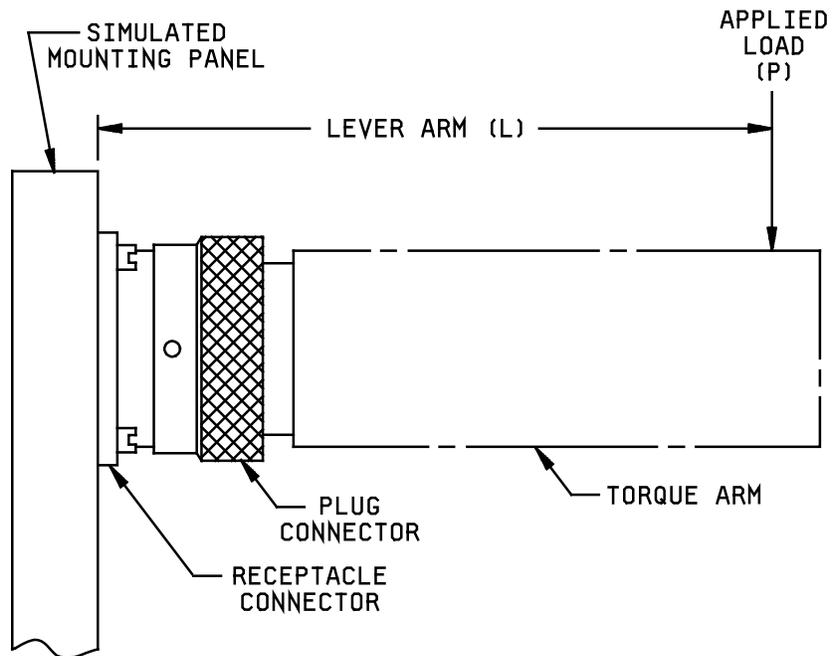
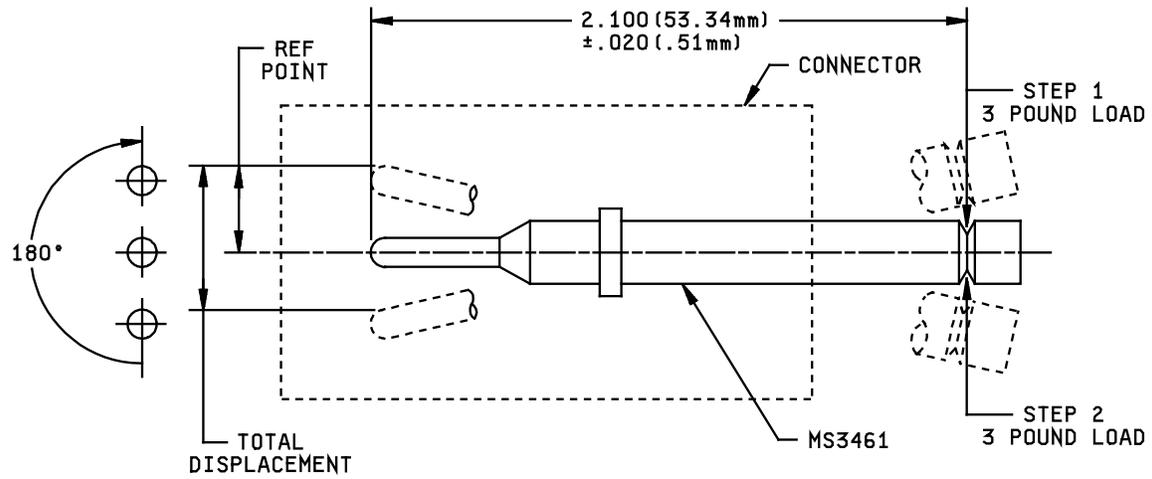


FIGURE 11. External bending moment test setup (see [4.6.30](#)).

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Steps:

1. Apply load to determine reference point.
2. Apply load in opposite direction (180°) and measure total deflection.

FIGURE 12. Pin contact stability test (see 4.6.31).

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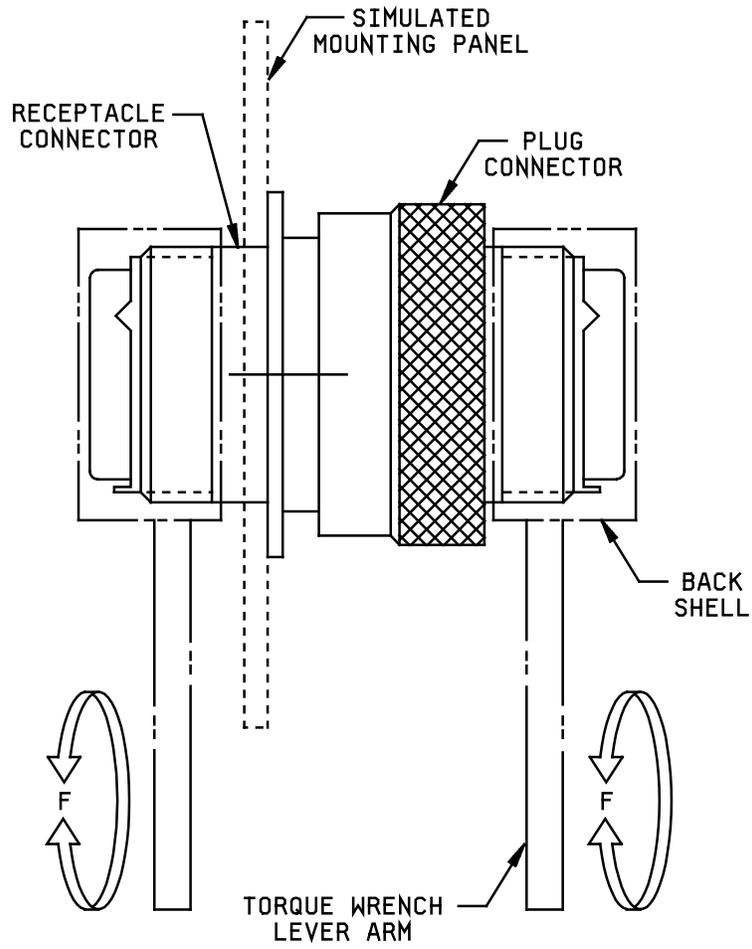


FIGURE 13. Torque test setup (see [4.6.37](#)).

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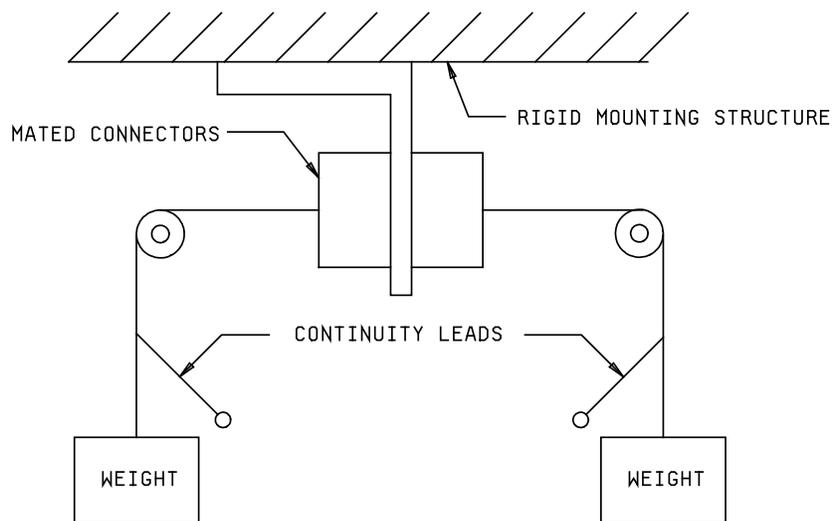


FIGURE 14. Fixture for temperature life with contact loading (orientation optional) (see 4.6.32).

CONCLUDING MATERIAL

Custodians:

Army - CR
 Navy - AS
 Air Force - 85
 DLA - CC

Preparing activity:

DLA - CC

(Project 5935-2007-162)

Review activities:

Army - AR, AV, MI
 Navy - EC, OS
 Air Force - 19, 99

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