AEROSPACE STANDARD

AS50151	REV. C

Issued 2004-06
Revised 2015-07

Superseding AS50151B

Connectors, Electrical, Circular Threaded, AN Type,
General Specification For

FSC 5935

RATIONALE

Revision is required to correct the paragraph reference from 4.7.13 to 4.6.13 and add the established standard procedures for corrosion sample evaluation.

Revision is required to remove classes DT, DZ, WT, and WZ from 1000 hour corrosion requirement and add new subparagraph to dynamic corrosion requirement to correct the DT, DZ, WT, and WZ established corrosion resistance of 500 hours as listed in AIR5919 and to clarify stainless steel class designations for testing. Table 25 has also been updated to reflect corrosion requirements for each individual connector class.

Revision is required to clarify the process for silver plating and clarify the durability requirement for AS34591 connectors.

Revision is required to add a new class X to accommodate a cadmium plating with 1000 hour corrosion resistance capability and to change the current class W plating corrosion resistance rating to 500 hours.

Revision is required to add the number of teeth for each shell size in Table 1 for the 360 degree option noted in Figure 1 and to update the Figure 1 note for the 360 degree option to reference Table 1.

1. SCOPE

1.1 Scope

This specification covers circular threaded electrical connectors with solder or removable crimp contacts (both front and rear release). These connectors are for use in electronic, electrical power, and control circuits (see 6.1).

1.2 Classification

Electrical connectors covered by this specification are divided into the following classes, series, and receptacle styles.

1.2.1 Classes

The classes of electrical connectors are as follows:

Class A - Solid shell solder contact connectors

Class B - Split shell solder contact connectors

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SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS50151C

Class C - Solder contact connectors for use with pressurized equipment

Class D - Crimp and solder contact connectors for use in high-impact shock conditions

Class DS - Crimp and solder contact connectors for use in high-impact shock conditions, stainless steel

Class DJ - Crimp contact connectors with backshell connector assembly for use in high impact shock conditions

Class DJS - Crimp contact connectors with backshell connector assembly for use in high impact shock conditions, stainless steel

Class DT - Crimp and solder contact connectors for use in high-impact shock conditions, with nickel fluorocarbon polymer additives over a suitable underplate finish

Class DY - Crimp and solder contact connectors for use in high-impact shock conditions, with pure dense electrodeposited aluminum finish

Class DZ - Crimp and solder contact connectors for use in high-impact shock conditions, with zinc nickel over suitable underplate finish

Class E - Environment resistant solder contact connectors

Class F - Environment resistant solder contact connectors, with clamp

Class H - Hermetic solder contact connectors

Class HS - Hermetic solder contact connectors, stainless steel with passivated finish

Class K - Crimp and solder firewall connectors

Class KS - Crimp and solder firewall connectors, stainless steel with passivated finish

Class KT - Crimp and solder firewall connectors, ferrous alloy with cadmium olive drab over nickel finish

Class L - Fluid resistant crimp contact connectors

Class LS - Fluid resistant crimp contact connectors, stainless steel with passivated finish

Class P - Environment resistant potted solder contact connectors

Class R - Crimp and solder contact connector with grommet seal without clamp

Class U - Fluid resistant crimp contact connectors

Class W - General purpose crimp contact connectors (500 hour corrosion resistance requirement)

Class WT - General purpose crimp contact connectors, with nickel fluorocarbon polymer additives over a suitable underplate finish

Class WY - General purpose crimp contact connectors, with pure dense electrodeposited aluminum finish

Class WZ - General purpose crimp contact connectors, with zinc nickel over suitable underplate finish

Class X - General purpose crimp contact connectors (1000 hour corrosion resistance requirement)

1.2.2 Series

The series of electrical connectors are as follows:

Series I - Solder contact connectors

Series II - Front release, crimp contact connectors

Series III - Rear release, crimp contact connectors

Series IV - Connector accessories

1.2.3 Receptacle Styles

The receptacle styles of electrical connectors are as follows:

Flange (box or wall)
Jam nut
Cable connecting
Solder mounting

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 General

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

2.2 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS-QQ-P-416 Plating, Cadmium (Electrodeposited)

AMS-QQ-S-763 Steel, Corrosion Resistant, Bars, Wire, Shapes, and Forgings

AMS2454 Plating, Electroless Nickel, Codeposited with Polytetrafluoroethylene (PTFE)

AIR1351 Manufacturers' Identification of Aerospace Electrical and Electronic Wiring Devices and Accessories

AS22759 Wire, Electrical, Fluoropolymer-Insulated, Copper or Copper Alloy

AS31091 Boots, Heat-Shrinkable, Strain-Relief, Straight

AS31551 Connector, Electric, Rear Accessory Design Standard

AS31971 Gage Pin for Socket Contact Engagement Test

AS34021 Connector, Receptacle, Electric, Box Mounting, Front Release, Crimp Contact, AN Type

AS34121 Connectors, Receptacle, Electric, Wall Mounting, Front Release, Crimp Contact, AN Type - with Accessory Threads

AS34591 Connector, Plug, Electrical, Self-Locking, Coupling Nut, Rear Release, Crimp Contact, AN Type

AS39029 Contacts, Electrical Connector, General Specification For

AS39029/29 Contacts, Electrical Connector, Pin, Crimp Removable (For AS50151 Series, AS34501 and MIL-DTL-83723 Series 2 Connectors)

AS39029/30 Contacts, Electrical Connector, Socket, Crimp Removable (For AS50151 AS345XX Series and MIL-DTL-83723 Series II Connectors)

AS39029/44 Contacts, Electrical Connector, Pin, Crimp Removable (For AS50151 Series AS34001 Connectors)

AS39029/45 Contacts, Electrical Connector, Socket, Crimp Removable (For AS50151 Series AS34001 Connectors)

AS39029/112 Electrical Connector, Contact Bushing, Wire Barrel

AS85049 Connector Accessories, Electrical, General Specification For

AS85049/11 Connector Accessories, Electrical, Backshell, Environmental, Cable Sealing, Straight, Category 1A (For AS50151 Crimp, MIL-DTL-26482 Series 2, AS81703 Series 3, and MIL-DTL-83723 Series III Connectors)

AS85049/52 Connector Accessories, Electrical, Strain Relief, Nonenvironmental, Self-Locking and Non-Self-Locking, Straight, Category 4B (For AS50151 Crimp, MIL-DTL-26482 Series 2, AS81703 Series 3, and MIL-DTL-81723 Series III Connectors)

2.2.1 Connectors, Solder Contact*

AS25183 Connector, Plug, Electric, Potting Seal, Solder Contact, AN Type

AS31001 Connector, Receptacle, Electric, Wall Mounting, Solder Contacts, AN Type

AS31011 Connector, Receptacle, Electric, Cable Connecting, Solder Contacts, AN Type

AS31021 Connector, Receptacle, Electric, Box Mounting, Solder Contacts, AN Type

AS31031 Connector, Receptacle, Electric, Potting Seal, Solder Contact, AN Type

AS31061 Connector, Plug, Electric, Straight, Solder Contacts, AN Type

AS31071 Connector, Plug, Electric, Quick Disconnect

AS31081 Connectors, Plug, Electric, Solder Contact, 90 Degree, AN Type

AS31421 Connectors, Receptacle, Electrical, Box Mounting, Solder Contact, Hermetic, AN Type

AS34361 Connector, Plug, Electric, Solder Contact, Utility

AS34411 Connector, Plug, Electric, Utility

AS35071 Connector, Plug, Electric, Solder Contact, Quick Disconnect, Utility

2.2.2 Connectors, Crimp Contact, Front Release*

AS34001 Connectors, Receptacle, Electric, Wall Mounting, Front Release, Crimp Contact, AN Type

AS34011 Connectors, Receptacle, Electric, Cable Connecting, Front Release, Crimp Contact, AN Type

AS34021 Connector, Receptacle, Electric, Box Mounting, Front Release, Crimp Contact, AN Type

AS34041 Connectors, Receptacle, Electric, Jam Nut Mounting, Front Release, Crimp Contact, AN Type

AS34061 Connectors, Plug, Electric, Front Release, Crimp Contact, AN Type

AS34081 Connectors, Plug, Electric, 90 Degree Assembly, Crimp Contact, AN Type

AS34091 Connectors, Plug, Electric, 45 Degrees Assembly, Crimp Contact, AN Type

AS34121 Connectors, Receptacle, Electric, Wall Mounting, Front Release, Crimp Contact, AN Type - With Accessory Threads

2.2.3 Connectors, Crimp Contact, Rear Release*

AS34501 Connectors, Receptacle, Electrical, Wall Mounting, Rear Release, Crimp Contact, AN Type

AS34511 Connectors, Receptacle, Electric, Cable Connecting, Rear Release, Crimp Contact, AN Type

AS34521 Connector, Receptacle, Electric, Box Mounting, Rear Release, Crimp Contact, AN Type

AS34541 Connectors, Receptacle, Electrical, Jam Nut Mounting, Rear Release, Crimp Contact, AN Type

AS34561 Connectors, Plug, Electrical, Rear Release, Crimp Contact, AN Type

2.2.4 Connector Accessories

AS25042* Cover, Electrical AS50151 Connector, Plug, AN Type

AS25043* Cover, Electrical AS50151 Connector, Receptacle, AN Type

AS31051* Connector, Receptacle, Electric, Dummy Stowage

AS85049/138 Connector Accessories, Electrical, Cap, Dust, Plastic, Category 9

* AS50151 detail specification

2.3 U.S. Government Publications

Copies of these documents are available online at http://quicksearch.dla.mil.

2.3.1 Specifications and Standards

The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, these documents are listed in the Department of Defense ASSIST database: http://quicksearch.dla.mil/.

2.3.1.1 Specifications

2.3.1.1.1 Federal

L-P-410 Plastic, Polyamide (Nylon), Rigid, Rods, Tubes, Flats, Molded and Cast Parts

2.3.1.1.2 Department of Defense

MIL-S-901 Shock Tests H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for

MIL-DTL-915 Cable, Electrical, for Shipboard Use, General Specification for

MIL-PRF-5606 Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance

MIL-S-7742 Screw Threads, Standard, Optimum Selected Series: General Specification for

MIL-PRF-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

MIL-PRF-8516 Sealing Compound, Synthetic Rubber, Electric Connectors and Electric Systems, Chemically Cured

MIL-DTL-16878 Wire, Electrical, Insulated, General Specification for

MIL-DTL-22520 Crimping Tools, Terminal, General Specification for

MIL-PRF-23586 Sealing Compound (With Accelerator), Silicone Rubber, Electrical

MIL-DTL-25038 Wire, Electrical, High Temperature, Fire Resistant, and Flight Critical, General Specification for

MIL-DTL-81381 Wire, Electric, Polyamide-Insulated, Copper or Copper Alloy

MIL-DTL-83488 Coating, Aluminum, High Purity

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-81969/17 Installing and Removal Tools, Connectors, Electrical Contact, Type I, Class 1, Composition C

MIL-I-81969/19 Installing and Removal Tools, Connector, Electrical Contact, Type II, Class 1, Composition C

MS3187 Plug, End Seal, For MIL-DTL-26482, AS50151, AS81703, and MIL-DTL-83723 Electrical Connectors

MS27488 Plug, End Seal, Electrical Connector

MS28900 Packing, Preformed, For Electrical Use

MS33678 Connector, Receptacle, Electric, Integral Mounting

MS33695 Contacts, Video Coaxial Connector

2.3.1.2 Standards

2.3.1.2.1 Federal

FED-STD-H28 Screw-Thread Standards for Federal Services

2.3.1.2.2 Department of Defense

MIL-STD-167-1 Mechanical Vibrations of Shipboard Equipment (Type I-Environmental and Type II-Internally Excited)

MIL-STD-1285 Marking of Electrical and Electronic Parts

MIL-STD-1651 Insert Arrangements for AS50151, MIL-DTL-22992 (Classes C, J, and R), and MIL-DTL-83723 (Series II) Electrical Connectors

2.4 Non-Government Publications

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

2.4.1 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B85 Aluminum-Alloy Die Castings

ASTM A342 Materials, Feebly Magnetic, Permeability of

ASTM B488 Gold for Engineering Uses, Electrodeposited Coatings of

ASTM A582 Free-Machining Stainless and Heat Resisting Steel Bars

ASTM B700 Standard Specification for Electrodeposited Silver for Engineering Use

ASTM B733 Metals, Autocatalytic Electroless Nickel-Phosphorus Coating On

ASTM B841 Standard Specification for Electrodeposited Coatings of Zinc Nickel Alloy Deposits

2.4.2 EIA Publications

Available from Electronic Component Association (ECA), 2500 Wilson Boulevard, Arlington, VA 22201-3834, Tel: 703-907-7500, www.eia.org.

EIA-364-02 Air Leakage Test Procedure for Electrical Connectors

EIA-364-03 Altitude Immersion Test Procedure for Electrical Connectors

EIA-364-05 Contact Insertion, Release and Removal Force Test Procedure for Electrical Connectors

EIA-364-06 Contact Resistance Test Procedures for Electrical Connectors

EIA-364-09 Durability Test Procedure for Electrical Connectors and Contacts

EIA-364-010 Fluid Immersion Test Procedure for Electrical Connectors

EIA-364-020 Withstanding Voltage Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts

EIA-364-021 Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts

EIA-364-025 Probe Damage Test Procedure for Electrical Connectors

EIA-364-026 Salt Spray Test Procedure for Electrical Connectors, Contact and Sockets

EIA-364-027 Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors

EIA-364-028 Vibration Test Procedure for Electrical Connectors and Sockets

EIA-364-029 Contact Retention Test Procedure for Electrical Connectors

EIA-364-031 Humidity Test Procedure for Electrical Connectors and Sockets

EIA-364-032 Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets

EIA-364-035 Insert Retention Test Procedure for Electrical Connectors

EIA-364-037 Contact Engagement and Separation Force Test Procedure for Electrical Connectors

EIA-364-045 Firewall Flame Test Procedure for Electrical Connectors

EIA-364-083 Shell To Shell and Shell-To-Bulkhead Resistance Test Procedure for Electrical Connectors

2.4.3 IPC - Association Connecting Electronics Industries Publications

Available from IPC, 3000 Lakeside Drive, 309 S, Bannockburn, IL 60015, Tel: 847-615-7100, www.ipc.org.

J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies

J-STD-006 Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications Requirements For

2.4.4 NCSL Publications

Available from NCSL International, 2995 Wilderness Place, Suite 107, Boulder, CO 80301, Tel: 303-440-3339, www.ncsli.org.

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

2.5 Order of Precedence

In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications, or detail sheets), the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Detail Sheets

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

3.2 Qualification

The connectors furnished under this specification shall be products that are authorized by the qualifying activity (QA) for listing on the applicable qualified products list before contract award (see 4.3 and 6.14).

3.3 Materials

3.3.1 Dissimilar Metals

When dissimilar metals are employed in contact with each other in a connector or in a mated pair of connectors, protection against galvanic corrosion shall be provided (see 6.17).

3.3.2 Nonmagnetic Materials (except class H and K connectors)

All parts shall be made of materials which are classed as nonmagnetic except for classes H and K connectors (see 1.2 and 3.6).

3.3.3 Contacts

3.3.3.1 Contact Materials

Contacts shall be made of conductive materials. Thermocouple contacts shall be made of a material compatible with the thermocouple wire to which attachment is intended (see 6.16).

3.3.3.2 Contact Plating

3.3.3.2.1 Contact Plating (solder type, except class H)

Contacts shall be silver plated in accordance with ASTM B700 or gold plated in accordance with ASTM B488 over silver plating in accordance with ASTM B700, any type or grade. The resultant minimum thickness of contact plating shall be 100 µin. Accessory members of the socket contacts need not be plated but shall meet the requirements for dissimilar metals specified in 3.3.1.

3.3.3.2.2 Contact Plating (class H connectors)

Contacts shall be gold plated to a thickness of not less than 50 µin in accordance with ASTM B488, type 3, code C, over an suitable underplate. A silver underplate shall not be used and must be certified in the submittal for qualification.

3.3.3.2.3 Contact Plating (thermocouple)

Thermocouple contacts shall be cadmium plated in accordance with AMS-QQ-P-416, or otherwise protected from corrosion. Accessory members of the socket contacts need not be plated, but shall meet the requirements for dissimilar metals (see 3.3.1).

3.3.4 Dielectric Materials

3.3.4.1 Insert and Grommet

Insert and grommet materials shall be dielectric having hardness, electrical, and mechanical characteristics capable of meeting the requirements of this specification.

3.3.4.1.1 Connectors (except solder contact class A, B, C, H, K, and P)

The mating faces of pin inserts of solder contact connectors shall be a resilient material within a Shore A Durometer range of 60 to 85. On crimp contact front release connectors and rear release style P connectors, the Shore A Durometer range shall be 35 to 85 with a thickness of not less than 0.090 inch.

3.3.4.1.2 Class H

The hermetic sealing of class H connectors shall be accomplished by the use of vitreous material. The mating faces of pin inserts shall be resilient material within a Shore A Durometer range of 35 to 55.

3.3.5 Potting Molds

Potting molds shall be made of polyamide conforming to L-P-410. The molds shall incorporate a means for attachment to the connector and shall accept and bond to MIL-PRF-8516 or MIL-PRF-23586 potting material without treatment by the user.

3.3.6 Shells, Coupling Rings, and Backshells

a. Connector shells and coupling rings, except for class D, H, and K, shall be made of aluminum alloys. Die castings, if used, shall conform to ASTM B85, composition number GPASC84B.

b. Class D shells (no material designator) and coupling rings shall be made of a heat treated wrought aluminum alloy meeting the requirements of this specification.

c. Class H and K shells and coupling rings shall be made of ferrous alloy.

d. Class H, K, L, and U shells and coupling rings shall be made of nonmagnetic corrosion-resistant steel in accordance with AMS-QQ-S-763, 300 series, or ASTM A582, type XM-1 or 303. Class D and DJ shells (material designator “S”) and coupling rings shall be made of nonmagnetic corrosion resistant steel in accordance with AMS-QQ-S-763, series 316 class.

e. Backshells shall be fabricated and finished with the same materials as the connectors.

3.3.6.1 Finish

The resultant finish on all connectors shall be electrically conductive.

a. The finish of class A, B, C, E, F, P, and R connectors with aluminum alloy shells, coupling rings and external screws shall be cadmium plated in accordance with AMS-QQ-P-416, type II, and class 3. A preliminary plating of another metal is permissible. The resultant finish on cadmium plate connectors shall be olive drab (light to dark). Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

b. The finish of class D connectors with wrought aluminum shells and coupling rings, class W and X connectors with aluminum alloy shells and coupling rings, class DJ connectors with backshell assembly, and external screws for these classes shall be cadmium plated in accordance with AMS-QQ-P-416, type II, and class 3 over nickel. The resultant finish on cadmium plated connectors shall be olive drab (light to dark). Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

c. The finish of class H connectors with ferrous alloy shells and coupling rings, series II and series III class K connectors with ferrous alloy shells and coupling rings, and external screws shall be electroless nickel in accordance with ASTM B733, class 3 or 4. A preliminary plating of another metal is permissible. Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

d. The finish of series I class K connectors with ferrous alloy shells and coupling rings, series II and III class KT connectors with ferrous alloy shells and coupling rings, and external screws for these classes shall be cadmium plate in accordance with AMS-QQ-P-416, type II, and class 3. The resultant finish on cadmium plated connectors shall be olive drab (light to dark). Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

e. The finish of class DS connectors with corrosion-resistant steel shells and coupling rings shall be cadmium plate in accordance with AMS-QQ-P-416, type II, class 3, and color-black. All other classes of connectors with corrosion-resistant steel shells and coupling rings shall be passivated.

f. The finish of class HT connectors with ferrous alloy shells and coupling rings, and external screws shall be electrically conductive fused tin. Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

g. The finish of class L and U connectors with aluminum alloy shells and coupling rings, and external screws shall be electroless nickel in accordance with ASTM B733, class 3 or 4. Stainless steel in accordance with AMS-QQ-S-763 is an acceptable alternative for external screws.

h. The finish for class DT and WT connectors with aluminum alloy shells and coupling rings shall be nickel fluorocarbon polymer in accordance with AMS2454 over a suitable underplate.

i. The finish for class DY and WY connectors with aluminum alloy shells and coupling rings shall be pure dense electrodeposited aluminum in accordance with MIL-DTL-83488, type II. Final finish shall be non-reflective and electrically conductive.

j. The finish for class DZ and WZ connectors with aluminum alloy shells and coupling rings shall be zinc nickel in accordance with ASTM B841 over suitable underplate. Final finish shall be black and electrically conductive.

3.4 Design and Construction

Connectors and accessories shall be designed and constructed to withstand handling incident to installation and maintenance in service. The connectors and accessories shall conform to the following:

Crimp contact connectors, back end configuration except AS34021, AS34121, AS34521, AS34021, and AS34121	Figure 1
Connector, front release, series II interface dimensions	Figures 2 and 3
Connector, rear release series III, and hermetic, interface dimensions	Figure 4, 5, and 6
Connector solder contact (pin and socket) series I configuration	Figure 7
Accessories to be used with series II and series III connectors	AS85049

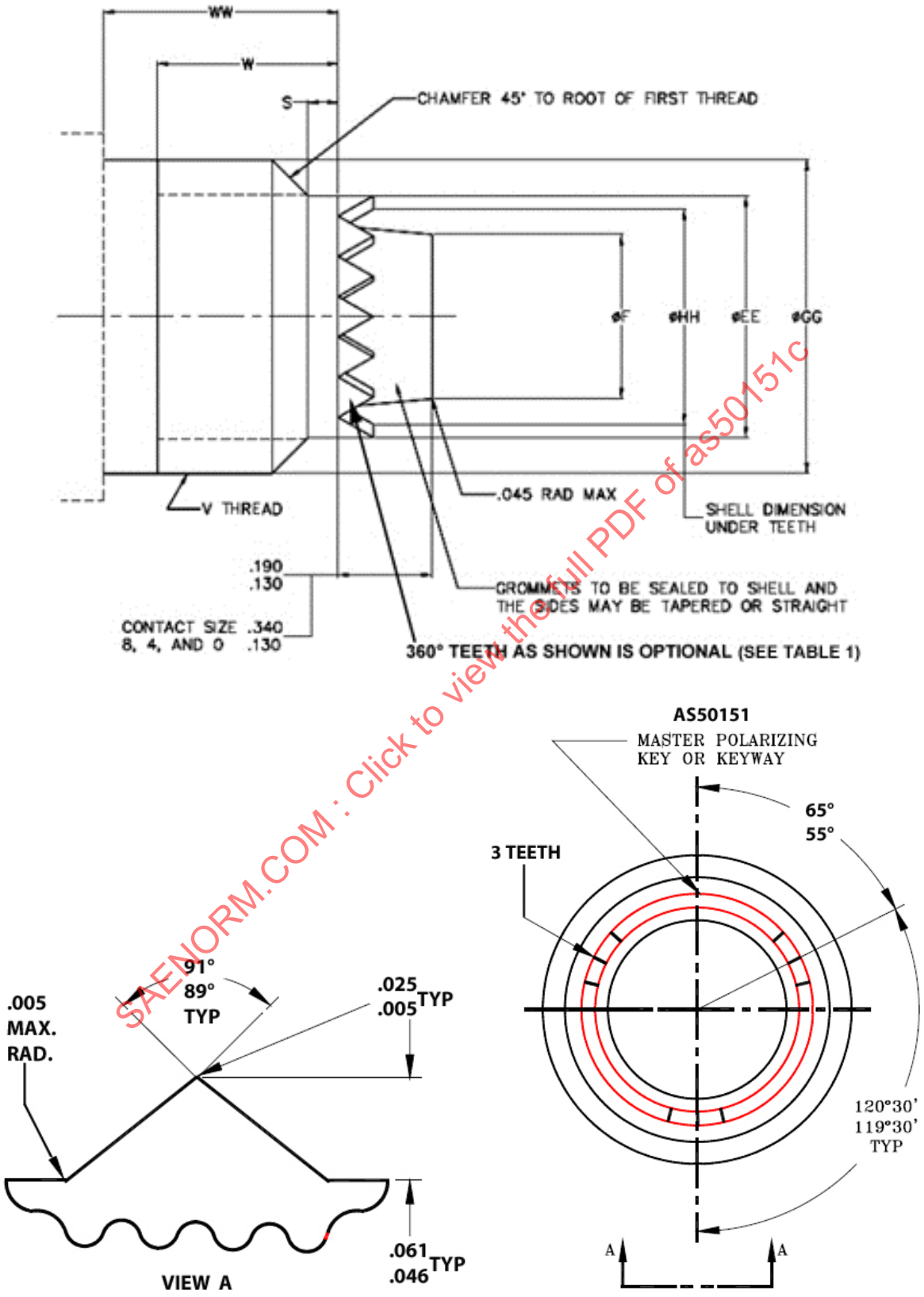


Figure 1 - Crimp contact connector back end configuration except AS34021, AS34121, and AS34521

Table 1 - Figure 1 dimensions

SHELL SIZE	V THREAD CLASS 2A	EE DIA.	F DIA. 1/	GG +0.000 -0.010	HH ±0.005	S +0.005	W MIN. PERF. THREAD	WW MIN. 2/	# OF TEETH (OPTIONAL 360 DEGREE FIGURE 1 DESIGN)
8S	.500-20 UNF	0.426/0.419	0.275/0.305	0.500	0.368	0.065	0.290	0.310	12
10S, 10SL	.625-24 UNEF	0.562/0.555	0.380/0.405	0.625	0.502				15
12S, 12	.750-20 UNEF	0.679/0.672	0.516/0.549	0.750	0.618				21
14, 14S	.875-20 UNEF	0.804/0.797	0.590/0.665	0.875	0.743				24
16, 16S	1.000-20 UNEF	0.929/0.922	0.715/0.790	1.000	0.868				30
18	1.0625-18 UNEF	0.984/0.977	0.794/0.869	1.062	0.924				33
20	1.1875-18 UNEF	1.109/1.102	0.919/0.994	1.187	1.049				36
22	1.3125-18 UNEF	1.234/1.227	1.044/1.119	1.312	1.174				39
24	1.4375-18 UNEF	1.359/1.352	1.159/1.244	1.437	1.299				42
28	1.750-18 UNS	1.613/1.603	1.394/1.465	1.750	1.520	0.095	0.467	0.487	54
32	2.000-18 UNS	1.863/1.853	1.640/1.715	2.000	1.770				63
36	2.250-16 UN	2.113/2.103	1.855/1.930	2.250	1.985				72
40	2.500-16 UN	2.363/2.353	2.070/2.145	2.500	2.200				81
44	2.750-16 UN	2.613/2.603	2.325/2.400	2.750	2.455				87
48	3.000-16 UN	2.858/2.848	2.575/2.650	3.000	2.705				96

1/ Diameter of any exposed portion of the grommet.
2/ Length to accommodate accessories.

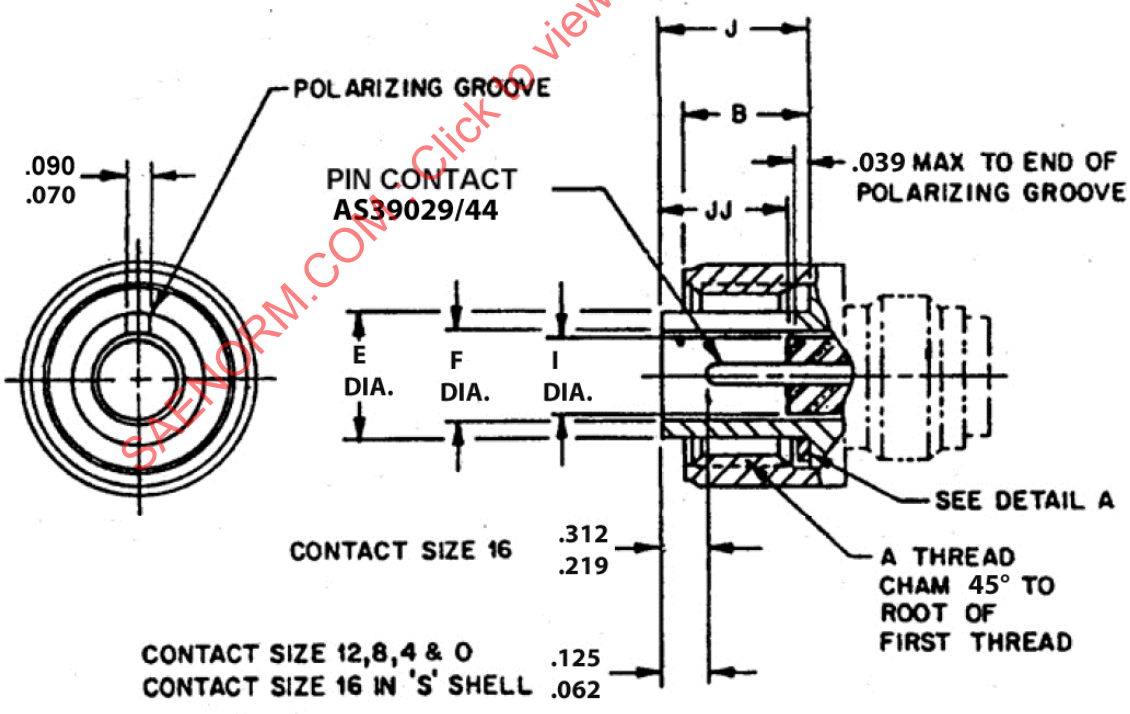


Figure 2 - Connector, plug, front release, series II, interface dimensions

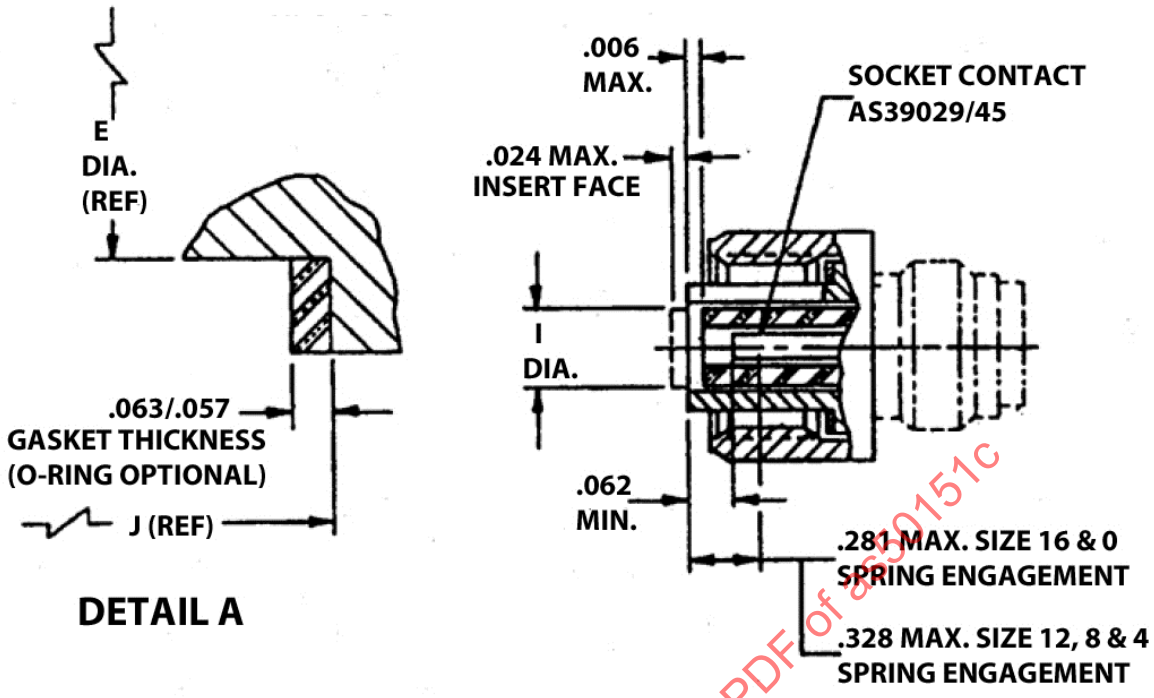


Figure 2 - Connector, plug, front release, series II, interface dimensions (continued)

Table 2 - Figure 2 dimensions

SHELL SIZE	A THREAD CLASS 2B	B DIA. +0.000 -0.062	E DIA. 1/ +0.000 -0.010	F DIA. 1/ +0.015 -0.000	I +0.000 -0.020	J ±0.005	JJ ±0.015
8S	.500-28 UNEF	0.414	0.365	0.252	0.250	0.570	0.501
10S	.625-24 UNEF		0.440	0.323	0.320		
10SL			0.446	0.398	0.397		
12S	.750-20 UNEF		0.555	0.450	0.448		
12		0.664				0.757	0.689
14S	.875-20 UNEF	0.414	0.675	0.526	0.525	0.570	0.501
14		0.664				0.757	0.689
16S	1.000-20 UNEF	0.414	0.805	0.651	0.650	0.570	0.501
16		0.664				0.757	0.689
18	1.125-18 UNEF		0.930	0.776	0.770		
20	1.250-18 UNEF		1.050	0.932	0.925		
22	1.375-18 UNEF		1.175	1.026	1.020		
24	1.500-18 UNEF		1.300	1.151	1.145		
28	1.750-18 UNS		1.520	1.370	1.365		
32	2.000-18 UNS		1.770	1.620	1.615		
36	2.250-16 UN		1.980	1.838	1.830		
40	2.500-16 UN		2.230	2.057	2.045		
44	2.750-16 UN		2.485	2.310	2.300		
48	3.000-16 UN		2.735	2.560	2.550		

1/ On shell size 10SL “E” diameter tolerance is +0.000/-0.006 and “F” diameter tolerance is +0.006/-0.000.

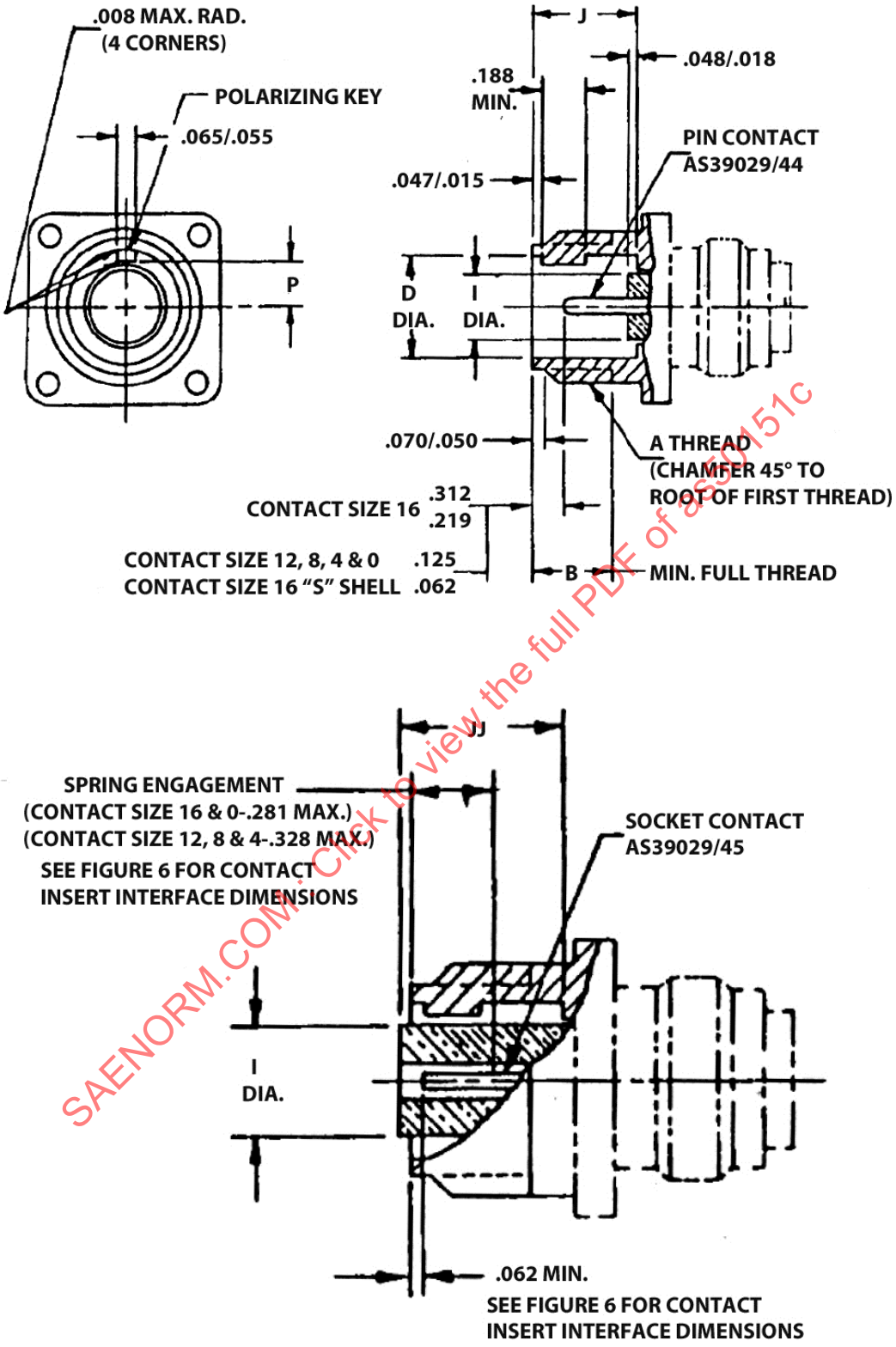
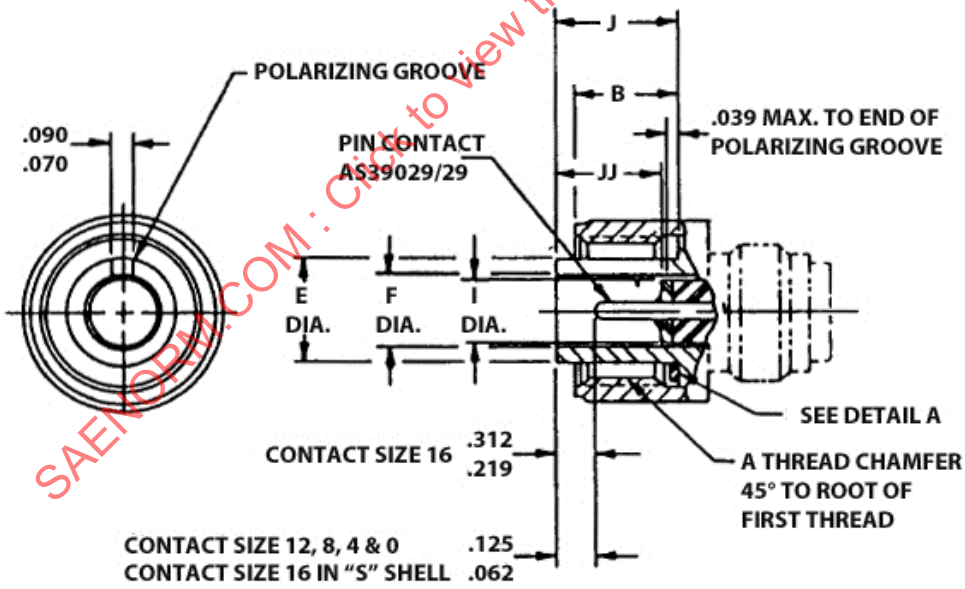


Figure 3 - Connector, receptacle, front release, series II interface dimensions

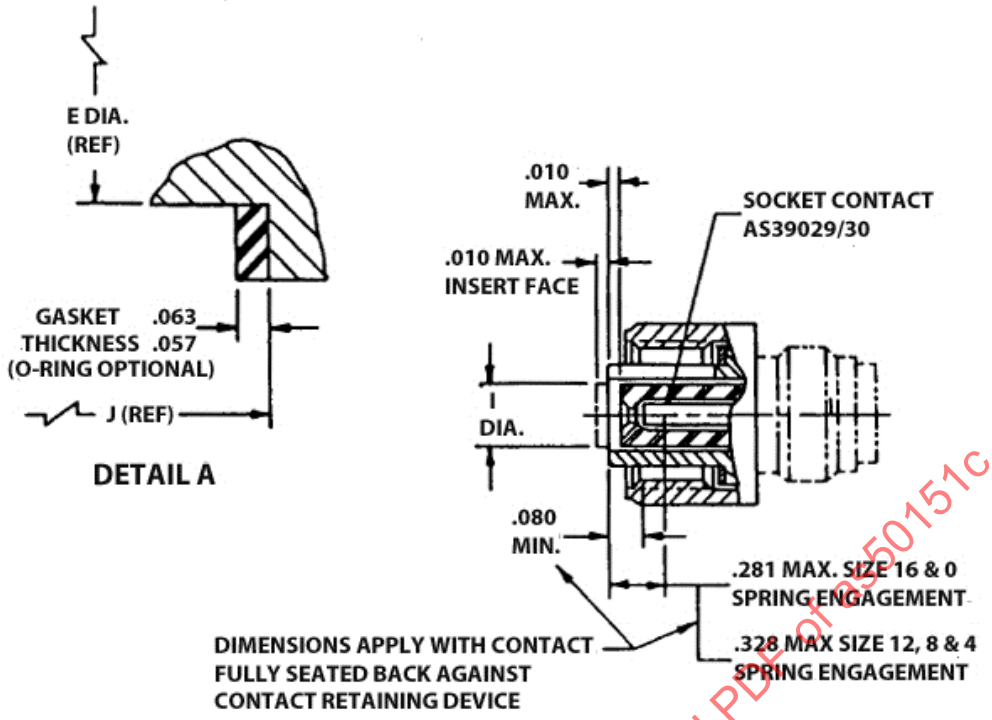
Table 3 - Figure 3 dimensions

SHELL SIZE	A THREAD CLASS 2A	B MIN. THREAD	D DIA. +0.015 -0.000	I DIA. +0.000 -0.020	J ±0.005	JJ ±0.015	P +0.010 -0.000
8S	.500-28 UNEF	0.375	0.370	0.250	0.536	0.543	0.130
10S	.625-24 UNEF		0.448	0.320			0.165
10SL				0.397			
12S	.750-20 UNEF		0.558	0.448	0.536	0.543	0.224
12		0.625			0.724	0.731	
14S	.875-20 UNEF	0.375	0.678	0.525	0.536	0.543	0.263
14		0.625			0.724	0.731	
16S	1.000-20 UNEF	0.375	0.808	0.650	0.536	0.543	0.325
16		0.625			0.724	0.731	
18	1.125-18 UNEF		0.933	0.770	0.724	0.731	0.385
20	1.250-18 UNEF		1.053	0.925			0.463
22	1.375-18 UNEF		1.178	1.020			0.510
24	1.500-18 UNEF		1.303	1.145			0.573
28	1.750-18 UNS		1.523	1.365			0.683
32	2.000-18 UNS		1.773	1.615			0.808
36	2.250-16 UN		1.985	1.830			0.915
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



Note - See Figure 6 for contact insert interface dimensions

Figure 4 - Connector, plug, rear release, series III, interface dimensions



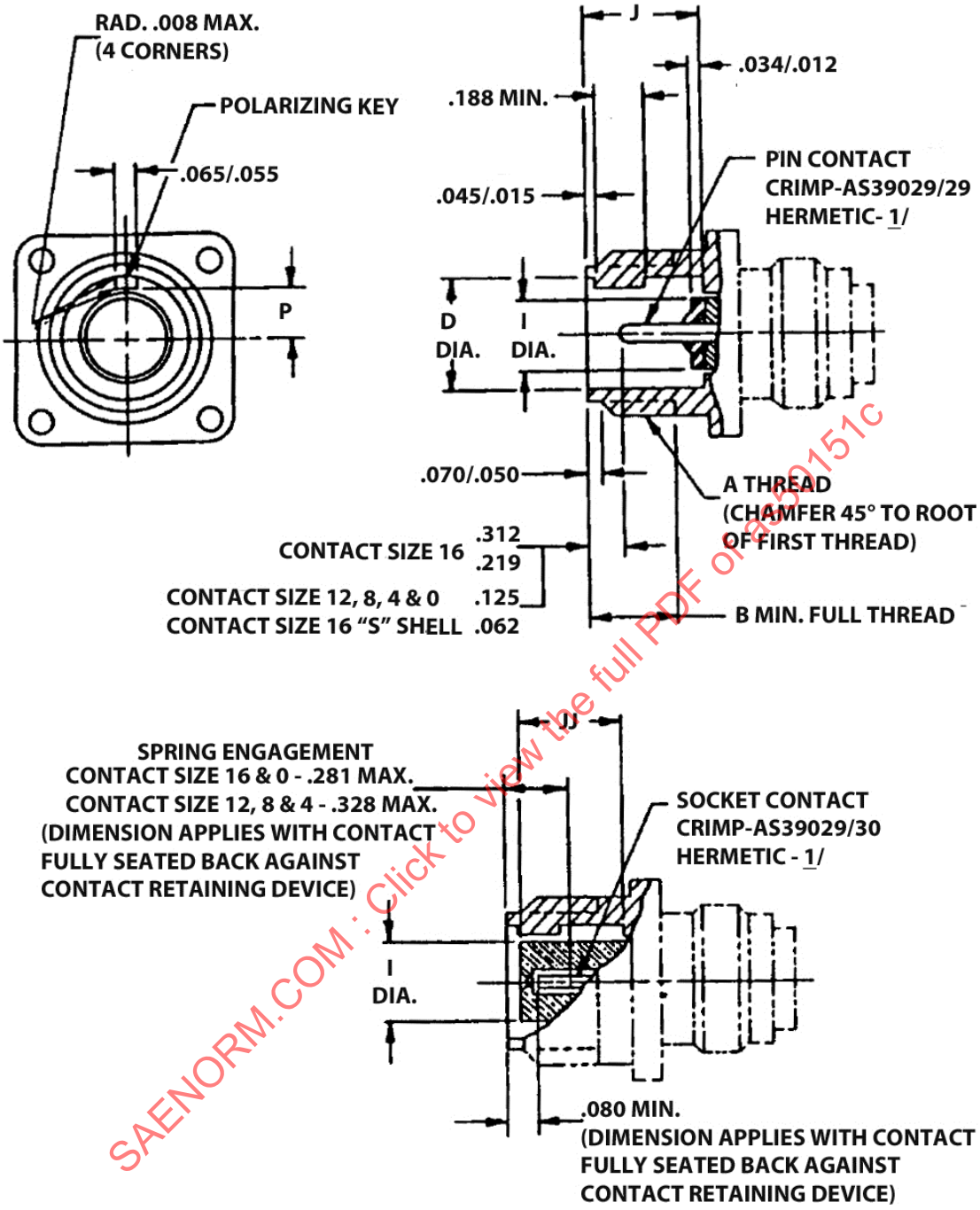
Note - See Figure 6 for contact insert interface dimensions

Figure 4 - Connector, plug, rear release, series III, interface dimensions (continued)

Table 4 - Figure 4 dimensions

SHELL SIZE	A THREAD CLASS 2B	B DIA. +0.000 -0.062	E DIA. 1/ +0.000 -0.010	F DIA. 1/ +0.015 -0.000	I +0.000 -0.020	J ±0.005	JJ ±0.015
8S	.500-28 UNEF	0.414	0.365	0.252	0.250	0.570	0.510
10S	.625-24 UNEF		0.440	0.323	0.320		
10SL			0.446	0.398	0.397		
12S	.750-20 UNEF		0.555	0.450	0.448		
12		0.664				0.757	0.698
14S	.875-20 UNEF	0.414	0.675	0.526	0.525	0.570	0.510
14		0.664				0.757	0.698
16S	1.000-20 UNEF	0.414	0.805	0.651	0.650	0.570	0.501
16		0.664				0.757	0.698
18	1.125-18 UNEF		0.930	0.776	0.770		
20	1.250-18 UNEF		1.050	0.932	0.925		
22	1.375-18 UNEF		1.175	1.026	1.020		
24	1.500-18 UNEF		1.300	1.151	1.145		
28	1.750-18 UNS		1.520	1.370	1.365		
32	2.000-18 UNS		1.770	1.620	1.615		
36	2.250-16 UN		1.980	1.838	1.830		
40	2.500-16 UN		2.230	2.057	2.045		
44	2.750-16 UN		2.485	2.310	2.300		
48	3.000-16 UN		2.735	2.560	2.550		

1/ On shell size 10SL “E” diameter tolerance is +0.000/-0.006 and “F” diameter tolerance is +0.006/-0.000.



1/ Hermetic connector contacts shall be fixed solder type contacts with mating end conforming to Figure 7 socket or pin detail as required.

Note – See Figure 6 for contact insert interface dimensions

Figure 5 - Connector, receptacle, rear release, series III and hermetic interface dimensions

Table 5 - Figure 5 dimensions

SHELL SIZE	A THREAD CLASS 2A	B MIN. THREAD	D DIA. +0.015 -0.000	I DIA. +0.000 -0.020	J ±0.005	JJ ±0.015	P +0.010 -0.000
8S	.500-28 UNEF	0.375	0.370	0.250	0.536	0.533	0.130
10S	.625-24 UNEF		0.448	0.320			0.165
10SL				0.397			
12S	.750-20 UNEF		0.558	0.448	0.536	0.533	0.224
12		0.625			0.724	0.731	
14S	.875-20 UNEF	0.375	0.678	0.525	0.536	0.533	0.263
14		0.625			0.724	0.721	
16S	1.000-20 UNEF	0.375	0.808	0.650	0.536	0.533	0.325
16		0.625			0.724	0.721	
18	1.125-18 UNEF		0.933	0.770	0.724	0.721	0.385
20	1.250-18 UNEF		1.053	0.925			0.463
22	1.375-18 UNEF		1.178	1.020			0.510
24	1.500-18 UNEF		1.303	1.145			0.573
28	1.750-18 UNS		1.523	1.365			0.683
32	2.000-18 UNS		1.773	1.615			0.808
36	2.250-16 UN		1.985	1.830			0.915
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

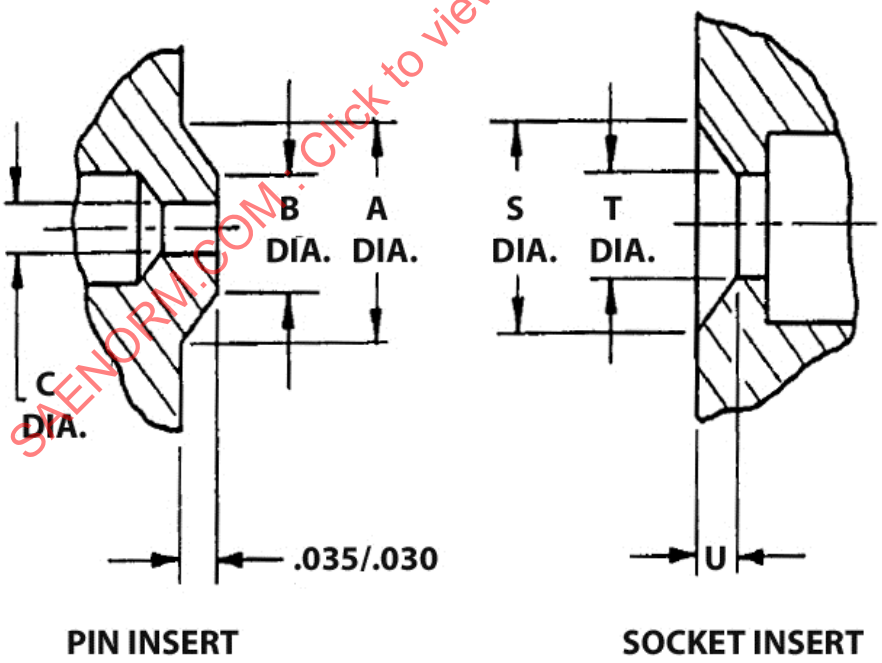
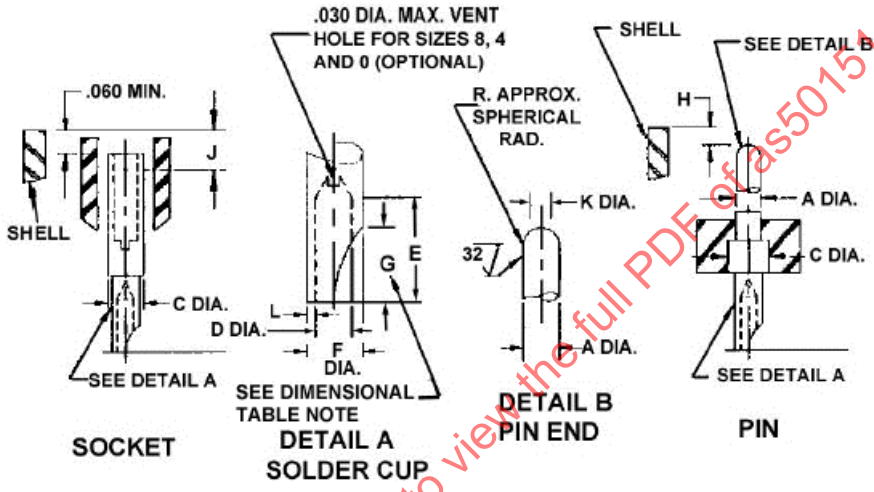


Figure 6 - Connector, rear release, series III, insert entry dimensions

Table 6 - Figure 6 insert entry dimensions

CONTACT SIZE	A DIA.	B DIA.	C DIA.	S DIA.	T DIA.	U
16	0.150 0.140	0.135 0.131	0.061 0.058	0.140 0.130	0.079 0.072	0.035 0.031
12	0.208 0.198	0.188 0.184	0.093 0.090	0.204 0.193	0.111 0.104	0.040 0.035
8	0.310 0.300	0.270 0.265	0.141 0.138	0.306 0.295	0.159 0.152	0.040 0.035
4	0.396 0.386	0.355 0.350	0.224 0.221	0.392 0.381	0.262 0.234	0.033 0.027
0	0.578 0.568	0.537 0.533	0.356 0.353	0.573 0.563	0.414 0.366	0.033 0.027



CONTACT SIZE	A ±0.001 DIA. 1/	C MAX. DIA. 2/	D MIN. DIA.	E +0.063 -0.003	F DIA. MAX.	H PLUG MIN.	H RECPT MAX.	J MAX. PLUG AND RECPT 3/	K DIA. OF FLAT	L MIN.
16	0.0625	0.127	0.069	0.250	0.116	0.250	0.312	0.281	0.032 MAX	0.007
16S 4/	0.0625	0.127	0.069	0.250	0.116	0.062	0.125		0.032 MAX	0.007
12	0.094	0.190	0.112	0.375	0.154			0.375	0.032 MAX	0.009
8	0.142	0.310	0.205	0.500	0.268				0.032 MAX	0.017
4	0.225	0.441	0.328	0.625	0.398				0.105 ±0.021	0.021
0	0.357	0.597	0.464	0.625	0.550			0.281	0.237 ±0.021	0.021

1/ Applies after plating.
2/ Used for calculating mechanical spacing between contacts and between contacts and shell.
3/ Represents the distance from the end of the shell to the point at which the mating pin engages the socket contact spring.
4/ Dimensions shown are typical of shell sizes 8S, 10S, 10SL, 12S, 14S, and 16S.

NOTE - "G" diameter max. for sizes 12 and 16 = 2/3 E dimension, radius of cutout optional.
For sizes 0, 4, and 8, cutout is optional.

Figure 7 - Solder contact (pin and socket), series I configuration

3.4.1 Contacts

Contacts shall conform to AS39029 except as otherwise required herein for solder contact connectors. Contacts shall be designed so that neither the pin nor socket contacts are damaged during mating of counterpart connectors. The quantity of crimp contacts required for the connector plus one spare contact for connector arrangements having 26 contacts or less and two spare contacts for arrangements over 26 contacts shall be included in the unit package. No spares shall be supplied with sizes 8, 4, and 0 contacts. For other than direct shipments to the Government, crimp contact connectors are permitted to be ordered without contacts (see 6.2).

3.4.1.1 Solder Contacts

Solder contacts shall conform to Figure 7.

3.4.1.1.1 Mating End

The entering end of socket contacts shall be rounded or chamfered to allow for misalignment of the entering pin. The socket contacts shall provide the spring action for maintaining the contacting pressure between the pin and the socket. Size 12 and 16 socket contacts shall be designed to exclude the entrance of a pin 0.005 inch larger than the allowable maximum diameter of a mating pin. Size 16 contacts shall pass the resistance probe damage test (see 4.6.22). Use of designs for solder type pin and socket contacts sizes 0, 4, and 8 which allow contacts to be readily removable from their inserts for soldering to their conductors is permitted.

3.4.1.1.2 Solder Cups

Solder cups shall be designed so that during soldering no components are damaged and no liquid solder escapes. The solder cups shall be as indicated on Figure 7. The solder cups of sizes 0, 4, and 8 shall be provided with a vent hole or with other provisions to prevent trapping of air during soldering. The interior surface of solder cups for sizes 16 and 12, except thermocouple contacts, shall be completely tinned over 100% of the full circle portion and for at least 50% of the remainder of the solder well area. For sizes 0, 4, and 8 the interiors shall be completely tinned with solder conforming to J-STD-006, composition Sn60 or better commercial grade. If flux is used, flux residues and contaminants shall be completely removed without affecting the components. No excess solder shall be on the exterior of the solder cup.

3.4.1.2 Crimp Contacts

Crimp contacts shall be designed to prevent damage to the contact retention device or sealing member during insertion or removal of the contact. Front release crimp contacts shall conform to AS39029/44 and AS39029/45 and be qualified to AS39029. Rear release contacts shall conform to AS39029/29 and AS39029/30 and be qualified to AS39029.

3.4.1.2.1 Installing and Removal Tools (front release connectors)

The individual contacts shall be positively retained in the connector when installed with the applicable MIL-I-81969/17 contact insertion tool. The individual contacts shall be capable of being removed from the connector when using the applicable MIL-I-81969/19 contact removal tool.

3.4.1.2.2 Installing and Removal Tools (rear release connectors)

The individual contacts shall be positively retained in the connector when installed with the applicable MIL-I-81969/14 contact insertion tool. The individual contacts shall be capable of being removed from the connector when using the applicable qualified MIL-I-81969/14 and /15 contact removal tool.

3.4.2 Insert Design and Construction

Inserts shall be of voidless construction and secured to prevent rotation within the shell.

3.4.2.1 Insert Retention

3.4.2.1.1 Resilient Inserts

All resilient inserts shall be nonremovable from the shell.

3.4.2.1.2 Hard Material Inserts

Hard material inserts for class A and B connectors having provisions for more than one alternate position shall be removable from the shell. However, they shall be retained within the shell when the conduit nut or adapter is removed.

3.4.2.2 Insert Positioning

Inserts shall be installed in the position indicated in the applicable MS sheet. Removable inserts shall be keyed to prevent rotation with respect to the shell. Slots and markings for any of the alternate positions, as well as specific design details, shall be as specified in MIL-STD-1651 (see 6.6.7).

3.4.2.2.1 Crimp Contact Inserts

Crimp contact inserts shall be bonded to and nonremovable from the shell.

3.4.2.3 Inserts for Solder Contact Connectors

Inserts containing nonremovable solder contacts shall not be damaged by the solder process.

3.4.2.4 Inserts for Crimp Contact Connectors

The insert and wire sealing grommet or insulating spacer of crimp contact connectors shall be one integral part and permit the removal and reinsertion of individual contacts without damage to the sealing members.

3.4.2.5 Contact Arrangement

Contacts shall be arranged in accordance with MIL-STD-1651. Except for contacts in hard insert, all solder cup openings, regardless of insert position, shall be oriented at right angles to and facing toward the key or keyway of the shell.

3.4.2.6 Contact Spacing

Unless otherwise specified in MIL-STD-1651, minimum mechanical spacing and creepage distance shall be as shown in Table 7.

Table 7 - Minimum contact spacing

Minimum Contact Spacing (inch)		
Service Rating	Air Spacing	Creepage Distance
Instrument	----	1/16
A	1/16	1/8
D	1/8	3/16
E	3/16	1/4
B	1/4	5/16
C	5/16	1

3.4.2.7 Contact Alignment

Inserts for socket contacts shall provide an overall sideplay of the socket contacts of 0.005 to 0.015 inch from the required position to facilitate alignment of mating pin contacts.

3.4.2.8 Contacts for Class H Connectors

Contacts shall be fused into the vitreous inserts of class H connectors. A resilient face gasket shall be bonded to the pin insert to ensure an interfacial seal in mating with an environmental resistant counterpart connector.

3.4.3 Screw Threads

Screw threads intended to mate with parts of another approved manufacturer shall be UNEF, UNF, or NEF, class 2A or 2B, conforming to MIL-S-7742, except that 1-3/4-18 and 2-18 threads shall be UNS class 2A or 2B, conforming to FED-STD-H28. Screw threads shall be checked after plating by means of ring and plug gages only, in accordance with FED-STD-H28. Slight out-of-roundness beyond the tolerances of MIL-S-7742 is allowed if the threads can be checked without forcing the thread gages. Screw threads are permitted to be relieved provided the relief does not interfere with the performance of the screw threads (see 6.15).

3.4.4 Shell Design

Connector shells shall be seamless, except for class B, and retain their inserts.

3.4.4.1 Lubrication

Connectors shall meet the requirements of this specification after all internal coupling ring threads have been coated with a lubricant.

3.4.4.2 Snap Rings and Slots

When snap rings are used to retain the inserts in their shells in class A or B connectors, the snap rings shall be accessible, capable of repeated use, and of rectangular cross section. The snap ring slots shall have square sides and enough depth to prevent the snap ring from sliding, pulling, or twisting out of position.

3.4.4.3 Use of Retaining Devices

When retaining rings or other devices are used in the coupling ring retention system for plugs and accessories, the retention devices shall be positively captivated or utilized in such a manner that the plugs and accessories shall remain electrically functional as an assembled connector in the event of a retention device failure.

3.4.4.4 Rear Release Connectors

Connectors with rear release contact retention systems shall have blue color bands in accordance with the applicable MS standard.

3.4.5 Coupling Connections

Threaded coupling rings shall be knurled and designed so that the pin and socket contacts engage or disengage as the ring is respectively tightened or loosened. The coupling rings of crimp contact connector plugs shall be captive to the shell. The quick disconnect plugs shall be provided with gripping surfaces and be fastened to receptacles by a device that engages receptacle threads, but can be pulled free in an emergency.

3.4.5.1 Safety Wiring of Coupling Rings

All threaded coupling rings except AS34591 shall be designed for safety wiring. At least two holes shall be provided for shell sizes 14 and smaller, and at least three equally spaced holes for connector sizes 16 and larger. These holes shall be of a diameter to accommodate 0.032 inch diameter wire.

3.4.5.2 Shell Polarization

Polarization of connectors shall be accomplished by matched integral key and keyway of counterpart connectors. The polarization of counterpart connectors shall take place before coupling rings are engaged.

3.4.5.3 Engagement Seal

Pin contact connectors with resilient interfaces, except class A, shall contain sealing means so that the engaged contacts meet with the requirements of 3.4.1. The design of the seal shall be such that in mated connectors all air paths between adjacent contacts and between contacts and shells are eliminated. There shall be interfacial mating of the engaged connector insert to provide dielectric under compression of 0.005 inch minimum. Plug connectors shall have a peripheral seal. Connector plug shells with threaded coupling rings shall be provided with a static peripheral seal to ensure shell to shell sealing.

3.4.6 Wire Sealing

3.4.6.1 Class D, DT, DY, DZ, E, F, K, KS, KT, L, R, U, W, X, WT, WY, AND WZ Connectors

Class D, DT, DY, DZ, E, F, K, KS, KT, L, R, U, W, X, WT, WY, AND WZ connectors, except AS31021, AS34021, AS34121, AS34521, AS34021, and AS34121 shall be provided with a wire sealing grommet capable of sealing on wires of the sizes specified in Table 8.

Table 8 - Wire range accommodations

Contact Size	Wire Size	Outside Diameter (OD) of Finished Wire (inch) 1/					
		Solder Contact Connectors		Crimp Contact Connectors			
				Front Release		Rear Release	
		min 2/	max	min 2/	max	min 2/	max
16-22 3/	26 24 22	N/A	N/A	0.066	0.130	N/A	N/A
16-16, 12-16 4/	20 18 16	0.064	0.130	0.066	0.130	0.053	0.103
12-12	14 12	0.114	0.170	0.097	0.170	0.085	0.158
8-8	10 8	0.164	0.255	0.132	0.255	0.132	0.255
4-4	6 4	0.272	0.370	0.237	0.370	0.237	0.370
0-0	2 0	0.415	0.550	0.360	0.550	0.360	0.550

1/ Wire reference MIL-W-16878, AS22759, MIL-DTL-81381, and MIL-DTL-915.
2/ For OD smaller than that specified, see 6.1.1.
3/ For series II only.
4/ Only crimp contact connector data applies to size 12-16 contacts.

NOTE: N/A - Not applicable.

3.4.6.1.1 Solder Contact Connectors

Class F and R solder contact connectors shall be provided with a removable resilient grommet and retaining feature. The grommet shall be designed to fit against the rear face of the insert with the retaining feature in the installed condition. The design of the seal shall be such that in mated connectors all air paths between adjacent contacts and between contacts and shells are eliminated. There shall be interfacial mating of the engaged connector insert to provide dielectric under compression of not less than 0.005 inch. Connector plug shells with threaded coupling rings shall be provided with a static peripheral seal to ensure shell to shell sealing.

3.4.6.1.1.1 Class P Connectors

Class P connectors shall be provided with a plastic potting form capable of accepting and bonding to MIL-PRF-8516 or MIL-PRF-23586 potting material. Inserts of class P connectors shall be designed so that potting material adheres to the shell and insert without treatment by the user.

3.4.6.1.1.2 Class H Connectors

Class H connectors shall not be supplied with a wire sealing grommet. However, the shells and inserts shall be designed so that MIL-PRF-8516 or MIL-PRF-23586 potting compound adheres to the insert without treatment by the user.

3.4.6.1.2 Crimp Contact Connectors

Crimp contact connectors shall be provided with an integral grommet and insert.

3.4.6.1.2.1 Grommet Sealing Plugs

Grommets shall be designed to accept sealing plugs in accordance with MS3187 or MS27488, in lieu of wire where unused contacts are employed. Except for contact sizes 0 and 4, sealing plugs for 15% of the number of contacts, but not less than one sealing plug shall be enclosed in the unit package. For indirect shipments, connectors are permitted to be ordered without grommet sealing plugs (see 6.2). For insert arrangements containing one contact of a particular size, sealing plugs shall not be supplied (see 6.2).

3.5 Intermateability and Interchangeability

3.5.1 Intermateability

Connectors shall be intermateable. When different types of connectors (front or rear release) or different types of contacts (crimp or solder) are used in a mated pair of connectors, the applicable requirements specified herein for the type or class shall be met.

3.5.2 Interchangeability

All connectors and accessories having the same part number shall be completely interchangeable with each other with respect to installation (physical) and performance (function) as specified herein.

3.6 Magnetic Permeability (except classes H and K)

The relative magnetic permeability of connectors and accessories and connectors with thermocouple contacts shall be not greater than 2.0 when tested in accordance with 4.6.2.

3.7 Disengagement (AS31071, AS35071)

The axial tension required to separate the plug shell (insert removed) from receptacle shall be 8 pounds ± 4 pounds, when tested in accordance with 4.6.3.

3.8 Temperature Cycling (thermal shock)

Connectors shall continue to meet the requirements of this specification after being subjected to the temperature extremes specified in 4.6.4.

3.9 Air Leakage

3.9.1 Solder Contact Receptacles (except class A, B, H, and P)

The air leakage rate shall be not greater than 1 atmospheric inch^3/hour (4.55×10^{-3} cm^3/s). The specified leakage rate shall apply through the connector and not through the flange and mounting surface area when tested in accordance with 4.6.5.1.

3.9.2 Class H Receptacles

The air leakage rate shall not exceed 0.1 µm foot^3/hour (1×10^{-6} cm^3/s) when tested in accordance with 4.6.5.2. The specified leakage rate shall apply through the connector and not through the flange and mounting surface area, unless solder mounted.

3.10 Contact Retention

The axial displacement of crimp contacts shall not be greater than 0.025 inch and contacts shall be retained in their inserts when subjected to the axial loads specified in 4.6.6 or 4.6.6.1.

3.11 Dielectric Withstanding Voltage

Connectors shall show no evidence of breakdown or flashover when subjected to the test voltages and altitudes in accordance with 4.6.7. Corona shall not be considered as breakdown.

3.12 Vibration

3.12.1 Sine Vibration

Mated connectors shall not be damaged and there shall be no loosening of parts due to vibration. Counterpart connectors shall be retained in full engagement, and the interruption of electrical continuity shall be no longer than 10 µs when tested in accordance with 4.6.8.1 or 4.6.8.2.

3.12.2 Random Vibration

A current discontinuity of 10 µs or more, disengagement of the mated connectors, evidence of cracking, breaking, or loosening of parts shall be cause for rejection when tested in accordance with 4.6.8.3.

3.13 Shock

Mated connectors shall not be damaged and there shall be no loosening of parts, nor shall there be an interruption of electrical continuity longer than 10 µs during the exposure to mechanical shock when tested in accordance with 4.6.9.

3.14 Humidity

Mated connectors shall withstand the applicable voltage in Table 9 for 5 minutes minimum after being tested in accordance with 4.6.10.

Table 9 - Test voltages after humidity

Service Rating	Test Voltage (volts-rms)
Instrument	300
A	750
D	1350
E	1875
B	2575
C	4500

3.15 Contact Resistance

Contacts in the mated condition shall meet the ambient 25 °C (77 °F) contact resistance requirements of AS39029 except the potential drop of class H contacts shall be not greater than 125 mV initially or 200 mV after conditioning when tested in accordance with 4.6.11.

3.16 Durability

Counterpart connectors shall show no mechanical or electrical defects detrimental to the operation of the connector after 100 cycles of coupling and uncoupling for crimp contact connectors (500 cycles for AS34591 connectors), or of mating and unmating for solder contact connectors when tested in accordance with 4.6.12.

3.17 Corrosion

Connectors shall exhibit no exposure of the basis material as defined by AIR4789 when tested in accordance with 4.6.13. Table 25 identifies specific corrosion requirements for each individual connector class.

3.18 Insulation Resistance

3.18.1 At Room Temperature

The insulation resistance shall be not less than 5000 MΩ when tested in accordance with 4.6.14.1.

3.18.2 At Elevated Temperature-Short Time (solder type only)

The insulation resistance shall be as shown on Figure 8 when tested in accordance with 4.6.14.3.

3.18.3 At Elevated Temperature-Long Time

The insulation resistance shall be as shown on Figure 8 when tested in accordance with 4.6.14.4.

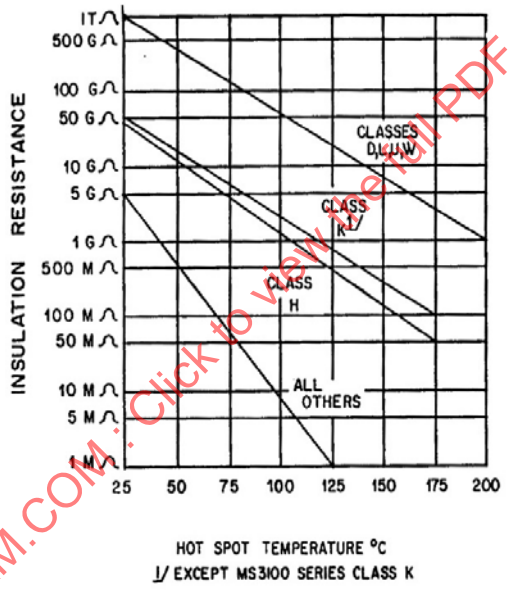


Figure 8 - Minimum insulation resistance versus hot spot temperature

3.19 Fluid Immersion

Connectors shall mate with their counterpart connectors after fluid immersion in accordance with 4.6.15.

3.20 Firewall (class K connectors)

Mated connectors shall prevent passing of a flame through the connector for at least 20 minutes when tested in accordance with 4.6.16. 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 21 shall be applied for the first 5 minutes without a break in continuity. During the next minute the current drawn by the connector shall be not greater than 2 A when a test potential of 100 to 125 V AC at 60 Hz is applied between adjacent contacts and between contacts and the shell.

3.21 Insert Retention

Inserts shall not be dislocated from their original positions or damaged when they are subjected to the pressures specified in 4.6.17.

3.22 Moisture Resistance

Mated connectors with rear accessory hardware assembled shall maintain an insulation resistance of 100 MΩ or greater at 25 °C (77 °F) after being subjected to the moisture resistance test in accordance with 4.6.18.

3.23 Water Pressure

3.23.1 Solder Contact Receptacles (except classes A, B, H, K, and P)

When tested in accordance with 4.6.19.1, receptacle inserts and panel seals shall show no leakage. In addition, there shall be no evidence of leakage at the interface of mated connectors. At the end of 48 hours while still immersed, the insulation resistance of mated connectors shall be not less than 100 MΩ. After removal of unmated connectors from the immersion tank, the insulation resistance shall be not less than 100 MΩ (see 4.6.19.1).

3.23.2 Crimp Contact Connectors

Mated connectors class D, DS, DT, DY, L, U, W, X, WT, WY, and WZ assembled with AS85049/11 backshells insulation resistance shall be not less than 100 MΩ after being subjected to the water pressure test. They shall show no evidence of entrance of water when tested in accordance with 4.6.19.2.

3.24 External Bending Moment

Connectors shall exhibit no evidence of damage, as revealed by inspection with 3X magnification, when stressed using the applicable bending moment in accordance with 4.6.20.

3.25 Contact Engaging and Separating Forces (solder contacts)

The socket contact engaging and separating forces shall be within the applicable limits specified in Table 10 when tested in accordance with 4.6.21.

Table 10 - Contact engagement and separation forces

Contact Mating End Size	Minimum Separation Force (ounces) Minimum Diameter AS31971 Pin	Maximum Average Engagement Force (ounces) Maximum Diameter AS31971 Pin	Maximum Engagement Force (ounces) Maximum Diameter AS31971
16	2	33	48
12	3	56	80
8	5	N/A	160
4	10	N/A	240
0	15	N/A	320

NOTE: N/A – Not applicable.

3.26 Resistance to Probe Damage (size 16 solder socket contacts only)

Socket contacts shall meet the engagement and separation force requirements specified in 3.25 after being subjected to the resistance to probe damage in accordance with 4.6.22.

3.27 Shell Conductivity (crimp connectors)

Mated connectors shall be electrically conductive from the plug accessory thread to the receptacle mounting flange or to the accessory thread on the cable connecting plug. The overall DC resistance shall be not greater than 0.005 Ω for class D, DS, DT, DY, DZ, W, X, WT, WY, and WZ or 0.05 Ω for all other classes when measured in accordance with 4.6.23.

3.28 Contact Insertion and Removal Forces (crimp connectors)

The forces required to insert and remove unlocked contacts shall not exceed the requirements specified in Table 11 when tested in accordance with 4.6.24.

Table 11 - Contact insertion and removal forces

Contact Size	Insertion and Removal Forces (pounds, maximum)
16	20
12	25
8	30
4	40
0	40

3.29 Altitude Immersion (series III only)

The mated connector's insulation resistance shall be not less than 1000 MΩ when tested in accordance with in 4.6.25. Any evidence of dielectric breakdown or flashover shall be cause for rejection.

3.30 Marking

Each connector shall be legibly and permanently marked on the shell or coupling ring in accordance with MIL-STD-1285. An example of the military part number is shown in 6.6. The date code, manufacturer name, symbol or code, and assembly plant symbol or code is required for all connector types. Metal stamping of part numbers is acceptable after plating. Metal impression marking, if used, shall show no exposure of unprotected basis metal which will adversely affect performance. Marking shall be legible after corrosion testing (see 3.17 and 4.6.13). Manufacturers' symbols or trademark shall be listed in AIR1351.

3.30.1 Insert Marking

Inserts shall be marked as specified in MIL-STD-1651. Manufacturer's identification is permitted. Raised or depressed characters shall not be used on insert mating faces for any markings of crimp contact connectors.

3.30.1.1 Contact Designations

Contact identification on crimp connector inserts shall be designated by identifiable letters or numbers of contrasting color. Contact identification on solder contact inserts by use of contrasting color is permissible. Positioning and arrangement of the characters shall be such that the contact cavity is readily identifiable. All contacts shall be designated on the front face of the insert. Eighty percent of the characters on any face of the connector shall remain identifiable after completion of the tests specified in Tables 12 and 13.

3.30.1.1.1 Grommet and Insulating Spacers

Wire openings on the rear face of grommets and insulating spacers shall be marked with legible characters corresponding to the insert contact designators. Raised, depressed, or contrasting colored characters shall be used. It is permissible to identify only those wire openings which are located on the vertical centerline of the grommets of solder contact connectors.

3.30.2 Use of Part Number Designations

MS sheet designations shall not be applied to a product, except for qualification test samples (see 6.14), until notification has been received from the activity responsible for qualification that the product has been approved for listing on the qualified products list (QPL).

3.31 Workmanship

Loose contacts, poor molding fabrication, loose materials, defective bonding, damaged or improperly assembled contacts, peeling, or chipping of plating or finish, galling of mating parts, nicks and burrs of metal parts, and warping of the post molding shall be a basis for rejection of items.

Table 12 - Qualification inspection for solder contact connectors

Inspection	Requirement Paragraph	Test Paragraph
Group 1		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Magnetic permeability (except class K)	3.6	4.6.2
Disengagement (AS31071, AS35071 plug only)	3.7	4.6.3
Temperature cycling	3.8	4.6.4
Contact retention	3.10	4.6.6.1
Dielectric withstanding voltage	3.11	4.6.7.1
Vibration	3.12.1	4.6.8.1
Dielectric withstanding voltage	3.11	4.6.7.1
Shock	3.13	4.6.9.1
Humidity	3.14	4.6.10
Dielectric withstanding voltage	3.11	4.6.7.4
Contact resistance	3.15	4.6.11
Durability	3.16	4.6.12
Corrosion	3.17	4.6.13
Contact resistance	3.15	4.6.11
Insulation resistance (long time)	3.18.3	4.6.14.4
Fluid immersion	3.19	4.6.15.1
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 2		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Firewall	3.20	4.6.16
Group 3	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Visual and mechanical		
Magnetic permeability	3.6	4.6.2
Temperature cycling	3.8	4.6.4
Air leakage 1/	3.9	4.6.5.1
Contact retention	3.10	4.6.6.1
Insert retention	3.21	4.6.17
Dielectric withstanding voltage	3.11	4.6.7.1
Vibration 1/	3.12.1	4.6.8.1
Dielectric withstanding voltage	3.11	4.6.7.1
Shock 1/	3.13	4.6.9.1
Moisture resistance 2/	3.22	4.6.18.2
Contact resistance 2/	3.15	4.6.11
Durability 2/	3.16	4.6.12
Corrosion 2/	3.17	4.6.13
Contact resistance 2/	3.15	4.6.11
Insulation resistance (short time) 2/	3.18.2	4.6.14.3
Fluid immersion 2/	3.19	4.6.15.1
Visual and mechanical 2/	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1

Table 12 - Qualification inspection for solder contact connectors (continued)

Group 4		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Temperature cycling	3.8	4.6.4
Air leakage	3.9.1	4.6.5.2
Dielectric withstanding voltage	3.11	4.6.7.1
Insulation resistance	3.18.1	4.6.14.4
Durability	3.16	4.6.12
Vibration	3.12.1	4.6.8.1
Shock	3.13	4.6.9.1
Moisture resistance	3.22	4.6.18.2
Corrosion	3.17	4.6.13
Contact resistance	3.15	4.6.11
Insert retention	3.21	4.6.17
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 5		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Dielectric withstanding voltage	3.11	4.6.7.1
Insulation resistance	3.18.1	4.6.14.1
Fluid immersion	3.19	4.6.15.2
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 6		
Contact engaging and separating forces	3.25	4.6.21
Resistance to probe damage (size 16 only)	3.26	4.6.22
Contact engaging and separating forces	3.25	4.6.21
Corrosion (5 contacts only)	3.17	4.6.13
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1

1/ Shall be monitored/witnessed by the qualifying activity.
2/ Shall be performed by the qualifying activity.

Table 13 - Qualification inspection for crimp contact connectors

Inspection	Requirement Paragraph	Test Paragraph
Group 1		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Magnetic permeability (except class K)	3.6	4.6.2
Shell conductivity	3.27	4.6.23
Contact insertion and removal forces	3.28	4.6.24
Contact retention	3.10	4.6.6
Insulation resistance	3.18	4.6.14
Temperature cycling	3.8	4.6.4
Dielectric withstanding voltage	3.11	4.6.7.2
Water pressure (series II only)	3.23.2	4.6.19.2
Altitude immersion (series III only) 1/	3.29	4.6.25
Durability (except dynamic corrosion classes)	3.16	4.6.12
Vibration (series II only) 1/	3.12.1	4.6.8.1
Random vibration (series III only) 1/	3.12.2	4.6.8.3
Shock 1/	3.13	4.6.9
Moisture resistance	3.22	4.6.18
Corrosion (except dynamic corrosion classes)	3.17	4.6.13.2
Dynamic corrosion	3.17	4.6.13
Contact resistance	3.15	4.6.11
Insert retention	3.21	4.6.17
Contact retention	3.10	4.6.6
External bending moment	3.24	4.6.20
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 2		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Insulation resistance	3.18	4.6.14.1
Dielectric withstanding voltage	3.11	4.6.7.2
Dielectric withstanding voltage (altitude)	3.11	4.6.7.3
Insulation resistance (long time)	3.18.3	4.6.14.4
Contact resistance	3.15	4.6.11
Dielectric withstanding voltage	3.11	4.6.7.2
Insert retention	3.21	4.6.17
Contact retention	3.10	4.6.6
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1

1/ Shall be monitored/witnessed by the qualifying activity.

Table 13 - Qualification inspection for crimp contact connectors (continued)

Inspection	Requirement Paragraph	Test Paragraph
Group 3		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Contact insertion and removal forces	3.28	4.6.24
Contact retention	3.10	4.6.6
Visual and Mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 4		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Firewall	3.20	4.6.16
Group 5 (Performed by the QA)		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Insulation resistance	3.18	4.6.14
Dielectric withstanding voltage	3.11	4.6.7.2
Fluid immersion	3.19	4.6.15
Dielectric withstanding voltage	3.11	4.6.7.2
Insert retention	3.21	4.6.17
Contact retention	3.10	4.6.6
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 6 (Performed by the QA)		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Temperature cycling	3.8	4.6.4
Dielectric withstanding voltage	3.11	4.6.7.2
Durability	3.16	4.6.12
Moisture resistance	3.22	4.6.18.1
Contact resistance	3.15	4.6.11
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Group 7 (class D only)		
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Temperature cycling	3.8	4.6.4
Dielectric withstanding voltage	3.11	4.6.7
Water pressure	3.23.2	4.6.19.2
Vibration	3.12.1	4.6.8.2
High impact shock	3.13	4.6.9
Dielectric withstanding voltage	3.11	4.6.7
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1

3.32 Dust Caps

Dust caps in accordance with MS90376 shall be placed on the end of each connector. Hermetic connectors require caps on both ends or some other means to prevent damage to the termination end of the connector.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

With the exception of the stores release requirements, the supplier is responsible for the performance of all inspection requirements as specified herein unless otherwise specified in the contract or purchase order. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements. Qualification by similarity may be granted. The acceptance and extent of qualification by similarity shall be determined by the Qualifying Activity. Similarity is established through a rationale that certain designs, materials, and/or processes are identical to those already approved through qualification of the components. Verification testing for the new product is not required for designs, materials, and/or processes already approved. When a Qualified Products List is being established the qualification by similarity rationale shall be approved by the qualifying activity prior to initiation of the remaining portions of the qualification inspection process.

4.1.1 Test Equipment and Inspection Facilities

Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of inspection equipment shall comply with the requirements of NCSL Z540-3 or ISO 10012-1.

4.1.1.1 Classification of Inspection

The inspection of connectors shall be classified as follows:

a. Qualification inspection (see 4.4).

b. Quality conformance inspection (see 4.5).

    1. Inspection of product for delivery (see 4.5.1).

    2. Inspection of preparation for delivery (see 4.5.2).

4.2 Inspection Conditions and Preparation of Samples

Inspection Conditions: Unless otherwise specified, all inspections shall be made in accordance with the general requirements of EIA 364. Performance of the inspection shall be the responsibility of the qualification applicant under authorization of the qualifying activity (NAVAIR). The qualifying activity shall authorize the applicant to begin qualification testing by written notice that describes the requirements of submission in accordance with this specification. The qualification applicant shall furnish test results, certifications, and tested product to the qualifying activity. The samples shall be taken from the same lot as tested by the supplier and plainly identified by attached durable tags marked with the information listed below. The tags must be stamped by the supplier and qualifying activities designated quality Assurance Representative (QAR) inspector as representative samples of the manufacturer's normal production capability. Samples submitted without the stamp will not be accepted.

4.2.1 Assembly Plants

Assembly plants shall be listed on or be approved for listing on AS50151 qualified products list. The qualified connector manufacturer shall certify that the assembly plant is approved for the distribution of the manufacturer's parts. The assembly plant shall use only piece parts supplied by the qualified connector manufacturer. No testing other than visual examination is required of certified piece parts obtained from the qualified connector manufacturer, except when there is cause for rejection. Assemblies produced at the assembly plant shall be subjected to inspection to ensure that the assembly process conforms with that established at the qualified manufacturing plant. Quality control requirements, including Government inspection surveillance, shall be the same as required for the qualified connector manufacturer. Assembly plants shall list their symbols or trademarks in AIR1351.

4.3 Qualification Inspection

Qualification inspection shall consist of the examinations and tests performed in the sequence specified in Tables 12 and 13 on the qualification test samples specified in 4.3.2. The supplier shall perform all testing with the exception of test group 3 for Table 12 and test groups 5 and 6 for Table 13. The second part of test group 3 in Table 12 (starting with moisture resistance) and test groups 5 and 6 for Table 13 will be performed by the Qualifying Activity. The qualification test samples shall be as specified in 4.3.1. After receipt of the letter of authorization from the activity responsible for qualification (see 6.4), the applicant shall submit the test report (certified by the Government inspector indicating the extent to which the tests were witnessed), along with all other documentation required by 4.4.

4.3.1 Qualification of Additional Connectors

Qualification by similarity to qualified components or to components submitted for qualification is permissible when materials, designs, and manufacturing processes are similar. The manufacturer shall provide to the qualifying activity, full details of the similarities and differences of the components and manufacturing processes, and a proposed qualification test program which will address the differences. Testing shall not begin until the manufacturer's proposal has been approved or modified by the qualifying activity.

4.3.2 Qualification Samples

Samples of each item submitted for qualification shall be tested in the sequence specified in Tables 12 or 13, as required. Specific details on preparation of samples shall be as follows: Each connector subjected to qualification testing shall be provided with a counterpart connector for those tests requiring mating assemblies. The counterpart connectors provided for this purpose shall be new, previously qualified connectors or new connectors submitted for qualification testing. Manufacturers not producing mating connectors shall submit data substantiating that tests were performed with approved counterpart connectors. For crimp contact connectors, two cavities of each sample shall contain unwired contacts and sealing plugs in accordance with MS27488. Connectors with less than four contacts of a given contact size shall not have sealing plugs installed for that contact size. All test samples required for the Qualifying Activity testing shall comply with 4.3.1 and shall be forwarded to the Qualifying Activity prior to the start of the supplier's testing.

4.3.2.1 Wire-to-Contact Assembly

Unless otherwise specified (see 4.3.2.7.4), connectors shall be wired using wire selected from those specified in Table 8. Where wired contacts are required, terminations shall be accomplished as specified in 4.3.2.1.1 or 4.3.2.1.2.

4.3.2.1.1 Solder Contacts

Solder in accordance with J-STD-001 shall be used. For class H connectors, termination of wire to solder terminals shall be accomplished with solder conforming to J-STD-006, composition Ag 1.5 or Sn 10.

4.3.2.1.2 Crimp Contacts

Crimp contacts shall be crimped with tools conforming to MIL-DTL-22520 as specified in AS39029 /29, /30, /44, or /45.

4.3.2.2 Solder Contact Connectors (class A, B, C, and P)

Qualification samples and qualification tests for solder contact connectors in class A, B, C, and P shall consist of two complete connector assemblies of class A or C wall mounting receptacles and class A or B straight plugs, each with insert arrangements with the greatest number of contacts submitted for qualification in each shell size range, which shall pass the tests of Table 12, group 1. Qualification testing of these samples qualifies other shell types and the balance of insert arrangements in class A, B, C, and P by similarity. Testing of solder contacts need not be performed if compliance of similar contacts has previously been demonstrated in conjunction with qualification testing of connectors of a different class. After the shock test in group 3, the samples shall be forwarded to the Qualifying Activity for performance of the remaining tests.

4.3.2.3 Solder Contact Connectors (class H)

Qualification samples and qualification tests for solder contact connectors in class H shall be as specified in 4.3.2.1 and 4.3.2.2.

4.3.2.3.1 Groups 4 and 6

Two class H receptacles in each shell size range with insert arrangements with the greatest number of contacts for which qualification is desired, together with mating class D, DT, DY, DZ, F, L, P, R, U, W, X, WT, WY, or WZ straight plugs, shall pass the tests of Table 12, group 4 and group 6.

4.3.2.3.2 Group 5

Four class H receptacles from each shell size range (small range: 8S to 16; medium range: 18 to 28; and large range: 32 to 48) with insert arrangements representing typical manufacturing shall pass the group 5 tests of Table 12. Where mating plugs are required class K or L shall be used. Qualification testing of the samples qualifies all other shell types and the balance of shell sizes and insert arrangements in class H by similarity.

4.3.2.4 Solder Contact Connectors (classes F and R)

Qualification samples and qualification tests for solder contact connectors in classes F and R shall consist of two complete connector assemblies, class R wall mounting receptacles and class F straight plugs, each with insert arrangements with the greatest number of contacts for which qualification is desired, in each shell size, which shall pass the tests of Table 12, group 3. For test purposes, contacts shall be wired in accordance with 4.3.2.1 except that for each size contact, no more than two wires or 10% of the wires, whichever is greater, shall be the larger of the two sizes shown in Table 8. Qualification testing of these samples qualifies other shell types and the balance of insert arrangements in class F and R by similarity. Testing of solder contacts need not be performed if compliance of similar contacts has previously been demonstrated in conjunction with qualification testing of connectors of a different class.

4.3.2.5 Series I Connectors (class K)

Qualification samples and qualification tests for series I connectors in class K shall consist of the complete connector assemblies. Qualification testing of these samples qualifies other shell types and the balance of insert arrangements in class K by similarity.

4.3.2.5.1 Group 1

Two complete connector assemblies, class K wall mounting receptacles and straight plugs, each with insert arrangements with the greatest number of contacts for which qualification is desired, in each shell size, shall pass the tests specified in Table 12, group 1.

4.3.2.5.2 Group 2

Two complete connector assemblies, class K wall mounting receptacles and straight plugs, from each shell size range with insert arrangement having the greatest number of contacts for which qualification is desired, shall be assembled with wire conforming to MIL-DTL-25038 and pass the tests specified in Table 12, group 2.

4.3.2.6 Socket Contacts for Solder Contact Connectors, Group 6

Twenty of each socket contact size and configuration used in the solder contact connectors shall pass the tests of Table 12, group 6. Sockets which are not completely assembled prior to installation in the insert such as class H, socket style, are permitted to be provided and tested in connectors.

4.3.2.7 Crimp Contact Connectors

Qualification samples and qualification tests for crimp contact connectors in classes D, DT, DY, DZ, K, L, W, X, WT, WY, WZ, and U shall be as specified in the following paragraphs. Shell sizes are grouped into three ranges (small range: 8S to 16; medium range: 18 to 28; large range: 32 to 48) for qualification testing. Successful completion of the qualification tests in Table 13 qualifies:

a. For the shell size submitted, all shell sizes and styles within the range.

b. For the service ratings submitted, all contact arrangements complying with those service ratings.

4.3.2.7.1 Group 1

Two connectors of each class with insert arrangements in each shell size range (small, medium, and large) of each contact retention system to be qualified shall pass the group 1 tests of Table 13. One sample shall have the pin insert in the plug and the socket insert in the receptacle. The other sample shall have the inserts reversed. One sample shall be terminated with wire approaching the minimum OD specified in Table 8, and the other with maximum OD wire. The connectors shall be tested with an AS85049/52 strain relief clamp assembled on the back threads or other appropriate backshell hardware. The receptacles shall be wall mounting.

4.3.2.7.2 Group 2

One connector of each class (for each service rating) with insert arrangements having the maximum contact density and of each contact retention system to be qualified shall pass the group 2 tests of Table 13. The plug shall have socket inserts, and the receptacle pin inserts, and shall be terminated with the maximum OD wire specified in Table 8. Backshell hardware shall be the same as group 1, and the receptacles shall be wall mounted.

4.3.2.7.3 Group 3

Additional connectors shall be supplied to provide a minimum of 10 contact cavities of each contact size and of each contact retention system. These connectors shall pass the group 3 tests of Table 13. Additional contact sizes are permitted to be qualified by completion of the group 3 tests.

4.3.2.7.4 Group 4 (class K only)

One class K connector in each shell size range with insert arrangements representing typical manufacturing and of each contact retention system to be qualified shall pass the group 4 tests of Table 13. Each connector shall be assembled with wire conforming to MIL-DTL-25038.

4.3.2.7.5 Group 5

Twelve class D, DT, DY, DZ, U, K, L, W, X, WT, WY, or WZ connectors with insert arrangements in the medium shell size range shall pass the group 5 tests of Table 13. All samples shall have the socket insert in the plug and the pin insert in the receptacle and shall be terminated with maximum OD wire specified in Table 8. Backshell hardware shall be the same as group 1. If more than one contact retention system is to be qualified, a minimum of two connectors of each retention system shall be subjected to each test fluid. The test samples shall be forwarded to the Qualifying Activity for the performance of the Group 5 testing.

4.3.2.7.6 Group 6 (front and rear release connector intermateability)

If requested by the qualifying activity, one connector with insert arrangements of class D, DT, DY, DZ, K, L, W, X, WT, WY, WZ and U in each shell size range and of each release system combination (one male plug with front release mated to female receptacle with rear release, one male plug with rear release mated to female receptacle with front release, one female plug with front release mated to male receptacle with rear release and one female plug with rear release mated to male receptacle with front release) shall pass the group 6 tests of Table 13. Backshell hardware shall be the same as group 1 and the receptacles shall be wall mounting. The test samples shall be forwarded to the Qualifying Activity for the performance of the Group 6 testing.

4.3.2.7.7 Group 7 (class D, DT, DY, or DZ only)

Two complete connector assemblies, class D, DT, DY, or DZ wall mounting receptacles and straight plugs, each with insert arrangements with the greatest number of contacts in each shell size range shall pass the tests of Table 13, group 7. One sample shall have the pin insert in the plug and the socket insert in the receptacle. The other sample shall have the socket insert in the plug and the pin insert in the receptacle. One connector shall be assembled with a AS85049/11 type B cable backshell and 6 feet of the applicable cable specified in Table 14. The remaining connector shall be assembled with an AS31091 boot and 6 feet of the applicable cable specified in Table 14.

a. For the shell size range submitted, all shell sizes and styles within those ranges.

b. For the service ratings submitted, all contact arrangements complying with those service ratings.

Table 14 - Test cable size 1/, 2/

AS85049/11 Backshell Dash Number	AS31091 Boot Dash Number (Type B)	AS50151 Shell Size	Cable OD Max
07/08	11	8S	0.432
11/12	12	10S/10SL	0.432
13/14	13	12/12S	0.432
116/117	13	14/14S	0.432
21/22	14	16/16S	0.700
27/28	14	18	0.750
33/34	15	20	0.750
41/42	15	22	0.750
47/48	16	24	0.750
55/56	16	28	0.750
65/66	17	32	1.250
71/72	17	36	1.250
79/80	18	40	1.250
87/88	18	44	1.250
95/96	18	48	1.250

1/ Select type to match maximum cable entry and insert configuration of AS50151.
2/ No armor to be used on test cable.

4.3.3 Qualification Rejection

There shall be no failures during any examination or tests of the connectors or accessories submitted for qualification tests. After notification of any failure, the agent responsible for qualification testing (see 6.14) shall receive details of corrective action from the manufacturer before initiating any further tests deemed necessary to ensure compliance with connector requirements.

4.4 Conformance Inspection

4.4.1 Inspection of Product for Delivery

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

4.4.2 Group A Inspection

Group A inspection shall consist of all of the applicable tests specified in Table 15.

Table 15 - Group A inspection

Inspection 1/	Requirement Paragraph	Test Paragraph
Visual and mechanical	3.1, 3.3, 3.4, 3.5, 3.30, and 3.31	4.6.1
Air leakage (for class H only) 2/	3.9.2	4.6.5.2
Dielectric withstanding voltage 2/, 3/	3.11	4.6.7.5
Insulation resistance 2/, 3/	3.18.1	4.6.14.2

1/ 100% inspection.
2/ The contractor is permitted to use in-process controls for this requirement.
3/ Crimp contact connectors only.

4.5 Periodic Inspection

Periodic inspection shall consist of group B. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.5.1.4); delivery of products which have passed group A shall not be delayed pending the results of these periodic inspections.

Retention of qualification inspection (Table 16) shall be performed by the Qualifying Activity on sample units produced with equipment and procedures normally used in production. To retain qualification, the supplier shall forward their periodic qualification submittal every 36 months to the Qualifying Activity. The Qualifying Activity shall establish the initial reporting date. Failure to submit test samples/data within 30 days after the end of the sampling interval may result in loss of qualification for the products. Except where the results of these inspections show noncompliance with the applicable requirements, delivery of products which have passed group A inspection shall not be delayed pending the results of retention of qualification inspections.

4.5.1 Group B Inspection

Group B inspection shall consist of the tests specified in Table 16 in the order shown. Group B inspection shall be made on sample units selected from inspection lots which have passed the Group A inspection.

Table 16 - Group B inspection

Inspection	Requirement Paragraph	Test Paragraph	Group					
			1	2	3	4	5	6
Visual and mechanical	3.1, 3.3, 3.4,3.5, .30, and 3.31	4.6.1						
Insulation resistance	3.18	4.6.14	X	X	X	X	--	--
Dielectric withstanding voltage	3.11	4.6.7.2	X	X	X	X	--	--
Contact retention	3.10	4.6.6	X	X	--	--	X	X
Shell conductivity	3.27	4.6.23	--	--	--	--	X	X
Air leakage	3.9.1	4.6.5.1	X	--	--	X	--	--
Durability	3.16	4.6.12	--	X	--	X	--	X
Moisture resistance (except classes A, B, C, and K only)	3.22	4.6.18	X	--	X	--	X	--
Humidity (classes A, B, C, and K only)	3.14	4.6.10	X	--	--	--	--	--
Water pressure (series II only	3.23.1	4.6.19.1	--	--	--	--	X	--
Altitude immersion (series III only)	3.29	4.6.25	--	--	--	--	X	--
Corrosion	3.17	4.6.13	--	X	--	X	--	X

4.5.1.1 Sampling Plan

Every 36 months, mated connector sample units which have passed group A inspection shall pass the tests specified in Table 16. Samples shall be selected to provide two samples per applicable test group, as determined by the contact type and the class of the samples to be tested. In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. The form of the report shall be in accordance with the Qualifying Activity requirements. If limited production has occurred for the reporting period, the manufacturer may request the Qualifying Activity to consider a similar certification to fulfill the periodic requirement. Qualification by Certification shall not be permitted for more than one 36 month interval.

4.5.1.1.1 Solder Contact Connectors (class A, B, C, E, F, K, P, and R)

Samples and tests for solder contact connectors shall consist of four mating plugs and receptacles in various shell sizes and classes representing a cross section of production. Plugs and receptacles of different classes are permitted to be mated. The samples shall be wired as specified in 4.3.2.1. Two complete mating connector assemblies shall pass the tests of Table 16, group 1 and the other two assemblies shall pass the tests of Table 16, group 2.

4.5.1.1.2 Solder Contact Connectors (class H)

Samples and tests for solder contact connectors shall consist of four receptacles with mating plugs in various shell sizes representing a cross section of production. Two complete mating connector assemblies shall be wired as specified in 4.3.2.1 and pass the tests of Table 16, group 3. The remaining two assemblies need not be wired but shall pass the tests of Table 16, group 4.

4.5.1.1.3 Crimp Contact Connectors

Samples and tests for crimp contact connectors shall consist of four mating plugs and receptacles in various shell sizes and classes representing a cross section of production. Plugs and receptacles of different classes are allowed to be mated. The samples shall be wired as specified in 4.3.2.1. Two complete mating connector assemblies shall pass the tests of Table 16 group 5, and the other two assemblies shall pass the tests of Table 16, group 6.

4.5.1.1.4 Solder Socket Contacts

Samples and tests for solder socket contacts shall be as specified in 4.3.2.6.

4.5.1.2 Failures

If one or more sample units fail to pass group B inspection, the sample shall be considered to have failed.

4.5.1.3 Disposition of Sample Units

Sample units which have been subjected to group B inspection shall not be delivered on the contract or purchase order.

4.6 Methods of Examination and Tests

4.6.1 Visual and Mechanical Examination

The connectors, accessories, and piece parts shall be visually and mechanically examined to ensure conformance with 3.1, 3.3, 3.4, 3.5, 3.30, and 3.31. The use of in process controls to examine component parts, unrelated to lot sizes of finished connectors, is permitted in lieu of examination of these components in the finished connectors to ensure conformance of these component parts.

4.6.2 Magnetic Permeability

The relative permeability shall be checked with an indicator conforming to ASTM A342. The connectors or accessories are permitted to be wired or unwired, as convenient, but shall not carry current (see 3.6).

4.6.3 Disengagement (AS31071, AS35071)

The plug (without the insert) shall be fully mated to a mounted receptacle. An increasing axial tension shall be applied to the plug and the force at separation measured (see 3.7).

4.6.4 Temperature Cycling (thermal shock)

Accessories or unmated connectors shall be tested in accordance with EIA 364-032, condition I, 5 cycles, except that the temperature extremes shall be as specified in Table 17. At the completion of the last cycle, the connectors shall be returned to room temperature for inspection (see 3.8).

Table 17 - Temperature extremes

Class	Temperature		
	Extremes	Degrees C	Degrees F
A, B, C, E, F, P, R	Low	–55 +0 –3	–67 +0 –5
	High	+125 +3 –0	+257 +5 –0
D, H, K, W, X, DT, WT, DY, WY, DZ, WZ	Low	–55 +0 –3	–67 +0 –5
	High	+175 +3 –0	+347 +5 –0
L, U	Low	–55 +0 –3	–67 +0 –5
	High	+200 +3 –0	+392 +5 –0

4.6.5 Air Leakage Tests

4.6.5.1 Solder Contact Receptacles (except class A, B, H, and P)

The connector shall be tested for air leakage in accordance with EIA 364-02. The pressure differential across the connector shall be 30 pounds/inch^2. The leakage rates shall be measured in both directions while at the low temperature extremes of Table 17 (see 3.9.1).

4.6.5.2 Class H Receptacles

All class H receptacles shall be mounted in a manner which will allow for the application of 15 pounds/inch^2 nominal pressure differential across the receptacles and tested in accordance with EIA 364-02. The leakage rate shall be determined while pressurized air or gas, containing not less than 10% of helium by volume, is applied to the receptacle (see 3.9.2).

4.6.6 Contact Retention

Axial loads in accordance with Table 18 shall be applied to the mating end of the individual contacts. The connector shall have all contacts in place during the test in accordance with EIA 364-029 (see 3.10).

Table 18 - Contact retention axial loads

Contact Mating End Size	Minimum Axial Load (pounds)		
	Fixed Type Contacts	Removable Crimp Type Contact, Except Class D, DT, DY, DZ	Class D, DT, DY, DZ
16	10	25	50
12	15	30	50
8	20	50	80
4	20	60	100
0	25	75	100

4.6.6.1 Solder Contact Connectors

Connectors shall be tested as specified in 4.6.6. The measurement of the displacement of the contacts is not required (see 3.10).

4.6.7 Dielectric Withstanding Voltage (see 3.11)

4.6.7.1 Dielectric Withstanding Voltage (sea level, solder contacts only)

Wired, unmated connectors shall be tested in accordance with EIA 364-020, with the following details and exceptions:

a. The magnitude of the test voltage shall be as specified in Table 19. (For maximum recommended working voltages, see 6.1.2.)

b. 50% of the contacts available shall be tested, but in no case shall less than six dielectric withstanding voltage readings be taken. If the number of contacts is three or less, all contacts shall be tested. The test voltage shall be applied between each wired contact and each adjacent contact and the shell.

c. For acceptance testing, simulated contacts and special techniques are permitted to be used in performing this test.

Table 19 - Dielectric withstanding test voltages

Service Rating	Test Voltage (volts-rms)	
	Sea Level	70 000 feet
Instrument	1000	260
A	2000	360
D	2800	400
E	3500	440
B	4500	480
C	7000	560

4.6.7.2 Dielectric Withstanding Voltage (sea level, crimp contact connectors only)

Mated or unmated connectors, as required, shall be tested in accordance with EIA 364-020. 50% of the contacts shall be tested, but in no case shall less than six dielectric withstanding voltage readings be taken. If the number of contacts is three or less, all contacts shall be tested. The test voltage shall be applied between each wired contact and each adjacent contact and the shell. If an insert has more than one service rating, similar connections shall be made for the different test voltages as needed.

4.6.7.3 Dielectric Withstanding Voltage (altitude)

Mated connectors and unmated connector halves with pin contacts shall be tested in accordance with EIA 364-020, with the following details and exceptions:

a. The magnitude of the test voltage shall be as specified in Table 19.

b. 50% of the contacts available shall be tested, but in no case shall less than six dielectric withstanding voltage readings be taken. If the number of contacts is three or less, all contacts shall be tested. The test voltage shall be applied between each wired contact and each adjacent contact and the shell.

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 class H connectors shall be subjected to the high altitude. The rear face shall be protected.

4.6.7.4 Dielectric Withstanding Voltage (after humidity at sea level)

The mated connectors shall show no evidence of breakdown when the voltage indicated for the applicable service rating in Table 9 is applied between the two closest contacts and between the shell and the contacts closest to the shell in accordance with EIA 364-020, except the test voltage shall be applied for 5 minutes (see 3.11).

4.6.7.5 Dielectric Withstanding Voltage (group A inspection at sea level)

Unmated connectors or insert assemblies shall show no evidence of breakdown when the applicable test voltage of Table 19 is applied between the two closest contacts, and between the shell (or simulated shell) and the contact closest to the shell in accordance with EIA 364-020. The period of application of voltage shall be 2 seconds minimum and simulated contacts are permitted to be used.

4.6.8 Vibration

Complete mated connectors shall be mounted and pass the applicable vibration test. Each receptacle shall be mounted on a fixture, which, in turn, shall be attached to a vibration table. A sensor shall monitor the vibration of the receptacle at a point on or near the receptacle. A counterpart plug shall be engaged with the receptacle and be attached without the use of safety wire. The wire bundles or cables shall be clamped to non-vibrating points at least 8 inches from the rear of the connectors. The clamping length shall be chosen to avoid resonance of the wire bundles or cables. All contacts shall be wired in a series circuit, and a current that shall be not greater than 100 mA shall flow through the series circuit during the test. An instrument shall be employed to monitor the current flow and to indicate discontinuity of contact or interruption of current flow (see 3.12).

4.6.8.1 Sine Vibration (solder contact connectors only)

The mated connector shall be mounted as specified in 4.6.8 and vibrated in accordance with EIA 364-028, test condition II.

4.6.8.2 Sine Vibration (series II only)

Mated connectors shall be mounted as specified in 4.6.8 and tested in accordance with EIA 364-028, test condition III, and also in accordance with the endurance test of MIL-STD-167-1.

4.6.8.3 Random Vibration (series III only)

Wired, mated connectors shall be tested in accordance with to EIA 364-028. The following details shall apply:

a. The connector shall be mounted on the table.

b. Test condition VI - letter J.

c. The duration of test shall be 8 hours in the longitudinal direction and 8 hours in the perpendicular direction.

4.6.9 Shock (see 3.13)

4.6.9.1 Shock (except class D, DS, DT, DY, and DZ connectors)

Mated connectors shall be tested in accordance with EIA 364-027, test condition A. Connectors shall be mounted and mated. All contacts shall be wired in a series circuit with a current that shall be not greater than 100 mA. The wire bundles or cables shall be clamped to structures that move with the connectors. A minimum of 8 inches of wire or cable shall be unsupported behind the rear of each connector.

4.6.9.2 High Impact Shock (class D, DS, DT, DY, and DZ connectors)

Complete mated connectors with AS85049/11 backshells or AS31091 boots with 6 feet of unarmored cable (see Table 14) installed shall be tested in accordance with MIL-S-901, Grade A. Mounting fixtures shall be in accordance with MIL-S-901, lightweight. All contacts shall be wired in a series circuit with a current that shall be not greater than 100 mA flowing through the series circuit during the high impact shock. A device shall be used to monitor the current flow and to indicate any discontinuity which exceeds 10 µs interruption of current flow. The mated connectors shall be held together only by the locking device. Cable or wires shall be supported on a stationary frame not closer than 36 inches from the connector assembly.

4.6.10 Humidity

Mated connectors shall be exposed to a relative humidity in accordance with EIA 364-031, method II, at a room temperature of 71 °C ± 2 °C for 14 days. Immediately after exposure, without any forced drying, conduct the dielectric withstanding voltage test of 4.6.7.4. Class H receptacles and AS31021 receptacles shall have their rear portion enclosed and not exposed to humidity (see 3.14).

4.6.11 Contact Resistance

The contact resistance shall be measured in accordance with EIA 364-06. Solder contact connectors shall be tested with the coupling ring removed (see 3.15 and 4.6.13.3).

4.6.12 Durability

Counterpart connectors shall be mated and unmated 100 times at a rate that shall not be greater than 60 cycles per hour in accordance with EIA 364-09 (see 3.16). AS34591 connectors shall be mated and unmated 500 times at a rate that shall not be greater than 300 cycles per hour in accordance with the AS34591 detail sheet requirement.

4.6.13 Corrosion

Unmated connectors and individual contact samples shall be tested in accordance with EIA 364-026. The samples shall not be mounted but suspended from the top of the chamber using waxed twine, string, glass rods, or glass cord. Wire ends shall be protected to prevent salt migration. The details and exceptions of this test shall be as specified in 4.6.13.1, 4.6.13.2, and 4.6.13.3 (see 3.17).

4.6.13.1 Corrosion (class A, B, C, E, F, P, R, and class H and AS31001 series class K ferrous alloy connectors)

Test condition letter B.

4.6.13.2 Corrosion (series II and series III class K ferrous alloy connectors and class L, U, DY and WY aluminum connectors)

Test condition letter A for class K, L and U. The connectors shall be subjected to the salt spray test for 48 hours mated followed by 48 hours unmated.

Test condition letter C for class DY and WY. The connectors shall be subjected to the salt spray test for 250 hours mated followed by 250 hours unmated.

4.6.13.3 Dynamic Corrosion (Class X and Classes DS, HS, KS, LS, US and WS Stainless Steel Connectors)

Test condition letter D. The plugs and receptacles shall be mated and unmated 50 cycles at a rate that shall be not greater than 300 cycles per hour. The mating and unmating shall be accomplished so that the plugs and receptacles are completely separated during each cycle. The connectors shall then be subjected to the salt spray test for 952 hours mated, followed by 48 hours unmated. After salt spray exposure, the remaining number of durability cycles specified in 4.6.12 shall be completed.

4.6.13.3.1 Dynamic Corrosion - 500 hours (Classes D, DJ, DT, DZ, W, WT, and WZ)

Test condition letter C. The plugs and receptacles shall be mated and unmated 50 cycles at a rate that shall be not greater than 300 cycles per hour. The mating and unmating shall be accomplished so that the plugs and receptacles are completely separated during each cycle. The connectors shall then be subjected to the salt spray test for 452 hours mated, followed by 48 hours unmated. After salt spray exposure, the remaining number of durability cycles specified in 4.6.12 shall be completed.

4.6.14 Insulation Resistance

4.6.14.1 Insulation Resistance at Room Temperature (see 3.18.1)

Unmated connectors shall be tested in accordance with EIA 364-021. The following details and exceptions shall apply:

a. For lot acceptance testing simulated contacts and special techniques, as approved by the qualifying activity (see 6.2), are permitted to be used in performing this test.

b. The tolerance on the applied voltage shall be ±10%.

4.6.14.2 Insulation Resistance at Room Temperature (group A)

Insulation resistance shall be measured in accordance with 4.6.14.1 between at least two closest adjacent contacts, and between the shell and at least one contact closest to shell. Simulated contacts and shells are permitted to be used (see 3.18.1).

4.6.14.3 Insulation Resistance at Elevated Temperature (short time)

The insulation resistance shall be measured in accordance with 4.6.14.1 except that the connectors shall have been exposed to an ambient temperature of 125 °C (257 °F) for 60 hours. After completion of the 60 hours and while at the 125 °C temperature, measurements shall be made. During the duration of the test sequence, and while at the 125 °C temperature measurements shall be made at least two times. The interval between each series of measurements shall be not less than 24 hours (see 3.18.2).

4.6.14.4 Insulation Resistance at Elevated Temperature (long time)

The insulation resistance shall be measured in accordance with 4.6.14.1. Elevated temperatures and required minimum insulation resistances are specified in Table 20. All measurements shall be made at the end of 1000 hours while the connectors are at the elevated temperature (see 3.18.3).

Table 20 - Insulation resistance at elevated temperature (long time)

Class of Connector	Minimum Insulation Resistance (megohms)	Test Temperature +5 °C (41 °F) –0 °C (32 °F)
A, B, C, E, F, P, and R	30	85 °C (185 °F)
H	50	175 °C (347 °F)
K	100	175 °C (347 °F)
L, D, U, and W	1000	200 °C (392 °F)

4.6.15 Fluid Immersion (see 3.19)

4.6.15.1 Limited Capabilities (class A, B, C, E, F, P, and R)

Unmated connectors shall be fully immersed in the fluids specified below for the required periods. At least one connector with its mating counterpart shall be immersed in each fluid. After removal from the fluid, each connector shall remain for 1 hour in air at room conditions. Connectors shall be fully mated with mating connectors that were immersed simultaneously in the same fluid.

a. Hydraulic fluid conforming to MIL-PRF-5606 – 20 hours.

b. Lubricating oil conforming to MIL-PRF-7808 – 20 hours.

4.6.15.2 Complete Capabilities (class, D, DT, DY, DZ, K, L, H, U, W, X, WT, WY, and WZ)

Connector samples shall be tested in accordance with EIA 364-010 (one sample per fluid). Following the fluid immersion cycles, the connector shall be visually examined at 3X magnification for cracks and tears and shall be mated by hand.

4.6.16 Firewall (class K conductors)

The mated, torqued, and wired connectors shall be tested in accordance with EIA 364-045 (see 3.20). The wire bundles shall be clamped to fixed points at least 8 inches behind the connectors. Test currents shall be as specified in Table 21.

Table 21 - Firewall test currents

Contact Size		DC Test Current (amperes)
Mating End	Wire Barrel End	
16	16	22
12	12	41
8	8	73
4	4	135
0	0	245

4.6.17 Insert Retention

Unmated connectors shall be tested in accordance with EIA 364-035 (see 3.21). The maximum pressure shall be as specified in Table 22.

Table 22 - Insert retention test pressures

Shell Size	Test Pressure (psi gage)	
	All Classes Except H	Class H
8 through 12	150	200
14 through 18	100	
20 through 22	75	
24 through 28	60	
32 through 40	45	
44 through 48	30	

4.6.18 Moisture Resistance

Moisture resistance test specimens shall be subjected to the high humidity (see 4.6.18.1) or extreme humidity range (see 4.6.18.2) moisture tests, as applicable. The connectors shall be wired and mated to the counterpart connectors. They shall be mounted horizontally with the wires descending into the backshell with no drip loops or splices within the chamber. The wires shall leave the chamber through vapor tight seals. Connectors without rear seal grommets shall have their terminals protected (see 3.22). Prior to the beginning of the test and at the end of the test period and while at the high humidity, the insulation resistance between each contact and other contacts shall be determined as specified in of EIA 364-021.

4.6.18.1 Moisture Resistance at High Humidity (crimp contact connectors)

Wired, mated connectors shall be tested in accordance with EIA 364-031. The following details and exceptions shall apply:

a. Test procedure – method IV.

b. The mated connectors shall be mounted in a vertical position.

c. Step 7a shall be performed during the last cycle.

d. Three hours minimum after the start 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 °C ± 5 °C (68 °F ± 9 °F) and condensation is observed on the connector.

e. For qualification testing, insulation resistance readings shall be made on a minimum of 50% of the circuits.

4.6.18.2 Moisture Resistance, Extreme Humidity Range (solder contact connectors)

Mated solder contact connectors shall be subjected to the following test. The test chamber shall consist of a box 12 inches deep by 16 inches wide by 24 inches long, capable of being sealed, and shall be constructed of materials that, in the presence of water, do not affect deterioration of the samples. An open screen tray shall be provided to support the test specimens 8 inches below the top of the box. Provisions shall be made to bring out wires for measurement purposes through vapor tight seals near the top of the box. Controls shall be provided that will cause the chamber air temperature to vary 5 °C (9 °F) once each hour for 20 days, from any temperature between 22 and 28 °C (72 and 82 °F) causing heavy condensation to form on the samples once each hour. The bottom of the test chamber shall be covered with 1/4 inch of tap water to start the test. The heat application to supply the temperature variation shall be radiant in nature and applied to the underside of the test chamber.

4.6.19 Water Pressure

When specified (see 3.23.1 and 3.23.2), electrical connectors shall pass the water pressure tests of 4.16.9.1 or 4.6.19.2.

4.6.19.1 Solder Contact Receptacles (except class A, B, H, K, and P)

The connectors shall be immersed in tap water to a depth of 6 feet for 48 hours as follows:

a. Receptacles shall be mounted by using flange gaskets. Jam nut mounting receptacle flanges shall be sealed only with O-ring seals provided as accompanying hardware. One-half of the wall mounting receptacles shall be front mounted and the remaining half shall be back mounted. The terminal ends of the receptacles shall be external to the tank.

b. 50% of the connectors tested shall be mated, and insulation resistance of the mated immersed connectors shall be measured at the end of the 48 hour period. The other 50% of the connectors shall be tested unmated. Upon completion of the test, the connectors shall be removed from the tank, all external moisture removed from the connectors by shaking them at room temperature, and insulation resistance measured within 1/2 hour after removal from the water. Receptacles, mated and unmated, shall be inspected for leakage through or around the insert and for leakage of the panel seals (see 3.23.1).

4.6.19.2 Crimp Contact Connectors and Accessories

Crimp contact connectors or connector accessories shall be tested in accordance with 4.6.19.1 except 100% of the connectors shall be tested mated. Dummy connectors, duplicating crimp contact connector accessory interfacing features (see Figure 1), are permitted for use in lieu of actual connectors in testing the accessories (see 3.23.2).

4.6.20 External Bending Moment

The receptacles shall be mounted to a rigid panel. Before mating the plug to the receptacle, a bending moment test arm shall be threaded onto the rear of the plug shell. The fixture shall be of any design which will permit the application of the load except it must not provide support for the connector shell in front of the engaged threads (see Figure 9). After mating the plug and receptacle, the bending moment listed in Table 23 measured from the panel shall be applied. The load shall be applied at a rate of 10 pounds/second until the required load is applied. The load shall then be held for 1 minute (see 3.24).