SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS39029 | REV. C

Issued 2001-01
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Superseding AS39029B

Contacts, Electrical Connector, General Specification For

RATIONALE

The AE-8C1 committee approved the AS39029B draft without the PdNi plating requirements in it. The published AS39029B document does not reflect the document version approved by committee and needs to be revised to remove the inappropriate information.

1. SCOPE

1.1 Scope

This specification covers the general requirements for removable crimp, solderless wrap, and solder type electrical contacts for use in connectors and other electric and electronic components (see 6.1) with stranded conductor wire. The contacts shall be capable of operating within the temperature range as specified (see 3.1).

1.2 Classification

1.2.1 Part Number and BIN (Basic Identification Number) Code

Each contact shall be identified by a non-significant, but distinctive three digit number indicating the BIN code as specified on the applicable specification sheet (see 3.1 and the Appendix A). The part number shall be as specified in the specification sheets (see 3.1).

1.2.2 Class

Contacts shall be of the following classes as specified (see 3.1).

Class A - Maximum operating temperature +125 °C.

Class B - Maximum operating temperature +200 °C.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
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SAE WEB ADDRESS: http://www.sae.org

1.2.3 Type

Contacts and bushings shall be of the types shown in Table 1 as specified (see 3.1).

TABLE 1 - CONTACT TYPES

Type	Material	Application/Specification
A	Copper alloy	General Purpose / ASTM B 36, B 121, B 16, B 16M, B 124 or equivalent
B	Ferrous alloy	Hermetic / ASTM B 829
C	Nickel-Chromium (formerly Chromel)	Thermocouple / ASTM E 230 Type E Thermocouple / ASTM E 230 Type K
	Nickel-Aluminum/Silicon (formerly Alumel)	Thermocouple / ASTM E 230 Type K
	Copper-Nickel Alloy (formerly Constantan)	Thermocouple / ASTM E 230 Type E Thermocouple / ASTM E 230 Type J Thermocouple / ASTM E 230 Type T
	Iron	Thermocouple /ASTM E 230 Type J
	Copper	Thermocouple /ASTM E 230 Type T
D	Copper alloy	Shielded (including coaxial, twin-axial, and tri-axial) / ASTM B 36, B 121, B 16, B 16M, B 124

1.3 Deletion of Stock

Deletion of stock manufactured to a revision letter prior to the revision letter specified in this basic specification and a specification sheet shall be specified herein and in the specification sheet.

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 the 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 U.S. Government Documents

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.

MIL-DTL-22520 Crimping Tools, Terminal, Tool Kits, Hand or Power Actuated, Wire Termination, General Specification for

MIL-DTL-55330 Connectors, Electrical and Fiber Optic, Packaging of

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

MS3190 Contact Wire Barrel, Crimp Type

MIL-HDBK-454 Department of Defense Handbook, General Guidelines for Electronic Equipment

SD-6 Provisions Governing Qualification

2.2 Other Publications

The following documents form a part of the specification to the extent specified herein. Detail sheets that do not appear in the following list have been cancelled. Unless otherwise specified the issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

2.2.1 SAE Publications

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

AIR1351 Manufacturer's Identification of Electrical Connector Contacts, Terminals and Splices

AS4461 Assembly and Soldering Criteria for High Quality/High Reliability Soldered Wire and Cable Termination in Aerospace Vehicles

AS5261 Contact Wire Barrel, Crimp Type

AS22759 Wire, Electric, Flouropolymer-Insulated, Copper or Copper Alloy

AS31971 Gage Pin for Socket Contact Engagement Test

AS33481 Contact Bushing, Electric, Wire Barrel

AMS-P-81728 Plating, Tin-lead (Electro-deposit)

AMS-QQ-N-290 Nickel Plating (Electrodeposited)

2.2.1.1 AS39029 Specification Sheets

AS39029/1 Contacts, Electrical Connector, Pin, Crimp Removable (For AS81714 Terminal Junction System)

AS39029/2 Contacts, Electrical Connector, Pin, Crimp Removable (For AS81659 Series 1 Connectors)

AS39029/3 Contacts, Electrical Connector, Socket, Crimp Removable (For AS81659 Series 1 Connectors)

AS39029/4 Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-26482 Series 2, AS81703 Series 3, MIL-DTL-83733, and MIL-DTL-83723 Series 3 Connectors)

AS39029/5 Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-26482 Series 2, AS81703 Series 3, MIL-DTL-83733, and MIL-DTL-83723 Series 3 Connectors)

AS39029/7 Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-DTL-26482 Series 2 and AS81703 Series 3 Connectors)

AS39029/8 Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-DTL-26482 Series 2 and AS81703 Series 3 Connectors)

AS39029/9 Contacts, Electrical Connector, Pin, Crimp Removable, Thermocouple (For MIL-DTL-26482 Series 2, AS81703 Series 3, MIL-DTL-83723 Series 3, and MIL-DTL-83733 Connectors)

AS39029/10 Contacts, Electrical Connectors, Socket, Crimp Removable, Thermocouple (For MIL-DTL-26482 Series 2, AS81703 Series 3, MIL-DTL-83723 Series 3, and MIL-DTL-83733 Connectors)

AS39029/11 Contacts, Electrical Connector, Pin, Crimp Removable (For AS81659 Series 2 Connectors)

AS39029/12 Contacts, Electrical Connector, Socket, Crimp Removable (For AS81659 Series 2 Connectors)

AS39029/16	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-C-81511 Series 4 Connectors)
AS39029/17	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-C-81511 Series 3 Connectors)
AS39029/18	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-C-81511 Series 3 and 4 Connectors)
AS39029/19	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-C-81511 Series 3 and 4 Connectors)
AS39029/20	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-C-81511 Series 3 Connectors)
AS39029/21	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-C-81511 Series 4 Connectors)
AS39029/22	Contacts, Electrical Connector, Socket, Crimp Removable (AS81714 Terminal Junction System Series II, TJS and MIL-C-81511 Series 3 and 4 Class L Connectors)
AS39029/23	Contacts, Electrical Connectors, Pin, Crimp Removable, Shielded (For MIL-DTL-26482 Series 1 Connectors)
AS39029/24	Contacts, Electrical Connectors, Socket, Crimp Removable, Shielded (For MIL-DTL-26482 Series 1 Connectors)
AS39029/25	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-DTL-26482 Series 1 Connectors)
AS39029/26	Contacts, Electrical Connectors, Socket, Crimp Removable, Shielded (For MIL-DTL-26482 Series 1 Connectors)
AS39029/27	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, Size 12 (For MIL-DTL-38999 Series II Connectors)
AS39029/28	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded, Size 12 (For MIL-DTL-38999 Series I, II, III and IV Connectors)
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 AS34501 Series and MIL-DTL-83723 Series II Connectors)
AS39029/31	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-26482 Series 1, MIL-DTL-26500 and MIL-DTL-26518 Connectors)
AS39029/32	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-C-26482 Series 1, MIL-DTL-26500 and MIL-DTL-26518 Connectors)
AS39029/33	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-C-81511 Series 1 Connectors)
AS39029/34	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-28748/3 and MIL-DTL-28748/13 Connectors)
AS39029/35	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-28748/4 and MIL-DTL-28748/14 Connectors)
AS39029/36	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-28748/9 Connectors)

AS39029/37	Contacts, Electrical Connector, Socket, Crimp Removable, (For MIL-DTL-28748/10 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)
AS39029/46	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-C-81511 Series 2 Connectors)
AS39029/47	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-C-81511 Series 1 and 2 Connectors)
AS39029/48	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-22992 Class L Connectors)
AS39029/49	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-22992 Class L Connectors)
AS39029/50	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-DTL-83733 Connectors)
AS39029/51	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-DTL-83733 Connectors)
AS39029/54	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-DTL-26500 and MIL-DTL-26518 Connectors)
AS39029/55	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-DTL-26500 and MIL-DTL-26518 Connectors)
AS39029/56	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-38999 Series I, III, and IV Connectors)
AS39029/57	Contacts, Electrical Connectors, Socket, Crimp Removable (For MIL-C-24308, MIL-DTL-38999 Series II, MIL-DTL-55302/68, /71, /72, /75 and MIL-DTL-83733 Connectors)
AS39029/58	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-24308, MIL-DTL-38999 Series I, II, III, and IV, and MIL-DTL-55302/69 and MIL-DTL-83733 Connectors)
AS39029/59	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, Size 8 (For MIL-DTL-38999 Series I, III, and IV Connectors)
AS39029/60	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded, Size 8 (For MIL-DTL-38999 Series I, III, and IV Connectors)
AS39029/63	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-24308 Connectors)
AS39029/64	contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-24308 Connectors)
AS39029/69	Connector Contact, Electrical Socket, Crimp Removable (For AS85028(AS) Connectors
AS39029/70	Connector Contact, Electrical Pin, Crimp Removable (For AS85028(AS) Connectors
AS39029/71	Contacts, Electrical Connector, Pin, Removable, Solderless Wrap-Post Termination (For MIL-DTL-38999 Series II, MIL-DTL-24308, MIL-DTL-83733, and MIL-DTL-55302/69 Connectors)
AS39029/72	Contacts, Electrical Connector, Socket, Removable, Solderless Wrappost Termination (For MIL-DTL-38999 Series I, II, III, and IV, MIL-DTL-24308, and MIL-DTL-55302/68, /71, and /75 Connectors)
AS39029/73	Contacts, Electrical Connectors, Socket, Solder, Removable, Shielded (For MIL-DTL-83723 Series 3, MIL-DTL-26482 Series 2 and MIL-DTL-83733 Connectors)

AS39029/74	Contacts, Electrical Connectors, Pin, Solder, Removable, Shielded (For MIL-DTL-83723 Series 3, MIL-DTL-26482 Series 2 and MIL-DTL-83733 Connectors)
AS39029/75	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, Size 12 (For MIL-DTL-38999 Series I, II, III and IV Connectors)
AS39029/76	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded, Size 16 (For MIL-DTL-38999 Series I, II, III, and IV and MIL-DTL-24308 Connectors)
AS39029/77	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, Size 16 (For MIL-DTL-38999 Series I, III and IV Connectors)
AS39029/78	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded, Size 16 (For MIL-DTL-38999 Series II and MIL-DTL-24308 Connectors)
AS39029/79	Contacts, Electrical Connector, Pin, Crimp Removable, Shielded (For MIL-DTL-28748/9 Connectors)
AS39029/80	Contacts, Electrical Connector, Socket, Crimp Removable, Shielded (For MIL-DTL-28748/10 Connectors)
AS39029/83	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-28840 Connectors)
AS39029/84	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-28840 Connectors)
AS39029/85	Contacts, Electrical Connector, Pin, Crimp Removable, Thermocouple (For AS50151, AS34501 Series and MIL-DTL-83723 Series II Connectors)
AS39029/86	Contacts, Electrical Connector, Socket, Crimp Removable, Thermocouple (For AS50151, AS34501 Series and MIL-DTL-83723 Series II Connectors)
AS39029/87	Contacts, Electrical Connector, Pin, Crimp Removable, Thermocouple (For MIL-DTL-38999 Series I, II, III, and IV, MIL-DTL-24308, and MIL-DTL-83733)
AS39029/88	Contacts, Electrical Connector, Socket, Crimp Removable, Thermocouple (For MIL-DTL-38999 Series I, III, and IV Connectors)
AS39029/89	Contacts, Electrical Connector, Socket, Crimp Removable, Thermocouple (For MIL-DTL-38999 Series II, MIL-DTL-83733, and MIL-DTL-24308 Connectors)
AS39029/90	Contact, Electrical Connector, Concentric Twinax, Pin, Size 8
AS39029/91	Contact, Electrical Connector, Concentric Twinax, Socket, Size 8
AS39029/92	Contacts, Electrical Connector, Crimp Removable (For MIL-S-12883/ 40 and /41 Relay Sockets)
AS39029/93	Contacts, Electrical Connector, Pin, Crimp Removable (For MIL-DTL-83527 Connector)
AS39029/94	Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-DTL-83527 Connector)
AS39029/97	Contacts, Electrical Connector, Pin, Crimp Removable, Coaxial, Size 1 (For MIL-DTL-83527 Connectors)
AS39029/98	Contacts, Electrical Connector, Socket, Crimp Removable, Coaxial, Size 1 (For MIL-DTL-83527 Connectors)
AS39029/99	Contacts, Electrical Connector, Socket, Crimp Removable, Coaxial, Size 5 (For MIL-DTL-83527 Connectors)

AS39029/100 Contacts, Electrical Connector, Socket, Crimp Removable, Coaxial, Size 5 (For MIL-DTL-83527 Connectors)

AS39029/101 Contacts, Electrical Connector, Socket, Crimp Removable (For MIL-S-12883/44, MIL-S-12883/45, and MIL-S-12883/46 Relay Sockets)

AS39029/102 Contacts, Electrical Connector, Pin, Crimp Removable, coaxial, Size 12 (For MIL-DTL-38999 Series I, II, III and IV Connectors)

AS39029/103 Contacts, Electrical Connector, Socket, Crimp Removable, Coaxial, Size 12 (For MIL-DTL-38999 Series I, III and IV Connectors)

AS39029/104 Contacts, Electrical Connector, Concentric Twinax, Pin, Shielded, Size 8 (For MIL-DTL-28840)

AS39029/105 Contacts, Electrical Connector, Concentric Twinax, Socket, Shielded, Size 8 (For MIL-DTL-28840)

AS39029/106 Contacts, Electrical Connector, Socket, Crimp-Removable (For MIL-DTL-38999 Series I, III and IV and MIL-DTL-29600 Series A Connectors)

AS39029/107 Contacts, Electrical Connector, Pin, Crimp-Removable (For MIL-DTL-38999 Series I, III and IV and MIL-DTL-29600 Series A Connectors)

AS39029/112 Contact Bushing, Electric, Wire Barrel

AS39029/113 Contact, Electrical Connector, Concentric Twinax, Pin, Size 8 (For MIL-DTL-38999 Connectors)

AS39029/114 Contact, Electrical Connector, Concentric Twinax, Socket, Size 8 (For MIL-DTL-38999 Connectors)

2.2.2 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

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

ANSI/ISO10012-1 Quality Assurance Requirements for Measuring Equipment

2.2.3 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 E 230 Standard Specification and Temperature-Electromotive Force (EMF) Tables forStandardized Thermocouples

ASTM A 342 Test Method for Permeability of Feebly Mechanic Materials

ASTM B 488 Standard Specification for Electrodeposited Coatings of Gold for Engineering Uses

ASTM E 595 Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Out-gassing in a Vacuum Environment

ASTM B 700 Standard Specification for Electrocomposte Coatings of Silver for Engineering

2.2.4 ASQ Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (United States or Canada)) or +1-414-272-8575 (International), www.asq.org.

ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

2.2.5 EIA Publications

Available from Electronic Industries Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834, Tel: 703-907-7500, www.eia.org.

EIA RS359 EIA Standard Colors for Identification and Coding

EIA-364-D Electrical Connector/Socket Test Procedures Including Environmental Classifications

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

EIA-364-08 Crimp Tensile Strength Test Procedure for Electrical Connectors

EIA-364-20 Withstanding Voltage Test Procedure for Electrical Connectors, Sockets and Coaxial Contacts

EIA-364-21 Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts

EIA-364-23 Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets

EIA-364-25 Probe Damage Test Procedure for Electrical Connectors

EIA-364-26 Salt Spray Test Procedure for Electrical Connectors, Contacts and Sockets

EIA-364-27 Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors

EIA-364-28 Vibration Test Procedure for Electrical Connectors and Sockets

EIA-364-31 Humidity Test Procedure for Electrical Connectors and Sockets

EIA-364-32 Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets

EIA-364-37 Contact Engagement and Separation Forces for Electrical Connectors

EIA-364-53 Nitric Acid Vapor Test, Gold Finish Test Procedure for Electrical Connectors and Sockets

2.2.6 IPC Publications

Available from IPC, 3000 Lakeside Drive, Bannockburn, IL 60015, Tel: 847-597-2862, www.ipc.org.

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

2.2.7 NASA Publications

Available from NASA, Documentation, Marshall Space Flight Center, AL 35812, www.nas.nasa.gov.

Publication 1124 Out-gassing Data for Selecting Spacecraft Materials

2.2.8 NCSL Publications

National Conference of Standards Laboratories, 2995 Wilderness Place, Suite 107, Boulder, CO 80301-5404, Tel: 303-440-3339, www.ncsli.org.

NCSL Z540-1 General Requirements for Calibration Laboratories and Measuring and Test Equipment

2.3 Order of Precedence

In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Acquisition Specifications

The individual item requirements shall be as specified this acquisition specification and in accordance with the applicable specification sheets (see 2.2.1.1). Unless otherwise specified in 3.1.1 through 3.1.4, any conflict between requirements of this specification and the specification sheet, the latter shall govern. Unless otherwise specified by contract or purchase order, product purchased to this specification shall be supplied to the latest revision in effect at issuance of the contract or purchase order (see 6.2).

3.1.1 Specification Sheets AS39029/9, /10, /31, /32, and /85-/89

In the materials or design characteristics table for each slash sheet the materials requirement shall be as follows:

Constantan shall be replaced with Jn
Alumel shall be replaced with Kn
Chromel shall be replaced with Kp
Iron shall be replaced with Jp

3.1.1.1 A footnote shall be added to the materials tables as follows:

Jn = Type J negative (formerly Constantan)
Kn = Type K negative (formerly Alumel)
Kp = Type K positive (formerly Chromel)
Jp = Type J positive (formerly Iron)

3.1.2 Specification Sheets AS39029/4, and /5

The “Localized Finish Option” and “Porosity Test, Localized Finish” requirements from each specification sheet shall be deleted.

3.1.3 Specifications Sheets AS39029/1-/5, /9-/12, /16-/18, /29-/33, /44-/47, and /106-/107

For the sited specification sheets an alternate design of the wire barrel lead-in angle shall be as follows:

Size 22 - Blend Radius 0.010 inches ± 0.005 inches
Size 20 - Blend Radius 0.015 inches ± 0.005 inches
Size 16 - Blend Radius 0.020 inches ± 0.005 inches

3.1.4 Specification Sheets AS39029/69 and /70

The low signal contact resistance on nickel plated conductor does not consistently meet requirements after Table 12, Group III conditioning. The requirement shall be waved for Qualification.

3.2 Qualification (see 4.4, 4.5 and 6.3)

Contacts furnished under the specification shall be products which are qualified for listing in the applicable qualified products list (QPL) at the time set for the opening of government bids or commercial purchase orders.

3.2.1 Use of Part Numbers

Part numbers shall not be applied to a product, except for qualification test samples (see 6.3), until notification has been received from the activity responsible for qualification that the product has been approved for listing on the qualified products list.

3.3 Materials (see 4.7.1)

Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the contacts to meet the performance requirements of the specification and the applicable specification sheet (see 3.1). Acceptance or approval of any constituent material shall not be construed as a guaranty of acceptance of the finished product.

3.3.1 Metals

The material for contacts and bushings shall be electrically conductive and shall be in accordance with Table 1. Hoods shall be made of corrosion-resistant steel.

3.3.1.1 Dissimilar Metals

When dissimilar metals are employed in intimate contact with each other, suitable protection against electrolytic corrosion shall be provided as specified in Guideline 16 of MIL-HBK-454.

3.3.1.2 Thermocouple Material

All thermocouple materials shall conform to ASTM E 230 for standard limits of error.

3.3.2 Accessory Members

Accessory members such as pressure members and retaining devices shall be corrosion-resistant material or shall be passivated or suitably treated to resist corrosion. Hoods shall be corrosion-resistant steel.

3.3.3 Finish (see 4.7.1 and 6.7)

Types A, B and D contacts shall have a finish as specified. Each desired finish shall be qualified.

3.3.3.1 Overall Finish (Type A and B)

The external plated surface diameters of the bodies of contact sizes larger than 12 and size 12 contacts used in AS50151 (MIL-DTL-5015) and MIL-DTL-83723, Series II connectors shall be silver-plated 0.00020 inch thick minimum in accordance with ASTM B 700. Unless otherwise specified (see 3.1), the external plated surface diameters of the body of all other size 12 and smaller contacts, except as noted in 3.3.2, shall be gold-plated in accordance with ASTM B 488, Type II, Code C, 0.000050 minimum thickness. The entire surface of the body of the contact shall have a nickel underplate per AMS-QQ-N-290, class 2, 0.00003 to 0.00015 inch thick.

3.3.3.2 Overall Finish (Type C)

Ferrous iron, ANSI Type J contacts shall be suitably protected from corrosion (see 3.1).

3.3.3.3 Overall Finish (Type D)

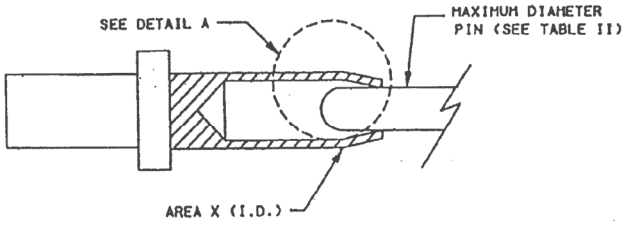
Inner and outer contacts of shielded contacts shall be gold-plated in accordance with ASTM B 488, Type II, Code C, 0.000050 minimum thickness. The entire surface of the body of the contact shall have a suitable underplate except silver shall not be used. A nickel underplate shall be per AMS-QQ-N-290, class 2, 0.00003 to 0.00015 inch thick.

3.3.3.4 Localized Finish (Types A and B)

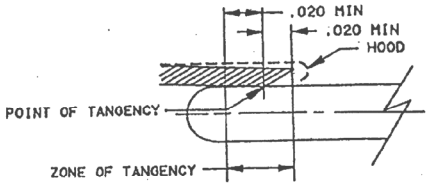
The body of contact size 12 and smaller shall have gold in accordance with ASTM B 488 , Type II, Code C, 0.000050 minimum thickness applied to areas X and Y (see Figure 1), as applicable. All other surfaces, except as noted in 3.3.2 and solderless wrap termination areas, shall be finished with gold in accordance with ASTM B 488, any type and grade (no thickness specified). The solderless wrap termination areas shall be plated the same as areas X and Y (see Figure 1), or plated with tin-lead, per AMS-P-81728, 50 to 95% tin, 0.0001 inch minimum thickness. Dimensions E and F shall be as specified in Appendix A. The entire surface of the body of the contact shall have a nickel underplate per AMS-QQ-N-290, class 2, 0.00003 to 0.00015 inch thick. Gold discoloration in areas other than X and Y is acceptable.

3.3.3.5 Localized Finish (Type D)

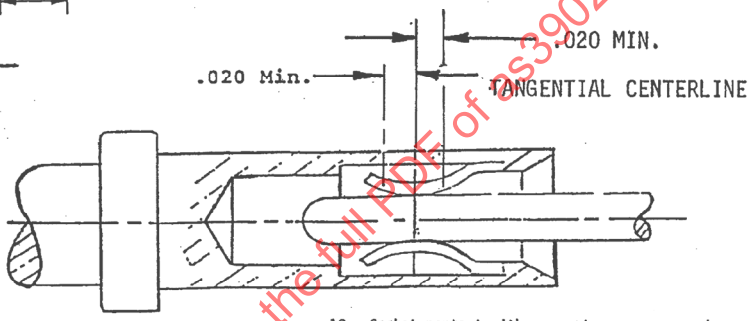
The inner and outer contacts of shielded contacts shall have gold in accordance with ASTM B 488, Type II, Code C, 0.000050 minimum thicknesses when applied to areas X or Y as shown on Figures 1 and 2, as applicable. The designated area includes the entire surface of the bodies of inner and outer contacts. All other surfaces, except as noted in 3.3.2, shall be finished with gold in accordance with ASTM B 488, any type and grade (no thickness specified). Dimensions E and F shall be as specified in Appendix A. The entire surface of the body of the contacts shall have a nickel underplate per AMS-QQ-N-290, class 2, 0.00003 to 0.00015 inch thick. Gold discoloration in areas other than X and Y is acceptable.



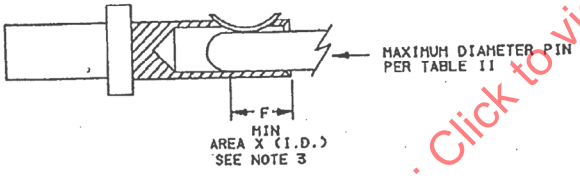
1A. Socket contact with integral pressure member (hood removed).



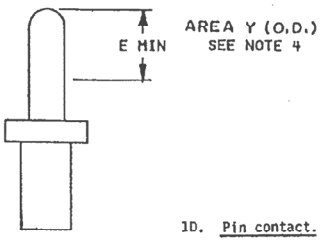
DETAIL A



1C. Socket contact with separate pressure member as primary current carrying interface.



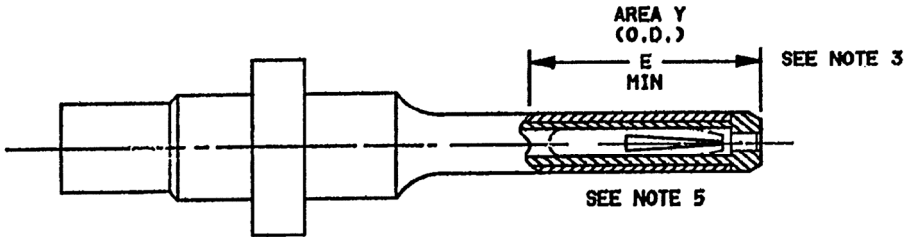
1B. Socket contact with separate pressure members.



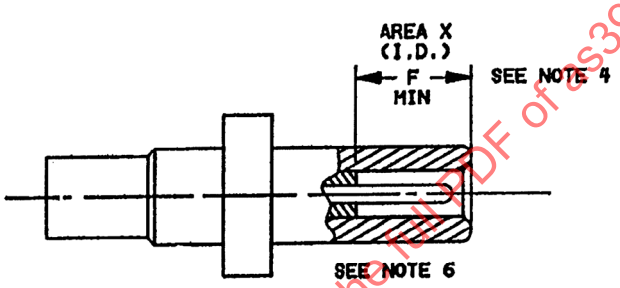
1D. Pin contact.

NOTES:
1. Dimensions are in inches.
2. For dimensions E and F, see the Appendix.
3. F equals the length of maximum electrical contact (wiping) plus .020 (0.51 mm) minimum wipe shall be equal to maximum E of mating pin engagement minus the spherical radius.
4. E equals length of maximum electrical contact (wiping) plus .020 (0.51 mm).

FIGURE 1 - AREAS OF APPLICATIONS OF LOCALIZED FINISH
(TYPES A AND B, ALSO INNER CONTACT OF TYPE D)



2A. Outer pin contact.



2B. Outer socket contact.

NOTES:
1. Dimensions are in inches.
2. For dimensions E and F, see the Appendix.
3. E equals length of maximum electrical contact (wiping) plus .020 (0.51 mm).
4. F equals length of maximum electrical contact (wiping) plus .020 (0.51 mm) minimum. Wipe shall be equal to maximum E of mating pin engagement minus the chamfer.
5. Pin contact - outer socket contact - inner (see Figure 1).
6. Socket contact - outer pin contact - inner (see Figure 1).

FIGURE 2 - AREAS OF APPLICATION OF LOCALIZED FINISH (TYPE D OUTER CONTACTS)

3.4 Design and Construction (see 4.7.1)

Contacts shall be of the design, construction and physical dimensions as specified (see 3.1). Unless otherwise specified, contact crimp barrels are to be designed in accordance with MS3190 or AS5261 (see 6.4.2).

3.4.1 Pin Engagement End

Unless otherwise specified (see 3.1), the mating end of all contacts (except size 22 and smaller) shall be formed with a spherical radius nominally one half the diameter of the pin The flat dimension on the engaging end of the pin contact is specified in Table 2. The mating end of size 22 and smaller pin contacts shall be as specified (see 3.1) and the flat shall be as specified in Table 2.

TABLE 2 - PIN DIMENSIONS AT MATING END (EXCEPT TYPE D)

Engagement End Size	Engagement End Diameter (inches)	Engagement Tip, Flat Diameter (inches)
4/0	.500 ± .001 (0.13) (0.03)	.375 ± .010 (9.53) (0.25)
2/0	.406 ± .001 (10.31) (0.03)	.281 ± .010 (7.14) (0.25)
0	.357 ± .001 (9.07) (0.03)	.232 ± .010 (5.89) (0.25)
2	.283 ± .001 (7.19) (0.03)	.158 ± .010 (4.01) (0.25)
4	.225 ± .001 (5.72) (0.03)	.100 ± .010 (2.54) (0.25)
6	.178 ± .001 (4.52) (0.03)	.086 ± .010 (2.18) (0.25)
8	.142 ± .001 (3.61) (0.03)	.076 ± .010 (1.93) (0.25)
10	.125 ± .001 (3.18) (0.03)	.072 ± .010 (1.83) (0.25)
12	.094 ± .001 (2.39) (0.03)	.062 +.000, -.015 (1.57) (0.00) (0.38)
14	.078 ± .001 (1.98) (0.03)	.039 +.000, -.015 (9.91) (0.00) (0.38)
16	.0625 ± .0010 (1.578) (0.03)	.032 +.000, -.015 (0.81) (0.00) (0.38)
20	.040 ± .001 (1.02) (0.03)	.020 +.000, -.015 (0.51) (0.00) (0.38)
22	.0300 ± .0005 (0.762) (0.013)	.015 Max (0.38)
23	.0270 ± .0005 (0.686) (0.013)	.013 Max (0.33)
24	.0250 ± .0005 (0.635) (0.013)	.012 Max (0.30)
26	.0200 ± .0005 (0.508) (0.013)	.010 Max (0.25)
28	.015 ± .0005 (0.381) (0.013)	.0075 Max (0.191)

3.4.2 Wire Barrel Size

Wire barrel sizes and ranges shall be as specified in Table 3.

TABLE 3 - WIRE BARREL RANGE ACCOMMODATIONS

Wire Barrel Size	Wire Size										
	0000	00	0	1	2	4	6	8	10	12	14
0000	X	X 1/									
00		X	X 1/								
0			X	X	X 1/						
1				X	X 1/		X 1/				
2					X	X 1/					
4						X	X 1/				
6							X	X 1/			
8								X	X 1/		
10									X	X 1/	
12										X	X

Wire Barrel Size	Wire Size								
	16	18	20	22	24	26	28	30	32
16	X	X	X						
20			X	X	X				
22				X	X	X	X 2/4/		
22D 5/				X	X	X	X 4/		
22M 3/					X	X	X 4/		
24					X	X	X 4/		
28 4/							X 4/	X 4/	X 4/

1/ With electrical conductive bushing AS39029/112 (see 3.4.5).
2/ Applies only to contact size 23-22.
3/ Inactive for new design.
4/ See 4.3.2.
5/ See 6.4.4.

3.4.3 Socket Mating End

The mating end of socket contacts shall be rounded or chamfered to direct and center the entry of the pin contact. Mechanical pressure members shall assure contact pressure between mated pins and sockets and the pressure member shall be protected from probe damage, oversize pin and handling damage.

3.4.3.1 Size 12 and Smaller

The mating end of size 12 and smaller removable socket contacts shall be of a closed-entry design (see 3.1). Unless otherwise specified, the pressure member shall not be exposed. The closed-entry design shall exclude the entry of a pin 0.005 inch larger than the allowable maximum pin diameter.

3.4.3.2 Size 10 and Larger

For size 10 and larger socket contacts, the design shall be as specified (see 3.1).

3.4.4 Wire Termination End

Contact wire barrel sizes shall conform to Table 3.

3.4.4.1 Crimp Termination

The contact crimp barrel shall be capable of being crimped to the wire sizes specified in Table 3. Unless otherwise specified (see 3.1), all wire barrels shall be capable of being crimped with MIL-DTL-22520 crimping tools. Wire barrel sizes 0, 4 and 8 shall be capable of being crimped with MIL-DTL-22520/23 crimping die as specified (see 3.1).

3.4.4.2 Solder Terminations

All solder cavities shall be so designed that during normal soldering operation there shall be no damage and no liquid solder will flow through to the front of the mating end preventing engagement of the contact. Unless otherwise specified, the wire barrels shall accommodate the maximum wire size as specified in Table 3. Except for Type C contacts, the interior surfaces of size 12 and 16 wire barrels, if specified, shall be completely tinned over 100% of the full circle portion and for at least 50% of the remainder of the solder well area. The interior surfaces of size 10 and larger wire barrels shall be completely tinned. Solder shall conform to J-STD-006, SN60 or SN63. Solder fluxes shall conform to J-STD-006. No excess solder shall be on the exterior of the wire barrels. Soldering shall be in accordance with AS4461.

3.4.5 Bushing (Size 10 and Larger) Wire Barrels

The bushing shall be electrically conductive and shall be contained in the wire barrel allowing accommodation of the maximum wire size as specified in Table 3. The bushing shall not obstruct the wire inspection hole. Bushings shall conform to AS39029/112.

3.4.6 Surface Roughness

The roughness height, defined in ANSI B46.1 of pin mating surfaces indicated (see 3.1) shall be 32 micro-inches or less after plating. Other surfaces shall be 63 micro-inches or less after plating.

3.5 Contact Performance

3.5.1 Permeability (Types A and D)

When tested as specified in 4.7.2, the relative magnetic permeability of the contact shall be no greater than 2.0μ.

3.5.2 Axial Concentricity

When measured as specified in 4.7.3, unless otherwise specified (see 3.1), all diameters shall be concentric to each other within the limits specified in 3.5.2.1 and 3.5.2.2.

3.5.2.1 Axial Concentricity After Manufacture (Unwired Contacts)

The total indicator reading (TIR) shall not exceed 0.006 for sizes 4/0 through 16 and 0.005 for sizes 20 through 28.

3.5.2.2 Axial Concentricity After Crimping to Wire (Wired Contacts)

The TIR shall not exceed 0.030 for sizes 4/0 through 10, 0.012 for sizes 12 through 16, and 0.011 for sizes 20 through 28 when tested in accordance with 4.7.3. Only contacts which are end positioned in the crimping tool are required to be checked for axial concentricity at the mating end after crimping to wire.

3.5.3 Low Signal Level Contact Resistance

3.5.3.1 Low Signal Level Contact Resistance, Type A (Size 16 Mating End and Smaller)

When tested as specified in 4.7.4, the low signal level contact resistance of each mated contact pair shall not exceed the applicable values specified in Table 4. Silver plated wire shall be used for qualification testing.

TABLE 4 - LOW SIGNAL LEVEL CONTACT RESISTANCE (TYPE A) WITH SILVER PLATED WIRE

Wire Size	Maximum Contact Resistance (milliohms)	
	ICV 1/	TCV 2/ 3/
16	5	6
20	9	11
22	15	17
24	20	23
26	31	38
28	50	60
30	75	88
32	110	125

1/ ICV - Initial condition values
2/ TCV - After conditioning values
3/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage.

3.5.3.2 Low Signal Level Contact Resistance, Type D (Applicable to Center Contact Only) with Silver Plated Wire

When tested as specified in 4.7.4, the low signal level contact resistance of each mated contact pair shall not exceed the values specified in the specification sheet (see 3.1).

3.5.4 Contact Resistance

When contacts are tested as specified in 4.7.5, the contact voltage drop for the various types shall be as specified in Table 5 thru 8. When the contact temperature rating in the specification sheet is not the same as in the contact resistance tables, the contact voltage drop for the next highest temperature above the rated temperature shall be used (i.e., for a 150 °C rated contact use 200 °C values).

3.5.4.1 Contact Resistance, Type A

The contact voltage drop of each mated copper alloy contact pair shall not exceed the applicable values specified in Tables 5 and 6.

TABLE 5 - CONTACT RESISTANCE (TYPE A) WITH SILVER-PLATED WIRE

Wire Size	Test Current Amperes	Maximum Voltage Drop (Millivolts)							
		25 °C ± 3 °C		25 °C ± 3 °C 1/ After Conditioning		125 °C +3 °C -0 °C		200 °C +3 °C -0 °C	
		Max	Max Avg	Max	Max Avg	Max	Max Avg	Max	Max Avg
0000	225	21	19	26	23	32	26	36	27
00	185	19	18	23	20	29	24	33	25
0	150	21	19	26	23	32	26	36	27
1	125	19	18	23	20	29	24	N/R 2/	N/R
2	100	17	16	21	18	26	21	29	22
4	80	23	21	28	24	35	28	40	30
6	60	25	23	30	26	38	31	43	33
8	46	26	24	32	28	39	32	45	34
10	33	33	30	40	37	50	42	57	45
12	23	42	38	51	43	63	51	71	54
14	17	40	36	48	41	60	48	68	51
16	13	49	45	59	51	74	60	84	63
20	7.5	55	50	66	56	83	67	94	71
22	5	73	66	88	75	110	88	125	94
24	3	45	41	54	46	68	55	77	63
26	2	52	47	63	54	73	63	89	67
28	1.5	54	49	65	56	81	65	92	86
30	1	60	55	73	62	90	73	103	78
32	0.5	44	40	53	45	66	53	74	56

1/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage.
2/ N/R - No requirement.

TABLE 6 - CONTACT RESISTANCE (TYPE A) WITH NICKEL-PLATED WIRE

Wire Size	Test Current Amperes	Maximum Voltage Drop (millivolts)							
		25 °C ± 3 °C		25 °C ± 3 °C 1/ After Conditioning		125 °C +3 °C -0 °C		200 °C +3 °C -0 °C	
		Max	Max Avg	Max	Max Avg	Max	Max Avg	Max	Max Avg
0000	225	53	48	65	58	80	65	90	68
00	185	48	45	58	50	73	60	83	63
0	150	53	48	65	58	80	65	90	68
1	125	48	45	58	50	73	60	N/R 2	N/R
2	100	43	40	53	45	65	53	73	55
4	80	58	53	70	60	88	70	100	75
6	60	63	58	75	65	95	78	108	83
8	46	65	60	80	70	98	80	113	85
10	33	50	45	57	56	75	63	86	68
12	23	63	57	77	65	95	77	107	81
14	17	60	54	72	62	90	72	102	77
16	13	74	68	89	77	111	90	126	95
20	7.5	83	75	99	84	125	101	141	107
22	5	110	99	132	113	165	132	188	141
24	3	68	62	81	69	102	83	116	87
26	2	80	72	96	83	120	96	137	104
28	1.5	81	74	98	84	122	98	138	104
30	1	90	83	110	93	135	110	155	117
32	0.5	66	60	80	68	99	80	111	84

1/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage

2/ N/R - No requirement

3.5.4.2 Contact Resistance, Type B

The contact voltage drop of each ferrous alloy contact with its applicable mating copper alloy contact shall not exceed the applicable values specified in Tables 7 and 8.

TABLE 7 - CONTACT RESISTANCE (TYPE B) WITH SILVER-PLATED WIRE

Wire Size	Test Current Amperes	Maximum Voltage Drop (millivolts)							
		25 °C ± 3 °C		25 °C ± 3 °C 1/ After Conditioning		125 °C +3 °C -0 °C		200 °C +3 °C -0 °C	
		Max	Max Avg	Max	Max Avg	Max	Max Avg	Max	Max Avg
0000	185	N/A 2/	N/A	N/A	N/A	N/A	N/A	N/A	N/A
00	150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0	100	231	147	286	182	352	224	396	252
2	80	187	N/R 3/	231	N/R	282	N/R	319	N/R
4	60	253	161	308	196	385	245	440	280
6	46	242	N/R	297	N/R	363	N/R	418	N/R
8	33	286	182	352	224	429	273	495	315
10	23	363	226	418	304	550	350	627	420
12	17	462	294	561	351	693	441	781	497
14	13	440	280	528	336	660	420	748	476
16	10	539	343	649	413	814	518	924	588
20	5	605	385	726	462	913	581	1034	658
22	3	803	511	968	616	1210	770	1375	875
24	2	495	315	594	378	748	476	847	539
26	1.5	583	371	704	448	880	560	1001	637
28	1	594	378	715	455	891	567	1012	644
30	0.5	660	420	803	511	990	630	1133	721
32	0.3	484	308	583	371	726	462	814	518

1/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage
2/ N/A - Not available
3/ N/R - No requirement

TABLE 8 - CONTACT RESISTANCE (TYPE B) WITH NICKEL-PLATED WIRE

Wire Size	Test Current Amperes	Maximum Voltage Drop (millivolts)							
		25 °C ± 3 °C		25 °C ± 3 °C 1/ After Conditioning		125 °C +3 °C -0 °C		200 °C +3 °C -0 °C	
		Max	Max Avg	Max	Max Avg	Max	Max Avg	Max	Max Avg
0000	185	53	48	65	58	80	65	90	68
00	150	48	45	58	50	73	60	83	63
0	125	53	48	65	58	80	65	90	68
1	100	48	45	58	50	73	60	N/R 2/	N/R
2	80	43	40	53	45	65	53	73	55
4	60	58	53	70	60	88	70	100	75
6	46	63	58	75	65	95	78	108	83
8	33	65	60	80	70	98	80	113	85
10	23	545	331	627	456	825	545	944	630
12	17	693	441	847	539	1045	665	1177	749
14	13	660	420	792	504	990	630	1122	714
16	10	814	518	979	623	1221	777	1386	882
20	5.0	913	581	1089	693	1375	875	1551	987
22	3.0	1177	749	1419	903	1771	1127	2002	1274
24	2.0	748	476	891	567	1122	714	1276	812
26	1.5	858	546	1045	665	1287	819	1474	938
28	1.0	891	567	1078	686	1342	854	1518	966
30	0.5	990	630	1210	770	1485	945	1705	819
32	0.3	726	462	880	560	1089	693	1221	777

1/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage

2/ N/R - No requirement

3.5.4.3 Contact Resistance, Type D

The contact voltage drop of each mated copper alloy contact pair (shielded contacts) shall not exceed the values specified in the specification sheet.

3.5.5 Contact Engagement and Separation Force (Socket Contact)

When tested as specified in 4.7.6, unless otherwise specified (see 3.1), the contact engagement and separation force shall be within the applicable limits specified in Table 9.

TABLE 9 - CONTACT ENGAGEMENT AND SEPARATION FORCES

Mating End Size	Initial			After Conditioning 1/		
	Minimum Separation Force (ounces)	Maximum Average Engagement Force (ounces)	Maximum Engagement Force (ounces)	Minimum Separation Force (ounces)	Maximum Average Engagement Force (ounces)	Maximum Engagement Force (ounces)
	Minimum Diameter AS31971 Pin	Maximum Diameter AS31971 Pin	Maximum Diameter AS31971 Pin	Maximum Diameter AS31971 Pin	Maximum Diameter AS31971 Pin	Maximum Diameter AS31971 Pin
0000	15	N/R 2/	320	12	N/R	380
00	15	N/R	320	12	N/R	380
0	15	N/R	320	12	N/R	380
2	10	N/R	240	8	N/R	290
4	10	N/R	240	8	N/R	290
6	5	N/R	160	4	N/R	190
8	5	N/R	160	4	N/R	190
10	4	N/R	60	3	N/R	72
12	3	24	30	2.5	29	36
16	2	24	30	1.5	29	36
20	0.7	12	18	0.6	14	22
22	0.7	9.5	12	0.6	11.4	14
23	0.5	6.8	8	0.4	8.1	10

1/ Applicable tests are temperature cycling, durability, salt spray, temperature life, industrial gas, and probe damage.
2/ N/R - No requirement

3.5.5.1 Maximum Average Engagement Force

The average engagement force with the maximum diameter AS31971 pin, unless otherwise specified (see 3.1), shall not exceed the applicable values specified in Table 9 and shall be established using the sample size selected as specified in 4.4.1 or 4.6.2.1, as applicable.

3.5.6 Temperature Cycling (Types A, B and D)

When tested as specified in 4.7.7, mated contact pairs shall withstand the thermal shock cycling without evidence of damage that would interfere with the mechanical or electrical performance.

3.5.7 Resistance to Test Probe Damage (Types A and B)

When tested as specified in 4.7.8, socket contacts shall withstand the bending moment and depth of the test probe insertion without evidence of damage that would interfere with the mechanical or electrical performance.

3.5.8 Crimp Tensile Strength

When tested as specified in 4.7.9, unless otherwise specified (see 3.1), the minimum axial load required to separate the wire from the contacts (Type A) either by pulling the wire out of the wire barrel or wire barrel bushing or breaking the wire within the wire barrel or wire barrel bushing, shall be not less than the applicable limit specified in Table 10. No failures are permitted.

TABLE 10 - TENSILE STRENGTH (TYPE A)

Wire Size	Axial Load (lb)				
	Silver Plated Copper Wire		Nickel-Plated Copper Wire		
	Initial Condition Values	Thermal Condition Values 1/	Initial Condition Values	Thermal Condition Values 1/	High Strength Copper Alloy Wire
0000	875	787.5	785	706.5	--
00	750	675.0	675	607.5	--
0	700	630.0	630	567.0	--
1	650	585.0	585	526.5	
2	550	495.0	495	445.5	--
4	400	360.0	360	324.0	--
6	300	270.0	270	243.0	--
8	220	198.0	200	180.0	--
10	150	135.0	135	121.5	--
12	110	93.0	100	85.0	--
14	70	61.0	60	53.0	--
16	50	45	37	33	--
20	20	14	19	14.3	--
22	12	7.5	8	6.0	--
24	8	6	6	4.5	--
26	5	4.0	3	2.5	--
28	3	2.25	2	1.50	--
30	1.5	1.13	1.5	1.13	--

1/ Applicable tests are temperature cycling and temperature life.

3.5.9 Durability (Types A, B and D)

When tested as specified in 4.7.10, the contacts shall show no evidence of defects detrimental to the mechanical or electrical performance when subjected to 500 mating cycles.

3.5.10 Vibration

When contacts are tested as specified in 4.7.11, there shall be no electrical discontinuity of 1 microsecond or greater. There shall be no defects detrimental to the mechanical or electrical performance.

3.5.11 Shock (Specified Pulse)

When contacts are tested as specified in 4.7.12, there shall be no electrical discontinuity of 1 microsecond or greater. There shall be no defects detrimental to the mechanical or electrical performance.

3.5.12 Salt Spray (Corrosion) (Types A, B and D)

When tested as specified in 4.7.13, mated contacts shall withstand 48 hours of salt spray conditioning without defects detrimental to the mechanical or electrical performance.

3.5.13 Temperature Life (Types A, B and D)

When tested as specified in 4.7.14, mated contacts shall withstand temperature conditioning for 1000 hours without defects detrimental to mechanical or electrical performance. There shall be no diffusion/migration of the base metal through the contact outer plating.

3.5.14 Industrial Gas (Gold-Finished Contacts Only) (Types A, B and D)

When tested as specified in 4.7.15, unmated contacts shall withstand industrial gas conditioning for 100 hours without defects detrimental to the mechanical or electrical performance.

3.5.15 Contact Strength (Mating End Size 20 and Smaller Pin Contacts, Type A)

After being subjected to mechanical loading specified in 4.7.16, pin contacts shall exhibit a permanent set no greater than 0.005 inch.

3.5.16 Plating Porosity (Gold-finished Contacts Only) (Types A and D)

3.5.16.1 Gold Plating Porosity (Over all gold finish contacts)

When tested as specified in 4.7.17, there shall be no bubbling during the observation period when gold-finished contacts are examined for plating porosity.

3.5.16.2 Localized Gold Finish Contacts

The average corrosion count for the sample lot of localized gold finish contacts shall be 1.0 or less.

3.5.17 Plating Thickness (Types A, B and D)

When measured as specified in 4.7.18, the plating thickness of external plated surface diameters, except for corners, shall be in accordance with 3.3.2. All other surfaces shall be plated to a thickness to assure specified performance of the contact.

3.5.18 Insulation Resistance (Type D)

When tested as specified in 4.7.19, unless otherwise specified (see 3.1), the insulation resistance shall exceed 5.0 gigohms at 25 °C, and 2.0 gigohms at the maximum operating temperature specified on the applicable specification sheet (see 3.1).

3.5.19 Dielectric Withstanding Voltage (Type D)

When tested as specified in 4.7.20, crimped contacts shall show no evidence of breakdown or flashover. Test voltage and altitude shall be as specified (see 3.1).

3.5.20 Crimpability

The supplier shall establish material, finish and process controls to assure that crimp contacts conform to the requirements of 3.4.4.1 and 3.5.8 when subjected to 4.7.21.

3.5.21 Humidity Temperature Cycling (Localized Gold-finished Contacts Only)

When tested as specified in 4.7.22, there shall be no evidence of defects detrimental to the electrical performance.

3.6 Marking (see 4.7.1)

Removable contacts shall be permanently and legibly marked with the supplier's symbol or trademark and BIN code color bands (see Figure 3). For contact size 16 and larger a three digit BIN number representing the color bands may be stamped on the contact with the color band. The stamped digits shall be a minimum of 0.060 inch high. Location of BIN code digits is optional. Unless otherwise specified (see 3.1), all markings shall remain legible after all tests. Flaking of the color bands in the crimp indenter area is acceptable providing the color of the bands is still identifiable.

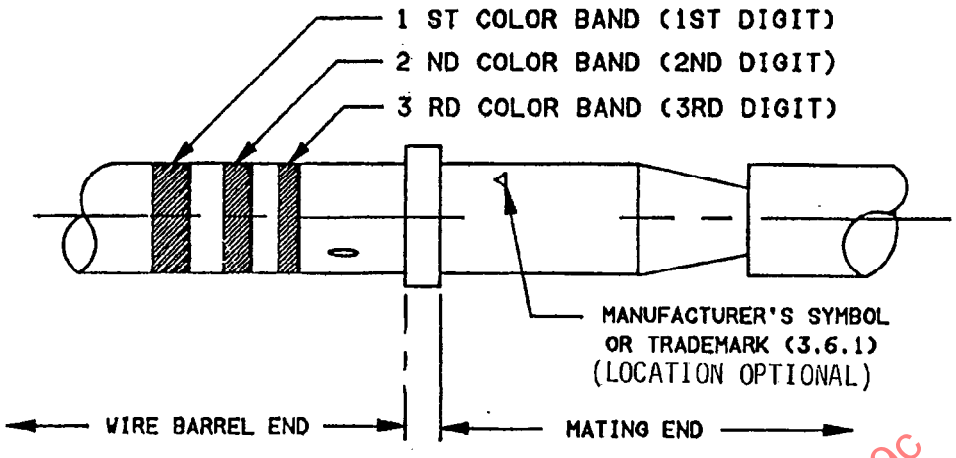


FIGURE 3 - CONTACT MARKING

3.6.1 Supplier's Symbol or Trademark (Removable Type)

The supplier's symbol or trademark shall be marked on removable type contacts. The supplier shall list the symbol or trademark in accordance with AIR1351.

3.6.2 BIN Code Color Bands

Each digit of the BIN code (see 1.2.1) shall be designated on the contact by a color band in accordance with the following:

0 - Black
1 - Brown
2 - Red
3 - Orange
4 - Yellow
5 - Green
6 - Blue
7 - Violet
8 - Gray
9 - White

The width of the first color band shall be appropriately twice the width of the second and third color bands. Unless otherwise specified, the color bands shall be located on the wire barrel and as shown on Figure 3. Colors for color bands shall be in accordance with EIA RS-359. Unless otherwise specified (see 3.1), colors shall remain within the specified extended limits during testing.

3.6.3 Supersession Data

The present and most recently superseded part number shall be marked on a label and included in each unit pack, as in the following example:

MS39029/5-115 supersedes M39029/5-20-20.

Other superseded part numbers may be included. A listing of supersession data can be found in the appendix A and on specification sheets.

3.7 Workmanship (see 4.7.1)

Contacts shall be processed in such a manner as to be uniform in quality and shall be free from foreign material and burrs or sharp corners that might damage the connector or affect mating of the contacts. Burrs and sharp edges shall be removed 0.005 inch maximum.

3.8 Disposition of Stock

Unless otherwise specified by the qualifying activity and coordinated with the preparing activity, qualified manufacturers and their selling agents or distributors may ship from stock: contacts which were manufactured in accordance with the previous revision of AS39029 and its slash sheets for a period of 18 months from the date of the latest revision.

This depletion of stock is only allowed for changes that do not impact form, fit, or function of the previously qualified AS39029 product(s).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

Unless otherwise specified, the supplier is responsible for the performance of all contract inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the supplier may use any facilities suitable for the performance of the inspection requirements specified herein. The purchaser or qualifying activity has the right to perform any of the inspections set forth in the standard where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for Compliance

All items must meet all technical requirements of the product standard. The inspection set forth in this standard shall become a part of the supplier's overall inspection system or quality program. The absence of any inspection requirements in the standard shall not relieve the supplier of the responsibility of assuring that all products comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the purchaser to acceptance of defective material.

4.1.2 Test Equipment and Inspection Facilities

Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with ANSI/NCSL Z540-1 or ISO 10012-1.

4.1.3 Test Report

The size, type and supplier's name and part number of the connector used to qualify the contacts shall be included in the qualification test report. All test data shall be compiled in accordance with an acceptable method, such as chapter 4 of SD-6.

4.2 Classification of Inspection

The inspection requirements specified herein are classified as follows:

Initial qualification inspection (see 4.4)
Retention of qualification (see 4.5)
Quality conformance inspection (see 4.6)

4.3 Inspection Conditions

Unless otherwise specified herein, all inspection shall be performed in accordance with the ambient conditions specified in EIA-364-D

4.3.1 Preparation of Samples

Type A contacts shall be wired as required with the minimum and maximum wire sizes specified in Table 3, except wire size 26 shall be the minimum wire used with contact sizes 22, 23 and 24 for test group II (see Table 12). Unless otherwise specified Type D contacts shall use silver plated conductor. Wire type shall be in accordance with AS22759 or MIL-DTL-81381 for Type A, B and C contacts. The length of the strip portion of the conductor shall be at least long enough to reach the bottom of the crimp barrel; but shall not be so long that more than 1/32 inch of the conductor is exposed when the conductor touches the bottom of the barrel. Type D contacts shall use the coaxial cable specified in the specification sheet (see 3.1).

4.3.2 Certification of the Supplier's Capability to Produce

Certification of the supplier's capability to produce the item should not be predicated on the submittal of a report but rather on representative samples of production parts selected at random by a representative of the qualifying activity. These parts, when successfully passing the qualification tests, shall ultimately demonstrate the supplier's capability to produce the item.

4.4 Initial Qualification Inspection

Initial qualification shall be performed by the qualifying activity test laboratory (see 6.3) and the supplier in accordance with Table 12, 13, and 14. Test sample units shall be produced with equipment and procedures normally used in production. Inspection shall be performed on each contact type the supplier seeks to qualify, unless qualification by similarity is approved. The extent of qualification testing by similarity shall be determined by the qualifying activity. The qualifying activity will perform test Groups III, VI and VII for Table 12 and 14, and Group II for Table 13. The supplier is responsible for performing all other test Groups in the applicable test Tables.

4.4.1 Sample Size

Unless otherwise directed by the qualifying agency (see 6.3), test samples of contacts and bushings of each part number for which qualification is desired shall be selected at random in the quantities specified in Table 11. The quantity required for the applicable type shall be subjected to testing as specified in 4.5.2. When requested by the qualifying activity, the remaining untested samples shall be forwarded to the qualifying activity with the qualification test reports. When qualification by similarity is requested, the Qualifying Activity shall consider the retention of qualification similarity groups as a guideline to determine total detail specification sheets for testing, however all aspects of materials, construction, application and performance shall be represented in the test samples for the requested approval. The qualifying activity shall determine which qualification by similarity contacts shall be tested based on user or supplier history when available. The supplier shall provide the qualifying activity dimensions extracted from supplier control drawings for untested contatcs qualified by similarity.

TABLE 11 - RANDOM SAMPLE QUANTITIES

Type	Contact Size	Number of sample units 1/				
					Spares	
		Pin Contact	Complete Socket	Socket Bodies Only 2/	Pin Contact	Complete Socket
A & B	10-10 & larger	18	16	2	18	18
A & B 4/	12-12 & smaller	48	40	8	48	48
A & B 5/	12-12 & smaller	52	48	4	52	52
C	All	10	10	N/A	10	10
D 3/	All	48	40	8	48	48

1/ For other than pin or socket contacts, the male contact shall be considered as equivalent to the pin; the female contact shall be considered as equivalent to the socket. Sufficient connector assemblies containing Type B contacts shall be supplied to satisfy the quantity specified. Type A contacts shall be provided as mating parts for Type B contacts submitted for test. For hermaphroditic contacts, double the quantities listed for pins shall be submitted.
2/ Hoods and, when applicable, springs and insulators shall not be assembled to the socket.
3/ Additional inner and outer contacts may be used for the tensile strength tests.
4/ Overall gold finish contacts only
5/ Localized gold finish contacts only

4.4.2 Initial Qualification Inspection Routine and Test Report Submittal

Unless otherwise specified, mated contacts shall be tested in a suitable connector that is designed for the contacts. The qualifying activity laboratory and supplier laboratory test methods shall be available to either party upon request. Where test measurements are required, the value shall be reported. The qualifying activity laboratory shall submit the test results for the qualifying activity required test groups in a data package to the supplier. The supplier will maintain the data for two retention periods. The supplier shall provide a final test report to the qualifying activity. The report shall contain the tests results for the supplier testing, and include all required certifications and signatures. The test report may contain the qualifying activity results. If the test results indicate nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, the product will not be approved.

4.4.2.1 Types A and B

Sample units shall be subjected to the qualification inspection specified in Table 12, in the order shown.

TABLE 12 - QUALIFICATION INSPECTION (TYPES A AND B CONTACTS)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected					
					Max Wire Size		Min Wire Size	
			Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger
GROUP I								
Examination of product	3.1,3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability 2/	3.5.1	4.7.2						
Preparation of samples	---	4.3.1						
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2						
Low signal contact resistance 2/	3.5.3.1	4.7.4						
Contact resistance (25 °)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6	8	4	5	3	2	1
Thermal shock	3.5.6	4.7.7						
Contact engagement and separation force	3.5.5	4.7.6						
Resistance to test probe damage	3.5.7	4.7.8						
Contact engagement and separation force	3.5.5	4.7.6						
Contact resistance (25 °C)	3.5.4	4.7.5						
Crimp tensile strength	3.5.8	4.7.9						
GROUP II								
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability 2/	3.5.1	4.7.2						
Preparation of samples	---	4.3.1						
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2	8	4	6	3	2	1
Low signal level contact resistance 2/	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
Durability	3.5.9	4.7.10						
Vibration 3/ 4/	3.5.10	4.7.11						
Shock (specified pulse) 3/ 4/	3.5.11	4.7.12						
Salt spray 5/	3.5.12	4.7.13						
Low signal level contact resistance 2/	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Contact resistance (at high temperature)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
GROUP III 8/								
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability 2/	3.5.1	4.7.2						
Preparation of samples	---	4.3.1						
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2	8	4	6	3	2	1
Low signal level contact resistance 2/	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
Temperature life 5/	3.5.13	4.7.14						
Low signal level contact resistance 2/	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Contact resistance (at high temperature)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
Crimp tensile strength	3.5.8	4.7.9						

See footnotes at end of table.

TABLE 12 - QUALIFICATION INSPECTION (TYPES A AND B CONTACTS) (CONTINUED)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected					
					Max Wire Size		Min Wire Size	
			Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger
GROUP IV								
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability 2/	3.5.1	4.7.2						
Preparation of samples	---	4.3.2						
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2						
Low signal level contact resistance 2/	3.5.3.1	4.7.4	8	-	4	-	4	-
Contact resistance (size 12 only)	3.5.4	4.7.5						
Industrial gas 5/	3.5.14	4.7.15						
Contact resistance (size 12 only)	3.5.4	4.7.5						
Low signal level contact resistance 2/	3.5.3.1	4.7.4						
Contact strength 2/	3.5.15	4.7.16						
GROUP V 2/								
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability	3.5.1	4.7.2						
Axial concentricity (unwired)	3.5.2.1	4.7.3.1						
Preparation of samples	---	4.3.2	8	4	4	2	4	2
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2						
Crimp tensile strength	3.5.8	4.7.9						
GROUP VI 8/								
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	4	-	-	-	-	-
Plating porosity 5/	3.5.16	4.7.17						
GROUP VII 8/			4	2	-	-	-	-
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1						
Plating thickness	3.5.17	4.7.18						
GROUP VIII 7/								
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1						
Preparation of samples	---	4.3.2	8	-	4	-	4	-
Examination-wired contacts	---	4.7.11						
Low signal level contact resistance	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Humidity-temperature cycling	3.5.21	4.7.22						
Low signal level contact resistance	3.5.3.1	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						

1/ Individual requirements paragraphs may exempt certain sizes or types of contacts from some tests in the sequence.
2/ Type A only.
3/ Not applicable to wire barrel size 28 and smaller.
4/ Initial qualification only.
5/ Integrity of color code not required after test.
6/ For socket contacts, conduct tests prior to assembly of hoods and springs. Unassembled parts shall be submitted to the qualifying activity.
7/ For localized gold finished contacts only.
8/ Test Group shall only be performed by the qualifying activity

4.4.2.2 Type C

The contacts shall be submitted for qualification inspection specified in Table 13, in the order shown.

TABLE 13 - QUALIFICATION INSPECTION (TYPE C CONTACTS)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected
GROUP I			
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	
Axial concentricity (unwired)	3.5.2.1	4.7.3.1	8 samples size 16 and smaller
Preparation of samples	---	4.3.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Contact engagement and separation force	3.5.5	4.7.6	
Vibration 2/ 3/	3.5.10	4.7.11	
Shock (specified pulse) 2/ 3/	3.5.11	4.7.12	
Contact engagement and separation force	3.5.5	4.7.6	
GROUP II 4/			
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	8 samples size 16 and smaller
Axial concentricity (unwired)	3.5.2.1	4.7.3.1	
Preparation of samples	---	4.3.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Contact engagement and separation force	3.5.5	4.7.6	
Crimp tensile strength	3.5.8	4.7.9	

1/ Individual requirements paragraphs may exempt certain sizes or types of contacts from some tests in the sequence
2/ Not applicable to wire barrel size 28 and smaller
3/ Initial Qualification only
4/ Test Group shall only be performed by the qualifying activity

4.4.2.3 Type D

Sample units shall be subjected to the qualification inspection specified in Table 14, in the order shown.

TABLE 14 - QUALIFICATION INSPECTION (TYPE D CONTACTS) (SEE 4.5.2.3)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected
GROUP I			
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1	
Permeability 2/	3.5.1	4.7.2	
Preparation of samples	---	4.3.1	
Examination-wired contacts	---	4.7.1.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	8
Contact resistance (25 °)	3.5.4.3	4.7.5	
Contact engagement and separation force	3.5.5	4.7.6	
Thermal shock	3.5.6	4.7.7	
Contact engagement and separation force	3.5.5	4.7.6	
Contact resistance (25 °C)	3.5.4.3	4.7.5	
Insulation resistance (25 °)	3.5.18	4.7.19.1	
GROUP II			
Examination of product	3.1, 3.3, 3.4,3.6, 3.7	4.7.1	
Permeability	3.5.1	4.7.2	
Axial concentricity (unwired)	3.5.2.1	4.7.3.1	
Preparation of samples	---	4.3.2	
Examination-wired contacts	---	4.7.1.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	
Contact resistance (25 °C)	3.5.4.3	4.7.5	
Contact engagement and separation force	3.5.5	4.7.6	
Durability	3.5.9	4.7.10	
Vibration 2/	3.5.10	4.7.11	8
Shock (specified pulse) 2/	3.5.11	4.7.12	
Salt spray 3/	3.5.12	4.7.13	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	
Contact resistance (25 °C)	3.5.4.3	4.7.5	
Contact resistance (at high temperature)	3.5.4.3	4.7.5	
Contact engagement and separation force	3.5.5	4.7.6	
Insulation resistance (25 °C)	3.5.18	4.7.19.1	

See footnotes at end of table.

TABLE 14 - QUALIFICATION (TYPE D CONTACTS) (SEE 4.5.2.3) (CONTINUED)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected
GROUP III 6/			
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1	
Permeability	3.5.1	4.7.2	
Preparation of samples	---	4.3.1	
Examination-wired contacts	---	4.7.1.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	
Contact resistance (25 °C)	3.5.4.3	4.7.5	
Contact engagement and separation force	3.5.5	4.7.6	8
Temperature life 3/	3.5.13	4.7.14	
Insulation resistance (at high temperature)	3.5.18	4.7.19.2	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	
Contact resistance (25 °C)	3.5.4.3	4.7.5	
Contact resistance (at high temperature)	3.5.4.3	4.7.5	
Contact engagement and separation force	3.5.5	4.7.6	
GROUP IV			
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1	
Permeability	3.5.1	4.7.2	
Axial concentricity (unwired)	3.5.2.1	4.7.3.1	
Preparation of samples	---	4.3.2	
Examination-wired contacts	---	4.7.1.1	8
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Dielectric withstanding voltage	3.5.19	4.7.20	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	
Industrial gas 3/	3.5.14	4.7.15	
Low signal level contact resistance 1/	3.5.3.2	4.7.4	

See footnotes at end of table.

TABLE 14 - QUALIFICATION (TYPE D CONTACTS) (SEE 4.5.2.3) (CONTINUED)

Inspection	Requirement Paragraph 1/	Test Paragraph	Number of Sample Units to be Inspected
GROUP V			
Examination of product	3.1, 3.3, 3.4, 3.6, 3.7	4.7.1	
Permeability	3.5.1	4.7.2	8
Axial concentricity (unwired)	3.5.2.1	4.7.3.1	
Preparation of samples	---	4.3.1	
Examination-wired contacts	---	4.7.1.1	
Axial concentricity (wired)	3.5.2.2	4.7.3.2	
Crimp tensile strength	3.5.8	4.7.9	
GROUP VI 6/			
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	4
Plating porosity 4/	3.5.16	4.7.17	
GROUP VII 6/			
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	4
Plating thickness 4/	3.5.17	4.7.18	
GROUP VIII 5/			
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	
Preparation of samples	---	4.3.1	
Examination-wired contacts	---	4.7.11	
Low signal level contact resistance	3.5.3.1	4.7.4	8
Contact resistance (25 °C)	3.5.4	4.7.5	
Humidity-temperature cycling	3.5.21	4.7.22	
Low signal level contact resistance	3.5.3.1	4.7.4	
Contact resistance (25 °C)	3.5.4	4.7.5	

1/ Inner contact only.
2/ Initial qualification only.
3/ Integrity of color code not required after test.
4/ Test shall be conducted prior to assembly of hoods and springs. Unassembled parts shall be submitted to the qualifying activity from the same socket contact lot as used for the other qualification tests.
5/ For localized gold finished contacts only.
6/ Test Group shall only be performed by the qualifying activity

TABLE 15 - RETENTION OF QUALIFICATION TESTING PERFORMED BY QUALIFYING ACTIVITY
(ALL CONTACT TYPES AS SPECIFIED)

Inspection 7/	Requirement Paragraph 4/	Test Paragraph	Number of Sample Units to be Inspected					
					Max Wire Size		Min Wire Size	
			Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger	Size 12 and Smaller	Size 10 and Larger
GROUP I (For A, B, & D Contacts)								
Examination of product	3.1,3.3, 3.4, 3.6, 3.7	4.7.1						
Permeability 5/	3.5.1	4.7.2						
Preparation of samples	---	4.3.1						
Examination-wired contacts	---	4.7.1.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2	8	4	6	3	2	1
Low signal level contact resistance 8/	3.5.3.1, 3.5.3.2	4.7.4						
Contact resistance (25 °C)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
Temperature Cycling	3.5.6	4.7.7						
Resistance to test probe damage 6/	3.5.7	4.7.8						
Contact resistance (25 °C)	3.5.5	4.7.6						
Contact resistance (at high temperature)	3.5.4	4.7.5						
Contact engagement and separation force	3.5.5	4.7.6						
Crimp tensile strength	3.5.8	4.7.9						
Group II (For A, B, & D Contacts)								
Examination of Product	3.1, 3.3, 3.4, 3.7	4.7.1	4	2	-	-	-	-
Plating thickness 1/	3.5.17	4.7.18						
Group III (For A & D Contacts)								
Examination of Product	3.1, 3.3, 3.4, 3.7	4.7.1	4	-	-	-	-	-
Porosity 1/, 3/	3.5.16	4.7.17						
Group IV (For C Contacts)								
Examination of product	3.1, 3.3, 3.4, 3.7	4.7.1	8 samples (size 16 & smaller)	-	-	-	-	-
Axial concentricity (unwired)	3.5.2.1	4.7.3.1						
Preparation of samples	---	4.3.1						
Axial concentricity (wired)	3.5.2.2	4.7.3.2						
Contact engagement and separation force	3.5.5	4.7.6						
Crimp tensile strength	3.5.8	4.7.9						

1/ For Type D contacts, conduct test prior to assembly of shrouds, springs and insulators
2/ When testing socket contacts, conduct tests prior to assembly of hoods and springs.
3/ For Type A and D contacts the Integrity of color code is not required after test
4/ Individual requirements paragraphs may exempt certain sizes or types of contacts from some tests in the sequence
5/ Applicable to Type A only
6/ Not applicable to Type D contatcs.
7/ The qualifying activity may authorize Group A data (see Table 16) to be used as an alternative to a specified test when the test can be shown to not affect the sequence result. The Group A data must contain recorded measurements (pass/fail not acceptable) and be recorded for the same samples subjected to the Retention of Qualification tests.
8/ Inner contact only.

4.4.3 Failure

One or more failures in any of the application examinations or tests shall be cause for refusal to grant qualification.

4.5 Retention of Qualification

Retention of qualification inspection 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 at intervals specified in 4.5.5 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 product. Except where the results of these inspections show noncompliance with the applicable requirements, delivery of products which have passed group A shall not be delayed pending the results of retention of qualification inspections.

4.5.1 Summary of Group A Results

The report shall consist of a summary of the results of the tests performed for inspection of product for delivery, group A, indicating as a minimum the number of lots that have passed and the number of lots that have failed. The results of tests of all reworked lots shall be identified and accounted for.

4.5.2 Retention of Qualification Test Results

Unless otherwise specified, mated contacts shall be tested in a suitable connector that is designed for the contacts. Where test measurements are required, the value shall be reported. The qualifying activity laboratory shall submit the required test results in a data package to the supplier. The supplier will maintain the data for two retention periods. The supplier test report shall be a summary of all Group A tests performed and completed during the retention qualification interval of 4.5.5, material certifications, and other details required by the qualifying activity. The qualifying activity may authorize Group A data to be used as an alternative to a specified test when the test can be shown to not affect the sequence result (see Table 15).. If the retention of qualification test results indicate nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

4.5.3 Retention of Qualification Certification of No Production

In the event that no production occurred during the reporting period (see 4.5.5), a certification report shall be submitted certifying that the supplier 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. No more than one reporting period may be certified.

4.5.4 Retention of Qualification Sample Types

Each qualified contact size specified in the specification sheet shall be submitted to examination of product inspection. The smallest contact size and the largest contact size shall be submitted to the remaining inspection tests for each specification sheet. Qualification by similarity to fewer contact types may be approved by the qualifying activity based on similar production procedures and in-process inspections.

4.5.5 Retention of Qualification Inspection

Retention of qualification shall only be performed by the qualifying activity. The Qualifying Activity shall issue an authorization letter to define the specific details of the periodic qualification. Retention of qualification inspection shall consist of the examinations and tests on all contact types specified in the order shown in Table 15. The inspection shall be performed and the results reported at the end of every 36 months from the initial qualification approval date (see 4.5), except when no production has occurred (see 4.5.3). The inspection shall be made on test samples selected in the quantities specified in Table 11. See paragraph 4.5.5.1 for similarity groups to determine total number of specification sheets to be tested. The manufacturer can propose a second level of similarity to the Qualifying Activity based on their specific designs, processes and overall QPL listing. Sample units shall be selected from inspection lots which have passed the Group A inspection. The qualifying activity may require additional testing as specified in Tables 13 or 15 based on field failure reports, retention of qualification test results, or other information received during the retention period. The qualifying activity shall provide full disclosure and explanation to the supplier for the additional test requirements.

4.5.5.1 Samples for Retention of Qualification by Similarity

Retention of qualification by similarity is applicable where a group of two or more detail specification sheets covers contacts which are similar in materials, construction, application and performance. In such event, the supplier may select the samples specified in Table 11 for any detail specification sheet in the similarity group, provided the detail specification sheet is tested with the appropriate mating contact. Testing of the selected specification sheet shall re-qualify all specification sheets in that similarity group. Also, where a requirement is more rigorous for a contact being qualified by similarity than the tested contact, the tested contact must meet the more rigorous requirement of the similar contact. The supplier shall provide the qualifying activity dimensions extracted from supplier control drawings for untested contacts qualified by similarity.

Similarity Groups

Group 1 M39029/1, /2, /3, /4, /5, /22, /29, /30, /56, /57, /58, /71, /72, /106, /107, /117 and /118

Group 2 M39029/34, /35, /36 and /37

Group 3 M39029/11, /12, /16, /17, /18, /33, /46, /47, /63, /64, /69, /70, /93 and /94

Group 4 M39029/31*, /32*, /44, /45, /48, /49, /83 and /84

Group 5 M39029/7, /8, /19, /20, /21, /50, /51, /73 and /74

Group 6 M39029/27, /28, /59, /60, /75, /76, /77, /78, /79 and /80

Group 7 M39029/23, /24, /25, /26, /54 and /55

Group 8 M39029/90, /91, 104, /105, /113 and /114

Group 9 M39029/99, /100, /102 and /103

Group 10 M39029/9, /10, /31*, /32*, /85, /86, /87, /88 and /89

Group 11 M39029/92, /101

M39029/112**

* The type A contacts are part of group 4, the thermocouple types are part of group 11.
** The contact bushings shall be tested with the applicable contacts.

4.5.6 Sample Units

Sample units of the same part number as presently qualified shall be selected.

4.5.7 Retention of Qualification Failure

If one or more sample units fail to pass any retention of qualification inspection, the sample types that represent the specification sheet shall be considered to have failed. The qualifying activity laboratory shall notify the supplier immediately of the failure.

4.5.8 Corrective Action

The supplier shall take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, etc. and which are considered subject to the same failure and submit the corrective action to the qualifying activity. Acceptance of the product shall be discontinued until corrective action, acceptable to the qualifying activity, has been taken.

4.5.9 Corrective Action Inspection

After the corrective action has been taken, the retention of qualification inspection tests for which the contact failed shall be repeated on additional sample units. Additional inspection tests may be required by the qualifying activity. Group A inspection may also be reinstituted by the qualifying activity.

4.6 Quality Conformance Inspection

4.6.1 Inspection of Product for Delivery

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

4.6.1.1 Inspection Lot

An inspection lot shall consist of all contacts of the same part number produced under essentially the same conditions, and offered for inspection at one time.

4.6.2 Group A Inspection

Group A inspection shall consist of the inspections specified in Table 16, in the order listed.

TABLE 16 - GROUP A INSPECTION

Inspection	Requirement Paragraph	Test Paragraph	AQL	
			Major	Minor
Examination of product	3.1, 3.3, 3.4, 3.6 and 3.7	4.7.1	1.0	4.0
Contact engagement and separation forces: Size 16 and smaller: Engagement, maximum Separation, minimum 1/	3.5.5	4.7.6	1.0 N/A	N/A N/A
Size 12 and larger: Engagement, maximum Separation, minimum			1.0 0.25	N/A N/A
Resistance to test probe damage (Types A and B) 2/	3.5.7	4.7.8	1.0	N/A
Contact engagement and separation forces (Types A and B) 2/	3.5.5	4.7.6		
Plating thickness (Types A, B and D)	3.5.17	4.7.18	3/	
Crimpability	3.5.20	4.7.21	4/	

1/ 100% inspection required.
2/ Sampling inspection shall be in accordance with ASQC Z1.4, level S-3.
3/ Sampling inspection shall be in accordance with ASTM B 488 or ASTM B 700, as applicable.
4/ Size 12 and larger - 5 contacts from each lot; size 16 and smaller - 10 contacts from each lot. No failures permitted.

4.6.2.1 Sampling Plan

Statistical sampling and inspection shall be in accordance with ANSI/ASQC Z1.4 for general inspection level II. Major and minor defects shall be as defined herein (see 6.7). The acceptable quality level (AQL) shall be as specified in Table 15. In-process controls, unrelated to lot size, may be used provided the equivalent or tighter AQL is maintained.

4.6.2.2 Rejected Lots

If an inspection lot is rejected, the supplier may rework it to correct the defects, or screen out the defective units, and resubmit for inspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as inspected lots. In the event of failure after inspection, information concerning the failure and corrective action taken shall be furnished to the cognizant inspection activity, if specified by contract or purchase order, and the qualifying activity.

4.6.2.3 Disposition of Sample Units

Sample units which have passed all the group A inspections may be delivered on the contract or purchase order, if the lot is accepted and the sample units are still within specified tolerance.

4.6.3 Inspection of Packaging

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

4.7 Methods of Inspection

4.7.1 Examination of Product (see 3.1, 3.3, 3.4, 3.6 and 3.7)

Contacts, before and after wiring, shall be examined to ensure conformance with this specification. In-process controls of component parts, unrelated to lot sizes of finished contacts, may be utilized in lieu of examination of those components in the finished contacts to assure conformance of these component parts. Contacts shall be examined to verify that physical dimensions, materials, design, marking, contact crimping instructions and installing and removal tool data, and workmanship are in accordance with the applicable requirements. When applicable, certification in accordance with the qualifying activity requirements shall be performed.

4.7.1.1 Wired Contacts

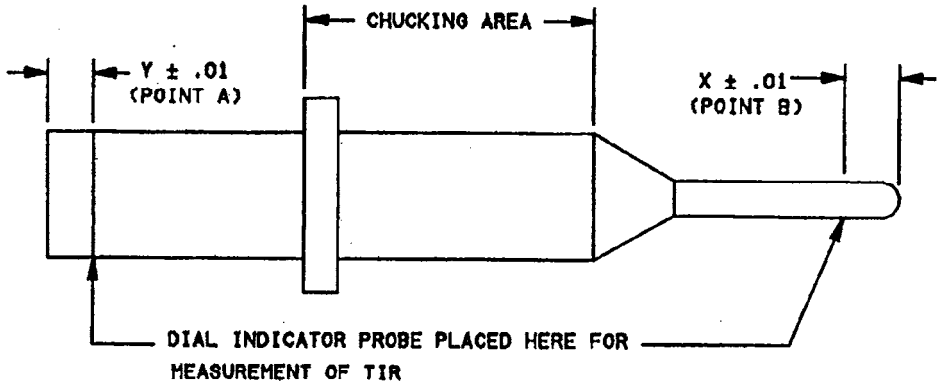
After wiring, contacts shall be examined under a magnification of three diopters (3X) and shall exhibit no cracks in the basis metal or peeled plating.

4.7.2 Permeability (Types A and D) (see 3.5.1)

The permeability of the contact shall be measured with an indicator conforming to ASTM A 342. Traceability of calibration of the instrument to the National Bureau of Standards is not required.

4.7.3 Axial Concentricity (see 3.5.2)

Removable contacts shall be chucked in the area shown on Figure 4 and rotated 360 degrees minimum. While the contact is rotated, the total indicator reading shall be measured as specified on Figure 4.



NOTES:
1. For size 12 and larger pins, X = 1 pin diameter and Y = .05 (1.27 mm).
2. For pins smaller than size 12, X = 2 pin diameters and Y = 1/2 the distance from the rear of the wire barrel to the beginning of the crimp indent.

FIGURE 4 - AXIAL CONCENTRICITY (TIR) MEASUREMENT (TYPICAL)

4.7.3.1 Unwired Contacts (see 3.5.2.1)

Removable contacts shall be chucked in the area shown on Figure 4 and rotated 360 degrees minimum. While the contact is rotated, the total indicator reading shall be measured at points A and B as shown on Figure 4.

4.7.3.2 Wired Contacts (see 3.5.2.2)

After crimping to wire, contacts shall be chucked in the area shown on Figure 4 and rotated 360° minimum. While the contact is rotated, the total indicator reading shall be measured at point A as shown on Figure 4. Contacts which are end positioned in the crimping tool shall also be measured at point B as shown on Figure 4.

4.7.4 Low Signal Level Contact Resistance (Types A and D) (see 3.5.3)

The low signal level contact resistance of mated contact pairs shall be measured in accordance with EIA-364-23 at 25 °C ± 3 °C with the pin contact engaged to a depth of .7L (see Figure 5).

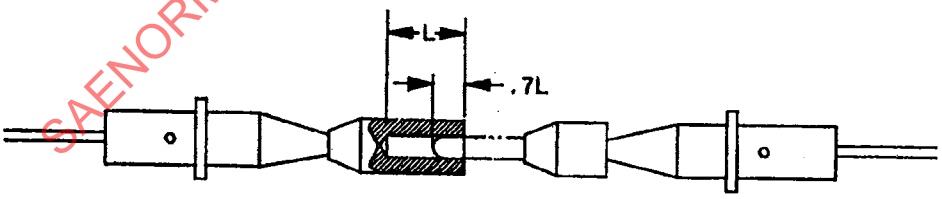


FIGURE 5 - DEPTH OF ENGAGEMENT FOR CONTACT RESISTANCE AND ENGAGEMENT AND SEPARATION FORCE TESTS

4.7.5 Contact Resistance (Types A, B and D) (see 3.5.4)

With the pin contact engaged for a depth of .7L (see Figure 5), the voltage drop of each mated pair shall be measured in accordance with EIA-364-06B at 25 °C ± 3 °C or at maximum rated temperature, as applicable (see 3.1). Measurements shall be taken after the temperature of the contact has stabilized. Voltage drop measurement connection points may be permanent connections. The test current shall be as specified in Tables 5 and 6 for Type A and Tables 7 and 8 for Type B.

4.7.6 Contact Engagement and Separation Force (Socket Contacts) (see 3.5.5)

Sockets shall be mounted in a suitable fixture for applying gradually increasing loads for the engagement and separation of the specified AS31971 test pins and in accordance with EIA-364-37. The test pins shall be inserted a minimum of .7L (see Figure 5). A maximum diameter test pin shall be inserted and removed from each socket contact. The engagement force shall be measured during insertion. A minimum diameter test pin shall be inserted and removed from each socket contact and the separation force shall be measured during removal. Special gage pins required for Type D contacts shall be as specified (see 3.1).

4.7.7 Temperature Cycling (Types A, B and D) (see 3.5.6)

Mated contacts shall be tested in accordance with EIA-364-32. Test condition A, except step 3 shall be the applicable maximum operating temperature (see 3.1). Measurement before and after cycling is not applicable. When the maximum operating temperature of the contact exceeds the maximum operating temperature of the applicable connector, the contacts may be tested without the connector. The mated contacts in or out of the connector shall be maintained in a fixed position during the test and for all post electrical tests.

4.7.8 Resistance to Test Probe Damage (Types A and B) (see 3.5.7)

Contacts shall be tested for probe damage in accordance with EIA-364-25. The diameter of the handle (0.190 inch) does not apply. The probe depth, dimension “B” shall be 1/2 and 3/4 of the specified minimum socket bore depth or as specified (see 3.1).

4.7.9 Crimp Tensile Strength (see 3.5.8)

Crimped contact wire assemblies shall be subjected to tensile strength in accordance with EIA-364-08. Contact quantities shall be in accordance with Tables 12, 13 and 14. The crimping tool shall be in accordance with the specification sheet (see 3.4.4.1).

4.7.10 Durability (Types A, B and D) (see 3.5.9)

Contacts shall be installed in a qualified connector and shall be subjected to 500 cycles of mating and unmating at a race of 300 cycles per hour maximum. The depth of the engagement shall not be less than 70% of the minimum bore depth (see Figure 5). The connector coupling devices may be removed for this test.

4.7.11 Vibration (see 3.5.10)

Contacts shall be tested in accordance with EIA-364-28. The test condition shall be VI, letter J, unless otherwise specified (see 3.1).The contacts shall be mated and wired in series. The contacts shall be mounted in a connector which shall be considered as part of the test fixture. Unless otherwise specified, the connector shall be defined in accordance with a commercial or military specification that specifies the contacts being qualified. A connector accessory may be used, if specified for the vibration test in the connector specification. Duration of test shall be 8 hours in the longitudinal direction and 8 hours in a perpendicular direction for a total of 16 hours unless otherwise specified (see 3.1).

4.7.12 Shock (Specified Pulse) (see 3.5.11)

Contacts shall be tested in accordance with EIA-364-27. The test condition shall be D, unless otherwise specified (see 3.1). The contacts shall be mounted in a connector which shall be considered as part of the test fixture. Unless otherwise specified, the connector shall be defined in accordance with a commercial or military specification that specifies the contacts being qualified. A connector accessory may be used, if specified for the shock test in the connector specification.

4.7.13 Salt Spray (Corrosion) (Types A, B and D) (see 3.5.12)

Mated contacts shall be tested in accordance with EIA-364-26. The following detail and exception shall apply: test condition B, 48 hours. Immediately after exposure, contacts shall be washed and then dried in a circulating air oven at a temperature of 38 °C ± 3 °C for 24 hours, maximum.

4.7.14 Temperature Life (Types A, B and D) (see 3.5.13)

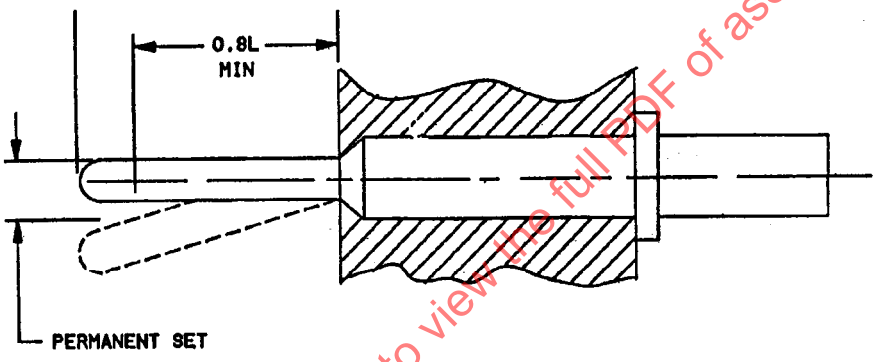
Mated contacts shall be subjected to their maximum specified operating temperature (see 3.1), as applicable, for 1000 hours. The contacts may be tested without the connector. The mated contacts shall be maintained in a fixed position during the test and for all post electrical tests.

4.7.15 Industrial Gas (Types A, B and D) (see 3.5.14)

Unmated contacts shall be placed on a non-corrosive rack in a closed plastic or glass chamber (volume two cubic feet maximum) which contains a 10% solution of suphurated potash NF in distilled water. Contacts shall not be immersed in the solution but shall be exposed to the sulfide vapor for 100 hours.

4.7.16 Contact Strength (Mating End Size 20 and Smaller Pin Contacts, Type A) (see 3.5.15)

Contacts shall be mounted in a suitable fixture and a gradual load applied to the pin as shown in Figure 6. The rate of travel of the testing machine shall not exceed 1 inch per minute, and the load shall be maintained for 1 minute, +15, -0 seconds. The permanent set shall be the difference between the initial and final position of the point of load application after load removal.



Mating End Size	Moment (lb-in) (unless otherwise specified) (see 3.1)
20	.53
22	.22
23	.16
24	.13

FIGURE 6 - CONTACT STRENGTH (TYPICAL)

4.7.17 Gold Finish Porosity (Types A and D) (see 3.5.16)

4.7.17.1 Overall Gold Finish Contacts

Contacts shall be placed in containers and covered with nitric acid (specific gravity 1.316 at 15.6 °C) at 25 ° ± 3 °C so that all contacts may be observed during the test. The contacts shall be observed for 30 seconds for plating porosity.

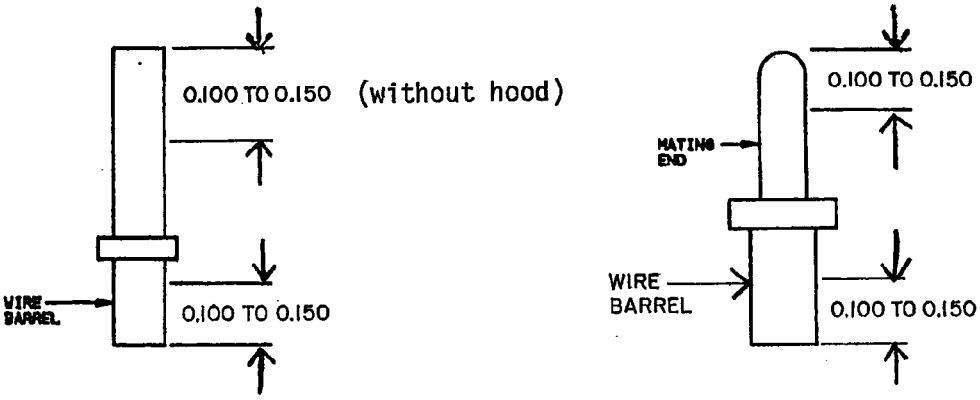
4.7.17.2 Localized Gold Finish Contacts

Porosity shall be tested in accordance with EIA-364-53. Immersion in nitric acid is not applicable.

4.7.18 Finish Thickness (Types A, B and D) (see 3.5.17)

4.7.18.1 Overall Finish (Types A, B and D) (see 3.3.3)

Finish thickness shall be measured in accordance with ASTM B 488 or ASTM B 700, as applicable, for the finish to be measured. Measurements shall be made on the external surfaces of the contact body at the locations shown on Figure 7. Inner and outer contacts of Type D contacts shall also be measured at these locations.

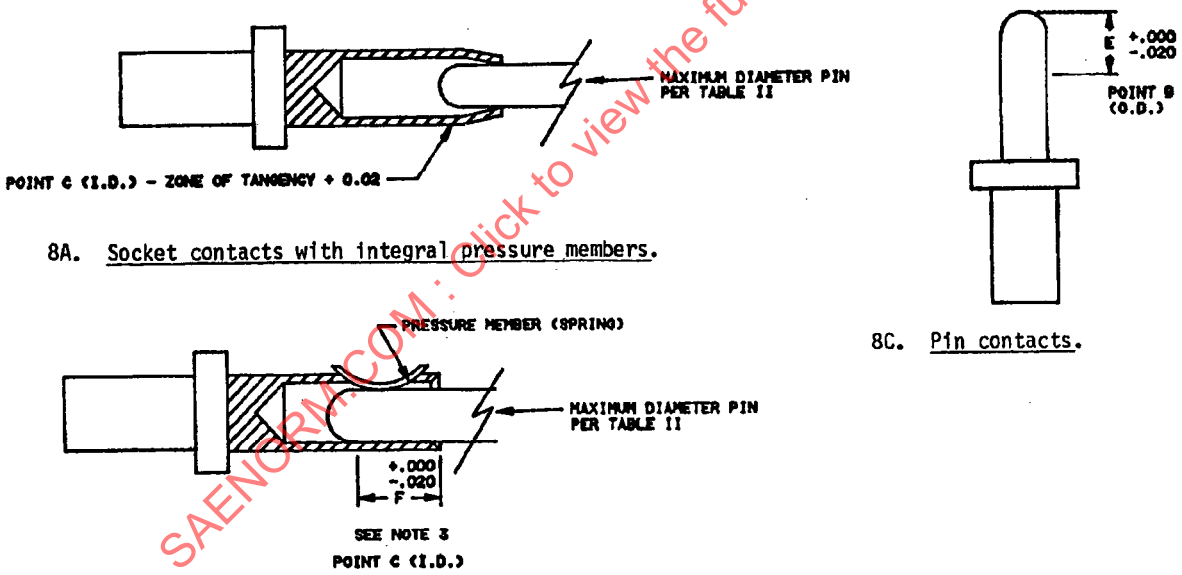


7A. Socket contacts. 7B. Pin contacts.

FIGURE 7 - PLATING THICKNESS MEASUREMENT - OVERALL FINISH (TYPES A, B AND D)

4.7.18.2 Localized Finish (Types A, B and D) (see 3.3.3)

Finish thickness shall be measured in accordance with ASTM B 488. Types A and B contacts and inner contacts of Type D contacts shall be measured at point B or C of Figure 8, as applicable. Outer contacts of Type D contacts shall be measured at point B or C of Figure 9, as applicable.



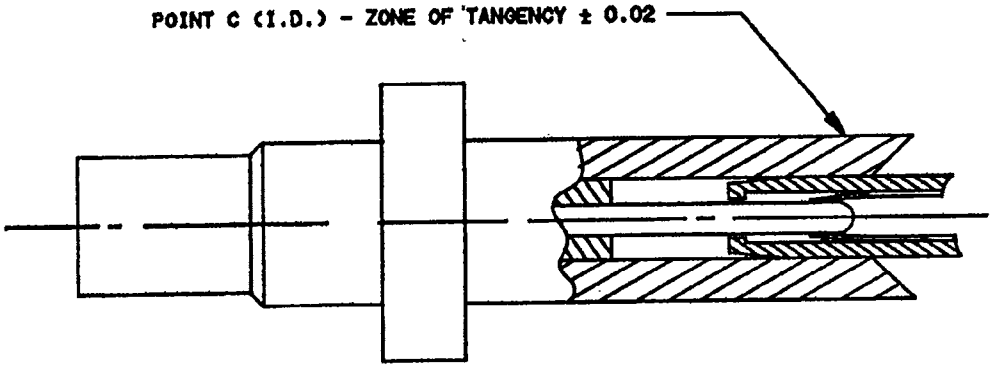
8A. Socket contacts with integral pressure members.

8B. Socket contacts with separate pressure members.

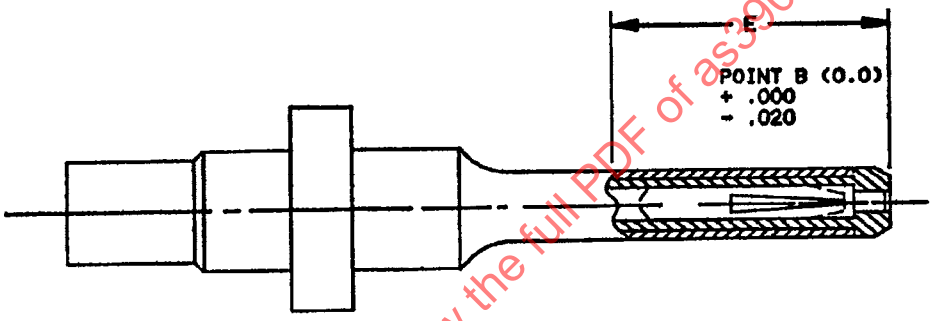
8C. Pin contacts.

NOTES:
1. Dimensions are in inches.
2. For dimensions E and F, see Appendix.
3. F equals length of maximum electrical contact (wiping) area plugs .020 (0.51 mm) minimum. Maximum wipe shall be equal to maximum E of mating pin engagement minus the spherical radius.

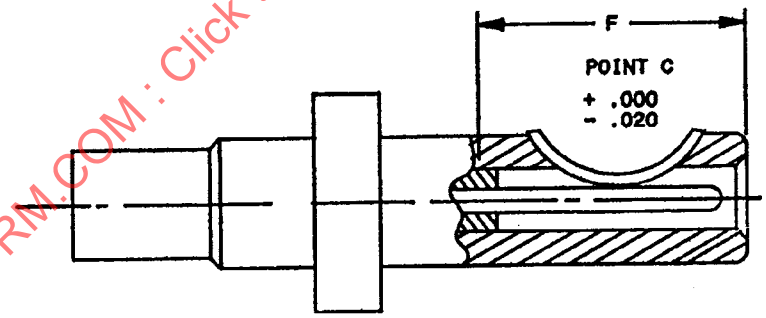
FIGURE 8 - PLATING THICKNESS MEASUREMENT - LOCALIZED FINISH



9A. Socket contact - outer with integral pressure are members.
Pin contact - inner (see FIGURE 8).



9B. Pin contact - outer
Socket contact - inner (see FIGURE 8).



9C. Socket contact - outer with separate pressure members.
Pin contact - inner (see FIGURE 8).

NOTES:
1. Dimensions are in inches.
2. For dimensions E and F see appendix.
3. F = Length of maximum electrical contact (wiping) plus .020 (0.51 mm) minimum. Wipe shall be equal to maximum E or mating pin engagement minus the chamfer.

FIGURE 9 - PLATING THICKNESS MEASUREMENT (LOCALIZED FINISH) (TYPE D OUTER CONTACT)

4.7.19 Insulation Resistance (Type D) (see 3.5.18)

Insulation resistance shall be measured between the crimped outer contact and the inner contact as specified in 4.7.19.1 and 4.7.19.2.

4.7.19.1 Insulation Resistance at Ambient Temperature

Unmated contacts shall be tested in accordance with EIA-364-21.

4.7.19.2 Insulation Resistance at Elevated Temperature

Unmated contacts shall be tested in accordance with EIA-364-21 at the end of exposure for 1000 hours to the maximum operating temperature specified (see 3.1).

4.7.20 Dielectric Withstanding Voltage (Type D) (see 3.5.19)

Test voltages shall be applied between the crimped outer contact and the inner contact as specified in 4.7.20.1 and 4.7.20.2.

4.7.20.1 Dielectric Withstand Voltage at Sea Level

Mated and unmated contacts shall be tested in accordance with EIA-364-20.

4.7.20.2 Dielectric Withstand Voltage at Altitude

Mated contacts shall be tested in accordance with EIA-364-20 at the altitude specified (see 3.1).

4.7.21 Crimpability (see 3.5.20)

The contacts shall be wired (see 4.3.2) and subjected to visual examination (see 4.7.1.1) and crimp tensile strength (see 4.7.9) tests. In-process control may be used in lieu of these tests to verify crimpability. Controls shall include verification of raw material properties, crimp barrel hardness, and, if required by the Qualifying Activity, secondary processes, such as heat treat and annealing. The process-control plan and records of its implementation shall be available to the responsible qualifying agency for verification.

4.7.22 Humidity-Temperature Cycling (Localized Gold-finished Contacts Only) (see 3.5.21)

Wired mated contacts shall meet the requirements of 3.5.21 when tested in accordance with EIA-364-31, Type II, for 240 hours period. Current applied to contacts during exposure shall be 100 milliamps ± 10 milliamps.

5. PACKAGING

5.1 Packaging Requirements

The requirements for packaging shall be in accordance with MIL-DTL-55330.

In addition to the marking requirements specified in MIL-DTL-55330, the identification marking of each unit pack shall include the present and most recently superseded part number (see 3.6.3).

6. NOTES

6.1 Intended Use

Contacts covered by this specification are primarily intended for use in multi-contact connectors where the coupling means is provided separately from the individual contact. Specific application and mating contacts will be included for information in the specification sheets. Contacts that are an integral part of the connector are not intended to be qualified to this specification; however, these contacts may be tested as required (see 3.1).

6.1.1 Type B Contact Test Currents

Type B contact test currents (see Table 7 and 8) are reduced to the equivalent of one full wire size rating to compensate for inherent increased resistivity of these contacts. The use of full test current (see Tables 5 and 6) on these contacts may result in overheating.

6.1.2 Type D Shielded Contacts

Type D contacts are coaxial contacts for use in multi-contact connectors. These contacts are for use to shield the circuit from unwanted interference (RFI and EMI). These contacts are not impedance mated and, therefore, are not recommended for RF use.

6.1.3 Contacts with Size 28 and Smaller Wire

Contacts with size 28 and smaller wire are not for use in random vibration and shock application.

6.2 Ordering Data

The acquisition document shall specify the Title, number including revision letter, and date of this basic specification. The title, number including revision letter, and date of the applicable specification sheets (see 3.1), and complete part number (see 1.2.1).

6.3 Qualification

With respect to products requiring qualification by the government, awards will be made only for products, which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List (QPL), whether such products have actually been so listed by that date. The qualifying activity will provide a summarized list of all qualified sources on a public accessible electronic site (http://www.navair.navy.mil/qpl/). The summary shall include but is not limited to the supplier approved part number and related specification part number, a dedicated approval reference number, a supplier location where purchases maybe requested and the manufacturing location of the component. The attention of the contractors is called to these requirements, and manufacturers (suppliers) are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts for the products delineated in this specification. Qualification is required for U.S. Government procurement. The qualifying activity, for U.S. Department of Defense procurement purposes, is the Naval Air Systems Command (Code 4.4.5.3), 22229 Elmer Road, Bldg. 2360, Room 107, Patuxent River, MD 20670. Application for qualification tests shall be made in accordance with provisions governing qualification in SD-6. Unless otherwise specified by contract, commercial procurement of these products shall meet these requirements.

6.3.1 Requalification

Requalification to this revision is required of any supplier electing to invoke localized finish (see 3.3.2).

6.4 Contact Characteristics

6.4.1 BIN Color Bands

Color bands are intended for identification of contacts before they are installed in the connector and prior to contact crimping.

6.4.2 Contact Wire Barrels

To maintain standard tooling requirements and insure contact crimp properties that meet field applications, the contact wire barrels for AS39029 are recommended to be in accordance with MS3190 or AS5261.

6.4.3 Wire Barrel Square Inspection/Bleed Holes

A square inspection/bleed hole is not recommended for contact crimp barrel, because the hole causes the barrel to crack during contact crimping.

6.4.4 Contact Threading

Because of potential threading issues, designers should be cautious when using size 22D contacts in vibration areas.

6.5 Supersession Data

This specification supersedes MIL-C-39029, MIL-C-39029/1 through /109, MIL-C-23216C(NAVY), MIL-C-26636A(USAF) and connector contact specification sheets in connector specifications MIL-C-22992, MIL-C-24308, MIL-C-28748, MIL-C-38999, MIL-C-83723, MIL-C-83733 (see Appendix A and the specification sheet for superseded connector contact part numbers, MS numbers and superseded AS39029 part numbers).

6.6 Resource Addresses

Military Specifications and Standards: http://assist.daps.dla.mil/quicksearch

SAE International: http://www.sae.org

ASTM International: http://www.astm.org

American National Standards Institute (ANSI): http://www.ansi.org

NASA: http://outgassing.nasa.gov

6.7 Definitions

6.7.1 Overall Finish (see 3.3.2.1, 3.5.17 and 4.7.18)

A finish having a specified minimum thickness applied (i.e., barrel plating techniques, non-selective types, etc.) on all external plating surface diameters except for corners, which assures the specified performance of the contact. All other surfaces shall be plated to a thickness that assures specified performance of the contact.

6.7.2 Localized Finish

A finish having a specified minimum thickness applied to a defined area (e.g., clad, inlay, welded dot, selective plating technique, etc.) (see 3.3.3, 3.5.17, 4.7.18 and the Appendix A).

6.7.3 Maximum Operating Temperature

Highest rated temperature as specified in the applicable associated specification (listed in Appendix A).

6.7.4 Critical Defects

A critical defect is a defect that judgment and experience indicate would result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product, or a defect that judgment and experience indicate is likely to prevent performance of the actual function of a major end item such as a ship, aircraft, tank, missile, or space vehicle.

6.7.5 Defect

A defect is any nonconformance of the unit of product with specified requirements.

6.7.6 Major Defect

A major defect is a defect, other than critical, that is likely to result in failure, or to reduce the usability of the unit of product for its intended purpose.

6.7.7 Minor Defect

A minor defect is a defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

6.7.8 Qualification Inspection

Qualification Inspection is a process that demonstrates that a component is capable of fully conforming to all the requirements defined in a standard. Qualification Inspection includes definition of the measurements, tests, analysis, and associated data which provides consistent rationale for acceptance of a particular supplier's design as meeting the standard requirements typically prior to acquisition by the Purchaser.

6.7.9 Qualified Products List

A Qualified Products List is a list of suppliers whose products have been evaluated to a defined process and who are authorized to provide those products to a purchaser upon request. When a Qualified Products List is specified only approved suppliers are authorized to provide products under the part number defined in the component standard. A Qualified Products List is established and maintained by a Qualifying Activity.

6.7.10 Qualifying Activity

A Qualifying Activity is a function established by a Purchaser or group of Purchasers that has a defined process used to consistently evaluate all Suppliers' products in accordance with the component standard.

6.7.11 Quality Conformance Inspection

Quality Conformance Inspection is a process which includes measurements, non-destructive tests, analysis, and associated data that will provide verification that a particular individual component continually conforms to the requirements defined in the standard.

6.7.12 Qualification by Similarity

An alternative Qualification Inspection process accomplished without completing all of the measurements, tests, and analysis requirements defined in the standard. Acceptance and the extent of similarity, is determined by the qualifying activity, and is established through rationale that verifies that certain design features are identical to those being required to be tested or of a previously qualified component to the extent necessary to assure that the component, if tested, would meet all of the required criteria. When a Qualified Products List is being established the qualification by similarity rationale shall be approved by the purchaser or qualifying activity prior to initiation of the remaining portions of the Qualification Inspection process.

6.7.13 Purchaser

A purchaser is an activity that can issue a purchase order or contract.

6.7.14 Supplier

A supplier is a manufacturer or a value added manufacturer which has design and production control of the processes used to produce the final component in accordance with the standard.

6.7.15 Metric Equivalents

Dimensions in the specification sheets are shown in inches and after plating. In some cases metric equivalents are provided in "(x.xx)", to the nearest 0.01 mm. Metric equivalents are calculated based on one inch equals 25.4 mm. The following inch-to-metric equivalent is provided for information only:

INCH	mm
.003	0.08
.005	0.13
.010	0.25
.015	0.38
.018	0.46
.022	0.56
.025	0.64
.026	0.66
.029	0.74
.032	0.81
.033	0.84
.0335	0.85
.035	0.89
.0355	0.90
.036	0.91
.037	0.94
.039	0.99
.041	1.04
.042	1.07
.044	1.12
.045	1.14
.046	1.17
.048	1.22
.050	1.27
.051	1.30
.055	1.40
.057	1.47

INCH	mm
.060	1.52
.061	1.55
.062	1.57
.063	1.60
.064	1.63
.065	1.65
.066	1.68
.068	1.73
.073	1.85
.075	1.91
.076	1.93
.078	1.98
.079	2.01
.080	2.03
.083	2.11
.085	2.16
.086	2.18
.090	2.29
.092	2.34
.093	2.36
.095	2.41
.098	2.49
.101	2.57
.102	2.59
.103	2.62
.105	2.67
.115	2.92

INCH	mm
.122	3.10
.125	3.18
.129	3.28
.130	3.30
.133	3.38
.136	3.45
.141	3.58
.147	3.73
.153	3.89
.155	3.94
.157	3.99
.158	4.01
.186	4.72
.190	4.83
.200	5.08
.210	5.33
.211	5.36
.215	5.46
.217	5.51
.223	5.66
.249	6.32
.250	6.35
.253	6.42
.281	7.14
.294	7.47
.298	7.57
.418	10.62
.456	11.58
.501	12.73

FIGURE 10 – METRIC EQUIVALENTS TABLES

6.8 The following information needs to appear on each specification sheet:

a. Part number and BIN code (see 1.2.1 and 3.6.2) for each contact.

b. Dimensions.

c. Class (see 1.2.2).

d. Type (see 1.2.3).

e. Material (Type C).

f. Tensile strength (Type D) (inner and outer contacts).

g. Contact resistance (Type D) (inner and outer contacts).

h. Engagement and separation force (Type D) (inner contact and contact assembly and test gages).

i. Dielectric withstanding voltage (Type D).

j. Insulation resistance (Type D) (when other than in 3.5.18).

k. Wire types required for testing (Type D).

l. Mating contact.

m. Usage information.

n. Applicable military crimping tools, turrets, positioners and dies.

o. Applicable military installing and removal tools.

p. Low signal level contact resistance (Type D inner contacts).

q. Vibration.

r. Shock.

s. Maximum operating temperature (see 6.7).

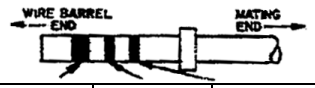
t. Finish if other than overall or localized gold.

6.9 Subject Term (Key Word) Listing

Basic identification number (BIN)
Bushing
Connector
Contact
Crimp
Engagement
Localized finish
Mating
Overall finish
Pin
Resistance
Socket
Solder
Solderless wrap
Tensile
Underplate
Wire
Wire barrel

6.10 A change bar (|) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

APPENDIX A - CONTACT IDENTIFICATION BY BIN CODE SUMMARY

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch) 10/	F (inch) 10/
	1st	2nd	3rd			Mating end size	Wire barrel size					
100	Brown	Black	Black	1-100	P	16	22	--	M39029/1-16-22	MIL-T-81714 (series 1)	.152	--
101	"	"	Brown	1-101	"	16	20	--	M39029/1-16-20	"	.152	--
102	"	"	Red	1-102	"	14	16	--	M39029/1-14-16	"	.167	--
103	"	"	Orange	1-103	"	12	12	--	M39029/1-12-12	"	.117	--
104	"	"	Yellow	2-104	"	22	22	--	M39029/2-22-22	MIL-C-81659 (series 1)	.380	--
105	"	"	Green	2-105	"	20	20	--	M39029/2-20-20	"	.380	--
106	"	"	Blue	2-106	"	16	16	--	M39029/2-16-16	"	.380	--
107	"	"	Violet	3-107	S	22	22	--	M39029/3-22-22	"	--	.380
108	"	"	Gray	3-108	"	20	20	--	M39029/3-20-20	"	--	.380
109	"	"	White	3-109	"	16	16	--	M39029/3-16-16	"	--	.500
110	"	Brown	Black	4-110	P	20	20	--	M39029/4-20-20 M83723/33B20	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 3) MIL-C-83733	.290	--

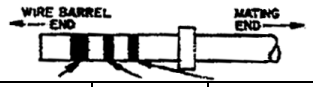
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
111	Brown	Brown	Brown	4-111	P	16	16	--	M39029/4-16-16 M83723/33B1G	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 3) MIL-C-83733	.290	--
112	"	"	Red	4-112	"	16	20	--	M39029/4-16-20	"	.290	--
113	"	"	Orange	4-113	"	12	12	--	M39029/4-12-12 M83723/33B12	"	--	--
114	"	"	Yellow	4-114	"	12	16	--	M39029/4-12-16	"	--	--
115	"	"	Green	5-115	S	20	20	--	M39029/5-20-20 M83723-34B20	"	--	.290
116	"	"	Blue	5-116	"	16	16	--	M39029/5-16-16 M83723-34B16	"	--	.290
117	"	"	Violet	5-117	"	16	20	--	M39029/5-16-20	MIL-C-26482 (series 2) MIL-C-81703 (series 3)	--	.290

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
118	Brown	Brown	Gray	5-118	S	12	12	--	M39029/5-12-12 M83723/34B12	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 1 & 3)	--	--
119	"	"	White	5-119	"	12	16	--	M39029/5-12-16	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 3) MIL-C-83733	--	--
120	"	Red	Black	6-120	P	--	--	16	M39029/6-01	MIL-C-81511 (series 1 & 2)	.210 3/	.154 3/
121	"	"	Brown	6-121	"	--	--	12	M39029/6-02	"	.210 3/	.154 3/
122	"	"	Red	6-122	"	--	--	12	M39029/6-03	"	.210 3/	.154 3/
123	"	"	Orange	6-123	"	--	--	12	M39029/6-04	"	.210 3/	.154 3/
124	"	"	Yellow	6-124	"	--	--	12	M39029/6-05	"	.210 3/	.154 3/

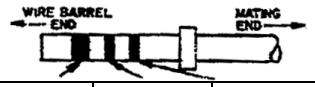
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
125	Brown	Red	Green	6-125	P	--	--	12	M39029/6-06	MIL-C-81511 (series 1 & 2)	.210 3/	.154 3/
126	"	"	Blue	7-126	"	--	--	12	M39029/7-001	MIL-C-26482 (series 2) MIL-C-81703 (series 3)	.440 3/	.280 3/
127	"	"	Violet	7-127	"	--	--	--	M39029/7-002	"	.440 3/	.280 3/
128	"	"	Gray	7-128	"	--	--	--	M39029/7-003	"	.440 3/	.280 3/
129	"	"	White	8-129	S	--	--	--	M39029/8-001	"	.280 3/	.440 3/
130	"	Orange	Black	8-130	"	--	--	--	M39029/8-002	"	.280 3/	.440 3/
131	"	"	Brown	8-131	"	--	--	--	M39029/8-003	"	.280 3/	.440 3/
132	"	"	Red	9-132	P	20	20	--	M39029/9-20-20-C1	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 3) MIL-C-83733	.380	--

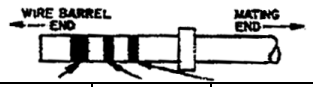
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
133	Brown	Orange	Orange	9-133	P	20	20	--	M39039/9-20-20-C2	MIL-C-26482 (series 2) MIL-C-81703 (series 3) MIL-C-83723 (series 3) MIL-C-83733	.380	--
134	"	"	Yellow	9-134	"	20	20	--	M39029/9-20-20-C3	"	.380	--
135	"	"	Green	9-135	"	20	20	--	M39029/9-20-20-C4	"	.380	--
136	"	"	Blue	9-136	"	20	20	--	M39029/9-20-20-C5	"	.380	--
138	"	"	Gray	10-138	S	20	20	--	M39029/10-20-20-C1	MIL-C-26482 (series 2)	--	.290
139	"	"	White	10-139	"	20	20	--	M39029/10-20-20-C2	MIL-C-81703 (series 3)	--	.290
140	"	Yellow	Black	10-140	"	20	20	--	M39029/10-20-20-C3	MIL-C-83723 (series 2)	--	.290
141	"	"	Brown	10-141	"	20	20	--	M39029/10-20-20-C4	MIL-C-83733	--	.290
142	"	"	Red	10-142	"	20	20	--	M39029/10-20-20-C5		--	.290
144	"	"	Yellow	11-144	P	22	22	--	M39029/11-22-22	MIL-C-81659 (series 2)	.266	--

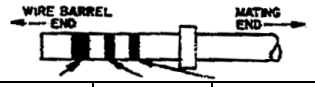
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
145	Brown	Yellow	Green	11-145	P	20	20	--	M39029/11-20-20	MIL-C-81659 (series 2)	.321	--
146	"	"	Blue	11-146	"	16	16	--	M39029/11-16-16	"	.413	--
147	"	"	Violet	11-146	"	12	12	--	M39029/11-12-12	"	--	--
148	"	"	Gray	12-148	S	22	22	--	M39029/12-22-22	"	--	.266
149	"	"	White	12-149	"	20	20	--	M39029/12-20-20	"	--	.321
150	"	Green	Black	12-150	"	16	16	--	M39029/12-16-16	"	--	.413
151	"	"	Brown	12-151	"	12	12	--	M39029/12-12-12	"	--	--
152	"	"	Red	13-152	"	--	--	16	M39029/13-01	MIL-C-81511 (series 1)	.160 4/	.210 4/
153	"	"	Orange	13-153	"	--	--	12	M39029/13-02	"	.160 4/	.210 4/
154	"	"	Yellow	13-154	"	--	--	12	M39029/13-03	"	.160 4/	.210 4/
155	"	"	Green	13-155	"	--	--	12	M39029/13-04	"	.160 4/	.210 4/
156	"	"	Blue	13-156	"	--	--	12	M39029/13-05	"	.160 4/	.210 4/

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
157	Brown	Green	Violet	13-157	S	--	--	12	M39029/13-06	MIL-C-81511 (series 1)	.160 4/	.210 4/
158	"	"	Gray	14-158	"	--	--	16	M39029/14-01	"	.160 4/	.210 4/
159	"	"	White	14-159	"	--	--	12	M39029/14-02	"	.160 4/	.210 4/
160	"	Blue	Black	14-160	"	--	--	12	M39029/14-03	"	.160 4/	.210 4/
161	"	"	Brown	14-161	"	--	--	12	M39029/14-04	"	.160 4/	.210 4/
162	"	"	Red	14-162	"	--	--	12	M39029/14-05	"	.160 4/	.210 4/
163	"	"	Orange	14-163	"	--	--	12	M39029/14-06	"	.160 4/	.210 4/
166	"	"	Blue	16-166	"	23	28	--	M39029/16-23-28	MIL-C-81511 (series 4)	--	.190
167	"	"	Violet	16-167	"	23	22	--	M39029/16-23-22	"	--	.190
168	"	"	Gray	16-168	"	20	20	--	M39029/16-20-20	"	--	.190
169	"	"	White	16-169	"	16	16	--	M39029/16-16-16	"	--	.190

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
170	Brown	Violet	Black	16-170	S	12	12	--	M39029/16-12-12	MIL-C-81511 (series 4)	--	--
171	"	"	Brown	17-171	"	23	28	--	M39029/17-23-28	MIL-C-81511 (series 3)	--	.190
172	"	"	Red	17-172	"	23	22	--	M39029/17-23-22	"	--	.190
173	"	"	Orange	17-173	"	20	20	--	M39029/17-20-20	"	--	.190
174	"	"	Yellow	17-174	"	16	16	--	M39029/17-16-16	"	--	.190
175	"	"	Green	17-175	"	12	12	--	M39029/17-12-12	"	--	--
176	"	"	Blue	18-176	P	23	28	--	M39029/18-23-28	MIL-C-81511 (series 3 & 4)	.190	--
177	"	"	Violet	18-177	"	23	22	--	M39029/18-23-22	"	.190	--
178	"	"	Gray	18-178	"	20	20	--	M39029/18-20-20	"	.190	--
179	"	"	White	18-179	"	16	16	--	M39029/18-16-16	"	--	--
180	"	Gray	Black	18-180	"	12	12	--	M39029/18-12-12	"	.240 3/	.205 3/
181	"	"	Brown	19-181	"	--	--	16	M39029/19-01	"	.225 3/	.205 3/

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
182	Brown	Gray	Red	19-182	P	--	--	12	M39029/19-02	MIL-C-81511 (series 3 & 4)	.225 3/	.205 3/
183	"	"	Orange	20-183	"	--	--	12	M39029/19-03	"	.225 3/	.205 3/
184	"	"	Yellow	20-184	S	--	--	16	M39029/20-01	MIL-C-81511 (series 3)	.195 4/	.240 4/
185	"	"	Green	20-185	"	--	--	12	M39029/20-02	"	.180 4/	.240 4/
186	"	"	Blue	20-186	"	--	--	12	M39029/20-03	"	.180 4/	.240 4/
187	"	"	Violet	21-187	"	--	--	16	M39029/21/01	MIL-C-81511 (series 4)	.195 4/	.240 4/
188	"	"	Gray	21-188	"	--	--	12	M39029/21-02	"	.180 4/	.140 4/
189	"	"	White	21-189	"	--	--	12	M39029/21-03	"	.180 4/	.240 4/
190	"	White	Black	22-190	"	22	28	--	M39029/22-22-28 M39029/15-22-28	MIL-T-81714 (series 2) & MIL-C-81511 (series 3 & 4, class L)	--	.110

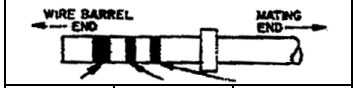
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
191	Brown	White	Brown	22-191	S	22	22	--	M39029/15-22-22 M39029/22-22-22	MIL-T-81714 (series 2) & MIL-C-81511 (series 3 & 4, class L)	--	.110
192	"	"	Red	22-192	"	20	20	--	M39029/22-20-20	"	--	.110
193	"	"	Orange	22-193	"	16	16	--	M39029/22-16-16	"	--	.110
194	"	"	Yellow	23-194	P	--	--	8	M39029/23-01	MIL-C-26482 (series 1)	.292 1/	.196 3/
195	"	"	Green	23-195	"	--	--	8	M39029/23-02	"	.292 3/	.196 3/
196	"	"	Blue	23-196	"	--	--	8	M39029/23-03	"	.292 3/	.196 3/
197	"	"	Violet	23-197	"	--	--	8	M39029/23-04	"	.292 3/	.196 3/
198	"	"	Gray	23-198	"	--	--	8	M39029/23-05	"	.292 3/	.196 3/
199	"	"	White	24-199	S	--	--	8	M39029/24-01	"	.196 4/	.292 4/

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
200	Red	Black	Black	24-200	S	--	--	8	M39029/24-02	MIL-C-26482 series 1)	.196 4/	.292 4/
201	"	"	Brown	24-201	"	--	--	8	M39029/24-03	"	.196 4/	.292 4/
202	"	"	Red	24-202	"	--	--	8	M39029/24-04	"	.196 4/	.292 4/
203	"	"	Orange	24-203	"	--	--	8	M39029/24-05	"	.196 4/	.292 4/
204	"	"	Yellow	25-204	P	--	--	12	M39029/25-01	"	.235 3/	.235 3/
205	"	"	Green	25-205	"	--	--	12	M39029/25-02	"	.235 3/	.235 3/
206	"	"	Blue	25-206	"	--	--	12	M39029/25-03	"	.235 3/	.235 3/
207	"	"	Violet	26-207	S	--	--	12	M39029/26-01	"	.235 3/	.235 3/
208	"	"	Gray	26-208	"	--	--	12	M39029/26-02	"	.235 4/	.235 4/
209	"	"	White	26-209	"	--	--	12	M39029/26-03	"	.235 4/	.235 4/

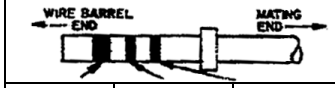
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
210	Red	Brown	Black	27-210	S	--	--	12	M39029/27-12A	MIL-C-38999 (series II)	.166 4/	.166 4/
211	"	"	Brown	28-211	P	--	--	12	M39029/28-12A	"	.166 3/	.166 3/
212	"	"	Red	29-212	"	16	16	--	M39029/29-16-16 MS3162-16-16 MS83723-29T16	MIL-C-5015 (MS3450) MIL-C-83723 (series 2)	.430	--
213	"	"	Orange	29-213	"	12	12	--	M39029/29-12-12 MS3162-12-12 MS83723-29T12	"	--	--
214	"	"	Yellow	29-214	"	8	8	--	M39029/29-8-8 MS3162-8-8 MS83723-29T8	"	--	--
215	"	"	Green	29-215	"	4	4	--	M39029/29-4-4 MS3162-4-4 M83723-29T4	"	--	--
216	"	"	Blue	29-216	"	0	0	--	M39029/29-0-0 MS3162-0-0 M83723-29T0	"	--	--

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
217	Red	Brown	Violet	30-217	S	16S	16	--	M39029/30-16S-16 MS3163-16S-16 M83723-30T17	MIL-C-5015 (MS3450) MIL-C-83723 (series 2)	--	.399
218	"	"	Gray	30-218	"	16	16	--	M39029/30-16-16 MS3163-16-16 M83723-30T16	"	--	.430
219	"	"	White	30-219	"	12	12	--	M39029/30-12-12 MS3163-12-12 M83723-30T12	"	--	--
220	"	Red	Black	30-220	"	8	8	--	M39029/30-8-8 MS3163-8-8 M83723-30T8	"	--	--
221	"	"	Brown	30-221	"	4	4	--	M39029/30-4-4 MS3163-4-4 M83723-30T4	"	--	--
222	"	"	Red	30-222	"	0	0	--	M39029/30-0-0 MS3163-0-0 M83723-30T0	"	--	--
223	"	"	Orange	31-223	P	20	20	--	MS3192-20-20A	MIL-C-26482 (series 1)	.290	--

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
224	Red	Red	Yellow	31-224	P	20	20	--	MS3192-20-20B	MIL-C-26482 (series 1)	--	--
225	"	"	Green	31-225	"	20	20	--	MS3192-20-20C1	"	--	--
226	"	"	Blue	31-226	"	20	20	--	MS3192-20-20C2	"	--	--
227	"	"	Violet	31-227	"	20	20	--	MS3192-20-20C3	"	--	--
228	"	"	Gray	31-228	"	16	16	--	MS3192-16-16-A	"	.290	--
229	"	"	White	31-229	"	16	16	--	MC24254-16P	MIL-C-26482 (series 1) MIL-C-26500	.290	--
230	"	Orange	Black	31-230	"	16	16	--	MS3192-16-16B	MIL-C-26482 (series 1)	--	--
231	"	"	Brown	31-231	"	16	16	--	MS3192-16-16C1	"	--	--
232	"	"	Red	31-232	"	16	16	--	MS3192-16-16C2	"	--	--
233	"	"	Orange	31-233	"	16	16	--	MS3192-16-16C3	"	--	--
234	"	"	Yellow	31-234	"	12	12	--	MS3192-12-12A	"	--	--
235	"	"	Green	31-235	"	12	12	--	MS24254-12-12P	MIL-C-26482 (series 1) MIL-C-26500	--	--

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
236	Red	Orange	Blue	31-236	P	12	12	--	MS3192-12-12B	MIL-C-26482 (series 1)	--	--
237	"	"	Violet	31-237	"	12	12	--	MS3192-12-12C1	"	--	--
238	"	"	Gray	31-238	"	12	12	--	MS3192-12-12C2	"	--	--
239	"	"	White	31-239	"	12	12	--	MS3192-12-12C3	"	--	--
240	"	Yellow	Black	31-240	"	20	20	--	MS3192A20-20A	"	.290	--
241 9/	"	"	Brown	31-241	"	20	20	--	MS24254-20P	MIL-C-26500 MIL-C-26482 (series 1)	.290	--
242	"	"	Red	32-242	S	20	20	--	MS3193-20-20A	MIL-C-26482 (series 1)	--	.290
243	"	"	Orange	32-243	"	20	20	--	MS3193-20-20B	"	--	--
244	"	"	Yellow	32-244	"	20	20	--	MS3193-20-20C1	"	--	--
245	"	"	Green	32-245	"	20	20	--	MS3193-20-20C2	"	--	--
246	"	"	Blue	32-246	"	20	20	--	MS3193-20-20C3	"	--	--
247	"	"	Violet	32-247	"	16	16	--	MS319316-16A	"	--	.290
248	"	"	Gray	32-248	"	16	16	--	MS24255-16S	MIL-C-26482 (series 1) MIL-C-26500	--	.290

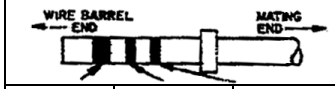
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
249	Red	Yellow	White	32-249	S	16	16	--	MS3193-16-16B	MIL-C-26482 (series 1)	--	--
250	"	Green	Black	32-250	"	16	16	--	MS3193-16-16C1	"	--	--
251	"	"	Brown	32-251	"	16	16	--	MS3193-16-16C2	"	--	--
252	"	"	Red	32-252	"	16	16	--	MS3193-16-16C3	"	--	--
253	"	"	Orange	32-253	"	12	12	--	MS3193-12-12A	"	--	--
254	"	"	Yellow	32-254	"	12	12	--	MS24255-12S	MIL-C-26482 (series 1) MIL-C-26500	--	--
255	"	"	Green	32-255	"	12	12	--	MS3193-12-12B	MIL-C-26482 (series 1)	--	--
256	"	"	Blue	32-256	"	12	12	--	MS3193-12-12C1	"	--	--
257	"	"	Violet	32-257	"	12	12	--	MS3193-12-12C2	"	--	--
258	"	"	Gray	32-258	"	12	12	--	MS3193-12-12C3	"	--	--
259	"	"	White	32-259	"	20	20	--	MS3193A-20-20A	"	--	.290
260	"	Blue	Black	32-260	"	20	20	--	MS24255-20S	MIL-C-26482 (series 1) MIL-C-26500	--	.290
261	"	"	Brown	33-261	"	23	28	--	MS3343A23-28	MIL-C-81511 (series 1)	--	.170

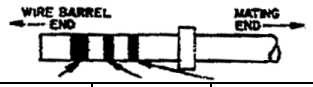
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
262	Red	Blue	Red	33-262	S	23	28	--	MS3343B23-28	MIL-C-81511 (series 1)	--	.170
263	"	"	Orange	33-263	"	23	22	--	MS3343A23-22	"	--	.170
264	"	"	Yellow	33-265	"	23	22	--	MS3343B23-22	"	--	.170
265	"	"	Green	33-265	"	20	20	--	MS3343A20-20	"	--	.270
266	"	"	Blue	33-266	"	20	20	--	MS3343B20-20	"	--	.270
267	"	"	Violet	33-265	"	16	16	--	MS3343A16-16	"	--	.270
268	"	"	Gray	33-268	"	16	16	--	MS3343B16-16	"	--	.270
269	"	"	White	33-269	"	12	12	--	MS3343A12-12	"	--	--
270	"	Violet	Black	33-270	"	12	12	--	MS3343B12-12	"	--	--
271	"	"	Brown	34-271	P	20	20	--	MS17803-20-20	MIL-C-28748/3	.282	--
272	"	"	Red	34-272	"	16	20	--	MS17803-16-20	MIL-C-28748/3	.282	--
273	"	"	Orange	34-273	"	16	16	--	MS17803-16-16	MIL-C-28748/3	.282	--
274	"	"	Yellow	35-274	S	20	20	--	MS17804-20-20	MIL-C-28748/4	--	.282
275	"	"	Green	35-275	"	16	20	--	MS17804-16-20	MIL-C-28748/4	--	.282
276	"	"	Blue	35-276	"	16	16	--	MS17804-16-16	MIL-C-28748/4	--	.282

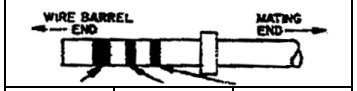
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
277	Red	Violet	Violet	36-277	P	16	20	--	MS17807-16-20	MIL-C-28748/9	.312	--
278	"	"	Gray	36-278	"	16	16	--	MS17807-16-16	MIL-C-28748/9	.312	--
279	"	Violet	White	37-279	S	16	20	--	MS17808-16-20	MIL-C-28748/10	--	.312
280	"	Gray	Black	37-280	"	16	16	--	MS17808-16-16	MIL-C-28748/10	--	.312
287	"	Gray	Violet	44-287	P	16	22	--	MS90453-16-22	MIL-C-5015 (MS3400 series)	.425	--
288	"	"	Gray	44-288	"	16	16	--	MS90453-16-16	"	.425	--
289	"	"	White	44-289	"	12	16	--	MS90453-12-16	"	--	--
290	"	White	Black	44-290	"	12	12	--	MS90453-12-12	"	--	--
291	"	"	Brown	44-291	"	8	8	--	MS90453-8-8	"	--	--
292	"	"	Red	44-292	"	4	4	--	MS90453-4-4	"	--	--
293	"	"	Orange	44-293	"	0	0	--	MS90453-0-0	"	--	--
294	"	"	Yellow	45-294	S	16	22	--	MS90454-16-22	"	--	.510
295	"	"	Green	45-295	"	16	16	--	MS90454-16-16	"	--	.510
296	"	"	Blue	45-296	"	12	16	--	MS90454-12-16	"	--	--
297	"	"	Violet	45-297	"	12	12	--	MS90454-12-12	"	--	--

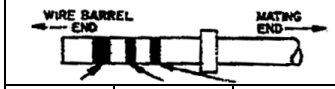
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
298	Red	White	Gray	45-298	S	8	8	--	MS90454-8-8	MIL-C-5015 (MS3400 series)	--	--
299	"	"	White	45-299	"	4	4	--	MS90454-4-4	"	--	--
300	Orange	Black	Black	45-300	"	0	0	--	MS90454-0-0	"	--	--
301	"	"	Brown	46-301	"	23	28	--	MS90460A-23-28	MIL-C-81511 (series 2)	--	.170
302	"	"	Red	46-302	"	23	28	--	MS90460B-23-28	"	--	.170
303	"	"	Orange	46-303	"	23	22	--	MS90460A-23-22	"	--	.170
304	"	"	Yellow	46-304	"	23	22	--	MC90460B-23-22	"	--	.170
305	"	"	Green	46-305	"	20	20	--	MS90460A-20-20	"	--	.220
306	"	"	Blue	46-306	"	20	20	--	MS90460B-20-20	"	--	.220
307	"	"	Violet	46-307	"	16	16	--	MS90460A-16-16	"	--	.220
308	"	"	Gray	46-308	"	16	16	--	MS90460B-16-16	"	--	.220
309	"	"	White	46-309	"	12	12	--	MS90460A-12-12	"	--	--
310	"	Brown	Black	46-310	"	12	12	--	MS90460B-12-12	"	--	--
311	"	"	Brown	47-311	P	23	28	--	MS90461A-23-28	MIL-C-81511 (series 1 & 2)	.220	--

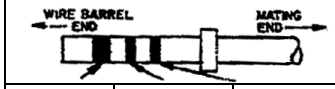
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
312	Orange	Brown	Red	47-312	P	23	28	--	MS90461B-23-28	MIL-C-81511 (series 1 & 2)	.220	--
313	"	"	Orange	47-313	"	23	22	--	MS90461A-23-22	"	.220	--
314	"	"	Yellow	47-314	"	23	22	--	MS90461B-23-22	"	.220	--
315	"	"	Green	47-315	"	20	20	--	MS90461A-20-20	"	.220	--
316	"	"	Blue	47-316	"	20	20	--	MS90461B-20-20	"	.220	--
Refer to bin codes 337 through 339 for remaining contacts of MIL-C-39029/47.												
317	Orange	Brown	Violet	48-317	P	6	6	--	MS90559-11	MIL-C-22992 (class L)	--	--
318	"	"	Gray	48-318	"	6N	6	--	MS90559-12	"	--	--
319	"	"	White	48-319	"	6G	6	--	MS90559-14	"	--	--
320	"	Red	Black	48-320	"	4	4	--	MS90559-8	"	--	--
321	"	"	Brown	48-321	"	4N	4	--	MS90559-9	"	--	--
322	"	"	Red	48-322	"	4G	4	--	MS90559-13	"	--	--
323	"	"	Orange	48-323	"	1/0	1/0	--	MS90559-5	"	--	--
324	"	"	Yellow	48-324	"	1/0N	1/0	--	MS90559-6	"	--	--

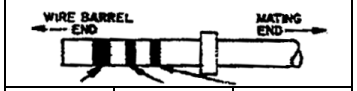
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
325	Orange	Red	Green	48-325	P	2/0	2/0	--	MS90559-3	MIL-C-22992 (class L)	--	--
326	"	"	Blue	48-326	"	2/0N	2/0	--	MS90559-4	"	--	--
327	"	"	Violet	48-327	"	4/0	4/0	--	MS90559-1	"	--	--
328	"	"	Gray	48-328	"	4/0N	4/0	--	MS90559-2	"	--	--
329	"	"	White	49-329	S	6	6	--	MS90560-7	"	--	--
330	"	Orange	Black	49-330	"	6G	6	--	MS90560-8	"	--	--
331	"	"	Brown	49-331	"	4	4	--	MS90560-5	"	--	--
332	"	"	Red	49-332	"	4G	4	--	MS90560-9	"	--	--
333	"	"	Orange	49-333	"	1/0	1	--	MS90560-3	"	--	--
334	"	"	Yellow	49-334	"	2/0	2/0	--	MS90560-2	"	--	--
335	"	"	Green	49-335	"	4/0	4/0	--	MS90560-1	"	--	--
337	"	"	Violet	47-337	P	16	16	--	MS90461B16-16	MIL-C-81511 (series 1 & 2)	.220	--

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
338	Orange	Orange	Gray	47-338	P	12	12	--	MS90461A12-12	MIL-C-81511 (series 1 & 2)	--	--
339	"	"	White	47-339	"	12	12	--	MS90461B12-12	"	--	--
340	"	Yellow	Black	50-340	"	--	--	12	M83733/13-12	MIL-C-83733	.260 5/	.260 5/
341	"	"	Brown	51-341	S	--	--	12	M83733/14-12	"	.260 6/	.260 6/
342	"	"	Red	54-342	P	--	--	12	MS27184-22P	MIL-C-26500	.235 3/	.255 3/
343	"	"	Orange	54-343	"	--	--	8	MS27184-20P	"	.235 3/	.255 3/
344	"	"	Yellow	55-344	S	--	--	12	MS27185-22S	"	.150 4/	.235 4/
345	"	"	Green	55-345	"	--	--	8	MS27185-20S	"	.150 4/	.235 4/
348	"	"	Gray	56-348	"	22	22D	--	MS27490-22D MS27655-22D	MIL-C-38999 (series, I, III, and IV)	--	.166
349	"	"	White	56-349	"	22	22M	--	MS27490-22M	"	--	.166

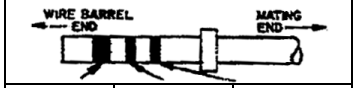
See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
350	Orange	Green	Black	56-350	S	22	22	--	MS27490-22	MIL-C-38999 (series I, III, and IV)	--	.166
351	"	"	Brown	56-351	"	20	20	--	MS27490-20 MS27655-20	"	--	.166
352	"	"	Red	56-352	"	16	16	--	MS27490-16 MS27655-16	"	--	.166
353	"	"	Orange	56-353	"	12	12	--	MS27490-12 MS27655-12	"	--	--
354	"	"	Yellow	57-354	"	22	22D		MS27491-22D MS27492-22D M24308/12-1	MIL-C-24308 MIL-C-55302/68, /71, /72, & /75 MIL-C-38999 (series II) MIL-C-83733		.166
355	"	"	Green	57-355	"	22	22M	--	MS27492-22M MS27491-22M	"		.166
356	"	"	Blue	57-356	"	22	22	--	MS27491-22 MS27492-22	"		.166
357	"	"	Violet	57-357	"	20	20	--	MS27491-20 MS27492-20	"		.166
358	"	"	Gray	57-358	"	16	16	--	MS27491-16 MS27492-16	"		.166

See footnotes at end of table.

CONTACT SUMMARY (CONTINUED)

BIN code 1/	Color bands 			Military part number M39029/	Pin or socket	Power contacts		Shielded contact cavity size	Superseded military part numbers	Connector used with (specification)	E (inch)	F (inch)
	1st	2nd	3rd			Mating end size	Wire barrel size					
359	Orange	Green	White	57-359	S	12	12	--	MS27491-12 MS27492-12	MIL-C-24308 MIL-C-55302/68, /72,/72 & /75 MIL-C-38999 (series II) MIL-C-83733	--	--
360	"	Blue	Black	58-360	P	22	22D	--	MS27493-22D MS27494-22D M24308/13-1	MIL-C-24308 MIL-C-55302/69 MIL-C-38999 (series I thru IV) MIL-C-83733	.166	--
361	"	"	Brown	58-361	"	22	22M	--	MS27493-22M MS27494-22M	"	.166	--
362	"	"	Red	58-362	"	22	22	--	MS27493-22 MS27492-22	"	.166	--
363	"	"	Orange	58-363	"	20	20	--	MS27493-20 MS27492-20	"	.166	--
364	"	"	Yellow	58-364	"	16	16	--	MS27493-16 MS27494-16	MIL-C-38999 (series I & III)	.166	--
365	"	"	Green	58-365	"	12	12	--	MS27493-12 MS27494-12	"	--	--
366	"	"	Blue	59-366	S	--	--	8	MS27535	MIL-C-24308	.200 4/	.405 4/
367	"	"	Violet	60-367	P	--	--	8	MS27536	"	.405 3/	.200 3/

See footnotes at end of table.