

INCH-POUND

MIL-DTL-3643B  
25 November 2003  
SUPERSEDING  
MIL-C-3643A  
21 February 1961

DETAIL SPECIFICATION

CONNECTORS, COAXIAL, RADIO FREQUENCY,  
SERIES HN, AND ASSOCIATED FITTINGS,  
GENERAL SPECIFICATION FOR

Inactive for new design after  
14 August 1972.

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for weatherproof, series HN-radio-frequency, coaxial connectors and associated fittings. These connectors have a nominal impedance of 50 ohms, an operating voltage of 1,500 volts root mean square, and a nominal operating frequency range of 0 to 10,000 MHz (see 6.1 and 6.3).

1.2 Classification.

1.2.1 Type designation. The type designation of connectors and associated fittings is derived from the AN nomenclature system specified in MIL-STD-196 (see 3.1 and 6.2).

1.2.2 Part or Identifying Number (PIN). The PIN consists of the applicable "UG" designation (see 6.3).

UG-XXXX( )/U

2. APPLICABLE DOCUMENTS

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

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, Attn: VAI, P.O. Box 3990 East Broad Street, Columbus, Ohio 43216-5000 or emailed to [RFConnectors@dsccl.dla.mil](mailto:RFConnectors@dsccl.dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil).

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2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## FEDERAL SPECIFICATIONS

L-P-516	-	Plastic Sheet and Rod, Thermosetting, Cast
O-F-499	-	Flux, Brazing, (Silver Brazing Filler Metal, Low Melting Point).
QQ-B-654	-	Brazing Alloys, Silver.
QQ-L-201	-	Lead Sheet.

## FEDERAL STANDARDS

FED-STD-H28	-	Screw-Thread Standards for Federal Services.
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## COMMERCIAL ITEM DESCRIPTIONS

A-A-59588	-	Rubber, Silicone.
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## DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130	-	Identification Marking of U. S. Military Property.
MIL-STD-202	-	Test Methods for Electronic and Electrical Component Parts.

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

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

## ASTM INTERNATIONAL

ASTM A108	-	Steel Bars, Carbon, Cold-Finished, Standard Quality.
ASTM B16	-	Rod, Brass, Free-Cutting, Bar and Shapes for Use in Screw Machines.
ASTM B36	-	Brass Plate, Sheet, Strip and Rolled Bar.
ASTM B121	-	Leaded Brass Plate, Sheet, Strip and Rolled Bar.
ASTM B124	-	Copper and Copper Alloy Forging Rod, Bar and Shapes.
ASTM B139	-	Phosphor Bronze Rod, Bar and Shapes.
ASTM B194	-	Copper Beryllium Alloy Plate, Sheet, Strip and Rolled Bar.
ASTM B196	-	Copper Beryllium Alloy Rod and Bar.
ASTM B197	-	Copper Beryllium Alloy Wire.
ASTM B700	-	Electrodeposited Coatings of Silver for Engineering Uses.
ASTM D1710	-	Tubing, Extruded and Compression Molded, Polytetrafluoroethylene (PTFE) Rod and Heavy Walled.

(Applications for copies should be addressed to the ASTM International, P.O. Box C700, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

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## INSTITUTE FOR INTERCONNECTING AND PACKAGING ELECTRONIC CIRCUITS

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

(Applications for copies should be addressed to the institute for Interconnecting and Packaging Electronic Circuits, 2215 Sanders Road, Northbrook, IL 60062.)

## SOCIETY OF AUTOMOTIVE ENGINEERS

SAE-AS8660 - Silicone Compound NATO Code Number S-736.  
 SAE-AMS-H-7199 - Heat Treatment of Wrought Copper-Beryllium Alloys, Process for (Copper Alloys: Numbers C17000, C17200, C17300, C17500 and C17510).  
 SAE-AMS-QQ-N-290 - Nickel Plating (Electrodeposited).  
 SAE-AMS-QQ-P-416 - Plating, Cadmium (Electrodeposited).

(Applications for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale PA, 15096-0001.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

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

3.2 Material. The material shall be as specified herein (see 3.1). However, when a definite material is not specified, a material shall be used which will enable the connectors and associated fittings to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.2.1 Brass. Brass shall be in accordance with ASTM B16, ASTM B36, ASTM B121 or ASTM B124.

3.2.2 Copper beryllium. Copper beryllium shall be in accordance with ASTM B194, ASTM B196 or ASTM B197. After machining and forming, parts fabricated of copper beryllium shall be heat-treated to condition HT in accordance with SAE-AMS-H-7199.

3.2.3 Phosphor bronze. Phosphor bronze shall be in accordance with composition A of ASTM B139.

3.2.4 Plastic. Plastic shall be in accordance with type E-2 of L-P-516, and shall show no visible flaws or cracks.

3.2.5 Silicone rubber. Silicone rubber shall be in accordance with class 2A, grade 50 or 60, of A-A-59588, except oil-immersion test is not applicable.

3.2.6 Silver solder. Silver solder shall be in accordance with class 1 of QQ-B-654.

3.2.6.1 Flux. Flux used while silver soldering shall be in accordance with O-F-499.

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3.2.7 Soft solder. Soft solder shall be in accordance with composition Sn60 of J-STD-006.

3.2.8 Polytetrafluoroethylene. Polytetrafluoroethylene shall be in accordance with ASTM D1710.

3.3 Design and construction. Connectors and associated fittings shall be of the design construction, and physical dimensions specified (see 3.1). Parts having similar electrical characteristics may be combined (fabricated as a single piece) to simplify construction. Parts of unlike materials may be combined such as brass and copper beryllium, provided copper beryllium is used in the fabrication of the single-piece construction.

3.3.1 Metal parts. Unless otherwise specified (see 3.1), all metal parts shall have a silver plating not less than .0002 inch (0.005 mm) thick of sufficient smoothness and density to withstand the salt-spray (corrosion) test specified in 4.4.3. Silver plating shall be in accordance with ASTM B700. Dimensions of metal parts shall include the plating (see 3.1).

3.3.2 Screw threads. Screw threads shall be in accordance with FED-STD-H28, and shall have the specified fit after plating (see 3.1).

3.3.3 Gage tests for contacts.

3.3.3.1 Center contacts (female). The center contacts shall meet the gage tests specified in 4.4.1.1 as piece parts and 4.4.1.2 in the assembled connector.

3.3.3.2 Outer contacts. The outer contacts shall meet the gage tests specified in 4.4.1.1.2 as piece parts and 4.4.1.2.2 in the assembled connector.

3.3.3.3 Outer contact form over. When outer contacts are tested as specified in 4.4.1.3, they shall show no signs of loosening.

3.3.4 Assembly and rotation. When tested as specified in 4.4.1.4, the assembled coupling nuts for electrical plug connectors and connector adapters shall not disengage. Subsequent to this test, the coupling nuts shall be free finger turning.

3.3.5 Interchangeability (applicable only to male terminations). The male terminations of the connectors shall mate properly with the test gage specified in 4.4.1.5. Protrusion of the spring-loaded pin beyond the spring retainer shall indicate an interference fit or eccentricity.

3.4 Dielectric withstanding voltage. When connectors are tested as specified in 4.4.2, there shall be no evidence of breakdown.

3.5 Salt spray (corrosion). When connectors and associated fittings are tested as specified in 4.4.3, they shall show no evidence of destructive corrosion or pitting. Destructive corrosion shall be construed as any type of corrosion, which in any way interferes with mechanical or electrical performance.

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

3.7 Marking. Connectors and associated fittings shall be marked in accordance with MIL-STD-130, with the type designation and the manufacturer's code symbol. Marking shall be in depressed characters approximately .093 inch (2.36 mm) high, in the place specified (see 3.1).

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3.8 Workmanship. Connectors and associated fittings shall be processed in such a manner as to be uniform in quality and shall be free from sharp edges and burrs, except where sharp edges are required for mechanical or electrical reasons. All solder joints shall be thoroughly cleaned.

## 4. VERIFICATION

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

- a. Component-materials inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Component-materials inspection. Component-materials inspections shall consist of verification that the component materials listed in table I, used in fabricating the connectors and associated fittings, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

TABLE I. Component materials inspection.

Component material	Requirement paragraph	Applicable specification
Brass	3.2.1	ASTM B16, ASTM B36, ASTM B121, or ASTM B124
Copper beryllium	3.2.2	ASTM B194, ASTM 196, or ASTM B197
Phosphor bronze	3.2.3	ASTM B139
Plastic	3.2.4	L-P-516
Silicone rubber	3.2.5	A-A-59588
Silver solder	3.2.6	QQ-B-654
Flux	3.2.6.1	O-F-499
Soft solder	3.2.7	J-STD-006
Polytetrafluoroethylene	3.2.8	ASTM-D1710

4.3 Conformance inspection.

4.3.1 Inspection conditions. Unless otherwise specified herein, all inspections shall be made at room ambient temperature, relative humidity, and pressure.

4.3.1.1 Inspection lot. An inspection lot, shall consist of all the connectors and associated fittings of the same type designation, produced under essentially the same conditions, and offered for inspection at one time.

4.3.1.2 Resubmitted lot. If an inspection lot is rejected, the supplier may replace it with a new lot, rework it to correct the defects, or screen out the defective units, and submit it again to acceptance inspection. Resubmitted lots shall be kept separate from new lots and shall be clearly identified as resubmitted lots.

4.3.1.3 Group A inspection. Group A inspection shall consist of the examinations and tests specified in table II, and shall be made on the same set of sample units.

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TABLE II. Group A Inspection.

Examination of test	Requirement paragraph	Method paragraph
Visual and mechanical examination:	---	4.4.1
Marking	3.6	---
Workmanship <sup>1/</sup>	3.7	---
Gage tests for contacts (assembled connectors:		
center contacts (female))	3.3.3.1	4.4.1.2.1
Outer contacts	3.3.3.2	4.4.1.2.2
Dielectric withstanding voltage	3.4	4.4.2

<sup>1/</sup> Assembly, fit of parts, and plating coverage.

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

4.3.1.3.1.1 Visual inspection (group A inspection). Each connector shall be visually examined for completeness, workmanship, and identification requirements. Attention shall be given to those assemblies that require a gasket to determine the condition of the gasket. Gaskets missing, twisted, buckled, kinked, or damaged in any way shall be cause for rejection. Group A inspection shall be performed in any order acceptable to the Government.

TABLE III. Inspection level.

Lot size	Visual and mechanical inspection
1 to 15	All
16 to 280	20
281 to 1,200	47
1,201 to 3,200	53
3,201 to 10,000	68
10,001 to 35,000	77
35,001 to 150,000	96
150,001 to 500,000	119
500,001 and over	143

4.3.1.4 Group B inspection. Group B inspection shall consist of the examinations specified in table IV, in the order shown, and shall be made on sample units which have passed group A inspection. The same set of sample units shall be used for both subgroups.

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TABLE IV. Group B inspection.

Examination	Requirement paragraph	Method paragraph
Subgroup 1		
Visual and mechanical examination:		
Outer contact form over	3.3.4	4.4.1.3
Assembly and rotation	3.3.5	4.4.1.4
Subgroup 2		
Visual and mechanical examination:		
Physical dimensions <sup>1/</sup>	3.3	Figure 1
Interchangeability (applicable only to male terminations).	3.3.6	4.4.1.5 and figure 2

<sup>1/</sup> Applicable only to female terminations.

4.3.1.4.1 Sampling plan. A sample of parts shall be randomly selected in accordance with table V. If one or more defects are found, the lot shall be screened for that particular defect and defects removed. After screening and removal of defects, a new sample of parts shall be randomly selected and subjected to all tests in accordance with table V. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification. Group B inspection shall be performed in any order acceptable to the Government.

TABLE V. Inspection level.

Lot size	Sample size
1 to 90	5
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1,200	19
1,201 to 3,200	23
3,201 to 10,000	29
10,001 to 35,000	35
35,001 and over	40

4.3.1.5 Disposition of sample units. Sample units, which have passed the groups A, and B inspections may be delivered on the contract or order, if the lot is accepted.

4.3.1.6 Group C inspection. Group C inspection shall consist of the examinations and tests specified in table VI.

4.3.1.6.1 Sampling plan.

4.3.1.6.1.1 Subgroup 1 (unassembled connectors and associated fittings). Equivalent piece parts for six sample units of each type connector and associated fitting shall be selected from the first lot produced. Thereafter, for each 500 connectors and associated fittings subsequently produced, piece parts for one sample unit shall be selected.

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4.3.1.6.1.1.1 Physical dimensions. To facilitate inspection of the physical dimensions, the unassembled sample units shall be divided into groups of identical piece parts. Inspection of the physical dimensions shall then be performed on a group-by-group basis.

TABLE VI. Group C inspection.

Examination or test	Requirement paragraph	Method paragraph
Subgroup 1 (unassembled connectors and associated fittings) Visual and mechanical examination: Design and construction: Physical dimensions <u>1/</u> Gage tests for contacts <u>2/</u>	3.3 3.3.3	4.4.1 4.3.1.6.1.1.1 4.4.1.1 to 4.4.1.1.2, incl
Subgroup 2 (assembled connectors and associated fittings) Salt spray (corrosion)	3.5	4.4.3

1/ Only those dimensions related to piece parts (other than gage tests for contacts) shall be checked.

2/ This test is not applicable to associated fittings. In addition, test 3 of 4.4.1.1.1.3 is not applicable to connectors UG-60E/U, -61E/U and -212C/U.

4.3.1.6.1.1.2 Acceptance criteria. No defects shall be permitted for piece parts. In addition, no defects shall be permitted for material, plating of metal parts, and screw threads; and no failures shall be permitted in the gage tests for contacts.

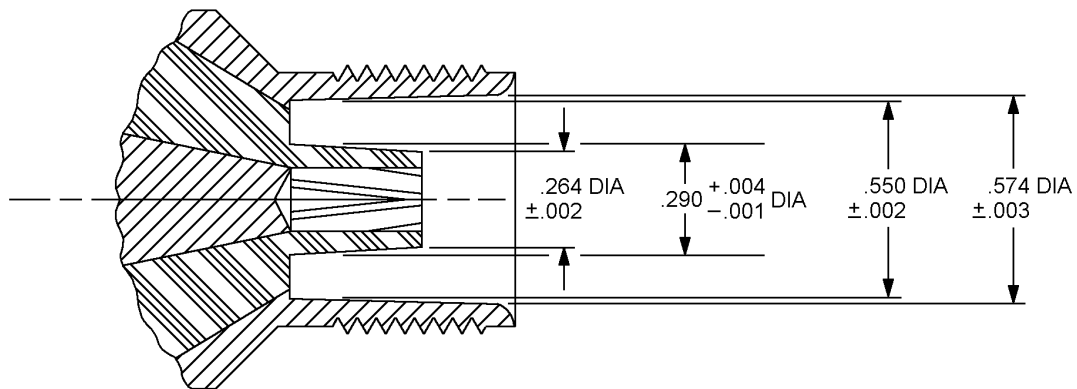
4.3.1.6.1.2 Subgroup 2 (assembled connectors and associated fittings). Six sample units of each type connector and associated fitting shall be selected from the first lot produced. Thereafter, for each 500 connectors subsequently produced, one sample unit shall be selected. If any failures occur during this test, the sample shall be rejected.

4.3.1.6.2 Disposition of sample units. Sample units, which have been subjected to group C inspection, subgroup 2, shall not be delivered on the contract or order.

4.3.1.6.3 Noncompliance. If the unit fails to pass group C inspection, corrective action shall be taken to remedy the manufacturing process, or the materials used in manufacturing the connectors, as warranted. Corrective action shall be taken on all units of product produced prior to such corrective action, and considered subject to the same failure. Acceptance of the product shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspection, or the inspection which the original sample failed, at the option of the Government). Groups A and B inspections may be reinstituted; however, final acceptance shall be withheld until the group C re-inspection has shown that the corrective action was successful. In the event of failure after re-inspection, information concerning the failure and the corrective action taken shall be furnished to the contracting officer.

4.3.1.7 Test equipment and inspection facilities. Test equipment and inspection facilities shall be of sufficient accuracy, reliability, and quantity to permit performance of the required inspection to the satisfaction of the Government.

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ALL DIMENSIONS IN INCHES

FIGURE 1. Dimensional requirements for female terminals.

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4.4 Methods of examination and test.

4.4.1 Visual and mechanical examination. Connectors and associated fittings shall be examined to verify that the design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.1, 3.3 to 3.3.5, incl, 3.6, and 3.7).

4.4.1.1 Gage tests for contacts (piece parts).

4.4.1.1.1 Center contacts (female). The center contacts shall be subjected to the gage tests specified in 4.4.1.1.1.1 to 4.4.1.1.1.3, inclusive, prior to assembling the center contact in the connector. The pins used in the performance of these tests may be tapered at their ends to facilitate insertion, but the tapered portions shall not be included in the specified dimensions (see 3.3.3.1).

4.4.1.1.1.1 Test 1. A pin .058 inch (1.47 mm) maximum diameter inserted to a depth of .093 inch (2.36 mm) shall make contact with all four contact members. A pin of .084 inch (2.13 mm) minimum diameter shall be inserted into the center contact to a depth of not less than .187 inch (4.75 mm), and then removed. When contacts are fixed in such a manner that removal for this test is not possible, the test pin shall be .072 inch (1.83 mm) minimum diameter in lieu of .084 inch (2.13 mm).

4.4.1.1.1.2 Test 2. All contact members shall make contact with a pin .062 inch (1.57 mm) maximum in diameter, within .031 inch (0.79 mm) of their tip ends, when this pin is inserted to a minimum depth of .187 inch (4.75 mm).

4.4.1.1.1.3 Test 3. When a pin .065 inch (1.65 mm) minimum in diameter is inserted to a minimum depth of .187 inch (4.75 mm), a .120 inch (3.05 mm) diameter contact shall pass through a cylindrical hole .122 inch (3.10 mm) maximum in diameter, and a .131 inch (3.33 mm) diameter contact shall pass through a hole of .133 inch (3.38 mm) maximum diameter and .5 inch (12.7 mm) minimum in length, when a maximum force of 2 pounds is applied. This test shall be applied only to those connectors with removable female contacts.

4.4.1.1.2 Outer contacts. All contact members shall make contact within .031 inch (0.79 mm) of their tip ends, with a ring having an inside diameter of .560 inch (14.22 mm) minimum. All contact members shall then enter a ring having an inside diameter of .570 inch (14.48 mm) maximum, when a maximum force of 5 pounds is applied (see 3.3.3.2).

4.4.1.2 Gage tests for contacts (assembled connectors).

4.4.1.2.1 Center contact (female). The center contact shall accept a pin having a maximum diameter of .063 inch (1.60 mm), when a minimum force of 1 pound is applied.

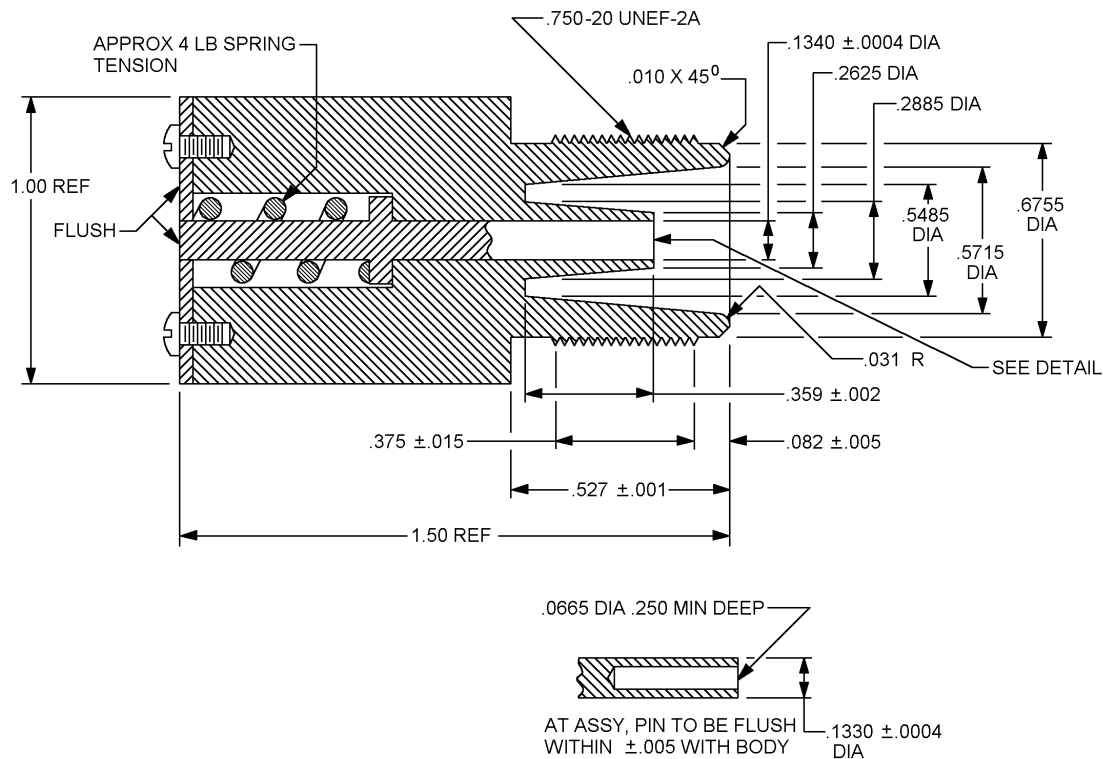
4.4.1.2.2 Outer contact. The outer contact shall accept a ring having a minimum diameter of .558 inch (14.17 mm), when a minimum force of 1 pound is applied.

4.4.1.3 Outer contact form over. A withdrawal force of 25 pounds shall be applied to the outer contact. The force shall be applied to and in the direction away from the connector body and along the longitudinal axis (see 3.3.3.3).

4.4.1.4 Assembly and rotation. The assembled coupling nut shall be subjected to a force of 100 pounds gradually applied relative to and in a direction away from the connector body and along a longitudinal axis. The coupling nut shall then be examined for free finger turning (see 3.3.4).

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4.4.1.5 Interchangeability (applicable only to male terminations) (see 3.3.5). A test gage in accordance with figure 2 shall be used. When testing connectors in which center contacts are not permanently assembled, the center section of the test gage shall be removed. When testing connectors in which center contacts are permanently assembled, the center section of the test gage shall be inserted and held in the position shown on figure 2. The coupling nut shall then be hand tightened on the gage. Rejection of male connector is based on binding as the connector is coupled, or protrusion of the center pin during or after coupling.



## NOTES:

1. Total Indicator Reading (T. I. R.) of all diameters = .0003 inch (.008 mm) max.
2. Tolerance of dimensions, unless otherwise specified shall be ±.0005 inch (0.013 mm).
3. All dimensions in inches.
4. Material shall be cold-rolled steel in accordance with ASTM A108, and shall be chrome plated.

FIGURE 2. Test gage for interchangeability test.

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4.4.2 Dielectric withstanding voltage (see 3.4). Connectors shall be tested in accordance with method 301 of MIL-STD-202. The following details shall apply:

- a. Special preparations or conditions-
  - (1) The maximum relative humidity shall be 50 percent. When facilities are not available at this test condition, connectors shall be tested at room ambient relative humidity. In case of dispute, if the test has been made at room ambient relative humidity, retest shall be made at 50 percent maximum relative humidity.
  - (2) The center contact of electrical plug connectors and electrical receptacle connectors shall be positioned in such a manner as to simulate actual assembly conditions.
  - (3) Precautions shall be taken to prevent air-gap voltage breakdowns.
  - (4) The voltage shall be metered on the high side of the transformer.
- b. Magnitude of test voltage - 5,000 volts root mean square, applied at approximately 500 volts per second until the rated test voltage is reached.
- c. Nature of potential - AC voltage.
- d. Points of application of test voltage - Between the center contact and body.

4.4.3 Salt spray (corrosion). Connectors and associated fittings shall be tested in accordance with method 101, test condition B, of MIL-STD-202. At the conclusion of this test, the connectors and associated fittings shall be washed, shaken, and air blasted and then permitted to dry for 24 hours at 40°C. The connectors and associated fittings shall then be examined for evidence corrosion (see 3.5).

## 5 PACKAGING

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

## 6. NOTES

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

6.1 Intended use. Connectors and associated fittings covered by this specification are intended for use in radio frequency applications up to 10,000 megahertz. They are designed for use with medium-size, radio frequency, coaxial cables. Their use is governed by temperature limitations of materials, and they are not recommended for use in applications where temperatures exceed 125°C.

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6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2. and 2.3).
- c. Packaging requirements (see 5.1).
- d. Title, number, and date of the applicable detail specification, and the complete type designation (see 1.2.1 and 3.1.)
- e. That the supplier will not substitute for a specified material or combination of fabricated parts (see 3.3) unless he obtains approval from the Government. Evidence to substantiate his claim that such a substitution is suitable is to be submitted with his request. Similar notification and substantiating evidence will be submitted at any later time if substitution becomes necessary or desirable. At the discretion of the Government, test sample may be required to prove the suitability of the proposed substitute.

6.3 Cross reference. Table VII provides a cross reference of the connector and armor-clamp combinations which produce connectors for use with armored cables.

TABLE VII. Cross reference of connectors and armor clamp combinations.

Connector without clamp		Clamp	
Type	Covered by detail specification	Type	Covered by detail specification and PIN
UG-59E/U	MIL-C-3643/1	MX-1286/U	MIL-C-39012/25 M39012/25-0013
UG-60E/U	MIL-C-3643/2	MX-1286/U	MIL-C-39012/25 M39012/25-0013
UG-61E/U	MIL-C-3643/3	MX-1286/U	MIL-C-39012/25 M39012/25-0013
UG-494B/U	MIL-C-3643/7	MX-1462/U	MIL-C-3643/14
UG-495D/U	MIL-C-3643/8	MX-1441/U	MIL-C-39012/25 M39012/25-0014

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6.4 Term (Keyword) listing.

Beryllium copper

6.5 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. Table VIII lists the Environmental Protection Agency (EPA) top seventeen hazardous materials targeted for major usage reduction. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see 3.6).

TABLE VIII. EPA top seventeen hazardous materials.

Benzene	Dichloromethane	Tetrachloroethylene
Cadmium and Compounds	Lead and Compounds	Toluene
Carbon Tetrachloride	Mercury and Compounds	1,1,1 - Trichloroethane
Chloroform	Methyl Ethyl Ketone	Trichloroethylene
Chromium and Compounds	Methyl Isobutyl Ketone	Xylenes
Cyanide and Compounds	Nickel and Compounds	

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

## CONCLUDING MATERIAL

## Custodians:

Army - CR  
Navy - EC  
Air Force - 11  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5935-4429-000)

## Review activities:

Army - AR, AT, MI  
Navy - AS  
Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil).