

**INCH-POUND**  
MIL-C-24714(SH)  
27 January 1989

**MILITARY SPECIFICATION**  
**CONNECTOR TUBES, HYDRAULIC COMPONENT,**  
**GENERAL SPECIFICATION FOR**

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

**1. SCOPE**

1.1 Scope. This specification covers the requirements for hydraulic valve connector tubes (ferrules, quills and transfer tubes).

1.2 Classification. Connector tubes shall be of the following compositions, as specified (see 3.2 and 6.2):

Composition-A - Aluminum alloy  
Composition-S - Corrosion-resisting steel  
Composition-T - Titanium alloy

1.3 Part or identifying number (PIN). PINs under this specification shall be formulated as specified in the applicable specification sheet (see 3.1).

**2. APPLICABLE DOCUMENTS**

**2.1 Government documents.**

2.1.1 Specifications and standards. The following specifications and standards 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).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## SPECIFICATIONS

## FEDERAL

- QQ-A-200 - Aluminum Alloy, Bar, Rod, Shapes, Structural Shapes, Tube and Wire, Extruded: General Specification for.
- QQ-A-200/8 - Aluminum Alloy 6061, Bar, Rod, Shapes, Tube and Wire, Extruded.
- QQ-A-225 - Aluminum and Aluminum Alloy, Bar, Rod, Wire, or Special Shapes; Rolled, Drawn, or Cold Finished; General Specification for.
- QQ-A-225/8 - Aluminum Alloy 6061, Bar, Rod, Wire and Special Shapes; Rolled, Drawn or Cold Finished.
- QQ-P-35 - Passivation Treatments for Corrosion-Resisting Steel.
- QQ-S-763 - Steel Bars, Wire, Shapes, and Forgings, Corrosion Resisting.
- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple-Wall.
- PPP-B-665 - Boxes: Paperboard, Metal Edged and Components.
- PPP-B-676 - Boxes, Setup.
- PPP-T-60 - Tape: Packaging, Waterproof.

## MILITARY

- MIL-P-116 - Preservation, Methods of.
- MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys.
- MIL-T-9047 - Titanium and Titanium Alloy Bars (Rolled or Forged) and Reforging Stock, Aircraft Quality.
- MIL-T-81556 - Titanium and Titanium Alloys, Extruded Bars and Shapes, Aircraft Quality.
- MIL-R-83248 - Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant.
- MIL-R-83248/1 - Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant, O-Rings, Class 1, 75 Hardness.
- MIL-C-24714/1 - Connector Tubes, Preferred Sizes, Valves and Subplates.

## STANDARDS

## MILITARY

- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-792 - Identification Marking Requirements for Special Purpose Components.

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Naval Publications and Forms Center (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

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

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)  
B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay).  
(DoD adopted)  
Y14.5 - Dimensioning and Tolerancing for Engineering Drawings.

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
D 3951 - Standard Practice for Commercial Packaging.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

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

3.2 Material. The alloys for the connector tubes shall be as specified (see 1.2 and 6.2). Metallurgical examinations of the raw material shall be made as specified (see 4.2).

3.2.1 Composition-A. These connector tubes shall be made of aluminum alloy 6061, tempered T6510 or T6511 in accordance with QQ-A-200 and QQ-A-200/8 or T651 in accordance with QQ-A-225 and QQ-A-225/8.

3.2.2 Composition-S. These connector tubes shall be made of corrosion-resisting steel, class 304 in accordance with QQ-S-763. Other corrosion-resisting steel having at least equivalent strength and corrosion resistance may be used when specifically approved by the contracting activity.

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3.2.3 Composition-T. These connector tubes shall be made of titanium alloy AB-1 in accordance with MIL-T-81556 or Ti-6Al-4V in accordance with MIL-T-9047.

3.2.4 Recovered materials. Unless otherwise specified herein, all material incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.3 Construction. Connector tubes shall be machined one-piece construction and shall conform to the dimensions as specified in the applicable specification sheet (see 3.1). Specification sheet dimensions are in accordance with ANSI Y14.5.

3.4 Finish.

3.4.1 Surface finish. Unless otherwise specified (see 6.2), surface roughness shall not exceed 125 microinches in accordance with ANSI B46.1.

3.4.2 Surface finish of O-ring grooves. The surface roughness of the O-ring groove diameter and O-ring groove sides shall not exceed 63 microinches in accordance with ANSI B46.1.

3.5 O-ring groove shape. O-ring grooves shall be rectangular in shape. Grooves may have up to 5 degrees slope on the sides to facilitate machining. The radius in the bottom corners of the groove shall be as specified (see 3.1). O-rings shall be in accordance with MIL-R-83248 and MIL-R-83248/1.

3.6 Part number marking. Connector tubes and related items shall be marked on one end with the applicable specification-based part number and on the other end with the manufacturer's commercial and Government entity code (CAGEC). For items less than 1.000 inch in diameter, the part pin number may be marked on the outside diameter rather than the end and inclusion of the CAGEC number is optional. Marking shall be by electrochemical etching in accordance with MIL-STD-792. Marking with the manufacturer's name (or logo) and part or identifying number in addition to the CAGEC is optional but shall be restricted to the end with the CAGEC number.

3.7 Corrosion protection. Composition-A connector tubes shall be anodized in accordance with MIL-A-8625. Composition-S connector tubes shall be passivated in accordance with QQ-P-35.

3.8 Workmanship. Connector tubes shall be free of contaminants such as lint, dirt, shavings and burrs, sharp edges or any other defects that could make the part unsatisfactory for the purpose intended.

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## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Metallurgical examination. A metallurgical examination shall be conducted on each lot of raw material used in manufacturing connector tubes to verify conformance to the applicable material specification (see 3.2 and 6.3).

4.3 Quality conformance inspection.

4.3.1 Quality conformance sampling. Sampling for quality conformance inspection shall be as specified (see 4.3.1.1 through 4.3.1.3).

4.3.1.1 Lot. A lot shall consist of finished connector tubes which are of the same material, type, size, fabricated by the same process, and produced as one continuous run or order, or part thereof, and submitted for acceptance inspection at the same time.

4.3.1.2 Sampling for examination. A random sample of connector tubes shall be selected from each lot and inspected in accordance with table I. The sampling plans in table II shall be utilized in accordance with the classification of defects in table I.

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TABLE I. Classification of defects.

Categories	Defects	Inspection method
Major		
101	Nonconformance to dimensional requirements (see 3.1)	SIE <u>1/</u>
102	Nonconformance to concentricity requirements (see 3.1)	SIE
103	Nonconformance to finish requirements (see 3.1)	Visual
Minor		
201	Nonconformance to marking requirements (see 3.6)	Visual

1/ Standard inspection equipment.

TABLE II. Sampling plan for major and minor defects. 1/, 2/, 3/

Lot size	Sample size	Accept	Reject
1 to 13	Entire lot	0	1
14 to 150	13	0	1
151 to 280	20	0	1
281 to 500	29	0	1
501 to 1200	34	0	1
1201 to 3200	42	0	1

1/ All defective items shall be replaced with acceptable items prior to lot acceptance.

2/ Stop inspecting samples when reject criteria is reached.

3/ Reject lots may be screened and resubmitted for inspection.

4.3.1.3 Rejection. Any connector tube in the sample which contains one or more defects shall be rejected. If the number of defective connector tubes in any sample exceeds the acceptance number for that sample, the entire lot shall be rejected.

4.3.2 Examination. Each connector tube taken as specified (see 4.3.1.2) shall be examined in accordance with table I to verify conformance to this specification.

4.4 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

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5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Preservation. Preservation shall be level A or commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Preservation application. Preservative compound shall not be applied to the connector tubes.

5.1.1.2 Unit protection. Connector tubes shall be ultrasonically cleaned, and shall be individually unit protected in accordance with method III of MIL-P-116 to afford protection against corrosion, deterioration, and physical damage during shipment. When specified (see 6.2), four unit packs shall be intermediate packed in containers conforming to PPP-B-566, PPP-B-636, PPP-B-665 or PPP-B-676 with type, class or grade at the contractor's option.

5.1.2 Commercial. The connector tubes shall be packaged in accordance with ASTM D 3951.

5.2 Packing. Connector tubes shall be packed level B or commercial, as specified (see 6.2).

5.2.1 Level B. Connector tubes shall be packed in overseas type boxes conforming to either of the following: PPP-B-636, class weather-resistant or PPP-B-640, class 2 (see 6.2). Fiberboard boxes shall not exceed the weight limitations of the applicable box specification. Box closures shall be in accordance with the applicable box specification and the appendix thereto. The joints and seams of all boxes shall be sealed with tape conforming to PPP-T-60.

5.2.2 Commercial. Connector tubes shall be packed in accordance with ASTM D 3951.

5.3 Marking of shipments. In addition to any special marking required (see 6.2), level B interior and exterior shipping containers shall be marked in accordance with MIL-STD-129, commercial containers in accordance with ASTM D 3951.

6. NOTES

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

6.1 Intended use. These connector tubes are designed as an interface between hydraulic valves and subplates in order to prevent leakage of hydraulic fluid.

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6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Composition required (see 1.2).
- (c) Issue of DoDISS to be cited in the solicitation, and, if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- (d) Title, number, and date of the applicable specification sheet, including complete PIN (see 3.1).
- (e) Material required (see 3.2).
- (f) Finish, if other than specified (see 3.4.1).
- (g) Level of preservation and packing required (see 5.1, 5.1.1.2, 5.2, and 5.2.1).
- (h) Special marking, if required (see 5.3).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Description (DIDs) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DIDs are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

<u>Reference paragraph</u>	<u>DID number</u>	<u>DID title</u>	<u>Suggested tailoring</u>
4.2	UDI-A-23264	Certification data/report	-----

The above DIDs were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DIDs are cited on the DD Form 1423.

6.4 Subject term (key word) listing.

Connector tubes  
 Ferrules  
 Quills  
 Transfer tubes

Preparing activity:  
 Navy - SH  
 (Project 4810-N068)



## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

1. DOCUMENT NUMBER MIL-C-24714 (SH)	2. DOCUMENT TITLE CONNECTOR TUBES, HYDRAULIC COMPONENT, GENERAL SPECIFICATION FOR
3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION <i>(Mark one)</i> <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER <i>(Specify):</i> _____
b. ADDRESS <i>(Street, City, State, ZIP Code)</i>	
5. PROBLEM AREAS	
a. Paragraph Number and Wording:	
b. Recommended Wording:	
c. Reason/Rationale for Recommendation:	
6. REMARKS	
7a. NAME OF SUBMITTER <i>(Last, First, MI) - Optional</i>	b. WORK TELEPHONE NUMBER <i>(Include Area Code) - Optional</i>
c. MAILING ADDRESS <i>(Street, City, State, ZIP Code) - Optional</i>	8. DATE OF SUBMISSION <i>(YYMMDD)</i>

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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