

INCH-POUND

MIL-V-24578B(SH)

27 May 1988

SUPERSEDING

MIL-V-24578A(SH)

31 August 1982

(See 6.5)

MILITARY SPECIFICATION

VALVES, GLOBE, PRESSURE INSTRUMENT, STEM TEST
CONNECTION, UNION END

This specification is approved for use within 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 1/4-inch outside diameter (od), union end globe valve with a stem test connection (see 6.1).

1.2 Classification. Valves shall be of the following types, classes and styles, as specified (see 6.2.1).

Type I - Inline
Type II - Angle
Class 1 - Stainless steel
Class 2 - Nickel copper alloy
Class 3 - Nickel chromium alloy
Style a - Socket weld union tailpiece
Style b - Heat recoverable coupling (HRC) union tailpiece

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and the supplement thereto, cited in the solicitation.

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.

AMSC N/A

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FSC 4820

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SPECIFICATIONS

FEDERAL

- QQ-N-281 - Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections.
- QQ-S-763 - Steel Bars, Wire, Shapes, and Forgings, Corrosion Resisting.

MILITARY

- MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein); Packaging of.
- MIL-S-901 - Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
- MIL-R-83248 - Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant.

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
- MIL-STD-798 - Nondestructive Testing, Welding, Quality Control, Material Control and Identification and HI-Shock Test Requirements for Piping System Components for Naval Shipboard Use.

(Copies of specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the (DoDISS) specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form).
(DoD adopted)

(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)

- A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service. (DoD adopted)
- A 276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

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- A 473 - Standard Specification for Stainless and Heat-Resisting Steel Forgings. (DoD adopted)
- A 582 - Standard Specification for Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished. (DoD adopted)
- B 164 - Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire. (DoD adopted)
- B 446 - Standard Specification for Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625) Rod and Bar.
- B 564 - Standard Specification for Nickel Alloy Forgings. (DoD adopted)

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

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

- AMS 5648 - Steel Bars, Forgings, Tubing, and Rings, Corrosion and Heat Resistant 17 Cr - 12Ni - 2.5Mo (SAE 30316) Solution Heat Treated.

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which 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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Materials. Materials shall be as specified in table I and shall be configured so as to prevent galling, seizing, or excessive wear on operating parts.

3.1.1 Recovered materials. Unless otherwise specified herein, all equipment, material and articles 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.

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TABLE I. Materials.

Part name	Material	Applicable documents
Class 1		
Body	Corrosion-resisting steel (stainless steel)	ASTM A 473, type 316 or 316L QQ-S-763, class 316
Bonnet	Corrosion-resisting steel (stainless steel)	ASTM A 582, type 416
Stem	Corrosion-resisting steel (stainless steel)	ASTM A 473, type 316 QQ-S-763, class 316 ASTM A 276, type 316 ASTM A 269, grade 316 AMS 5648
Packing (O-ring)	Rubber	MIL-R-83248, type II
Tailpiece	Corrosion-resisting steel (stainless steel)	ASTM A 276, type 304L or 316L
Bonnet and tailpiece nuts	Corrosion-resisting steel (stainless steel)	ASTM A 276, type 300 series ASTM A 582, type 303
Class 2		
Body	Nickel-copper alloy	ASTM B 164, QQ-N-281
Bonnet	Nickel-copper alloy	ASTM B 164, QQ-N-281
Stem	Nickel-copper alloy	ASTM B 164, QQ-N-281
Packing (O-ring)	Rubber	MIL-R-83248, type II
Tailpiece	Nickel-copper alloy	ASTM B 164, QQ-N-281
Bonnet and tailpiece nuts	Nickel-copper alloy Corrosion-resisting steel	ASTM B 164 ASTM A 582, type 303, 303Se

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TABLE I. Materials. - Continued

Part name	Material	Applicable documents
Class 3		
Body	Nickel-chromium alloy	ASTM B 446 or ASTM B 564
Bonnet	Nickel-chromium alloy	ASTM B 446 or ASTM B 564
Stem	Nickel-chromium alloy	ASTM B 446 or ASTM B 564
Packing (O-ring)	Rubber	MIL-R-83248, type II
Tailpiece	Nickel-chromium alloy	ASTM B 446 or ASTM B 564
Bonnet and tailpiece nuts	Nickel-chromium alloy	ASTM B 446 or ASTM B 564
	Corrosion-resisting steel	ASTM A 582, type 303, 303Se

3.2 Design and construction.

3.2.1 Design pressure. Valves shall operate at a pressure of 6000 pounds per square inch (lb/in²) and tested at a pressure as specified in 3.5.

3.2.1.1 Valves shall restrict the system fluid from contacting the bonnet.

3.2.2 Dimensions and configuration. Valves shall conform to the dimensional envelope shown on figure 1 with end connections in accordance with figure 2. Valves shall be supplied with tailpieces, union nuts, and O-rings as shown on figures 3, 4 and 5, and test connection and cap as shown on figure 1 (see 4.3).

3.2.2.1 Tailpieces. The tailpieces shall be of either the socket-weld coupling type, or the HRC type, as shown on figures 3 and 4, respectively (see 6.2.1).

3.2.3 Handwheel operation. Valves shall shut with a clockwise turn of the handwheel and open with a counterclockwise motion when viewed from directly over the handwheel (see 4.3).

3.2.4 Stem test connection. Valves shall be fitted with a stem test connection located above the handwheel. Stem test connection shall be as shown on figure 1 and shall be capped. Cap shall be vented and shall seal against the stem seal to avoid inadvertent venting. Cap shall be permanently attached by a lanyard to valve bonnet. Lanyard shall be attached in such a manner as to not interfere with the operation of either the valve or the test connection. Lanyard shall be wire rope coated with flexible, translucent plastic of commercial design with suitable crimped fittings (see 4.3).

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3.2.5 Union connection. Valve design shall provide for a union type connection between the body and the bonnet. The design shall also provide for a positive metal to metal backseat to prevent the stem from backing out of the bonnet. This shall be accomplished without the addition of separate pieces or additional operations (such as swaging). (The intention is to have the stem assemble from the bottom of the bonnet (see 4.3)).

3.2.6 Handwheel dimension and configuration. Valve handwheel shall not exceed the dimension shown on figure 1 and shall be round with a non-slip feature or "T" shaped and shall attach to the stem so as to preclude relative motion between the stem and handwheel. The preferred method of attachment is by flats or spline. If a friction device is used to attach the handwheel to the stem, a locking method to preclude unintentional loosening of the friction device shall be included. Handwheel material shall be metal or plastic or a combination of metal and plastic (see 4.3).

3.2.7 Gauge board mounting. Valve shall include a method for mounting in a 5/8-inch diameter opening on a 1/8 to 5/16-inch thick gauge board with full "panel nut" engagement without interfering with normal valve operation. This design shall also include a method for positive prevention of unintentional loosening (see 4.3 and 5.1.1).

3.2.8 Threaded parts. Threaded parts shall have threads in accordance with ANSI B1.1 (see 4.3).

3.2.9 Locking devices. Locking devices, where required for threaded fasteners or threaded parts, shall be of the "self-locking" type (see 4.3).

3.2.10 Torque. Valves shall open and close fully with a torque applied to the stem not to exceed 62 inch pounds (see 4.3).

3.3 Shock. Valves furnished under this specification shall pass the requirements of high impact shock tests in accordance with MIL-S-901 and MIL-STD-798 (see 4.4.1).

3.3.1 Equipment and test classification shall be in accordance with grade A, hull and bulkhead mounted principal unit, complete assembly, class I, type A, of MIL-S-901.

3.4 Vibration. Valves furnished under this specification shall pass the vibration requirements as specified in MIL-STD-167-1, type I environmental vibration up to and including 50 cycles per second (see 4.4.2).

3.5 Structural soundness. Valves shall withstand the following:

- (a) Valve body and test connection shall withstand an operating pressure of 6000 lb/in² and a test pressure 1-1/2 times the operating pressure (see 4.4.3).
- (b) Valve seats shall withstand a hydrostatic gauge pressure of 6000 lb/in² above and below the seat (see 4.4.3).
- (c) Valves shall withstand a pneumatic gauge pressure of 100 lb/in² above and below the seat (see 4.4.3).

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3.6 Marking.

3.6.1 Valve marking. Each valve shall be low stress die stamped or electro etched on the body, legibly, as follows:

- (a) 6000 water, oil and gas (WOG).
- (b) One-fourth inch.
- (c) Manufacturer's name or trademark.
- (d) Direction of flow. Direction of flow shall be marked on the side of the body.

3.6.2 Identification plates. Where body configuration will not allow for the following information, an identification plate shall be supplied with each valve and shall contain the following:

- (a) Manufacturer's drawing number.
- (b) MIL-V-24578.

The above information may be low stress stamped or electro etched on the body if room allows (see 4.3).

3.7 Special tools. Special tools shall not be required to install or service the valves. Special tools are defined as those tools not listed in the Federal Supply Catalog (copies of this catalog may be consulted in the office of the Defense Contract Administration Services Management Area (DCASMA)).

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 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 the specification 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 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 assuring that all products or supplies submitted to the Government for acceptance 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 Government to acceptance of defective material.

4.2 Sampling for quality conformance inspection.

4.2.1 Inspection lot. An inspection lot shall consist of all valves of the same type and class produced under essentially the same conditions, and offered for delivery at one time.

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4.2.2 Sampling for visual and dimensional examination. Sampling of each lot for visual and dimensional examination as specified in 4.3 shall be conducted in accordance with MIL-STD-105, general inspection level II, AQL 2.5 percent.

4.3 Visual and dimensional examination. Sample valves shall be visually and dimensionally examined to determine conformance with the applicable drawings and with the requirements specified in 3.2.2, 3.2.3, 3.2.4, 3.2.5, 3.2.6, 3.2.7, 3.2.8, 3.2.9, 3.2.10 and 3.6.

4.4 Tests.

4.4.1 Shock test. Each type and class valve design shall be shock tested to assure compliance with the requirements specified in 3.3 and shall be subject to review for similarity of design and materials. Evidence of previously conducted successful tests will be accepted as meeting this test (see 4.5).

4.4.1.1 Shock test procedure. Valves shall be hydrostatically pressurized internally to 6000 lb/in^2 . Testing medium shall be clean tap water with no additive other than cutting oil at temperatures not less than 40 degrees Fahrenheit ($^{\circ}\text{F}$) nor exceeding 100°F . A total of nine blows shall be applied in accordance with MIL-S-901 for each condition and position specified in MIL-STD-798. Momentary malfunction at the time of impact blow is permitted and acceptable. Permanent deformation, misalignment or functional impairments will be cause for rejection.

4.4.2 Vibration test. Each valve design shall be vibration tested under normal operating conditions to duplicate shipboard installation and shall successfully meet the requirements specified in 3.4. Submission of a detailed description with drawings of the test set-up shall be prepared for review prior to actual testing. Detailed test requirements as specified in MIL-STD-167-1 shall apply with test reports (see 4.5).

4.4.3 Structural soundness test. Each valve shall be hydrostatically tested, as follows, to assure compliance with the requirements specified in 3.5. Any weeping, leakage, or permanent deformation will be cause for rejection.

- (a) Hydrostatically test body and test connection cap assembly with the valve in the half open position at 9000 lb/in^2 for 1 minute. Permanent deformation will be cause for rejection.
- (b) Hydrostatically test valve and seat after hand closure, in accordance with 3.5, on each side of the seat at 6000 lb/in^2 for 1 minute. Zero leakage shall be permitted.
- (c) Air test above and below seat after hand closure, in accordance with 3.5, under water at 100 lb/in^2 . Zero leakage shall be permitted.

4.4.4 Stem back-out test. With valve in the full open position, the valve shall be turned counterclockwise by hand. Valve shall resist further opening through the stem back-out device and the positive method specified in 3.2.5 shall prevent the bonnet from backing out of the body. The torque to be applied for this test shall be three times the maximum permissible operating torque (see 3.2.10).

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4.5 Test reports. Test reports shall be prepared in accordance with the data ordering documents included in the contract or order (see 6.2.2) for the following:

- (a) Shock test (see 4.4.1).
- (b) Vibration test (see 4.4.2).
- (c) Structural soundness test (see 4.4.3).
- (d) Stem back-out test (see 4.4.4).

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

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging requirements of referenced documents listed in section 2 (see 6.3).

5.1 Preservation-packaging, packing, and marking. Valves shall be individually preserved-packaged level A or C, packed level A, B, or C, as specified (see 6.2.1), and marked in accordance with MIL-V-3.

5.1.1 Panel nut (see 3.2.7) shall be individually packaged and attached to the valve.

6. NOTES

6.1 Intended use. Valves covered by this specification are intended for use as an instrument piping isolation valve (gauge valve).

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type, class and style of valve required (see 1.2).
- (c) Type of tailpiece required (see 3.2.2.1).
- (d) Levels of preservation-packaging and packing required (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

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<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.6	Reports, equipment shock test	UDI-T-23753	---
4.6	Report, vibration testing	UDI-T-23762	---
4.6	Reports, test	DI-T-2072	---

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

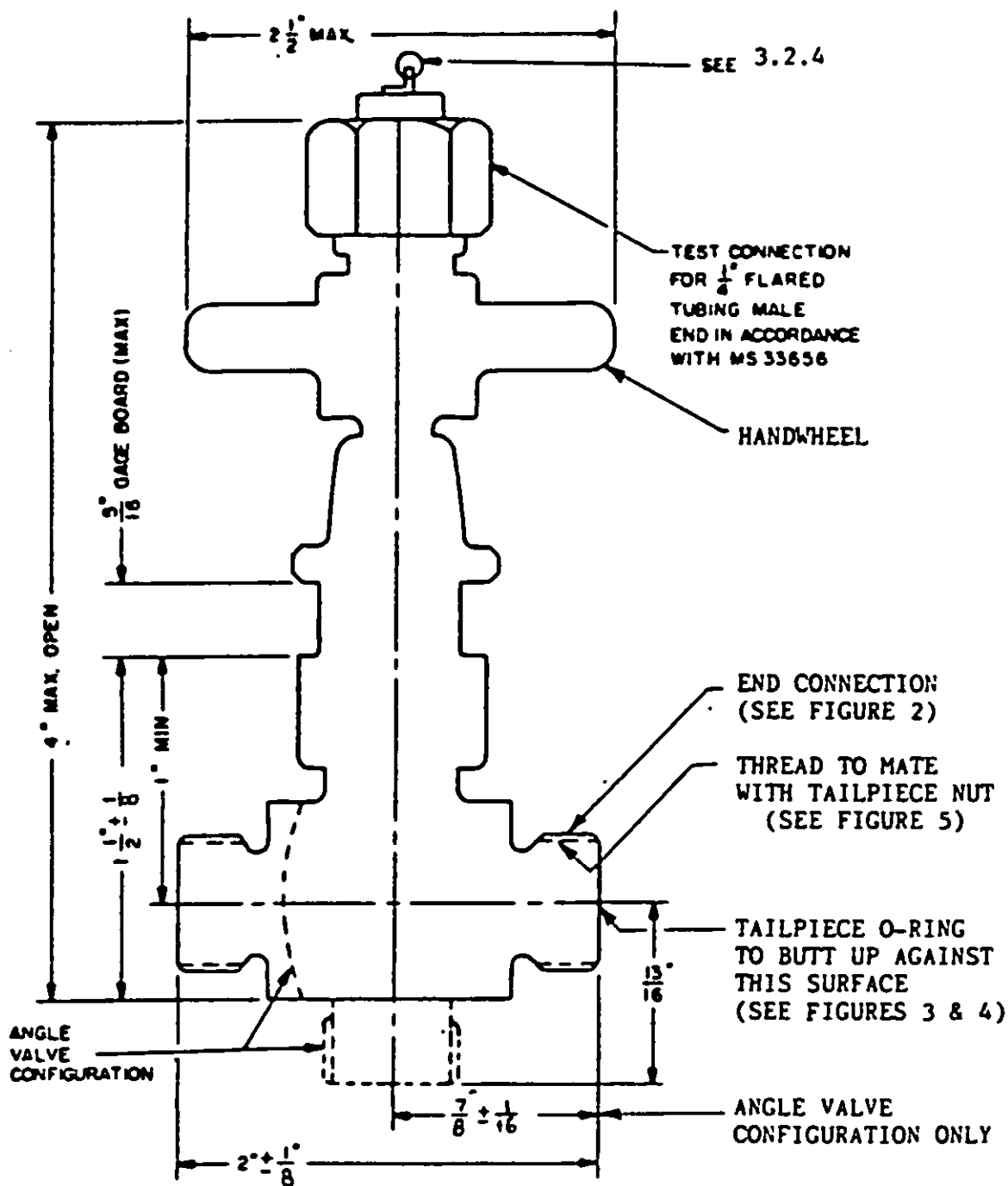
6.4 Subject term (key word) listing.

Angle valve
Heat recoverable coupling
Inline valve
Socket weld union

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project 4820-N501)

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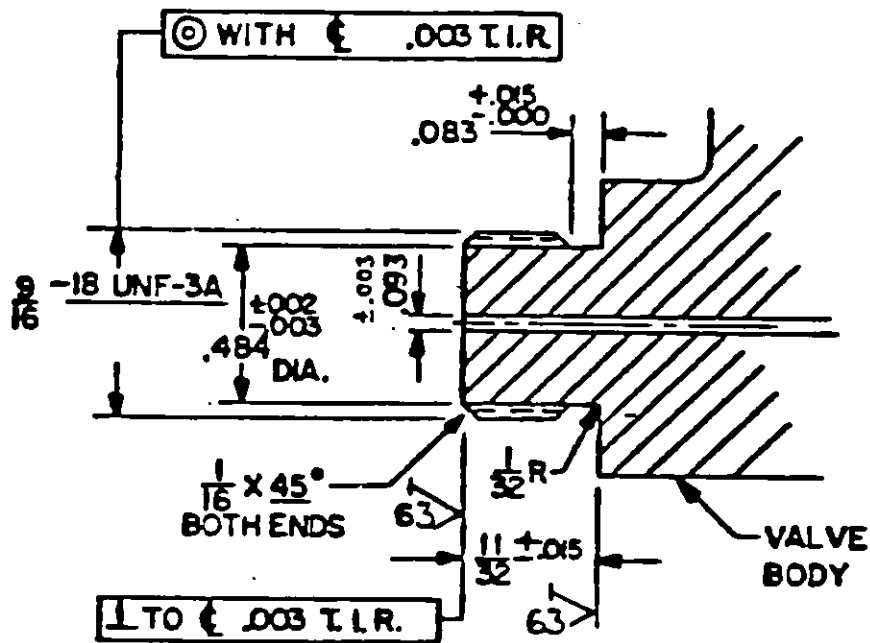


NOTE: Test connection cap shall be suitably drilled #67 (0.032 drill) for venting.

SH 1320275

FIGURE 1. Valve envelope dimensions.

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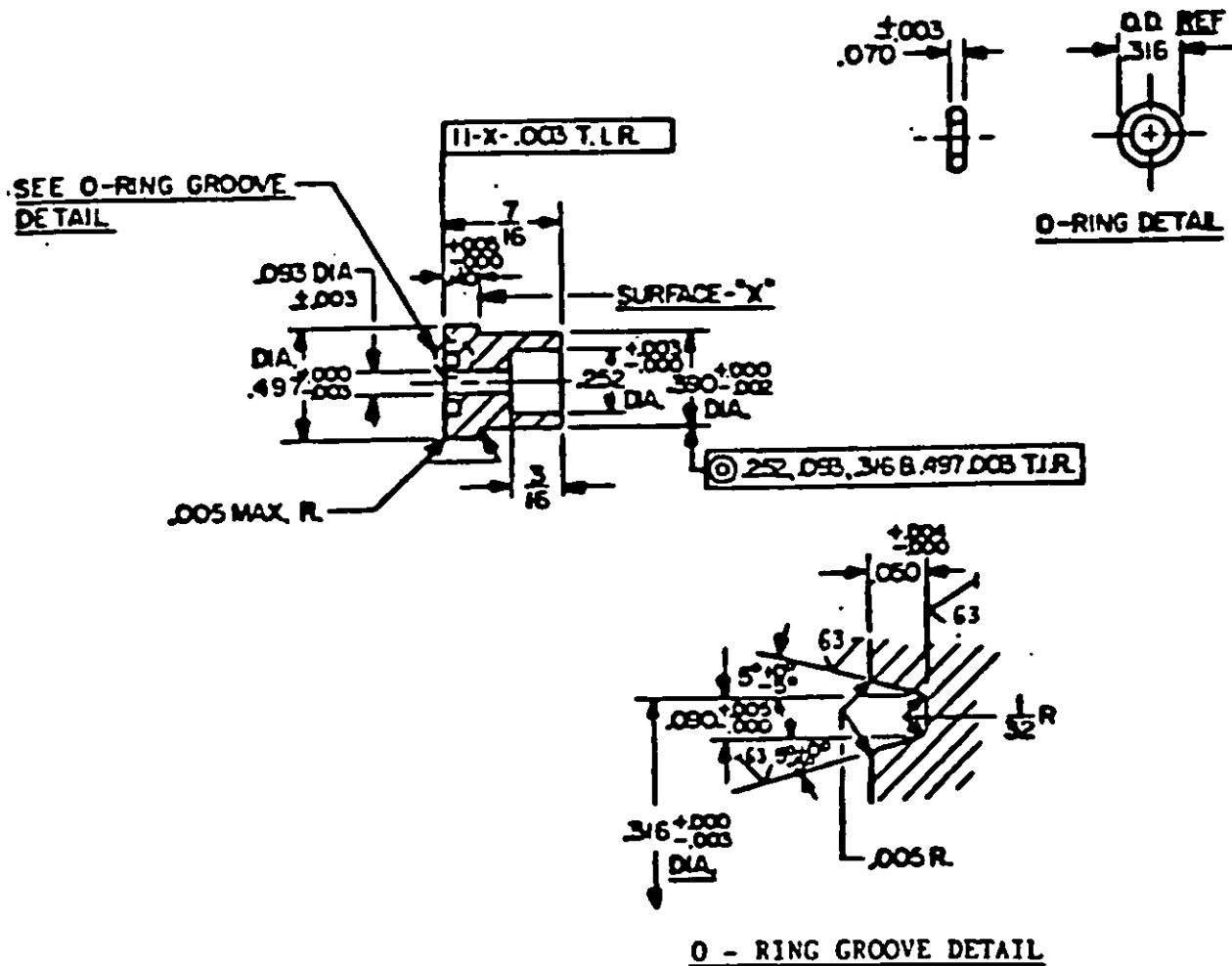


NOTE: Surface finish 63 shall be as indicated or smoother.

SH 1320276

FIGURE 2. End connection details.

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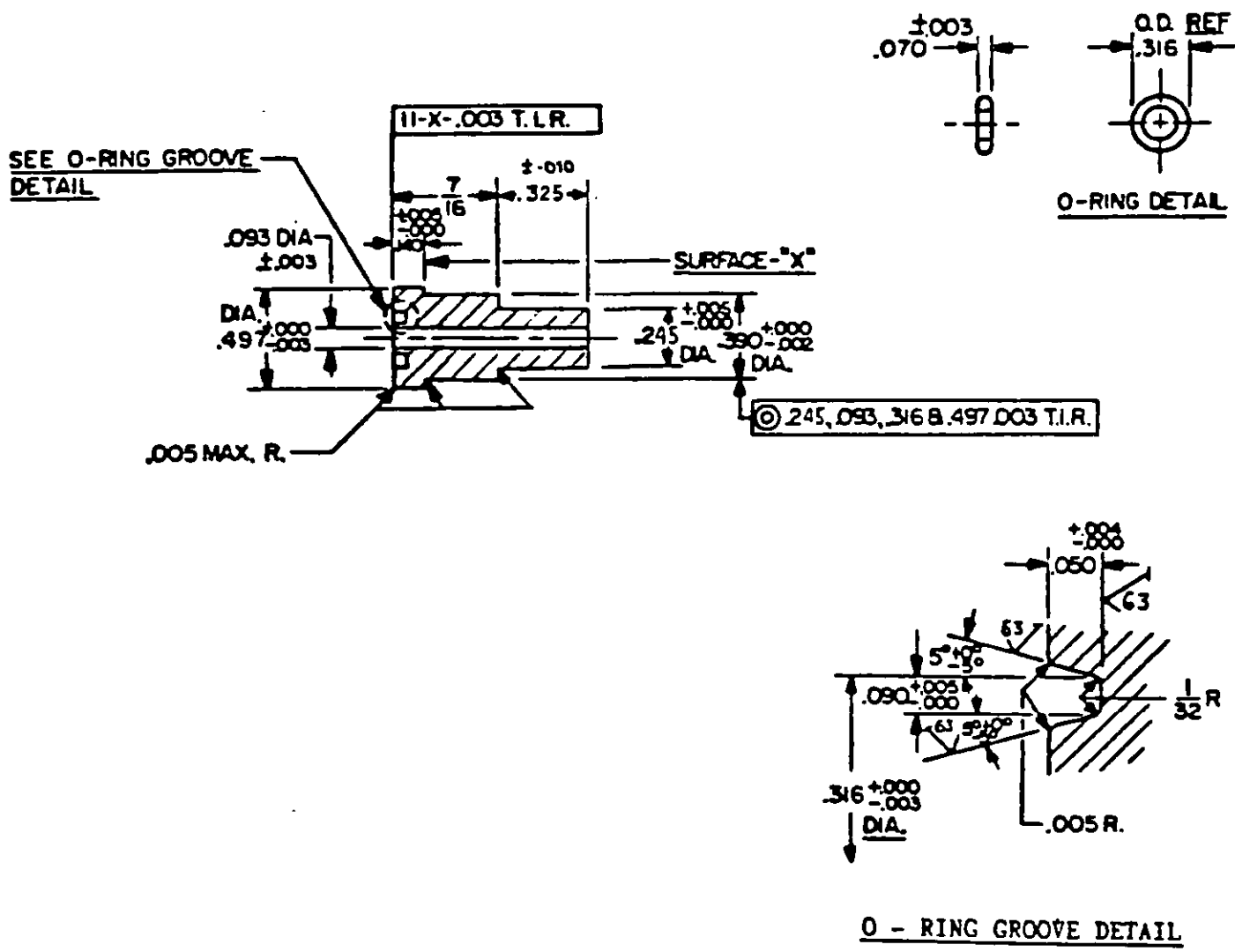


NOTE: Surface finish 63 shall be as indicated or smoother

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FIGURE 3. Tailpiece - socket weld coupling type.

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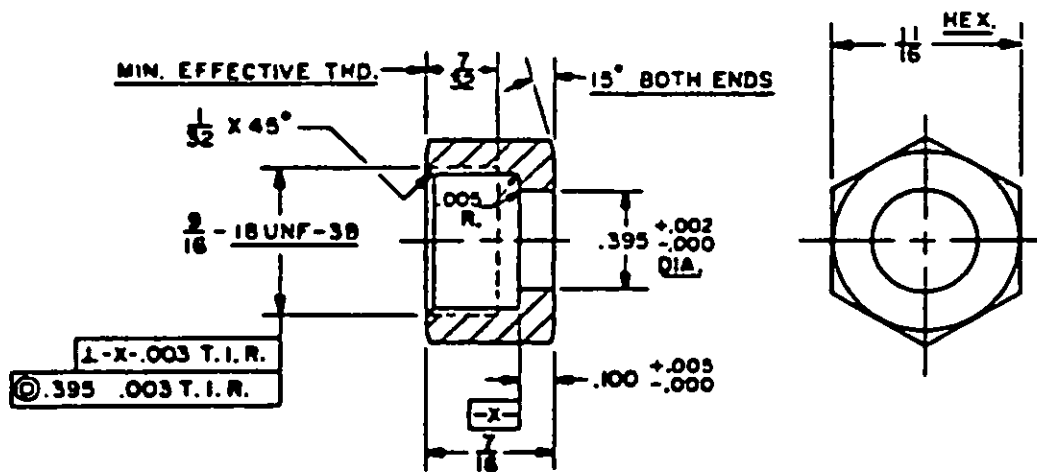


NOTE: Surface finish 63 shall be as indicated or smoother

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FIGURE 4. Tailpiece - heat recoverable coupling (HRC) type.

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FIGURE 5. Tailpiece nut.

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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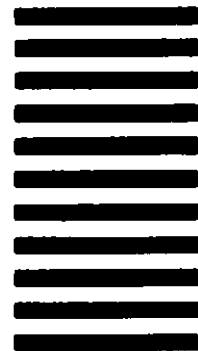
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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-V-24578B(SH)		2. DOCUMENT TITLE VALVES, GLOBE, PRESSURE INSTRUMENT, STEM TEST CONNECTION, UNION END	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER (Specify): _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	

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