

MIL-V-24509 (SHIPS)
21 October 1974

MILITARY SPECIFICATION
VALVES, FLANGED, BALL AND LUBRICATED PLUG FOR COMBINED
SEWAGE AND SEA WATER SERVICE

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

1. SCOPE

1.1 Scope. This specification covers flanged ball and lubricated plug valves for service, having a mixture of sewage and sea water at a pressure of 100 pounds per square inch gage (lb/in²g). Sewage shall be considered to include some detergents, caustics, acids, hydrocarbon wastes, oils, and solvents.

1.2 Classification. Valves shall be furnished in the following types, as specified (for types II and III, see figures 1 through 9 and 6.2.1):

Type I - 2-way, 2-port.
Type II - 3-way, 2-port.
Type III - 3-way, 3-port.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-C-390 - Copper Alloy Castings (Including Cast Bar).
QQ-C-591 - Copper-Silicon, Copper-Zinc-Silicon, and Copper-Nickel-Silicon Alloys: Rod, Wire, Shapes, Forgings, and Flat Products (Flat Wire, Strip, Sheet, Bar, and Plate).
QQ-N-281 - Nickel-Copper-Alloy Bar, Plate, Rod, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections.
QQ-N-286 - Nickel-Copper-Aluminum Alloy, Wrought.
QQ-N-288 - Nickel-Copper-Alloy and Nickel-Copper-Silicon Alloy Castings.

MILITARY

MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein): Packaging of.
MIL-R-196 - Repair Parts for Internal Combustion Engines, Packaging of.
MIL-B-857 - Bolts, Nuts, and Studs.
MIL-S-901 - Shock Tests, H.I. (High Impact): Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-G-6032 - Grease, Plug Valve, Gasoline and Oil Resistant.
MIL-F-20042 - Flanges, Pipe, Bronze (Silver Brazing).
MIL-B-24480 - Bronze, Nickel-Aluminum Castings, For Seawater Service.

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-278 - Fabrication Welding and Inspection; and Casting Inspection and Repair for Machinery, Piping and Pressure Vessels in Ships of the United States Navy.
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.
MS16142 - Boss, Gasket Seal Straight Thread Tube Fitting, Standard Dimensions For.
MS18229 - Plug for "O" Ring Gasket.

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(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
B61 - Steam or Valve Bronze Castings.

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

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Materials. Material not definitely specified shall be of the best commercial grade and suitable for the purpose intended.

3.2 Design.

3.2.1 Valves shall be capable of being operated by one person (see 3.2.9).

3.2.2 Flow passages shall be full round bore and shall be a dimension equal to the nominal size of the valve (see table II) with a tolerance of plus 1/16 inch minus zero. The inlet and outlet ways shall be chamfered to provide a smooth transition from the valve bore to match the bore of the flange specified in MIL-F-20042 of the same nominal size.

3.2.3 Ball valves. Ball valves shall be capable of tight seating in both directions. The seats shall be nonmetallic, renewable, compatible with sewage and seawater mixture and shall be located in a manner which will minimize erosive effects due to fluid flow through the valve. Thrust washers and other wetted parts shall be compatible with sewage and seawater mixture. The ports shall align with the body in the flow position so as not to create pockets or steps that could collect sewage or solid matter in the valve.

3.2.3.1 Ball valve stems shall be nickel-copper alloy conforming to QQ-N-281.

3.2.3.1.1 Ball valve stem seals shall be compatible with sewage and seawater mixture and shall be either O-rings, packing, or split rings. Stems shall not be removable while the valve is in service.

3.2.4 Plug valves. Plug valves shall be stick lubricated and be capable of being lubricated while under pressure. A built in screw may be used to apply the lubricant in stick form. The arrangement for lubricating shall be such that the lubricant is evenly distributed and all parts of the valve are adequately lubricated before the occurrence of appreciable overflow. Valves shall be so designed that when fully lubricated, excess lubricant will be visibly displaced to the outside near the point of lubrication.

3.2.4.1 The plug ports shall be properly aligned with the body ports in all flow positions and the plug shall not be subject to being raised or lowered by the line pressure.

3.2.4.2 Plug valve bodies shall be of ample strength to withstand lubricant pressure and applied stresses necessary for the operation of the valve.

3.2.5 The valve shall incorporate provisions for positively restraining the ball or plug in its flow and closed positions.

3.2.6 Impregnation, where required, shall be accomplished in accordance with MIL-STD-278.

3.2.7 Dimensions and machining of end flanges shall conform to MIL-F-20042, class 150.

3.2.8 Pipe plugs and mating threads, where used, shall be in accordance with MS18229 and MS16142.

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3.2.9 Unless otherwise specified in the contract or order, valves under 6 inches shall be furnished with lever handles; valves 6 inches and larger shall be provided with hand wheels and shall be operated through enclosed worm and gear mechanisms. The maximum allowable tangential force to operate the valve, based on the lever length or handwheel diameter, shall be as specified in table I.

Table I - Maximum allowable tangential force.

Lever length or hand-wheel diameter in inches	Total tangential force in pounds-force
Below 5	106
5	112
6	118
7	121
8	124
9	127
10	130
11	130
12	133
14	138
16	141

3.2.10 Rotation of the ball or plug shall be limited to the specified angle and position by positive stops. The position of the ports in the ball or plug shall be shown by permanent and distinct external marks.

3.2.11 The bodies, balls, plugs, covers, glands and base plates shall be bronze or nickel-copper conforming to ASTM B61, QQ-C-390, alloy 903 or 922, QQ-N-281, QQ-N-286, QQ-N-288, or MIL-B-24480.

3.2.12 Worm and gear mechanisms shall be commercial items except that they shall be shock tested while mounted on the valve in an operating condition.

3.2.13 Threaded fasteners shall be in accordance with MIL-B-857. Fastener material shall be silicon bronze in accordance with QQ-C-591.

3.2.14 Plug valves, shall be lubricated prior to shipment with a lubricant satisfactory for sewage service. Plug valves shall be capable of satisfactory operation with lubricant in accordance with MIL-G-6032, type II. The identification plate shall indicate this lubricant and the manufacturer's lubricant as satisfactory.

3.2.15 Dimensions. The valve face-to-face and center-to-face dimensions shall be in accordance with table II, and as specified (see 6.2.1). The face-to-face tolerance shall be plus or minus 1/16 inch. The center-to-face tolerance shall be plus or minus 1/32 inch.

Table II - Dimensions.

Size	Face-to-face 2-way	Center-to-face 3-way
(Inches)	(Inches)	(Inches)
1-1/4	5-1/4	----
1-1/2	5-3/4	3-1/8
2	6-1/2	3-1/2
2-1/2	7-3/4	4
3	9	4-1/2
3-1/2	10	5
4	10-1/2	5-1/4
4-1/2	12	----
5	13	6-1/2
6	15	7-1/2
8	19	9-1/2

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3.3 Shock. Valves shall be designed to withstand the requirements of grade A, class I, type C of MIL-S-901, and MIL-STD-798.

3.4 Vibration. Valves shall be capable of meeting the vibration requirements in accordance with MIL-STD-167-1, type I.

3.5 Structural soundness. Valves shall be designed to withstand hydrostatic test pressure in the open position of 200 lb/in²g for 3 minutes with no leakage or weeping (see 3.2.6).

3.6 Seat. Valves shall withstand pressure of 100 lb/in²g for a minimum of 1 minute with no leakage through the closed port or to the atmosphere.

3.7 Marking.

3.7.1 Body marking. Valve bodies shall have the pressure rating and manufacturer's name or trademark etched, stamped, or cast integral with the body.

3.7.2 Identification plates. Valves shall bear an identification plate made of corrosion-resisting steel or brass. Identification plates shall be permanently fastened to a part of the valve not subjected to the working pressure. The identification plate shall include the following data:

- (a) Manufacturer's name or trademark.
- (b) Size of valve and rating.
- (c) Body and ball or plug material composition.
- (d) Manufacturer's identification number or drawing number.
- (e) Specification MIL-V-24509.
- (f) Allowance parts list (APL) or National stock number (NSN) (if known).
- (g) Acceptable plug valve lubricant (as applicable).

3.8 Repair parts and special tools. The use of routine repair parts other than ball valve seats and lubricant is prohibited. 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 Service (DCAS)).

3.9 Technical data. The supplier shall prepare engineering drawings in accordance with the data ordering document included in the contract or order (see 6.2.2).

3.9.1 Drawings. In addition to the drawing content required by the data ordering document, the unique requirements specified in 3.9.1.1 and 3.9.1.2 shall be included.

3.9.1.1 Preliminary drawings. Preliminary drawings or descriptive literature which are sufficient to permit evaluation of the design and materials as necessary to determine conformance with specification requirements shall be submitted to the procuring activity. The drawings or literature shall show the following:

- (a) A sectional assembly of the valve.
- (b) Bill of materials listing specification, grade, condition and any other data required to identify the properties of the material proposed.

3.9.1.2 Final drawings. When required by the contract or order, detail assembly drawings shall be submitted to the procuring activity. The information required on the preliminary drawings, including the following, shall be submitted:

- (a) Details of the seat, ball or plug assembly, as applicable.
- (b) Dimensions - overall, accessibility space including disassembly clearances and all dimensions pertinent to installation.
- (c) Surface finishes - show finish marks for all bearing areas.
- (d) Previous approval for shock and vibration, where applicable.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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.

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4.2 Sampling for quality conformance inspection.

4.2.1 Lot. Valves of the same material, pressure rating, size and construction offered for delivery at the same time and manufactured within the preceding twelve months shall be considered a lot for purposes of sampling.

4.2.2 Sampling for visual and dimensional examination. Sampling for visual and dimensional examination specified in 4.3.1 and 4.3.2 shall be conducted in accordance with MIL-STD-105, inspection level II, APL 2.5 percent.

4.3 Examination.

4.3.1 Visual examination. Sample valves shall be visually examined to determine conformance with the specified design, inclusion of all required parts, proper assembly, proper machine finalizing and the existence of proper markings (see 3.2).

4.3.2 Dimensional examination. Sample valves shall be examined to determine conformance with the applicable drawings and the dimensional requirements specified in 3.2.2 and 3.2.15.

4.4 Parts. The Government representative may accept certification that parts conform to their applicable material specification providing that such certification contains the actual examination, test, or other verifiable data. Certification representing stock more than one year old are not acceptable.

4.5 Test methods.

4.5.1 Shock test. Each valve design shall be shock tested to assure compliance with the requirements specified in 3.3. Previous approval will be accepted as meeting this test (see 4.6). Plug valve tests shall be the same as ball valve tests, as applicable.

4.5.2 Structural soundness test. Each valve shall be hydrostatically tested to assure compliance with the requirements specified in 3.5.

4.5.3 Seat test. Each valve shall be seat tested to assure compliance with the requirements specified in 3.6.

4.6 Shock test report. The supplier shall prepare a shock test report in accordance with the data ordering document included in the contract or order (see 6.2.2).

4.7 Inspection of preparation for delivery. The preservation-packaging, packing, and marking shall be inspected for compliance with section 5 of this document.

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements. For the extent of applicability of the preparation for delivery 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 and marked in accordance with MIL-V-3, as specified (see 6.2.1).

5.1.1 Special marking. In addition to the marking required in 5.1 and 5.1.2 shelf life markings, where applicable (O-rings) shall be applied to repair parts packages containing nonmetallic items.

5.1.2 Repair parts. Repair parts shall be preserved-packaged, packed, and marked (see 5.1.1) in accordance with the levels of MIL-R-196 as applicable for the intended use and destination as follows:

	<u>Levels</u>	
	<u>Preservation-packaging</u>	<u>Packing</u>
Onboard (accompanying valves)	A	C
Stock	A	B
Immediate use	C	C

Unless otherwise specified (see 6.2.1), repair parts shall be packed separately and shipped concurrently with the valve(s).

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6. NOTES

6.1 Intended use. Valves covered by this specification are intended for sewage and seawater mixture service.

6.2 Ordering data.

6.2.1 Procurement requirements. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type of valve required (see 1.2).
- (c) Flow plan (see 1.3 and figures 1 through 9).
- (d) Valve size (see 3.2.15).
- (e) Allowance parts list or National stock number, if available.
- (f) Repair parts, if required.
- (g) Levels of preservation-packaging and packing required (see 5.1).
- (h) When repair parts are to be packed and shipped other than as specified (see 5.1.2).

6.2.2 Contract data requirements. When this specification is used in a procurement invoking the data requirement clause of the Armed Services Procurement Regulations (ASPR) paragraph 7-104.9 (n) and which incorporates a DD Form 1423 Contract Data Requirements List (CDRL), the data requirements identified below will be developed as specified in the cited Data Item Description (DID) and delivered in accordance with such CDRL. When the ASPR provisions are not invoked, the data specified below shall be delivered in accordance with the contract requirements.

Specification paragraph	Data requirement	Service	Applicable DID	Options
(a) 3.9.1	Drawings	SH	UDI-E-23174	Categories A, E, F, and H, form J, type II
(b) 4.6	Reports, equipment shock test	SH	UDI-T-23753	-----

(Copies of DID's required by the supplier in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.)

6.3 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 3 do not apply when material and parts are procured by the supplier for incorporation into the equipment and lose their separate identity when the equipment is shipped.

Preparing activity:
Navy - SH
(Project 4820-N291)

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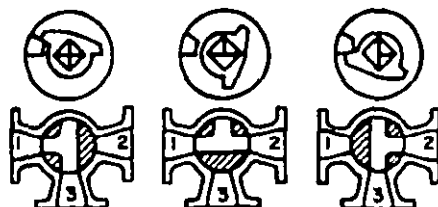


Figure 1-3-WAY,3-PORT, 180° TURN

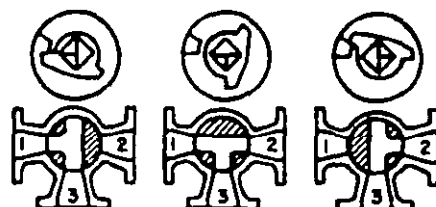


Figure 2-3-WAY,3-PORT, 180° TURN

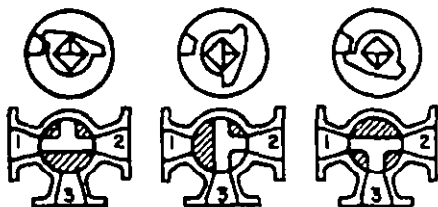


Figure 3-3-WAY,3-PORT, 180° TURN

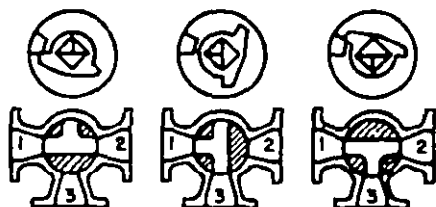


Figure 4 - 3-WAY,3-PORT, 180° TURN

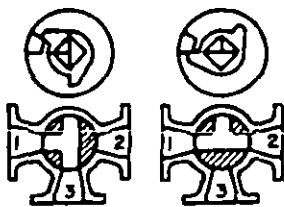


Figure 5-3-WAY,3-PORT, 90° TURN

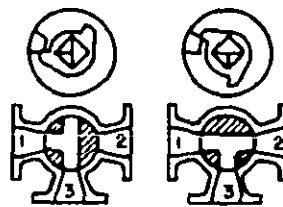


Figure 6-3-WAY,3-PORT, 90° TURN

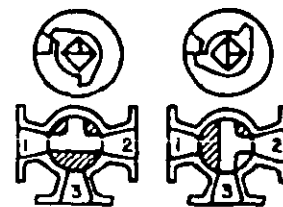


Figure 7-3-WAY,3-PORT, 90° TURN

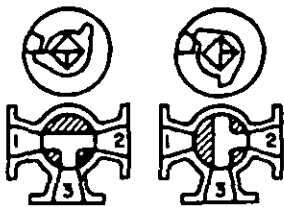


Figure 8-3-WAY,3-PORT, 90° TURN

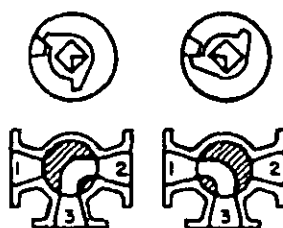


Figure 9-3-WAY,2-PORT, 90° TURN

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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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a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		8. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
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