INCH-POUND

MIL-V-24509A (SH)
24 December 1992
SUPERSEDING
MIL-V-24509 (SHIPS)
21 October 1974
(See 6.9)

MILITARY SPECIFICATION

VALVES, FLANGED, BALL AND PLUG FOR SEWAGE AND SEA WATER SERVICE

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 flanged ball and plug valves for sewage and seawater service, under pressure or vacuum. Sewage contains seawater with varying amounts of detergents, caustics, acids, human wastes, sediments, oils, greases, solvents, and other chemical agents used on board ship.

1.2 Classification. Valves furnished in the following types, as specified (see 6.2). For flow plans of type II and III valves, see figures 1 through 9.

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

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 05Q42, 2531 National Center Building 3, Washington, DC 20362-5160 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 FSC 4820

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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).

SPECIFICATIONS

FEDERAL

PPP-F-320 -	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes.
QQ-C-390 -	Copper Alloy Castings (Including Cast Bar).
QQ-N-281 -	Nickel-Copper-Alloy Bar, Rod, Plate, Rod, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections.
QQ-N-286 -	Nickel-Copper-Aluminum Alloy, Wrought(UNS N05500).
TT-E-489 -	Enamel, Alkyd, Gloss, .Low VOC Content.

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-S-1222 -	Studs, Bolts, Hex Cap Screws, Socket Head Cap Screw, and Nuts.
MIL-L-19140 -	Lumber and Plywood, Fire-retardant Treated.
MIL-F-20042 -	Flanges, Pipe, and Bulkhead, Bronze (Silver Brazing).
MIL-P-20689 -	Plastic Plastisol (For Coating Metallic Objects).
MIL-B-24480 -	Bronze, Nickel-Aluminum (UNS No. C95800) Casting, For Seawater Service.
DOD-V-24657 -	Valve Actuator, Direct Coupled, Gear Driven Electrically Powered for Naval

	Shipboard Propulsion and Auxiliary Systems. (Metric)
MIL-C-24723 -	Castings, Nickel-Copper Alloy
MIL-R-83248 -	Rubber Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant.

STANDARDS

FEDERAL

FED-STD-595 -	Colors Used in Government Procurement.

MILITARY

MIL-STD-167-1 -	Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
MIL-STD-276 -	Impregnation of Porous Nonferrous Metal Castings.
MIL-STD-278 -	Welding and Casting Standard.
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.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

Naval Sea Systems Command (NAVSEA)

803-1385620 - Handwheels for Valves.

(Application for copies should be addressed to: Commander, Portsmouth Naval Shipyard, Code 202.2, Portsmouth, NH 03801.)

PUBLICATIONS

NAVSEA

9048-LP-022-7010 -	Valve, Manual and Remote Control Systems.
S6435-QJ-MMC-010 -	Design Criteria and Installation Requirements, Remote Mechanical Valve Actuator Systems.
S9505-AG-MMM-010 -	Rigid Rod Valve Remote Control System.

(Applications for copies should be addressed to the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) 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 SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 494 -	Standard Specification for Castings Nickel and Nickel Alloy. (DOD adopted)
B 61 -	Standard Specification for Steam or Valve Bronze Castings. (DOD adopted)
B 148 -	Standard Specification for Aluminum-Bronze Sand Castings.
B 584 -	Standard Specification for Copper Alloy Sand Castings for General Applications.
D 1400 -	Standard Test Method for Non-destructive Measurement of Dry Film Thickness of Non-conductive Coatings Applied to a Nonferrous Metal Base.
D 1457 -	Standard Specification for Polytetrafluoroethylene (PTFE) Molding and Extrusion Materials. (DOD adopted)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) (Continued)

F 467 - Standard Specification for Nonferrous Nuts for General Use.(DOD adopted)
F 468 - Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.(DOD adopted)

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B1.1 - Unified Inch Screw Threads (UN and UNR Thread Form). (DOD adopted)
B18.2.1 - Square and Hex Bolts and Screws Inch Series. (DOD adopted)
B18.2.2 - Square and Hex Nuts (Inch Series).(DOD adopted)
B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay). (DOD adopted)

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036).

(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, 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.5.

3.2 Materials. The material for ball and plug valves shall be as specified herein. Material selected shall prevent galling, seizing and excessive wear of operating parts and shall have

galvanic compatibility with system piping. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.2.1 Stem. Ball valve stems shall be nickel-copper alloy in accordance with QQ-N-281.

3.2.2 Impregnation. Impregnation of valve body castings, where required, shall be accomplished in accordance with MIL-STD-276 and MIL-STD-278.

3.2.3 Metallic parts. The bodies, balls, plugs, covers, glands and base plates shall be made from tin-bronze, alloys C90300 or C92200 in accordance with ASTM B 61, ASTM B 584, or QQ-C-390; nickel-aluminum-bronze, alloy C95800 in accordance with ASTM B 148 or MIL-B-24480; nickel-copper alloys in accordance with ASTM A 494, QQ-N-281 or MIL-C-24723; or nickel-copper-aluminum alloy in accordance with QQ-N-286.

3.2.4 Fasteners. Fastener material shall be nickel-copper, grades 400 or 405 in accordance with MIL-S-1222, ASTM F 467, or ASTM F 468 or nickel-copper-aluminum grade 500 in accordance with MIL-S-1222.

3.2.5 O-rings. O-rings shall be fluorocarbon elastomer in accordance with MIL-R-83248.

3.2.6 Non-metallic parts. Unless otherwise specified herein, seals, seats, gaskets, diaphragms, bearings, and other non-metallic parts shall be commercial, made of fluorocarbon resins or other materials compatible with sewage, seawater, and valve body material. Materials such as glass or graphite filler may be added to fluorocarbon resin, to improve wear resistance.

3.2.7 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new or 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. Ball and plug valves shall conform to the requirements and dimensions specified herein. Valves shall not leak under positive pressure, atmospheric pressure, or vacuum

(where specified) during service use. The valves shall be tight seating at all ports. Valve bodies shall withstand the applied stresses developed during operation of the valve. Valves shall be operable by one person. Plug valves shall not utilize a lift arrangement to unseat the plug before rotating, to reduce operating torque. Valves shall not be stick or gun lubricated to effect a seal or reduce operating torque. Low friction fluorocarbon resin material shall be employed on valve surfaces to prevent sticking and to provide low operating torque for ease of actuation. The ball or plug ports shall properly align with the body ports in all flow positions. The plug shall not raise or lower when subject to line pressure or vacuum.

3.3.1 Dimensions. Valve face-to-face and center-to-face dimensions shall be in accordance with table I for the valve size specified (see 6.2). 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. Flow passages shall be full ported round bore and shall be equal to the nominal size of the valve (see table I) with a tolerance of plus 1/16 minus zero inch. The inlet and outlet ways shall be chamfered to provide a smoother transition from the valve bore to match the bore of the end flange of the same nominal size. Dimensions and machining of end flanges shall be in accordance with MIL-F-20042, class 150. Drilled holes shall straddle the vertical centerline. Spot facing of bearing surfaces for bolt heads and nuts shall be in accordance with MIL-F-20042.

TABLE I. Dimensions.

Valve size (inches)	Face-to-face 2-way (inches)	Center-to-face 3-way (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

3.3.2 Rotation. Ball and plug rotation shall be limited by positive stops to the zero and 90 degree positions, and the zero and 180 degree positions, for 90-degree and 180-degree turn valves, respectively (see figures 1 through 9). The position of

the ports in the ball or plug shall be shown by permanent and distinct external marks. The valve shall incorporate provisions for positively restraining the ball or plug in each of its flow and closed positions.

3.3.3 Stem, ball, and plug. The stem and plug shall be fabricated from one piece, or the stem positively attached to the plug by welding in accordance with MIL-STD-278. Plug and seat surfaces throughout the periphery shall be smooth and provide maximum area contact with minimum clearances. Plug and seat surfaces shall have no grooves, cavities, or relief spaces to trap sediment or solidifying residues between the plug and body during plug rotation and in the plug closed and flow positions. Ball and plug 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. Ball valve cavities shall be filled with fluorocarbon resin inserts to prevent trapping sediment or solidifying residues in the valve cavities. Ball valve stems shall not be removable while the valve is installed in the piping and in service, and shall be "blowout" proof in construction, such as with a collared stem.

3.3.4 Low friction surfaces. Valves shall consist of a ball or plug rotating in the valve body cavity and operating against a port seat or seal face of polytetrafluoroethylene (PTFE) material. Valve port seat or seal shall exert positive contact pressure against the ball or plug during rotation and in all valve positions. The valve plug or ball shall be uncoated or coated with PTFE fluorocarbon resin. Low friction treated surfaces shall be either coated or sleeved with fluorocarbon resin (PTFE) in accordance with ASTM D 1457. Fluorocarbon resin surfaces that rub on one another shall be of slightly dissimilar formulations to reduce galling. Sleeved plug valves shall consist of a plug rotating in a PTFE resin sleeve positively secured in the valve body plug cavity. The sleeve may also act as the port seal.

3.3.4.1 Coating. Coating material shall be baked on spray-applied PTFE fluorocarbon resin material. Coating thickness shall be 6 mils minimum (See 4.7.2).

3.3.4.2 Sleeve. Valve plug cavity sleeve shall be molded from PTFE material. The sleeve shall be securely attached in the valve body plug cavity by a suitable locking method such as interlock grips or grooves to prevent loosening in service.

3.3.5 Handwheels and lever handles. Handwheels smaller than 11 inches in diameter shall be of commercial design and manufactured from steel, ductile iron, or malleable iron. Handwheels 11 inches in diameter and larger shall be cast steel

in accordance with the general dimensions of Drawing 803-1385620. The stem handwheel connection shall be in accordance with Drawing 803-1385620 for all sizes. When specified (see 6.2), handwheels and lever handles shall be color coded by painting in accordance with TT-E-489 and FED-STD-595 or covered with plastic plastisol in accordance with MIL-P-20689, type 1, class 1.

3.3.6 Handwheel and lever size. Unless otherwise specified (see 6.2), valves under 6 inches shall be furnished with lever handles; valves 6 inches and larger shall be provided with handwheels and shall be operated through enclosed worm and gear mechanisms. Valve nominal lever lengths and nominal handwheel diameters shall be as specified in table II.

TABLE II. Valve operating torque.

Valve size (inches)	Maximum operating torque 1/ (ft/lb)	Nominal lever length (inches)	Nominal handwheel diameter (inches)
1-1/4	20	5	7
1-1/2	25	6	8
2	35	7	11
2-1/2	40	8	11
3	45	9	12
3-1/2	50	10	14
4	60	11	16
4-1/2	70	13	16
5	80	14	18
6	100	--	21
8	120	--	24

1/ Measured at valve stem or manual actuator stem.

3.3.7 Manual valve actuators. Worm and gear mechanisms shall be enclosed and shall be commercial items except that they shall be shock and vibration tested while mounted on the valve in an operating condition (see 4.7.3 and 4.7.4).

3.3.8 Remote actuating gear. Valves shall be for use with mechanical remote actuating gear in accordance with NAVSEA S9505-AG-MMM-010, NAVSEA S6435-QJ-MMC-010, or NAVSEA 9048-LP-022-7010. Valves shall accept remote actuating gear sized to deliver between 20 and 50 percent more torque than the maximum operating torque listed in table II.

3.3.9 Electric valve actuators. When specified (see 6.2), electrically powered valve actuators shall be in accordance with DOD-V-24657. The actuator shall be shock and vibration tested

while mounted on the valve in an operating condition (see 4.7.3 and 4.7.4).

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

3.3.11 Threaded fasteners. Threads shall be in accordance with ANSI B1.1. Bolts and nuts shall be in accordance with ANSI B18.2.1 and ANSI B18.2.2.

3.4 Performance.

3.4.1 Pressure and temperature rating. Ball and plug valve maximum pressure and temperature rating shall be 150 pound per square inch (lb/in^2) at 150 degrees Fahrenheit (°F).

3.4.2 Vacuum rating. Valves 1-1/4 to 3-inche size, in addition to operating under pressure (see 3.4.1), shall also operate in vacuum sewage systems at a maximum of 20 inches mercury (Hg).

3.4.3 Shock. Valves shall withstand the shock requirements of Grade A, hull mounted, class I, type C in accordance with MIL-S-901, and MIL-STD-798 (see 4.7.3).

3.4.4 Vibration. Valves shall withstand the type I vibration requirements in accordance with MIL-STD-167-1 (see 4.7.4).

3.4.5 Structural soundness. Valves shall withstand an internal hydrostatic test pressure in the open position of 225 lb/in^2 for 5 minutes with no leakage, weeping, or structual distortion (see 4.7.5).

3.4.6 Seat tightness (pressure). Valves shall withstand a hydrostatic pressure of 165 lb/in^2 for a minimum of 3 minutes in all flow positions with no leakage through the closed port or to the atmosphere (see 4.7.6).

3.4.7 Seat tightness (vacuum). Valves 1-1/4 to 3-inch size shall maintain a vacuum of 20 inches of mercury in the closed position for a minimum of 15 minutes with no more than 1 inch of mercury vacuum loss (see 4.7.7). Valves shall meet the above requirement in all flow positions and open position.

3.4.8 Cycle life. Valves shall operate for a life of 2000 cycles (see 4.7.8).

3.4.9 Operating torque. The maximum allowable valve operating torque, including initial breakaway torque, applied to

the valve stem or manual actuator stem, at rated differential pressure (see 3.4.1), or rated vacuum (see 3.4.2), shall be as specified in table II (see 4.7.9).

3.5 Marking.

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

3.5.2 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 information:

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

3.6 Special tools. Special tools shall not be required for installation and routine maintenance. 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 Management Area Operations (DCMAO)). Repair of coated surfaces and sleeve replacement is not considered routine maintenance.

3.7 Workmanship. Valves shall be thoroughly cleaned both inside and out. Valves shall be free from burrs, loose sand, grit, scale, metal shavings, and all other contaminants which can affect performance and damage sealing surfaces. There shall be no sharp edges. All sealing, rubbing, and coated surfaces shall be smooth with no blemishes, scratches, scrapes or gouges. Machined surfaces shall not exceed 125 roughness height rating (RHR) as defined in ANSI B46.1, unless a rougher finish is allowed by specifications.

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 (see 6.3). 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 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.5).
b. Quality conformance inspection (see 4.6).

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified herein and 4.7.

4.3.1 Test temperature. Inspections and tests shall be accomplished at ambient room temperature.

4.3.2 Test fluid. Unless otherwise specified, all tests shall be conducted using clean fresh water.

4.4 Failures. One or more failures of any test shall be cause for rejection.

4.5 First article inspection. First article inspection shall consist of the examinations and tests specified in table III.

TABLE III. First article inspection.

Inspection	Requirement	Test
Visual and dimensional examination	3.3.1 through 3.3.11, 3.5.1, 3.5.2, and 3.7	4.7.1
Coating thickness test	3.3.4.1	4.7.2
Shock test	3.4.3	4.7.3
Vibration test	3.4.4	4.7.4
Structural soundness test	3.4.5	4.7.5
Seat tightness (pressure) test	3.4.6	4.7.6
Seat tightness (vacuum) test	3.4.7	4.7.7
Cycle life test	3.4.8	4.7.8
Operating torque test	3.4.9	4.7.9

4.5.1 First article inspection samples. Unless otherwise specified (see 6.3), one sample of each valve size shall be subjected to first article inspection specified in 4.5. The first article may be a standard production item from the contractor's current inventory, provided the valve meets the requirements of this specification and is representative of the design, construction, materials, and manufacturing technique applicable to the remaining valves to be furnished under the contract.

4.6 Quality conformance inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed valves as specified in 4.6.2 and 4.6.3 and inspect them as specified in table IV (see 6.5). If one or more defects are found in any sample, the entire lot shall be rejected. The contractor has the option of screening the lot 100% for the defective characteristic(s) or providing a new lot which shall be inspected as specified 4.7.

TABLE IV. Quality conformance inspection.

Inspection	Requirement	Test
Visual and dimensional examination	3.3.1 through 3.3.11, 3.5.1, 3.5.2, and 3.7	4.7.1
Coating thickness test	3.3.4.1	4.7.2
Structural soundness test	3.4.5	4.7.5
Seat tightness (pressure) test	3.4.6	4.7.6
Seat tightiness (vacuum) test	3.4.7	4.7.7
Operating torque test	3.4.9	4.7.9

4.6.1 Lot. For the purposes of quality conformance inspection sampling, a lot is defined as all the valves of the same pressure rating, size, and construction, using the same materials and production process, being offered for delivery at one time.

4.6.2 Sampling for visual and dimensional examination. A random sample shall be selected from each lot as specified in table V for the visual and dimensional examination of 4.7.1.

TABLE V. Sampling for visual and dimensional examination.

Lot Size	Sample Size	
	Major Defects	Minor Defects
2 to 15	5	2
16 to 25	5	3
26 to 50	5	5
51 to 90	7	5
91 to 150	11	6
151 to 280	13	7
281 to 500	16	9
501 to 1200	19	11
1201 to 3200	23	13
3201 and over	29	15

4.6.3 Sampling for quality conformance tests. A random sample shall be selected from each lot as specified in table VI for the tests specified in table IV.

TABLE VI. Sampling for quality conformance tests.

Lot size	Sample size
2-15	All
16-280	20
281-1200	47
1201 and over	53

4.7 Methods of inspection.

4.7.1 Visual and dimensional examination. Each sample selected as specified in 4.5.1 and 4.6.2 shall be visually and dimensionally examined to determine conformance to this specification, workmanship requirements, and applicable drawings. Major and minor defects shall be classified as shown in table VII. Any sample which fails to conform to this visual and dimensional examination shall be cause for rejection of the entire lot (see 6.5).

TABLE VII. Classification of defects.

Major	
101	Size not as specified.
102	Type not as specified.
103	Material not as specified.
104	Dimensions not as specified.
105	Color not as specified.
106	Component missing or damaged.
107	Improper assembly.
108	Workmanship.
109	Poor finish on machining.
110	Fluorocarbon resin coating or sleeve, rough, blistered, uneven, loose, bubbled, scratched, or gouged.
111	Nominal lever length and nominal handwheel diameter not as specified.
Minor	
201	Identification markings missing, incorrect, or illegible.

4.7.2 Coating thickness test. Ball or plug coating thickness shall be measured to determine conformance to 3.3.4.1 using ASTM D 1400.

4.7.3 Shock test. Each valve design shall be shock tested to determine conformance to 3.4.3. Valve actuators, when required, shall be mounted on valves during shock tests (see 3.3.7 and 3.3.9). Permanent deformation, misalignment, or functional impairments shall be cause for rejection. After shock test, valves shall be tested in accordance with 4.7.6, 4.7.7 as applicable, and 4.7.9.

4.7.4 Vibration test. Each valve design shall be tested to determine conformance to 3.4.4. Valve actuators, when required, shall be mounted on valves during vibration tests (see 3.3.7 and 3.3.9). The closed valve shall not open nor shall the open valve close due to vibration. After vibration testing, valves shall be tested in accordance with 4.7.6, 4.7.7 as applicable, and 4.7.9.

4.7.5 Structural soundness test. Each valve shall be hydrostatically tested to determine conformance to the requirements specified in 3.4.5.

4.7.6 Seat tightness (pressure) test. Each valve shall be hydrostatically seat tested in both directions to determine conformance to the requirements specified in 3.4.6.

4.7.7 Seat tightness (vacuum) test. Each valve in 1-1/4 to 3-inch size shall be vacuum seat tested in both directions and open position to determine conformance to the requirements specified in 3.4.7. Valves shall be tested for vacuum loss using a vacuum volume equivalent to a maximum of 30 feet of schedule 40 pipe of nominal valve size.

4.7.8 Cycle life test. Valves shall be subjected to a cycle test to determine conformance to 3.4.8. A cycle shall consist of the valve ball or plug rotating from one stop position to the other stop position and return. Time for a complete cycle shall not exceed 45 seconds. The valve shall be mounted with the stem horizontal for one-half of the test cycles. The test fluid shall be clean fresh water at ambient temperature. A positive head is required only to the extent to ensure that cycling occurs in a water environment. During the cycle test the stem seal may be adjusted or replaced if necessary not more than 4 times. The number of cycles between stem seal replacements shall be noted. Upon completion of the cycle test, the valve shall be pressure and vacuum tested and operating torque measured to the requirements specified in 4.7.6, 4.7.7 as applicable, and 4.7.9, after which the valve shall be internally inspected, and results noted. Failure of any of the above tests or any evidence of galling, seizing, peeling and excessive wear of the coated or sleeved surfaces or the port seals, or the ball or plug, or of any operating parts shall constitute failure of the cycle life test.

4.7.9 Operating torque test. Each valve shall be operated and the operating torque measured to determine conformance to 3.4.9. Torques shall be measured at the valve stem or manual actuator stem with the valve unpressurized, and pressurized to rated differential pressure and rated vacuum.

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

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 6.7)

5.1 Packaging requirements. Valves shall be preserved level A, C, or commercial, packed level A, B, C, or commercial as specified (see 6.2) and marked in accordance with MIL-V-3, and shall include shelf life markings where applicable (O-rings, bar

codes, and applicable packaging acquisition options therein as specified (see 6.2). In addition, for Navy acquisitions, the following shipboard stowage fire-retardant requirements apply:

a. Unless otherwise specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping containers and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B -	Type II - weather resistant. Category 1 - general use.
Level C -	Type I - non-weather resistant. Category 1 - general use.

b. Fiberboard. Fiberboard used in the construction of interior (unit and intermediate) and exterior fiberboard boxes including interior packaging forms shall conform to the class-domestic/fire retardant or class-weather resistant/fire retardant materials requirements as specified (see 6.2) in accordance with PPP-F-320 and amendments thereto.

6. NOTES

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

6.1 Intended use. Valves covered by this specification are intended for sewage and sea water service. Valves in sizes specified (see 3.4.2) are suitable for use in vacuum sewage systems.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number, and date of this specification.
(b) Type of valve and flow plan figure number (see 1.2), and whether ball or plug valve is specifically desired.
(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) When first article is required (see 3.1).
(e) Valve size (see 3.3.1).
(f) When color coding is required and color required (see 3.3.5).
(g) Lever or handwheel if other than as specified (see 3.3.6).

(h) Electric valve actuator, if required (see 3.3.9).
(i) Levels of preservation, packing and marking required (see 5.1).
(j) Marking and packaging acquisition options (see 5.1).
(k) When fire-retardant treated materials are not required (see 5.1).
(l) When drawing are required (see 6.3).
(m) Valve sizes for first article inspection where all sizes offered are not selected for test (see 6.5).
(n) Repair parts, if required.
(o) Allowance parts list or National stock number, if available.

6.3 First article. When first article inspection is required (see 6.2), the contracting officer should provide specific guidance to offerors whether the item should be a first article sample (see 3.1), and the number of items to be tested as specified in 4.5. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternative bids unless specifically requested to do so in the solicitation.

6.4 Part or identifying number (PIN). The PIN to be used for parts acquired to this specificatIon shall include prefix "M" to indicate an item defined by inch-pound units specification number, and code numbers as indicated in table VIII.

TABLE VIII. Part or identifying number (PIN).

PIN CODE:

Manufacturer Alpha Code	Nominal size (inches)	Type	Flow plan
A -	12 - 1-1/4	I - Type I	0 - Two way
B -	15 - 1-1/2	II - Type II	1 - Figure 1
C -	20 - 2	III - Type III	2 - Figure 2
D -	25 - 2-1/2		3 - Figure 3
E -	30 - 3		4 - Figure 4
	35 - 3-1/2		5 - Figure 5
	40 - 4		6 - Figure 6
	45 - 4-1/2		7 - Figure 7
	50 - 5		8 - Figure 8
	60 - 6		9 - Figure 9
	80 - 8		

TABLE VIII. Part or identifying number (PIN). Cont.

Operator	Category
L - Lever	P - Plug
H - Handwheel	B - Ball
E - Electric actuator	
O - Other	

6.5 Lot acceptance and rejection criteria. If one or more defects are found in any sample, the entire lot should be rejected. The contractor has the option of screening the lot 100% percent for the defective characteristic(s) or providing a new lot which must be inspected in accordance with the sampling plan contained herein.

6.6 Provisioning. Provisioning Technical Documentation (PTD), spare parts and repair parts should be furnished as specified in the contract. When ordering spare parts or repair parts for the equipment covered by this specification, the contract should state that such spare parts and repair parts should meet the same requirements and quality assurance provisions as the parts used in the manufacture of the equipment. Packing for such parts should also be specified.

6.7 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 contract for incorporation into the equipment and lost their separate identity when the equipment is shipped.

6.8 Subject term (key word) listing.

Coated valve
CHT piping system
Collection, holding and transfer (CHT)
Marine sanitation device (MSD)
Plumbing system
Plumbing system valve
Pollution control system
Sewage system valve
VCHT piping system
Vacuum collection, holding and transfer (VCHT)

6.9 Changes from previous issue. Marginal notations 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-N076)

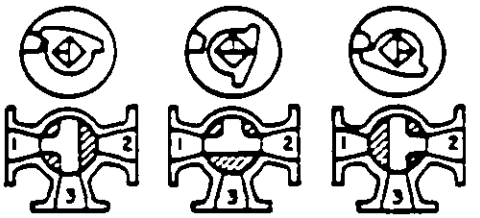

Figure 1- 3-WAY, 3-PORT, 180° TURN

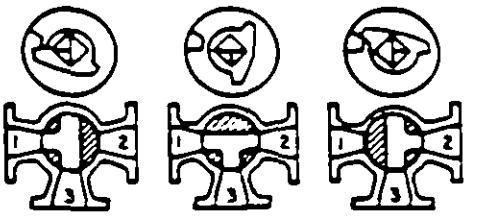

Figure 2- 3-WAY, 3-PORT, 180° TURN

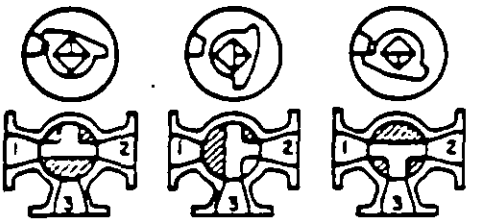

Figure 3 - 3-WAY, 3-PORT, 180° TURN

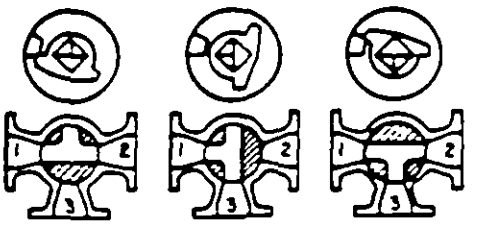

Figure 4 - 3-WAY, 3-PORT, 180° TURN

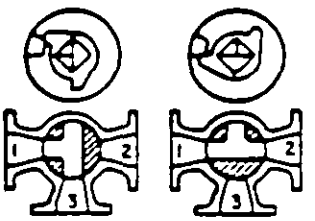

Figure 5 - 3-WAY, 3-PORT, 90° TURN

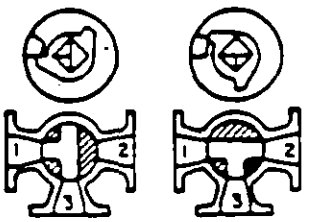

Figure 6 - 3-WAY, 3-PORT, 90° TURN

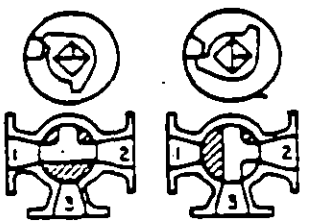

Figure 7 - 3-WAY, 3-PORT, 90° TURN

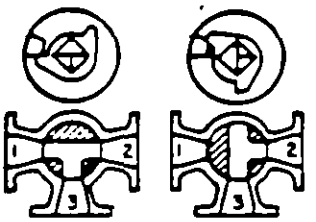

Figure 8 - 3-WAY, 3-PORT, 90° TURN

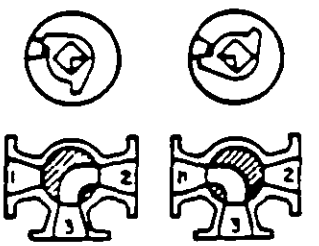

Figure 9 - 3-WAY, 2-PORT, 90° TURN

FIGURES 1 TO 9. Type II and type III valve flow plans.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER: MIL-V-24509A
2. DOCUMENT DATE (YYMMDD): 12-24-92
3. DOCUMENT TITLE: VALVES, FLANGED, BALL AND PLUG FOR SEWAGE AND SEA WATER SERVICE
4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)
5. REASON FOR RECOMMENDATION
6. SUBMITTER
   a. NAME (Last, First, Middle Initial)
   b. ORGANIZATION
   c. ADDRESS (*Include Zip Code*)
   d. TELEPHONE (*Include Area Code*)
      (1) Commercial
      (2) AUTOVON (*If applicable*)
7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY
   a. NAME: Technical point of contact: John Julian , Code 56Y35
   b. TELEPHONE (*Include Area Code*)
      (1) Commercial: (703) 6025791
      (2) AUTOVON: 332-5791
   c. ADDRESS (*Include Zip Code*)
      Commander
      Attn: 05Q42
      Naval Sea Systems Command
      2531 National Ctr 3
      Washington D.C. 20362-5160

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
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