INCH-POUND
MIL-V-2042E(SH)
06 June 1990
SUPERSEDING
MIL-V-2042D(SHIPS)
24 July 1968
(See 6.12)

MILITARY SPECIFICATION

VALVES, REDUCING, WATER SERVICE FOR NAVAL SHIPBOARD USE

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 self-contained globe, pressure reducing valves for use in water systems aboard Naval ships and in marine environments. These valves are limited to discharge pressure settings of 200 pounds per square inch (lb/in^2) and below. Guidance in the selection and installation of these valves is contained in MIL-HDBK-227.

1.2 **Classification.** Valves shall be of the following types and pressure ratings, as specified (see 6.2).

Type I – Pressurized spring chamber.

Type II – Unpressurized spring chamber.

Pressure ratings. Valves shall have nominal inlet pressure ratings of 150, 250, lb/in^2, or as specified (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 55Z3, 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 FSC 4820

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).

SPECIFICATIONS

FEDERAL

HH-P-151	Packaging; Rubber-sheet, Cloth-insert
QQ-B-637	Brass, Naval: Rod, Wire, Shapes, Forgings, and Flat Products with Finished Edges (Bar, Flat Wire, and Strip)
QQ-B-750	Bronze, Phosphor; Bar, Plate, Rod, Sheet, Strip, Flat Wire, and Structural and Special Shaped Sections
QQ-C-390	Copper Alloy Casting (Including Cast Bar)
QQ-C-465	Copper-Aluminum Alloys (Aluminum Bronze) (Copper Alloy Numbers 606, 614, 630, 632M, and 642); Rod, Flat Products with Finished Edges (Flat Wire, Strip, and Bar) Shapes, and Forgings
QQ-N-281	Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections
QQ-N-286	Nickel-Copper-Aluminum Alloy, Wrought (UNS N05500)
QQ-N-288	Nickel-Copper Alloy and Nickel-Copper-Silicon Alloy, Castings
QQ-S-763	Steel Bars, wire, Shapes, and Forgings, Corrosion Resisting
QQ-S-766	Steel Corrosion Resisting and Heat Resisting, Alloys, Plate, Sheet and Strip
TT-P-645	Primer Paint, Zinc Chromate, Alkyd Type
PPP-F-320	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes

MILITARY

MIL-V-3	Valves, Fittings, and Flanges (Except for Systems-Indicated Herein); Packaging of
MIL-C-882	Cloth, Duck, Cotton, or Cotton-polyester Blend, Synthetic Rubber, Impregnated and Laminated, Oil Resistant
MIL-S-901	Shock Tests, H.I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for
MIL-F-1183	Fittings, Pipe, Cast Bronze, Silver-Brazing, General Specification for
MIL-S-1222	Studs, Bolts, Hex Cap Screws, Socket Head Cup Screws and Nuts
MIL-P-15024	Plates, Tags, and Bands for Identification of Equipment
DOD-P-15328	Primer (Wash), Pretreatment (Formula No. 117 for Metals) (Metric)
MS 16142	Boss, Gasket Seal Straight Thread Tube Fitting, Standard Dimensions for
MIL-B-16541	Bronze, Valve; Castings
MIL-L-19140	Lumber and Plywood, Fire-Retardant Treated
MIL-F-20042	Flanges, Pipe and Bulkhead, Bronze (Silver Brazing)
MIL-C-20159	Copper-Nickel Alloy Castings (UNS No. C96200 and C96400)
MIL-F-24227	Fittings and Flanges, Cast Bronze, Silver Brazing Suitable for Ultrasonic Inspection
MIL-B-24480	Bronze, Nickel-Aluminum (UNS No. C45800) Castings for Seawater Service
MIL-C-24615	Castings, Nickel-Chromium-Molybdenum-Columbium Alloy
MIL-P-25732	Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Limited Service at 275 °F (135 °C)

MIL-R-83248	Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant

STANDARDS

FEDERAL

FED-STD-H28	Screw-Thread Standards for Federal Services

MILITARY

MIL-STD-167-1	Mechanical Vibrations of Shipboard Equipment (Type I – Environmental and Type II – Internally Excited)
MIL-STD-248	Welding and Brazing Procedure and Performance Qualification
MIL-STD-278	Welding and Casting Standard
MIL-STD-740	Airborne and Structureborne Noise Measurement and Acceptance Criteria of Shipboard Equipment
MIL-STD-1520	Corrective Action and Disposition System for Nonconforming Material

(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.)

2.1.2 **Other Government documents.** The following drawings 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)

803-1385946	Unions, Bronze, Silver Brazing, WOG for UT Inspection
803-1385947	Flanges, Bronze, 700 PSI, WOG for UT Inspection

(Application for copies should be addressed to the Naval Publications and Forms Center, (ATTN: NPODS) 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

(Application for copies should be addressed to the Naval Publications and Forms Center, (ATTN: NPODS) 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

2.2 **Non-Government publications.** The following documents forms 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 (ANSI)

B 46.1	Surface Texture (Surface Roughness, Waviness, and Lay); (DOD adopted)

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 125	Standard Specification for Steel Springs, Helical, Heat Treated
A 182	Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High Temperature Service; (DOD adopted)
B 21	Standard Specification for Naval Brass Rod, Bar, and Shapes (DOD adopted)
B 61	Standard Specification for Steam or Valve Bronze Castings; (DOD adopted)
B 103	Standard Specification for Phosphor Bronze, Plate, Sheet, Strip, and Rolled Bar; (DOD adopted)
B 150	Standard Specification for Aluminum Bronze, Rod, Bar, and Shapes
B 211	Standard Specification for Aluminum-Alloy Bar, Rod, and Wire; (DOD adopted)
B 446	Standard Specification for Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625) Rod and Bar
B 689	Standard Specification for Electroplated Engineering Nickel Coatings

(Application for copies should be addressed to the Instrument Society of America, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, NC 27709.)

(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 **Qualification.** Type II valves furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time of award of contract (see 4.3 and 6.6).

3.2 **First article.** When specified (see 6.2), sample type I valves and type II valves with nominal inlet pressure rating greater than 400 lb/in^2 shall be subjected to first article inspection (see 6.5) in accordance with 4.3.

3.3 **Materials.** *Materials shall be as specified in table I. However, this specification is not* intended to be restrictive provided proposed alternative materials will give equal or better marine service than the materials specified. Proposed alternative materials shall be subject to approval by the contracting activity. Components for which specific materials are not specified shall be materials compatible with the service intended (see 6.3 and appendix). Particular attention shall be given to avoid sensitization (see 6.8.1) of materials during hard facing, stress relieving, or welding. Use of cadmium plated parts and fasteners, including washers, is prohibited.

TABLE I. *List of materials.*

Name of parts	Material
Body and bottom cap	Valve bronze, ASTM B 61, or QQ-C-390, alloy C92200 Cast nickel-copper alloy QQ-N-288, composition E Copper-nickel, MIL-C-20159, alloy C96400 Gun metal, QQ-C-390, alloy C90300 Ni-Cr-Mo-Cb, ASTM B 446, MIL-C-24615 Aluminum bronze, MIL-B-24480
Spring chamber (type I valves)	Same as for body and bottom cap
Spring chamber (type II valves)	Same as for body and bottom cap plus: CRES, QQ-S-763, 04L, 316L or ASTM A 182, grades F304L, F316L, F304LN, F316LN Brass, QQ-B-637 or ASTM B 21 Aluminum, ASTM B 211, alloy 6061 Bronze, MIL-B-16541 or ASTM B 61, alloy 92200

TABLE I. *List of materials – Continued.*

Name of parts	Material
Stem[1]	Nickel-copper alloy, QQ-N-281, class A Nickel-copper-aluminum alloy, QQ-N-286
Guide bushings[1]	Nickel-copper-silicon alloy, QQ-N-288, comp D
Disc holder and seat ring	Nickel-copper alloy, QQ-N-281, class A Copper-nickel, QQ-C-390 or MIL-C-20159, alloy C71500 Nickel Aluminum Bronze alloy C63260
Springs not subject to line media	CRES (austenitic), QQ-S-763, ASTM A 182 Nickel-copper alloy, QQ-N-281 Ni-Cr-Mo-Cb alloy Nickel plated steel, ASTM A 125, plate to ASTM B 689, type 1, class (x) 125
Metallic parts subject to line media	Nickel-copper alloy, QQ-N-281 70-30 copper-nickel, MIL-C-20159, alloy C71500 Valve bronze, ASTM B 61, QQ-C-390, alloy C92200 Aluminum-bronze (Cast: QQ-C-390, alloy C95800) (Forged: QQ-C-465, ASTM B 150 alloy C63200) Phosphor bronze, QQ-B-750, ASTM B 103, alloy C51000
Metallic parts not subject to line media	Same as above, plus: CRES (300 and 400 series), QQ-S-763, and QQ-S-766, ASTM A 182 Naval brass, QQ-B-637, ASTM B 21 Nickel plated steel, ASTM A 125, plated to ASTM B 689, type 1 class (x) 125
Diaphragm	Synthetic fabric reinforced neoprene, Buna, or other material when specified (see 6.2) HH-P-151, class 2 and 4, MIL-C-882
Non-metallic seals: Disc insert and static seals	Polyurethane (polyether), Buna (MIL-P-25732), butyl, fluorocarbon elastomers (MIL-R-83248), Viton (MIL-R-83248) or other materials specified (see 6.2)
Dynamic seals	Polyurethane (polyether) or other materials when specified (see 6.2)
Bolting	Nickel-copper alloy, Nickel-copper-aluminum alloy, or CRES (300 series), to MIL-S-1222H

[1]The guiding surfaces on the stem (guide posts) and the guide bushings shall have a minimum hardness differential or 50 Brinell hardness numbers. The softer of the two guiding surfaces shall have a minimum hardness of 200 Brinell.

3.3.1 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.

3.3.2 Welding. Welding and brazing shall be in accordance with MIL-STD-248 and MIL-STD-278.

3.3.3 Painting. When specified (see 6.2), painting of external surfaces of nonferrous metal castings, piping, or other parts is not required, except that parts made of aluminum alloy shall be given one coat of pretreatment, DOD-P-15328, formula 117, and one coat of primer of TT-P-645, formula 84.

3.4 Construction.

3.4.1 Description. Valves shall be self-contained, spring-loaded, direct-operated pressure reducing valves incorporating a balanced valve element. Reduced pressure (not exceeding 200 lb/in^2) shall be sensed by a diaphragm and compared with a reference spring load. Any force imbalance shall be directly transmitted to and positively reposition a single seated valve element to limit the set point error within the limits specified in 3.5.5. Type I valves shall be valves in which the spring chamber in combination with the body and bottom cap forms a pressure containing envelope capable of withstanding the full proof pressure rating. These valves shall be specified for special applications where it is necessary to contain the line media in the event of a failure which subjects the spring chamber to full inlet pressure. The spring chamber assembly need not be leakproof; however, it shall contain line media at proof pressure without structural failure and shall limit external leakage to a small weepage (in drip form) past the adjusting screw threads and spring chamber joint. Type I valves shall also incorporate a choke feature on the poppet to limit capacity in the event of a diaphragm failure, where specified (see 6.2). Type II valves shall be valves in which the spring chamber does not form part of the pressure containing envelope.

3.4.2 Pressure envelope. The nominal inlet (see 6.8.2), design (see 6.8.3), and hydrostatic proof (see 6.8.4) pressures for the pressure containing envelope (body, gas dome or spring housing, and bottom cap) shall be as specified in table II. Design temperature (see 6.8.3) is also shown in table II.

TABLE II. *Design and proof pressures, and design temperatures.*

Nominal inlet pressure rating (lb/in^2)	Design pressure (lb/in^2)	Hydrostatic proof pressure (lb/in^2)	Design temperature (°F)
150	150	225	165
250	250	375	165
400	400	600	165
700	700	1050	165
Or as specified			

3.4.3 **Body passages.** Body passages shall produce gradual changes in flow direction so as to reduce any effects of concentrated impingement and 90-degree turns. In portions of the valve subject to velocity increases and flow direction changes, such as immediately downstream of the seat, the 90-degree impingement against the walls at close range shall be avoided. The body cavity downstream of the seat shall present a high angle (70 to 90 degrees) of incidence to the issuing jet. At points where direct impingement at close range does occur and cannot be eliminated, section thickness shall be substantially increased to provide adequate material to withstand the additional erosive effect.

3.4.4 **Diaphragm construction.** The main diaphragm shall be clamped between flanges on the body and spring chamber. Flange faces shall have phonographic or concentric serrations to ensure a leaktight flange seal. The flange faces shall have sufficient width and all edges in contact with the diaphragm shall be properly chamfered or rounded to prevent cutting or tearing of the diaphragm. The valve and diaphragm shall withstand a pressure differential across the diaphragm of twice the highest set pressure or 200 lb/in^2, whichever is greater, for type I valves, and twice the highest set pressure or 100 lb/in^2, whichever is greater, for type II valves, without damage or degradation to the performance capabilities of either the valve internals or the diaphragm. However, in no case shall the diaphragm be required to withstand a pressure differential greater than the nominal inlet pressure rating of the valve.

3.4.5 **Valving element construction.** The stem shall be of one piece construction and be top and bottom guided. The valve disc shall be retained on the stem with a threaded retainer utilizing a prefailing-torque locking feature. The disc shall incorporate a resilient seating insert which shall be readily replaceable on all sizes. Guide bushings shall be provided in the body and bottom cap, and shall have a minimum thickness of 0.60 inch. Concentricity, parallelism, squareness, and roundness requirements for all surfaces which establish main valve alignment shall ensure parallel disc/seat contact and free valve movement without sticking or binding in the assembled valve. The valve shall be designed so that these alignment requirements are maintained with interchangeable parts and under any additive tolerance (stackup) condition without requiring machining after assembly of the body and bottom cap. The bottom cap/body joint shall ensure, by positive means, the proper alignment of the lower guide bushing to ensure repeated correct reassembly. The

bottom cap shall be located by body guiding, that is, a close tolerance fit between machined diameters on the body and bottom cap rather than depending on studs or bolts for location. Where the bottom cap/body joint is of flanged construction, proper parallel alignment of the lower guide bushing shall be ensured by metal-to-metal takeup of at least a portion of the flange faces, which shall be machined true. Finish of the guiding surfaces shall be of a roughness height rating (RHR) of 32 or better. The guiding surfaces shall not be used as sealing surfaces.

3.4.6 **Valving element balance.** The valve element shall be completely pressure balanced when in the seated position. The dynamic seal shall be accomplished by use of either a diaphragm or a fully retained U-cup or O-ring. Where a U-cup or O-ring is used, the surface moving against the seal shall have a finish of RHR of 16 or better and shall not be used for guiding the stem.

3.4.7 **Seat ring.** A threaded-in seat ring shall be provided which is replaceable with hand tools (see 3.4.17) and does not require machining after assembly. The seat ring shall shoulder against the body to provide a positive pressure-tight joint in which the threads are not used to seal. Where a nonmetallic sealing element is utilized, a precision dimensioned gland or cavity shall be provided in either the body or set ring to ensure proper and controlled retention of the sealing element.

3.4.8 **Bolting requirements.** The spring chamber/body flange and bottom cap/body flange (if applicable) shall be secured by one of the following:

a. Through bolts threaded the entire length and fitted with a nut on each end. Threads on bolts and nuts shall be class 2 fit in accordance with FED-STD-H28.

b. Tap-end studs with a class 5 interference fit at the tap end and a class 2 fit at the nut end. Fit shall be in accordance with FED-STD-H28.

c. Hexagonal head bolts or cap screws.

Bearing surfaces of nuts and bolts and their respective mating surfaces on the valve shall be cast or forged smooth and true, or be finish machined. The bottom cap/body joint may be either of a flanged construction in accordance with the above, or of a threaded construction. A properly retained gasket or O-ring shall be provided to seal against external leakage.

3.4.9 **Spring construction.** Springs shall not be fully compressed under any operation or adjustment of the valve. Spring ends shall be squared and ground.

3.4.10 **Set point adjustment.** The set point (see 6.8.5) shall be adjustable with the valve under pressure. The adjusting screw shall have a right hand thread so that clockwise rotation increases the set pressure. The adjusting device shall be provided with a locknut and cap or other suitable means to guard against accidental change in set point. Set pressure shall be adjustable through a range of not less than 75 to 125 percent of the midrange set pressure with the installed spring without replacing any internal parts (see 6.2).

3.4.11 **Threads.** Threads shall conform to FED-STD-H28. Provisions shall be incorporated, where necessary, to prevent the accidental loosening of threaded parts. Generally, bolting shall be class 2 fit in accordance with FED-STD-H28. The material, hardness, finish, and clearances of mating threaded parts shall prevent galling of the threads. Pipe threads shall not be used for main connections, but may be used for low stressed internal parts, such as attachment of a pivot tube, when specifically approved.

3.4.12 **Interchangeability.** Parts having the same manufacturer's part number shall be directly interchangeable with each other with respect to installation and performance without requiring selection or fitting. In no case shall parts for a given valve be physically interchangeable or reversible unless such parts are also interchangeable or reversible with regard to function, performance, and strength.

3.4.13 **Accessibility.** Adjustment and repair of the valve shall be possible without removal from the line.

3.4.14 **End connections.** Valve ends shall be in accordance with the applicable documents listed in table III. Valve end connection type shall be as specified (see 6.2). When union end connections are specified, the option of supplying the union nuts and tail pieces shall be stated and the weight estimate adjusted accordingly. Flanges and union end thread pieces shall be cast or forged integral with the valve body with a straight thread and O-ring seal, with straight threads conforming to MS 16142. Inlet and outlet connections shall be of the same size and pressure rating.

TABLE III. *End connections.*

Nominal pressure rating (lb/in^2)	Union end	Flanged end
150	MIL-F-1183	MIL-F-20042
250	MIL-F-1183	MIL-F-20042
400	MIL-F-24227	MIL-F-20042
700	803-1385946	803-1385947
Or as specified		

3.4.15 **Face-to-face dimensions.** Face-to-face dimensions for 150- and 250-lb/in^2 rated valves shall be in accordance with table IV. Face-to-face dimensions for 400 and 700 lb/in^2 or specially rated valves shall be in accordance with table IV or as specified (see 6.2). For union end valves, the face-to-face dimension is defined as the distance between the parallel faces of the threaded ends of the valve body.

TABLE IV. *Face-to-face dimensions (inches + 1/16).*

Size (inches)	Flanged end		Union end
	150 lb/in^2	250 (lb/in^2)	150 and 250 lb/in^2
1/4	7-1/4	7-7/8	7-7/32
3/8	7-1/4	7-7/8	7-9/32
1/2	7-1/4	7-7/8	7-9/32
3/4	7-3/8	7-7/8	7-1/2
1	7-3/8	8-7/8	7-1/2
1-1/4	7-15/16	8-11/16	8-5/32
1-1/2	8-3/4	9-1/2	8-31/32
2	10	10-3/4	10-7/32
2-1/2	10-7/8	11-3/4	–
3	11-5/8	12-1/2	–
3-1/2	11-5/8	12-5/8	–
4	13-1/2	14-1/2	–

3.4.16 **Body configuration.** Valves shall have globe configuration with in-line inlet and outlet ports. Pressure lines, including the reduced pressure sensing line, shall be internally ported in the body.

3.4.17 **Special tools.** Special tools shall not be required for installing or removing the valve from the pipe line. Special tools may be furnished for servicing valve internals if it can be demonstrated by test (see 4.7.1) that use of the special tool is labor or time saving. Special tools are defined as those tools not listed in the Federal Supply Catalog.

3.5 **Performance.**

3.5.1 **Springs.** Springs shall not exhibit a set in excess of the calculated allowable (see 4.7.2).

3.5.2 **Hydrostatic proof.** The pressure containing envelope shall withstand internal hydrostatic pressure of 1.5 times the design pressure (see table II and 4.7.3).

3.5.3 **Seat tightness.** The pressure rise after lockup (see 6.8.6) on the downstream (or regulated outlet) side of the valve shall not exceed 10 percent of the set pressure or 2.5 lb/in^2, whichever is greater, over a 15-minute period (see 4.7.4).

3.5.4 **Set pressure limits.** Set pressure (see 6.8.7) shall be adjustable within the range established in 3.5.5 (see 4.7.5) (see 6.2).

3.5.5 **Accuracy of regulation.** Unless otherwise specified (see 6.2), the valve shall meet an accuracy or regulation (see 6.8.8) requirement defined as the amount by which the downstream regulated pressure can deviate from the set pressure at lockup when the flow through the regulator is increased to the rated capacity. The limits shall be as specified on figure 1.

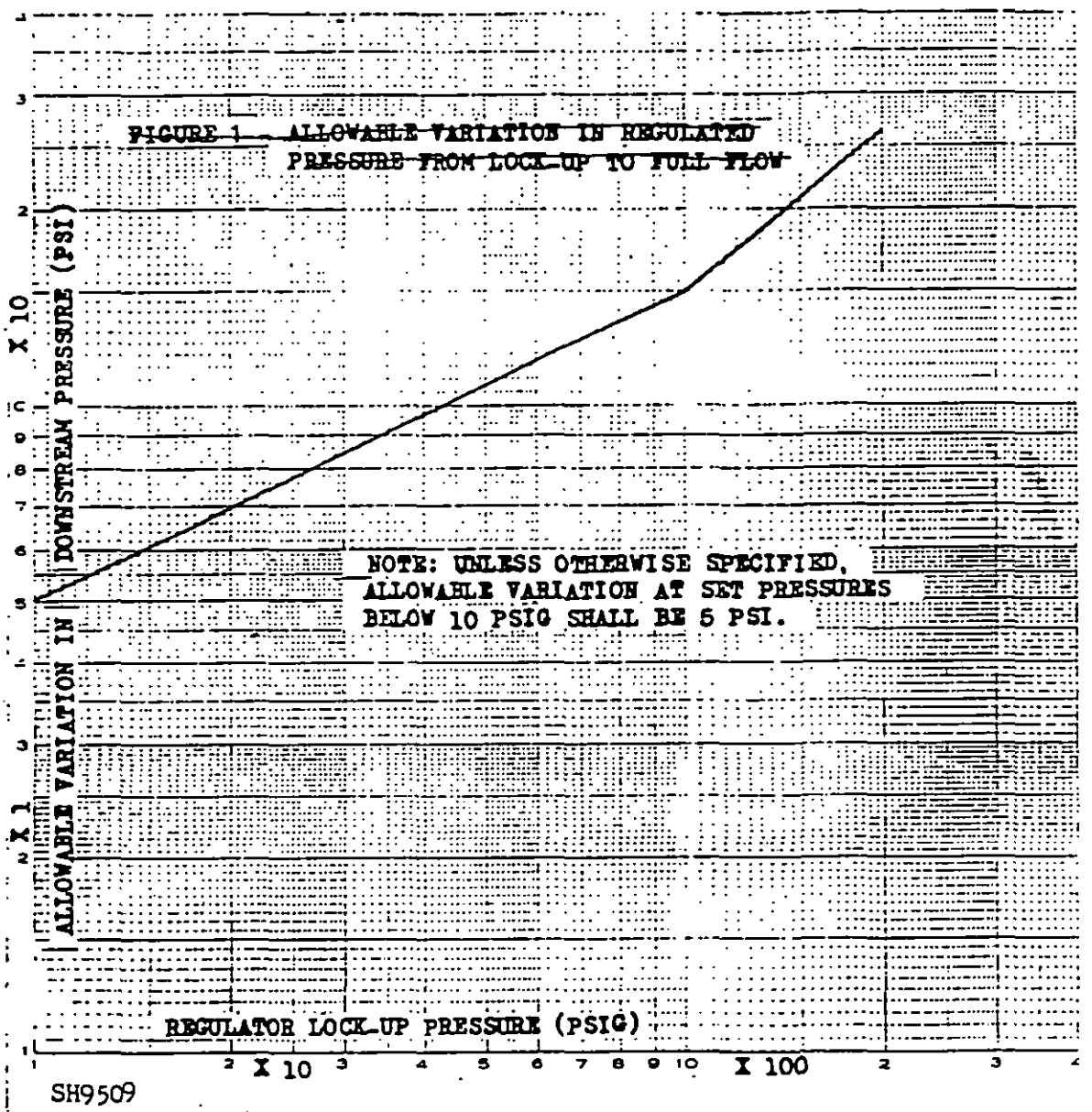

FIGURE 1. *Allowable variation in regulated pressure from lock-up to full flow.*

3.5.6 **Capacity requirements.** The minimum required valve flow coefficients (Cy) for type II 1/2 through 4-inch nominal pipe size (nps), 150- and 250-lb/in^2 rated valves with 5 to 30 and 25 to 60 lb/in^2 set pressure adjustment ranges, based on the accuracy of regulation specified in 3.5.5, shall be in accordance with table V. The minimum required capacity for other valves covered by this specification shall be as specified (see 6.2). Valves shall meet the specified capacity required (see 4.7.5) or any intermediate capacity requirement, while maintaining the regulated pressure within the accuracy limits specified in 3.5.5 without instability, and within noise and vibration requirements of 3.5.7.

TABLE V. *Minimum required valve C_v for type II, 150- and 250-lb/in^2 rated valves with 5 to 30 and 25 to 60 set pressure adjustment ranges.*

Size (inches)	5 to 50 lb/in^2 set pressure adjustable range			25 to 60 lb/in^2 rated valves adjustable range		
	Set pressure (lb/in^2) (allowable set pressure deviation)					
	10(5)	20(7)	30(8.5)	30(8.5)	45(10.25)	60(11.75)
1/2	2.5	3	3.5	2	2.5	3
3/4	3	3.5	4	2.5	3	3.5
1	4	5	6	3	4	5
1-1/4	5.5	7.5	9	5	7	8.5
1-1/2	7	10	12	6.5	9.5	11.5
2	15	20	25	12	17	22
2-1/2	30	35	40	25	30	35
3	45	50	55	40	45	50
3-1/2	55	60	65	50	55	60
4	70	75	80	65	70	75

3.5.6.1 **Capacity calculation.** The calculation of the valve flow C_v shall be from test data (test system and all calculations shall be in accordance with ISA-S75.01) based on the following basis for turbulent flow:

$$C_v = \frac{\text{Flow}}{\sqrt{\text{Inlet pressure} - \text{Delivered flow pressure}}}$$

Where: Flow = US gal/min of water at 60 degrees Fahrenheit (°F)
Inlet pressure = lb/in^2
Delivered flow pressure = The regulated pressure at the above flow rate (that is the droop pressure) lb/in^2

Example: A 1-1/2-inch, type II, 150-lb/in^2 rated 150-lb/in^2 water supply pressure and set lb/in^2. The valve delivers 125 gal/min when the regulated pressure drops to 13 lb/in^2 (that is, at a droop of 7 lb/in^2 as permitted on figure 1).

$$C_v = \frac{125}{\sqrt{150 - 13}} = 10.7$$

This satisfies the minimum requirement listed in table V for a 1-1/2-inch valve set at 20 lb/in^2

For set pressures between those listed in table V, the minimum required C_v shall be obtained by linear interpolation.

3.5.7 Noise and vibration. The valves shall be resistant to Type I environmental vibration in accordance with MIL-STD-167-1. There shall be no resonant frequency from 0 to 33 hertz (Hz), and no degradation of valve performance when excited in this frequency range. When specified (see 6.2), noise levels measured under all conditions of operation shall not exceed the airborne, structureborne, and fluidborne noise requirements of MIL-STD-740 (see 4.7.5).

3.5.8 Shock. The valve shall retain its set performance capability and suffer no structural damage or permanent deformation after shock (4.7.6) (see 6.2).

3.6 Marking.

3.6.1 Body markings. Valve bodies shall be permanently marked to show the following information:

a. Nominal size

b. Design pressure rating

c. Manufacturer's name or trade-mark

d. Flow direction arrow or the words "inlet" and "outlet" cast or forged, stamped with round bottom dies, or laser etched on them.

3.6.2 Identification plates. An identification plate in accordance with MIL-P-15024 and attaching devices made of corrosion resistant metal shall be attached to the valve and shall list the following:

a. Manufacturer's name

b. Set pressure range

c. Manufacturer's model or part number

d. Space for part or identifying (PIN) number.

3.7 Workmanship. Components shall be free from defects which affect their appearance or which may affect their operation. Castings shall be clean, sound, smoothly cored (where permissible), true to form, uniform in texture, and free from cold shunts, porosity, blow holes, and other injurious defects. Castings shall not be plugged, brazed, or burned, nor otherwise repaired without prior approval of NAVSEA. Welding and brazing shall be in accordance with 3.3.2. Castings and forgings shall be thoroughly cleaned, both inside and outside, and all fins, burrs, roughness, and residue shall be removed. Machined surfaces shall not exceed 125 RHR as defined in ANSI B46.1.

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 the 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. Qualification inspection (see 4.3)
b. First article inspection (see 4.3)
c. Quality conformance inspection (see 4.4).

4.3 **Qualification and first article inspection.** Qualification and first article inspection shall be performed at a laboratory acceptable to the Government (see 6.6 and 6.5) on sample valves produced with equipment and procedures normally used in production. Qualification and first article inspection shall consist of the examination and tests specified in table VI (see 6.3). The manufacturer shall be responsible for correcting all failures, malfunctions or problems resulting from all tests and examinations including those performed by the Government. After each corrective action has been completed, the test, portion of the test, or examination that resulted in the failure, malfunction or problem shall be repeated and shall be passed successfully.

TABLE VI. *Qualification and first article inspection.*

Inspection	Requirement	Test method
Visual, dimensional, and special tool demonstration[1]	3.4.2 to 3.4.16 3.4.17 and 3.7	4.7.1
Spring	3.5.1	4.7.2
Valve body and diaphragm hydrostatic proof	3.5.2	4.7.3
Seat tightness	3.5.3	4.7.4
Set pressure	3.5.4	4.7.5 a.
Accuracy of regulation	3.5.5	4.7.5 b.
Capacity	3.5.6	4.7.5 c.
Noise and vibration		
MIL-STD-167-1	3.5.7	4.7.5 d.
MIL-STD-740	3.5.7	4.7.5 d.
Shock	3.5.8	4.7.6
Packaging/marking	5.1	4.8

[1]The visual and dimensional inspection shall be required where specified in the test methods and at any point in the testing procedure where there exists a reasonable cause to examine a failure. The special tool demonstration (3.4.17) may be accomplished at any opportune time. The interchangeability of parts or the same manufacturer's part numbers (3.4.12) shall be demonstrated as part or the special tool demonstration.

4.3.1 **Qualification of first article test.** A 1-inch valve shall be submitted for each type and rating for which qualification is desired, provided the test valve is representative of the basic design features of all sizes of that type and rating included in this specification. Qualification or first article approval, based on the examination and test of that size, will then apply to all sizes of that

type and rating covered by this specification, where engineering drawings of the test valve, and assembly drawings of all sizes and that type and rating substantiate similarity of basic design features. The Government reserves the right to determine what are significant variations requiring separate qualification or first article testing of other sizes. The hydrostatic proof test, however, shall be performed on all sizes of valves submitted for approval.

4.3.2 **Failures.** Any uncorrectable failure shall be cause for rejection.

4.3.3 **Order of tests.** The order of tests shall be as listed in table VI from top to bottom.

4.4 **Quality conformance inspection.** Quality conformance inspection shall consist of examination and test as specified in table VII (see 6.3).

TABLE VII. *Quality conformance inspection.*

Inspection	Requirement	Test method
Visual and dimensional eximination	3.4.2 to 3.4.16	4.7.1 and 3.7
Hydrostatic proof	3.5.2	4.7.3
Seat tightness	3.5.3	4.7.4

4.4.1 **Inspection lot.** Valves of the same materials size, end connection type, set point, type, and pressure rating offered for delivery during the contract time limits shall be considered a lot for purpose of sampling.

4.4.2 **Sampling for quality conformance inspection.**

4.4.2.1 **Sampling for visual and dimensional examination.** A random sample shall be selected from each lot in accordance with inspection for the visual and dimensional examination of 4.7.1 and for examination for the defects classified in table VIII (see 6.7).

TABLE VIII. Classification of defects.

Major	
101	Type, capacity, material, pressure rating, range of discharge pressures, not specified, or body configuration not a globe type.
102	End preparation not as required, or improperly machined. Face-to-face dimensions not within tolerance.
103	Threads, bolting, or welding/brazing requirements, not as specified.
104	Seat ring not properly retained.
105	Diaphragm not clamped as required or damaged.
106	Body passages conducive to impingement on unreinforced areas.
107	Dimensional or structural change after hydrostatic test.
108	Dimensional errors, out of manufacturing tolerances.
109	Dirt, chips, sand, or residue from manufacturing processes present in valve.
110	Valve internal trim elements not concentric, parallel, square or are out of round, galled, and so forth. Parallel disc/seat contact and free valve movement not evident.
111	Spring exhibits a "set" above tolerance or can be fully compressed under operation or adjustment. Spring ends not square or ground. Plating (where utilized) not adequate.
112	Parts having the same manufacturer's number not interchangeable without causing out of tolerance dimensional changes in assembly stack-up dimensions, or unacceptable performance.
Minor	
201	Identification markings missing or illegible on valve body.
202	Painting of aluminum inadequate or not accomplished.
203	Use of special tools does not produce time or labor savings claimed.
204	Valve body must be removed from pipeline for repair.
205	Weight in excess by 10 percent or more of original estimate.
206	Packaging/marking not as specified.

4.4.2.2 **Sampling for quality conformance inspection.** A random sample shall be selected from each lot in accordance with table IX.

TABLE IX. *Sampling for tests.*

Lot size	Sample size
2 to 8	5
9 to 15	7
16 to 25	10
41 to 65	25
6 to 110	35
or over	

4.4.3 **Quality conformance inspection.** The sample items selected in accordance with 4.4.2.2 shall be subjected to the remaining quality conformance inspection showed in table VII.

4.5 **Rejected lots.**

4.5.1 **Rejection and reinspection.** Reworked lots shall be submitted for reinspection and acceptance in accordance with inspection 4.7.1.

4.5.2 **Nonconforming inspection lots.** Disposition of inspection lots found unacceptable shall be in accordance with MIL-STD-1520.

4.5.3 **Disposition of sample units.** Sample units which have been subjected to quality conformance tests (see 4.4) and approved may be delivered on the contract or purchase order, in an assembled, ready-for-service condition.

4.6 **Inspection conditions.** Inspections shall be performed in accordance with the test conditions specified in 4.6.1 and 4.6.2.

4.6.1 **Test temperature.** Inspection and tests shall be accomplished at ambient room temperature (see 3.5.6.1 for specific test water temperature).

4.6.2 **Test fluid.** Tests shall be conducted using clean fresh water.

4.7 **Methods of inspection.** Methods of inspection shall be in accordance with 4.7.1 through 4.7.6.

4.7.1 **Visual and dimensional examinations.** Each sample selected in accordance with 4.4.2.1 shall be weighed, tested as follows, and visually and dimensionally examined to determine conformance to this specification, and workmanship requirements. Major and minor defects shall be classified as shown in table VIII.

4.7.2 **Spring test.** The spring from the disassembled sample valve shall be visually and dimensionally examined as follows:

a. The free spring length shall be measured and an allowance of 0.010 each per inch of free spring length calculated. Fraction of inches of free spring length shall be prorated and added to the calculations for allowance.

b. The spring shall be fully (solidly) compressed and released.

c. Ten minutes after release the spring shall be measured again.

d. The spring shall not exhibit a set in excess of the allowance calculated in step (a.).

4.7.3 **Valve body and diaphragm hydrostatic proof test.** Sample valve body and valve diaphragm hydrostatic tests shall be performed to test strength and soundness of the pressure containing envelope. No structural failure, permanent deformation, damage to seating surfaces, or external leakage (except a slight weepage (in drip form) from spring chamber assemblies in type I valves) shall be acceptable. A visual and dimensional inspection is required after testing (see 4.7.1).

a. *For type I valve pressure containing envelope.* The hydrostatic test pressure shall be 1.5 times the nominal inlet pressure or design pressure. Table II contains a listing of hydrostatic proof pressures. Valve internals shall be removed for the test.

b. *For type II valve pressure containing envelope.* The test shall be performed as above except the body/spring chamber shall be blanked off.

c. *For type I and II valve diaphragm test.* The inlet port shall be blanked off and the outlet section of the valve hydrostatically pressurized to the higher of the following pressures.

(1) Two times the highest discharge setting available with the heaviest spring.

(2) 200 lb/in^2 (type I valves), 100 lb/in^2 (type II valves).

However in no case shall the diaphragm be required to withstand a pressure differential greater than the nominal inlet pressure rating of table II.

The valves shall be pressurized for 2 minutes, depressurized, and pressurized again for 2 minutes. At the completion, the valve shall be examined in accordance with 4.7.1.

4.7.3.1 **Special tests.** Special valve tests shall be as specified (see 6.2).

4.7.4 **Seat tightness test.** The sample valve shall be installed in a test setup which incorporates an accurate means of monitoring pressures at the inlet and outlet (regulated flow) of the valve. The outlet piping shall be arranged so that it shuts off while in flooded state with no air binding (entrapment) for approximately 100 pipe diameters downstream of the valve. With hydrostatic pressure equal to the rated nominal inlet pressure of the valve applied to the inlet, the valve shall be set to lock up at the midpoint of its pressure range setting. The pressure rise after lockup on the closed downstream (or regulated outlet) side of the valve shall not exceed 10 percent of the set pressure or 2.5 lb/in^2, whichever is greater, over a 15 minute period. If the valve fails to meet these requirements it shall be given a visual and dimensional examination (4.7.1) to determine the cause.

4.7.5 **Composite test.** The sample valve which has passed the seat tightness test shall be installed in a test setup which incorporates an accurate means of monitoring the flow rate and pressures at the inlet and outlet of the valve. This test setup will facilitate establishment of set pressure limits, accuracy of regulation, capacity, and noise and vibration response where specified (see 6.2).

a. *Set pressure test.* The sample valve accuracy at both the minimum and maximum of the set pressure range shall be established.

b. *Accuracy of regulation.* This test shall be conducted at the minimum and maximum set pressure range by applying an inlet pressure equal to the nominal rating and varying flow from lockup to full flow lockup. The droop characteristics shall be determined following the procedure of 3.5.6.1.

c. *Capacity requirements.* Continuing from above, the valve capacity in accordance with and within the limits specified in 3.5.6 shall be determined.

d. *Noise and vibration.* The valve shall be vibration tested with the nominal inlet pressure rating applied to the inlet port and the valve set at approximately the midpoint of the set pressure range. Performance requirements are set forth in 3.5.7. The valve shall be noise tested (MIL-STD-740) at maximum flow (no choke or with choke if specified) maximum capacity at highest reduced pressure, midrange, and at lowest reduced pressure.

4.7.6 Shock test. The valve shall be subjected to the high-impact mechanical shock requirements for grade A, class I of MIL-S-901 to determine its resistance to high-impact mechanical shock (see 6.3). The shock test shall be performed with the nominal hydrostatic pressure applied to the inlet port. During impact, an instantaneous, reversible pressure excursion is allowable. After the test, the valve shall be subject to a visual and dimensional check (4.7.1).

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

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging or preparation for delivery requirements of referenced documents listed in section 2, see 6.10.)

5.1 Packaging requirements. The valves shall be preserved level A, C commercial, packed level A, B, C or commercial and marked in accordance with MIL-V-3 as specified (see 6.2 and 6.3) and shall include bar coding. In addition, for Navy acquisitions, the following applies:

a. *Navy fire-retardant requirements.*

(1) *Lumber and plywood.* Unless otherwise specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping container 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

(2) *Fiberboard.* Unless otherwise specified, fiberboard used in the construction of class-domestic, non-weather resistant fiberboard, and cleated fiber-board boxes shall meet the flamespread and the specific optic density requirements of PPP-F-320.

5.1.1 **Commercial packing loose-fill.** When non-fire retardant loose-fill type materials are approved for packaging and packing applications such as cushioning, filler and dunnage, all containers (unit, intermediate, and shipping) shall be marked or labeled with the following information:

"CAUTION

Contents cushioned with non-fire retardant loose-fill material. Not to be taken aboard ship. Remove and discard loose-fill material before shipboard stowage. If required, recushion with uncompressed bound fiber, fiberboard sheet or die cuts, transparent flexible cellular material or kraft paper. (Specifications for above materials are listed in MIL-V-3)"

6. NOTES

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

6.1 **Intended use.** These valves are intended for use in water systems on Naval ships. The type II valve is similar in construction to the reducing valves required by issues of this specification prior to revision C and will be required on the majority of shipboard applications.

6.2 *Acquisition requirements.* Acquisition documents must specify the following:

a. Title, number, and date of this specification
b. Type, capacity, material and quantity required (see 1.2 and table IV)
c. Pressure and temperature rating 400 and 700 lb/in^2 rating should be specified if required (see 1.2 and 3.2)
d. 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)
e. When first article is required (see 3.2)

f. Any other special performance test or material and construction requirements (seals, diaphragms) (see table I)

g. When painting of external surface is not required (see 3.3.3)

h. When a choke feature is incorporated on the poppet (see 3.4.1)

i. End connection size and type. Face to face dimensions, if not listed in table IV. For union ends, specify delivery with or without nuts and tailpieces (see 3.4.14 and 3.4.15).

j. Set pressure required. Range of set pressures (see 3.4.10 and 3.5.4)

k. Regulation accuracy required, if other than listed (see 3.5.5)

l. Capacity requirements for valves not covered in table V (see 3.5.6)

m. When noise and vibration tests must be met (see 3.5.7)

n. When shock test must be met (see 3.5.8)

o. Special valve tests required (see 4.7.3.1)

p. Set pressure limits, accuracy of regulation, capacity, and noise and vibration response (see 4.7.5)

q. Preservation, packing and marking required (see 5.1)

r. When fire-retardant materials are not required (see 5.1)

s. When non-fire retardant loose-fill material is approved (see 5.1.1).

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 Descriptions (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 DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.3	Certificate of compliance	DI-E-2121	–
3.3	Engineering drawings	DI-DRPR-80651	–
4.1.1	Inspection system program plan	DI-R-4803	–
4.3	First article inspection report	DI-T-4902	–
4.4	Inspection and test reports	DI-T-5329	–

4.7.6	Report, equipment shock test	UDI-T-23753	–
5.1	Packing, Packaging, Preservation, and Transportability	DT-PACK-80120	–

The above DID's 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 DID's are cited on the DD Form 1423.

6.4 Technical manuals. The requirement for technical manuals should be considered when this specification is applied on a contract. If technical manuals are required, military specifications and standards that have been cleared and listed in DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL) must be listed on a separate Contract Data Requirements List (DD Form 1423), which is included as an exhibit to the contract. The technical manuals must be acquired under separate contract line item in the contract.

6.5 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory (see 3.2), and the number of items to be tested as specified in 4.3. 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 alternate bids unless specifically requested to do so in the solicitation.

6.6 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List No. 2042 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests must be made in accordance with "Provisions Governing Qualification SD-6" (see 6.6.1).

6.6.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

6.7 Lot acceptance and rejection.

6.7.1 Visual and dimensional examination. The acceptable quality level (AQL) should be 0.20 percent defective for major defects and 0.40 percent defective for minor defects for visual and dimensional examination (see 4.4.2.1). Any sample failing to conform to the visual and dimensional examination should be rejected, and if the rejection number exceeds the acceptance number for the sample, the lot represented by the sample should be rejected.

6.7.2 Quality conformance inspection. Any sample which fails any quality conformance inspection or test should be rejected and if the rejection number of defectives exceeds the acceptable number of defectives the lot represented by the sample should be rejected. The allowable number of rejects for lot sizes should be as listed in table X:

TABLE X. *Allowable number of rejects for log sizes.*

Lot size	Sample size	Allowable number of rejects
2 to 8	5	0
9 to 15	7	0
16 to 25	10	0
41 to 65	25	0
6 to 110	35	1
or over		

6.8 Definitions.

6.8.1 Sensitization. The changing of the structural or mechanical properties of a material.

6.8.2 Nominal pressure. The approximate maximum pressure which the valve will be subjected to in service under normal conditions.

6.8.3 Design pressure and temperature. The maximum pressure and temperature the valve should be subjected to under any condition. These are the pressure and temperature upon which the strength of the pressure containing envelope is based.

6.8.4 Proof pressure. The maximum test pressure that the valve is required to withstand without damage. Valve operation is not required during application of the proof pressure, but after the pressure has been removed, the valve must be capable of meeting all performance requirements.

6.8.5 **Set pressure.** The downstream pressure which the valve is set to maintain under a given set of operating conditions (that is, inlet pressure and flow). Normally the valve is set under conditions which will result in the highest downstream pressure (usually minimum inlet and lockup). Therefore, the delivered pressure would drop off or "droop" below the set pressure under all operating conditions.

6.8.6 **Lock-up pressure.** The outlet pressure delivered by a reducing valve when the flow is reduced to a point where it is equal to or less than the allowable leakage.

6.8.7 **Set pressure limits.** The range of set pressure over which the valve can be adjusted while meeting the performance requirements specified.

6.8.8 **Accuracy of regulation.** The maximum permissible band over which the downstream pressure may vary when the valve is set at any pressure within the required range of adjustment and is subjected to any combination of inlet pressure, flow demand, and ambient temperature variations, within the specified limits.

6.9 **Provisioning.** Provisioning Technical Documentation (PTD), spare parts, and repair parts should be furnished as specified in the contract.

6.9.1 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. Packaging for such parts should also be specified.

6.10 **Subcontracted 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.

6.11 **Subject term (key word) listing:**

Balanced
Pressurized spring chamber
Spring-loaded
Unpressurized spring chamber

6.12 **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-N031)

APPENDIX

Engineering Drawings Technical Content Requirements

10. SCOPE

10.1 Scope. This appendix covers the technical content requirements that should be included on drawings when required by the contract or order. This appendix is mandatory only when data item description DI-DRPR-80651 is cited on the DD Form 1423.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Specifications. The following specification forms 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.

SPECIFICATION

MILITARY

DOD-0-1000 Drawings, Engineering and Associated Lists

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

30. DRAWINGS

30.1 Drawing requirements. When required by the contract or order, drawings shall contain the following information:

a. An accurately scaled sectional assembly of the valve

b. Bill of materials listing specification, grade, condition, and any other data required to fully identify the properties of the materials proposed

c. Complete details of all replaceable internal trim sufficient to permit manufacture, by ship or tender, of repair parts

d. Dimensions and concentricity, parallelism, squareness and roundness requirements required to evaluate the guiding alignment and running clearance limits of the main valve

e. Finishes and hardnesses of the main valve dynamic guiding and sealing surfaces

f. Installation dimensions

g. End connection detail and clearance dimensions required for disassembly

h. Required assembly torques or other equivalent assembly instructions for all threaded parts (except adjustments)

i. Table of spring data

j. Estimated weight of complete valve assemblies

30.1.1 Tailoring of drawings. Only the information required above need be furnished for the type II drawings. The following data, (generally substantiated from tests) in addition to that required in DOD-D-1000, should be furnished for the type III drawings:

a. Ship identification
b. Applicable assembly drawing numbers
c. Applicable manual number
d. CID (APL) number
e. Application description
f. Valve description
g. The set pressure and adjustable range of valve
h. Required accuracy of regulation over specified range of operating conditions
i. Rated accuracy of regulation over specified range of operating conditions
j. Required maximum capacity under specified conditions
k. Rated maximum capacity under specified conditions
l. Fail-open capacity (for purposes of relief valve sizing).

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