MIL-V-2042D(SHIPS)
24 July 1968
SUPERSEDING
MIL-V-2042C(SHIPS)
28 November 1966
(See 6.6)

MILITARY SPECIFICATION

VALVES, REDUCING, WATER SERVICE, FOR

NAVAL SHIPBOARD USE

1. SCOPE

1.1 Scope.- This specification covers pressure reducing valves for use in water systems on Naval ships. These valves are limited to pressure settings of 200 pounds per square inch gage (psig) and below.

1.2 Classification.- Valves shall be of the following types, as specified (see 6.2).

Type I (special) - 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 be capable of containing line media at proof pressure without structural failure and shall limit external leakage to a small weepage past the adjusting screw threads and spring chamber joint. Type I valves may also incorporate a choke feature on the poppet to limit capacity in the event of diaphragm failure, where specifically ordered.

Type II - Valves in which the spring chamber does not form part of the pressure containing envelope.

1.3 Pressure ratings.- Valves shall have nominal pressure ratings of 150, 250, 400 and 700 psig as specified (see 6.2).

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

QQ-N-288 - Nickel-Copper Alloy and Nickel-Copper-Silicon Alloy Castings.

MILITARY

MIL-S-901	-	Shock Tests, H.I (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-D-1000/2	-	Drawings, Engineering and Associated Lists.
MIL-F-1183	-	Fittings, Tube, Cast Bronze, Silver Brazing.
MIL-M-16576	-	Metal, Gun Castings.
MIL-F-20042	-	Flanges, Pipe, Bronze (Silver Brazing).
MIL-C-20159	-	Copper-Nickel Alloy (70-30 and 90-10) Castings.
MIL-B-23921	-	Bronze, Nickel-Aluminum Castings for Seawater Service.
MIL-B-24059	-	Bronze, Nickel Aluminum, Rod, Flat Products with Finished Edges, Shapes and Forgings.
MIL-F-24227	-	Fittings and Flanges, Cast Bronze, Silver-Brazing Suitable for Ultrasonic Inspection.

STANDARDS

MILITARY
MIL-STD-167 - Mechanical Vibrations of Shipboard Equipment.

DRAWINGS

MILITARY
810-1385946 - Unions, Bronze, Silver Brazing, WOG for UT Inspection.
810-1385947 - Flanges, Bronze, 700 PSI, WOG for UT Inspection.

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

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

UNITED STATES OF AMERICA STANDARDS INSTITUTE (USAS)
B1.12-1963 - Class 5 Interference - Fit Thread.

(Application for copies should be addressed to the United States of America Standards Institute, 10 East 40th Street, New York, New York 10016).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
B61-63 - Steam or Valve Bronze Castings.

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

NATIONAL BUREAU OF STANDARDS
Handbook H28 - Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402).

FLUID CONTROLS INSTITUTE, INC. (FCI)
58-2 - Recommended Voluntary Standards for Measurement Procedure for Determining Control Valve Flow Capacity.

(Application for copies should be addressed to the Fluid Controls Institute, Inc., P. O. Box 1485, Pompano Beach, Florida 33061.)

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 West Jackson Boulevard, Chicago, Illinois 60606.)

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

3. REQUIREMENTS

3.1 Qualification.- The valves furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at time set for opening of bids (see 4.2 and 6.3).

3.2 Materials of construction.- Materials shall be as specified in table I. All materials shall be selected to prevent corrosion, galling, seizing, excessive wear or erosion where applicable.

Table I - List of materials

Name of parts	Material
Body and bottom cap	Valve bronze, ASTM B61 Monel (nickel-copper alloy) QQ-N-288 composition E 70-30 copper-nickel, MIL-C-20159 Gun metal MIL-M-16576
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 (300 series) Brass Aluminum Bronze
Stem 1/	Monel (nickel-copper alloy) K-Monel (nickel-copper-aluminum alloy)
Guide bushings 1/	S-Monel (nickel-copper-silicon alloy) Stellite
Disc holder and seat ring	Monel (nickel-copper alloy) 70-30 copper-nickel
Springs not subject to line media	CRES (austenitic) Monel (nickel-copper alloy) Inconel (nickel-chromium alloy) Nickel or cadmium plated steel
Metallic parts subject to line media	Monel (nickel-copper alloy) 70-30 copper-nickel Valve bronze Aluminum-bronze (Cast: MIL-B-23921) (Forged: MIL-B-24059) Phosphor bronze
Metallic parts not subject to line media	Monel (nickel-copper alloy) 70-30 copper-nickel Valve bronze Aluminum-bronze (Cast: MIL-B-23921) (Forged: MIL-B-24059) CRES (300 and 400 series) Brass Nickel or cadmium plated steel Phosphor bronze Hydraulic bronze
Diaphragm	Synthetic fabric reinforced Neoprene, Buna, or other material when specifically approved by NAVSEC (see 6.5) for this application.
Non-metallic seals: Disc insert and static seals	Polyurethane (polyether), Buna, Butyl, Viton or other materials when specifically approved by NAVSEC (see 6.5) for this application.
Dynamic seals	Polyurethane (polyether) or other materials when specifically approved by NAVSEC (see 6.5) for this application.
Bolting	Monel (nickel-copper alloy) K-Monel (nickel-copper-aluminum alloy) CRES (300 series)

1/ The guiding surfaces on the stem (guide posts) and the guide bushings shall have a minimum hardness differential of 50 Brinell hardness numbers. The softer of the two co-operating surfaces shall have a minimum hardness of 200 Brinell.

3.3 Valve description.- This specification covers self-contained, spring loaded, direct operated pressure reducing valves incorporating a balanced valve element. Reduced pressure shall be sensed by a diaphragm and compared with a reference spring load. Any force unbalance shall be directly transmitted to and positively reposition a single seated valve element to limit the set point error within the limits specified in 3.5.1.

3.4 Design and construction requirements.-

3.4.1 Pressure envelope.- The design and test pressures of the pressurecontaining envelope (valve body, spring chamber, and bottom cap for type I valves and valve body and bottom cap for type II valves) shall be specified in table II.

Table II - Design and test pressures

Nominal pressure rating (psig)	Design pressure (psig)	Proof pressure (psig)	Temperature (°F.)
150	150	225	165
250	250	375	165
400	400	600	165
700	700	1050	165

3.4.2 Body passages.- Body passages shall be designed to 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 design shall eliminate 90 degree impingement against the walls at close range. The design of the body cavity downstream of the seat shall be such as to present a high angle of incidence to the issuing jet. At points where direct impingement at close range does occur and cannot be eliminated, section thickness must be substantially increased to provide adequate material to withstand the additional erosive effect.

3.4.3 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 insure 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 diaphragm. The valve and diaphragm shall be capable of withstanding a pressure differential across the diaphragm of twice the highest set pressure or 200 pounds per square inch (psi) whichever is greater, for type I valves and twice the highest set pressure or 100 psi, 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 is the diaphragm required to withstand a pressure differential greater than the nominal inlet rating of the valve.

3.4.4 Valving element construction.- 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 prevailing-torque locking feature. The disc shall incorporate a resilient seating insert which must be readily replaceable on all sizes. Guide bushings shall be provided in the body and bottom cap and have a minimum thickness of 0.060 inches. Concentricity, parallelism, squareness, and roundness requirements for all surfaces which establish main valve alignment shall be such as to insure parallel disc/seat contact and free valve movement without sticking or binding in the assembled valve. The valve must be designed so that these alignment requirements are maintained with interchangeable parts and under any tolerance stack-up condition without requiring machining after assembly of the body and bottom cap. The bottom cap/body joint shall be designed to assure, by positive means, the proper alignment of the lower guide bushing so that correct reassembly is repeatedly assured. The bottom cap shall be located by body guiding (i.e. 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 assured by metal-to-metal takeup of at least a portion of the flange faces, which are machined true. Finish of the guiding surfaces shall be RHR 32 or better. The guiding surfaces shall not be used as sealing surfaces.

3.4.5. 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 16 or better and shall not be used for guiding the stem.

3.4.6 Seat ring.- A threaded-in seat ring shall be provided which is replaceable with hand tools 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 non-metallic sealing element is utilized, a precision dimensioned gland or cavity shall be provided in either the body or seat ring to insure proper and controlled retention of the sealing element.

3.4.7 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.
(b) Tap-end studs with interference fit at the tap end and a class 2 fit at the nut end. Interference fit shall be in accordance with USAS B1.12.
(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 finished machined. The bottom cap/body joint may be either of a flanged construction in accordance with the above, or of a threaded construction.

3.4.8 Spring construction.- Springs shall be designed so that they will be not fully compressed under any normal operation or adjustment of the valve. When removed and compressed solid, the springs shall not exhibit a permanent set exceeding 0.010 inch per inch of free spring length, measured 10 minutes after release of the spring. Spring ends shall be squared and ground.

3.4.9 Set point adjustment.- Means shall be provided for adjusting the set point 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.

3.4.10 Threads.- All threads shall conform to Handbook H28. Provisions shall be incorporated, where necessary, to prevent the accidental loosening of threaded parts. Generally, bolting shall be class 2 fit. The material, hardness, finish, and clearances of mating threaded parts shall be such as to 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 pitot tube, when specifically approved by Naval Ship Engineering Center (NAVSEC) (see 6.5).

3.4.11 Interchangeability.- All 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.

3.4.12 Accessibility.- The valve shall be accessible for adjustment and repair without removal from the line.

3.4.13 End preparation.- Valve ends shall be in accordance with the applicable documents listed in table III. Valve end preparation shall be as specified (see 6.2). When union end connections are specified the union nuts and tail pieces shall be furnished. Flanges and union end thread pieces shall be cast or forged integral with the valve body. Only the pertinent dimensions of the documents in table III apply. Inlet and outlet connections shall be of the same size and rating.

Table III - End preparation

Nominal pressure rating (psig)	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	810-1385946	810-1385947

3.4.14 End-to-end dimensions.- End-to-end dimensions for 150 and 250 psig rated valves shall be in accordance with table IV. Where particular end-to-end dimensions are required for 400 and 700 psig rated

valves, they shall be specified in the contract or order. For union ended valves, the end-to-end dimension is defined as the distance between the parallel faces of the threaded ends of the valve body.

Table IV - End-to-end dimensions (inches ±1/16)

Size inches	Flanged end		Union end
	150 psig	250 psig	150 and 250 psig
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	7-1/2
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	----

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

3.5 Performance requirements.-

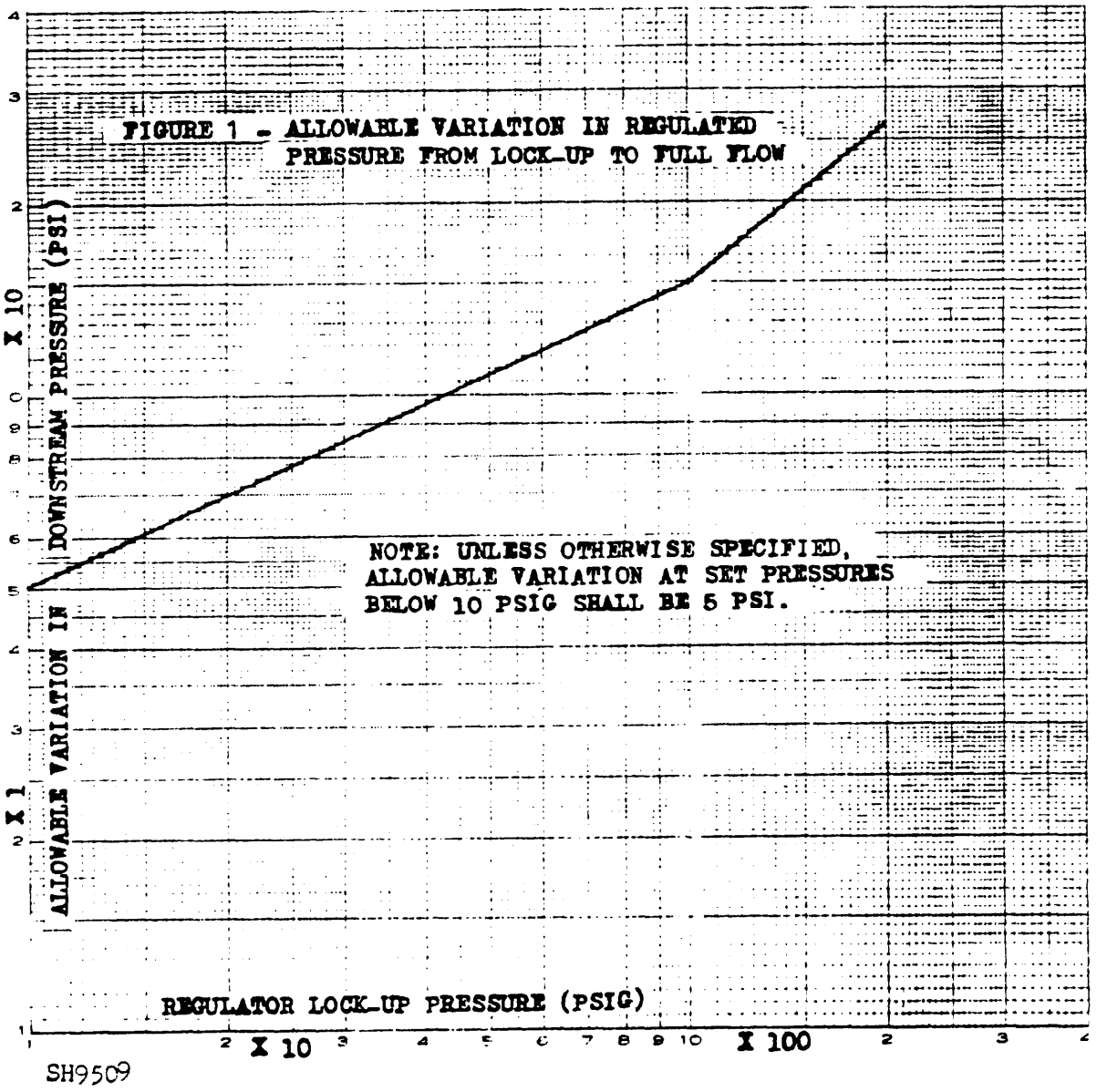
* 3.5.1 Accuracy of regulation.- Unless otherwise specified (see 6.2), the valve shall have an accuracy of regulation, defined as the amount by which the downstream regulated pressure can deviate from the set pressure at lock-up when the flow through the regulator is increased to the rated capacity, within the limits specified in figure 1. In applications requiring an accuracy of regulation different from that specified in figure 1, it shall be the responsibility of the contractor to specify the required accuracy in the purchase specification (see 6.2).

\# 3.5.2 Set pressure limits.- Set pressure shall be adjustable through a range not less than 75 to 125 percent of the mid-range set pressure with the installed spring, without replacing any internal parts. Type II, 150 and 250 psig rated valves shall be designed to provide standard set pressure adjustment ranges of 5-30, 25-60, and 50-100 psig.

* 3.5.3 Capacity requirements.- The minimum required valve flow coefficients (C_V) for 1/2 through 4 inch, 150 and 250 psig rated valves with 5-30 and 25-60 psig set pressure adjustment ranges, based on the accuracy of regulation specified in 3.5.1, 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). All valves shall meet the specified capacity requirement, or any intermediate capacity requirement, while maintaining the regulated pressure within the accuracy limits specified in 3.5.1 and without instability or excessive noise or vibration.

* Table V - Minimum required valve C_V for type II, 150 and 250 psig rated valves with 5-30 and 25-60 set pressure adjustable ranges.

Size (inches)	5-30 psig set pressure adjustable range			25-60 psig set pressure adjustable range		
	Set pressure psig (allowable set pressure deviation psi)					
	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



3.5.3.1 The calculation of the valve flow coefficient (C_V) shall be from test data (test system should be in accordance with Fluid Controls Institute, Inc. document FCI 58-2) on the following basis:

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

Where: Flow = US GPM of water
Inlet pressure = psig
Delivered flow pressure = The regulated pressure at the above flow rate (i.e. the droop pressure) psig.

Example: A 1-1/2 inch, type II, 150 psig rated valve on test with a 150 psig water supply pressure and set to lock-up at 20 psig. Valve delivers 125 GPM when the regulated pressure drops to 13 psig (i.e. at a droop of 7 psi as permitted in 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 psig.

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

3.5.4 Seat tightness.- Valves shall be capable of tight lock-up as defined by table VI.

3.6 Mechanical shock and vibration.- All valves shall be designed to meet the mechanical shock requirements of MIL-S-901 and vibration requirements of MIL-STD-167. When specified (see 6.2), shock tests shall be conducted in accordance with the requirements of grade A, class I of MIL-S-901 and vibration tests shall be conducted in accordance with the requirements of type I of MIL-STD-167.

3.7 Marking.-

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

(a) Nominal size.
(b) Pressure rating.
(c) Manufacturer's name or trade-mark.
(d) Flow arrow.

3.7.2 Identification plates.- An identification plate 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 and CD sheet number.
(d) Space for 9 digit CID number.

3.8 Drawings.-

3.8.1 Preliminary drawings.- Preliminary drawings which are sufficient to permit evaluation of the design and approval of materials, shall be submitted with bids to the procuring activity. These drawings shall show the following:

(a) A sectional assembly of the valve.
(b) Bill of materials listing specification, grade, condition, and any other data required to 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.
(k) Reference to any previous shock and vibration approval and test report numbers.

3.8.2 Final drawings.- Final drawings and certification data sheets shall be submitted to the procuring activity for approval within 60 days after date of contract. These drawings shall be in accordance with types II and III of MIL-D-1000/2 except for extent of detail. Only the information required in 3.8.1 need be furnished for the type II drawings. The following data, in addition to that required in MIL-D-1000/2, shall be furnished for the type III drawings:

(a) Ship identification.
(b) Applicable assembly drawing number(s).
(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).

4. QUALITY ASSURANCE PROVISIONS

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

4.2 Qualification tests [1/]. - Qualification tests shall be conducted at a laboratory satisfactory to NAVSEC and shall consist of the examination and tests outlined in table VI and specified in 4.2.2 through 4.2.9. Acceptance criteria shall be as given in table VI.

Table VI - Qualification test outline

Examination and test	Test conditions	Purpose of examination and test	Acceptance criteria
Dimensional examination	----------	To verify dimensional conformance of test valve to detailed engineering drawings.	Complete dimensional conformance
Proof test	(1.5xnominal rating) psig water applied to pressure containing envelope. Valve internals removed for type I valves. Body/spring chamber blanked off for type II valves	To test strength and soundness of pressure containing envelope.	No structural failure or external leakage with exception of slight weepage from spring chamber assembly in type I valves.
Downstream section strength test	Downstream port pressurized hydrostatically to higher of the following: (a) 2X highest setting available with heaviest spring. (b) 200 psig (type I valves); 100 psig (type II valves).	To test strength of diaphragm and valve assembly.	No damage to diaphragm and valve assembly including seating surface.

1/ Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.3 and 6.4).

Table VI - Qualification test outline--Continued

Examination and test	Test conditions	Purpose of examination and test	Acceptance criteria
Regulation accuracy test (see note 1)	Inlet pressure equal to nominal rating. Vary flow from lock-up to full flow to lock-up. Conduct at both extremes of set pressure range.	To determine droop characteristics.	Accuracy of regulation to fall within limits specified in 3.5.1.
Seat tightness test	Inlet pressure equal to nominal rating. Valve set to lock-up at mid-point of set pressure range. Downstream dead-end volume not to exceed 100 diameters of downstream pipe.	To test tight shutoff capability.	Set pressure rise not to exceed 10 percent of the set pressure or 2.5 psi, whichever is greater, over a 15 minute period.
H.I. shock test	Grade A, class I of MIL-S-901. Valve inlet pressurized to nominal rating.	To determine resistance of valve to high-impact mechanical shock.	No structural damage. Valve to retain performance capability.
Vibration test	Type I of MIL-STD-167. Valve operating with inlet pressure equal to nominal rating and valve set at mid-point of set pressure range.	To determine resistance of valve to environmental vibration conditions.	No resonant frequency 0-33 cps. No degradation to valve performance.

Note to table VI:

1. Where it is not practicable to maintain, at the maximum flows, and inlet pressure equal to the full nominal pressure rating of the valve, it will be acceptable to test at lower inlet pressure conditions within the limits of available test systems providing normal automatic performance of the valve is maintained. The test procedure shall be as required in 3.5.3.1.

4.2.1 Qualification test sample. - A 1 inch valve shall be submitted for each type and rating for which qualification approval is desired. Qualification 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 (see note). Detailed engineering drawings of the test valve, and assembly drawings of all sizes of that type and rating shall be submitted with the test valve.

NOTE: Upon specific approval, valves of other sizes may be tested. Use of only one valve size for qualification of a type and rating under this specification only applies where the test valve is representative of the basic design features of all sizes of the type and rating for which qualification is desired. NAVSEC (see 6.5) reserves the right to determine what are significant variations requiring separate qualification testing.

4.2.2 Examination prior to testing. - Upon receipt of the qualification test sample, the sample valve(s) shall be disassembled and visually and dimensionally examined to determine conformance with the requirements of this specification and complete dimensional conformance to the detailed engineering drawings.

4.2.2.1 Upon satisfactory completion of the examination specified in 4.2.2. the valve(s) shall be tested as specified in 4.2.3. through 4.2.9.

4.2.3 Proof test. - Proof test shall be conducted as follows: Pressurize the pressure containing envelope hydrostatically to the proof pressure specified in table II. Hold for 2 minutes, depressurize, and again pressurize for 2 minutes. At completion of the proof test the valve shall be examined in accordance with 4.2.4.

4.2.4 Disassembly and examination. - The valve shall be disassembled and visually and dimensionally examined for damage, wear, and operation of parts.

4.2.5 Downstream section strength test. - Downstream section strength test shall be conducted as follows: Blank off the inlet port and pressurize the outlet section of the valve hydrostatically to a pressure equal to the higher of the following:

(a) Twice the highest setting available with the heaviest spring.
(b) 200 psig (type I valves); 100 psig (type II valves).

However in no case shall the pressure used in this test exceed the nominal inlet pressure rating of the valve. Pressurize for 2 minutes, depressurize, and again pressurize for 2 minutes. At the completion the valve shall be examined in accordance with 4.2.4.

4.2.6 Regulation accuracy test. - Regulation accuracy test shall be conducted as follows: Install the valve in a test setup which incorporates an accurate means of monitoring the flow rate and inlet and regulated pressures. With a constant inlet pressure (see note 1 of table VI) vary the flow rate from lock-up to full flow to lock-up. Conduct test with valve set to lock-up at the minimum and maximum of the set pressure range of the valve.

4.2.7 Seat tightness test. - Seat tightness test shall be as follows: With water at pressure equal to the nominal rating of the valve applied to the inlet, set the valve to lock-up at the mid-point of the set pressure range. Measure the downstream pressure rise in a 15 minute period in a dead ended volume not exceeding 100 diameters of downstream pipe.

4.2.8 High-impact shock test. - The valve shall be subjected to the high-impact mechanical shock requirements for grade A, class I of MIL-S-901 with the nominal pressure rating applied to the inlet port.

4.2.9 Vibration test. - The valve shall be vibration tested in accordance with type I of MIL-STD-167 with the nominal pressure rating applied to the inlet port and the valve set at approximately the mid-point of the set pressure range.

4.3 Sampling for quality conformance inspection. -

4.3.1 Lot. - All valves of the same type and size offered for delivery at one time, shall be considered a lot for the purpose of sampling.

4.3.2 Sampling for visual and dimensional examination. - A random sample of valves shall be selected from each lot in accordance with table VII and shall be examined as specified in 4.4.1.1 and 4.4.1.2. Failure of any valve in the sample to pass the examination specified in 4.4.1.1 and 4.4.1.2 shall be cause for rejection of the lot.

Table VII- Sampling for visual and dimensional examination

Lot size	Sample quantity
2 to 25	1
26 to 65	2
66 to 180	3
Over 180	4

4.3.3 Sampling for tests. - A random sample of valves shall be selected from each lot in accordance with table VIII and shall be tested as specified in 4.4.2. If the number of rejected valves in any sample exceeds the acceptance number specified in table VIII, the lot represented by the sample shall be rejected. If the sample size specified in table VIII equals or exceeds the lot size, the lot shall undergo 100 percent inspection.

Table VIII- Sampling for tests

Lot size	Sample size	Allowable number of rejects
2 to 8	5	0
9 to 15	7	0
16 to 25	10	0
26 to 40	15	0
41 to 65	25	0
66 to 110	35	1
or over		

4.4 Quality conformance inspection. -

4.4.1 Examination. -

4.4.1.1 Visual examination. - A visual examination shall be made of the sample valves selected in accordance with 4.3.2 to verify conformance to the requirements of this specification.

4.4.1.2 Dimensional examination. - A dimensional examination shall be made on the sample valves selected in accordance with 4.3.2 to verify conformance with the approved master drawing.

4.4.2 Tests. -

4.4.2.1 Proof test. - Each of the sample valves selected in accordance with 4.3.3 shall be proof tested using method outlined in 4.2.3.

4.4.2.2 Seat tightness test. - Each of the sample valves selected in accordance with 4.3.3 shall be seat tightness tested using method outlined in 4.2.7.

4.4.2.3 Shock and vibration. - Where shock and vibration tests are required (see 6.2), valves of a type, size and rating that have not previously received shock and vibration approval (either from qualification testing or other previous testing) shall be shock and vibration tested using the methods outlined in 4.2.8 and 4.2.9.

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

5. PREPARATION FOR DELIVERY

(The preparation for delivery requirements specified herein apply only for direct Government procurements. Preparation for delivery requirements of referenced documents listed in Section 2 do not apply unless specifically stated in the contract or order. Preparation for delivery requirements for products procured by contractors shall be specified in the individual order.)

5.1 Domestic shipment and early equipment installation (see 5.3). -

5.1.1 Valves. -

5.1.1.1 Preservation and packaging. - Preservation and packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early installation and may conform to the suppliers commercial practice when such meets these requirements.

5.1.1.2 Packing. - Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules or other carrier regulations as applicable to the mode of transportation and may conform to the suppliers commercial practice when such meets these requirements. All ports shall be plugged or sealed with approved corrosion-resistant material to prevent entrance of moisture and dirt.

5.1.1.3 Marking. - Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the supplier's commercial practice. The information shall include nomenclature, Federal stock number or manufacturer's part number, contract or order number, manufacturer's name and destination.

5.2 Domestic shipment and storage or overseas shipment requirements. - The requirements and levels of preservation, packaging, packing and marking for shipment shall be specified by the procuring activity (see 6.2).

5.3 Use of polystyrene (loose-fill) material.

5.3.1 For domestic shipment and early equipment installation and level C packaging and packing. Unless otherwise approved by the procuring activity (see 6.2), use of polystyrene (loose-fill) material for domestic shipment and early equipment installation and level C packaging and packing applications such as cushioning, filler and dunnage is prohibited. When approved, unit packages and containers (interior and exterior) shall be marked and labelled as follows:

"CAUTION

Contents cushioned etc with polystyrene (loose-fill) material.
Not to be taken aboard ship.
Remove and discard loose-fill material before shipboard storage.
If required, recushion with cellulosic material bound fiber, fiberboard or transparent flexible cellular material."

6. NOTES

* 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 Ordering data. - Procurement documents should specify the following:

(a) Title, number and date of the specification.
(b) Type required (see 1.2).
(c) Pressure rating (see 1.3).
(d) End connection size and type (see 3.4.13).
(e) Regulation accuracy required if other than listed in 3.5.1.
(f) Set pressure required.
(g) Capacity requirements (see 3.5.3) for valves not covered in table V.
(h) When shock and vibration tests are required (see 3.6 and 4.4.2.3).
(i) Any other special performance and construction requirements.
(j) Preservation, packaging, packing and marking requirements, if other than specified in 5.1 (see 5.2).
(k) When polystyrene "loosefill" material is approved (see 5.3).

6.3 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in applicable Qualified Products List QPL 2042 whether or not such products have actually been so listed by the date. The attention of the suppliers is called to this requirement, 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 orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Ship Engineering Center, Department of the Navy, Washington, D. C. 20360, and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.4).

6.4 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.5 NAVSEC as used herein refers to the Auxiliary Equipment Branch, Washington, D. C. 20360.

6.6 CHANGES FROM PREVIOUS ISSUE. THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "#" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

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