

MIL-V-24545(SH)
24 September 1976

MILITARY SPECIFICATION
VALVE, DISTILLING PLANT, STEAM PRESSURE REDUCING,
QUIET DESIGN, FOR SUBMARINE SYSTEMS

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

1. SCOPE

1.1 This specification covers quiet design, self-contained steam pressure reducing valves.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. 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

MILITARY

- MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein), Packaging of.
- MIL-R-196 - Repair Parts for Internal Combustion Engines, Packaging of.
- MIL-S-901 - Shock Tests, H.I. (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for.
- MIL-R-17131 - Rods, And Powders, Welding, Surfacing.
- MIL-G-21032 - Gaskets, Metallic-Asbestos, Spiral Wound.

STANDARDS

MILITARY

- MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
- MIL-STD-271 - Nondestructive Testing Requirements for Metals.
- MIL-STD-278 - Fabrication Welding and Inspection; and Casting Inspection and Repair for machinery, Piping and Pressure Vessels in Ships of the United States Navy.
- MIL-STD-740 - Airborne and Structureborne Noise Measurements and Acceptance Criteria of Shipboard Equipment.

(Copies of specifications, standards, drawings, and publications required by contractors 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 the date of invitation for bids or request for proposal shall apply.

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.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Ship Engineering Center, Center Building, SEC 6124, Prince George's Center, Hyattsville, Maryland 20782 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B1.12-72 - Class 5 Interference - Fit Thread.

B16.5-73 - Steel Pipe Flanges and Flanged Fittings.

B18.2.1-72 - Square and Hex Bolts and Screws Including Askew Hex Bolts, Hex Cap Screws, and Lag Screws.

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

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

A105-75 - Forgings, Carbon Steel for Piping Components.

A193-75 - Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.

A194-74 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.

A216-75 - Carbon, Steel Castings Suitable for Fusion Welding for High-Temperature Service.

A675-72 - Special Quality Hot-Rolled Carbon Steel Bars Subject to Mechanical Property Requirements.

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

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

3. REQUIREMENTS

3.1 Sample for first article inspection. Prior to beginning production a sample shall be examined and tested as specified in 4.3 (see 6.3).

3.2 Valve description. Valves shall be a self-contained direct operated type. Downstream pressure feedback shall be sensed by a spring-loaded diaphragm to directly position the throttling valve.

3.3 Materials. Materials shall be as specified in table I. Materials for parts not listed in table I shall be compatible with the intended pressures and temperatures, and selected to prevent galling, seizing, or excessive wear on operating parts. Clearance shall prevent interferences due to the thermal expansion. Cadmium plating shall not be used.

TABLE I. List of materials.

Name of part	Materials
Body, bonnet, and bottom cover	Carbon steel ASTM A105-75, grade 11 ASTM A216-75, grade WCB ASTM A675-72, grade 60
Internal trim (Valving element, seat ring, guide posts and bushing)	Stellite ^{1/} Hardened corrosion-resisting steel (400 series) ^{2/}
Gaskets	MIL-G-21032, class B, type I
Diaphragm	Nickel-copper alloy 300 series stainless steel Nickel-chrome alloy
Springs	Inconel X-750 Inconel 600 Tungsten tool steel
Quiet-flow throttling element	Nickel-copper alloy corrosion-resisting steel
Bolting	ASTM A193-75 grade B7 ASTM A194-74 grade 2H

See footnotes on next page.

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- 1/ Where stellite is specified, it may consist of either wrought stellite 6B, cast stellite 6, or an inlay of stellite (not less than 3/32 inch thickness for main seat and disc surfaces). Where inlays are used, welding rods shall be in accordance with type MIL-RCr-A of MIL-R-17131.
- 2/ For all production parts of material whose mechanical properties can be altered by heat treatment, sample material (of the same form as used to fabricate the production parts being heat treated and representing each heat of material used) shall be subjected to tensile tests in the final heat-treated condition for the part. As a minimum, the tensile tests shall determine ultimate strength, yield strength, percent reduction in area, and percent elongation. Tensile test samples shall have been subjected to the same heat treatment as the part(s) made from the material. In the case of parts which contribute to the structural integrity of the pressure boundary, each production heat treatment furnace charge shall include sample material of the same form as used to fabricate the production parts being heat treated and representing each heat of material in the charge. For other parts, it is not necessary that sample material accompany each furnace charge; however, furnace temperature controls for heat treatment of parts shall be as accurate as the controls of the furnace(s) in which the sample material was heat treated. Acceptance criteria for the mechanical properties shall be in accordance with the material specification. The tensile test requirements and acceptance criteria for mechanical properties shall be included on the part drawing. In no case shall ductility less than 10 elongation in 2 inches be allowed.

3.4 Design and construction.

3.4.1 Design concept. Valves will be operated, maintained, and repaired onboard Naval ships and shall emphasize simplicity, maintainability, ruggedness, and reliability. Design shall permit access for adjustment and repair when working from either side of the valve and without requiring removal of the valve body from the line.

3.4.2 Maintainability. Internal parts shall permit easy disassembly and reassembly with standard tools and shall prevent, as far as practical, the incorrect reassembly of parts. Positioning and alignment of all parts in assembly shall employ positive means so that correct reassembly is repeatedly assured. 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.

3.4.2.1 Valve design shall permit accomplishment of the following maintenance actions within the time limits specified:

<u>Action</u>	<u>Time allowed</u>
Renew main valve trim	3/4 hour
Remove, clean, and replace quiet flow regulating element	2-1/2 hours

3.4.3 Interchangeability. Valve design shall permit interchangeability without individual modification of like parts between all valves. Each part shall have part number identity and shall be replaceable from stock or the manufacturer on a non-selective and random basis. Parts having the same manufacturer's part number shall be directly interchangeable with each other with respect to installation (physical) and performance (function). Physically interchangeable assemblies, components, and parts are those which are capable of being readily installed, removed, or replaced without alteration, misalignment, or damage to parts being installed or to adjoining parts. No fabrication operations such as cutting, filing, drilling, reaming, hammering, bending, prying, or forcing shall be required. This is not intended to preclude the use of special tools, fixtures, and other shop aid during original assembly of the parts into the article. However, any special tools required for maintenance shall be supplied with the valve. Special tools are defined as those tools not listed in the Federal Supply Catalog (copies of this catalog may be consulted in the office of the Defense Contract Administration Service (DCAS)).

3.4.4 Springs. Springs shall not be fully compressed during any normal operation or adjustment of the valve. The working stress shall be such that relaxation shall not exceed 5 percent over a 1000-hour period at the nominal operating temperature. Spring ends shall be squared and ground.

3.4.5 Threads. Threads shall conform to Handbook H28. Where necessary, provisions shall be incorporated to prevent the accidental loosening of threaded parts. Pipe threads shall not be used. ANSI B18.2.1-72 hex-head standards shall be used for cap screws and bolt heads.

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3.4.6 Pressure-temperature rating. Pressure-temperature rating shall be in accordance with 600 pound series in accordance with ANSI B16.5-73.

3.4.7 End connection. End connections shall be in-line 600 pound series raised-face flanges in accordance with ANSI B16.5-73. Size shall be as specified (see 6.2.1). Face-to-face distance between the raised-faces shall be as specified (see 6.2.1). Valves shall be capable of being installed, operated, adjusted, and maintained within the envelope specified (see 6.2.1). Inlet and outlet bore diameter shall be as specified (see 6.2.1), in order to match the piping bores. The external sensing the line shall be a 1/2-inch i.p.s., 600 pound series, raised-face flange in accordance with ANSI B16.5-73.

3.4.8 Bonnet and bottom cover joints. Bonnet and bottom cover (where applicable) shall be flanged for attachment to the body. Joints shall be secured by either of the following:

- (a) Through-bolts threaded the entire length and fitted with a nut on each end. Threads on both bolts and nuts shall be class 2 fit in accordance with Handbook H28.
- (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 ANSI B1.12-72.

Bonnet and bottom cover shall be located by body guiding (i.e. a close tolerance fit between machined diameters on the body, bonnet, and bottom cover) rather than depending on studs or bolts for location. Spiral wound gaskets shall be fully retained and the joints shall have metal-to-metal take-up to provide controlled compression of the gaskets. To assure easy gasket removal, not more than two gasket-retaining faces for each gasket shall be formed on a single part. Joint design shall assure parallel alignment of the guide bushings. Bolting area shall be provided to maintain metal-to-metal make-up over at least a 3 year period without retightening. Bearing surface of nuts and their respective surfaces on the valve shall be finished machined.

3.4.9 Body construction. Valve bodies shall be machined from a one-piece casting or forging and be a basic globe configuration with in-line inlet and outlet ports.

3.4.10 Internal trim.

3.4.10.1 Main valve. Internal trim shall be of cage construction. The quiet-flow regulating element and the seat ring shall be clamped in position by a cage which is either part of, or held in position by, the bonnet or bottom cover flange. This shall permit rapid replacement of all internal trim by avoiding the use of any threads within the valve cavity (such as seat-ring threads). Design shall assure that the cage remains under sufficient compression at all times to avoid any movement or looseness and the quiet-flow regulating element shall be confined and compressed on both top and bottom by this cage construction.

3.4.11 Quiet-flow regulating element. Element design employed to achieve a low-noise pressure loss shall avoid excessively small flow passages or any other feature jeopardizing operational reliability. The design and method of fabrication and inspection of the quiet-flow regulating element shall assure that the minimum cross-sectional area of any given flow passage shall not vary by more than plus or minus 3 percent on a unit-per-unit basis from the nominal point and that the overall flow capacity of the regulating element shall not vary by more than plus or minus 5 percent on a unit-per-unit basis. It shall be brazed or otherwise fabricated into a one-piece configuration, capable of withstanding installation and operational stresses. Internal passages shall be such that a 0.033 inch diameter perforated metal screen type strainer installed upstream will protect against clogging. Element cleaning shall not be required more often than annually, and replacement due to blockage, erosion, wear, etc., more often than once each 5 years. The element shall be capable of being quickly cleaned by backflush or with ultrasonic equipment. Special fixtures necessary for cleaning the element shall be supplied with each valve. The element structure shall be of a solid or continuous nature, not susceptible to media migration.

3.5 Service and ambient conditions. The valve shall operate satisfactorily when installed in a system where the service and ambient conditions are as follows:

- (a) Fluid - Saturated steam; moisture content as specified (see 6.2.1).
- (b) Inlet pressure range - As specified (see 6.2.1).
- (c) Design pressure - As specified (see 6.2.1).
- (d) Temperature - As specified (see 6.2.1).
- (e) Flow demand range - As specified (see 6.2.1).
- (f) Rate of flow demand variation - As specified (see 6.2.1).
- (g) Rate of inlet pressure variation - As specified (see 6.2.1).
- (h) Shock - As defined by grade A, class I of MIL-S-901.
- (i) Vibration - As defined by type I of MIL-STD-167-1.

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3.6 Performance requirements.

3.6.1 Accuracy of regulation. Accuracy of regulation, defined as the maximum permissible variation in downstream pressure which can occur with the valve set anywhere within the required range of adjustment and than subjected to the specified combinations of service and ambient conditions defined in 3.5., shall be as specified (see 6.2.1).

3.6.2 Capacity. The valve is required to throttle flow between the limits specified, (see 3.5 and 6.2.1). Between flow rates specified, at any set point within the range defined in 3.6.3, and at any inlet pressure and transient condition defined in 3.5, the valve shall operate smoothly without hunting, chattering, exceeding the noise criteria specified in 3.6.4, or violating the accuracy of regulation specified in 3.6.1.

3.6.3 Range of adjustment. The valve shall be adjustable over a range of delivered pressure as specified (see 6.2.1).

3.6.4 Noise. The valves shall meet the airborne and structureborne noise measurements in accordance with the requirements, measurements and data reporting procedures of MIL-STD-740 and the Appendix to this specification. This equipment shall not exceed the grade C airborne and type 2 structureborne criteria of MIL-STD-740.

3.6.5 Mechanical shock and vibration. Valves shall meet the mechanical shock requirements defined by grade A, class I of MIL-S-901 and the environmental vibration requirements defined by type I of MIL-STD-167-1.

3.7 Marking.

3.7.1 Body markings. The manufacturer's name or trademark and the body material composition shall be cast or forged integral with the valve body. The size, rating, and a flow arrow shall be cast or forged integral with the valve body or die stamped on raised metal pads (1/8 inch added wall thickness minimum).

3.7.2 Identification plates. Each valve shall have an identification plate permanently attached to an exposed position on the valve that will not be covered by insulation. The identification plate shall be made of corrosion-resistant material and shall contain the following information or a space therefor:

- (a) Manufacturer's name and address
- (b) MIL-V-24545
- (c) ANSI 600 pound rated.
- (d) Adjustable set pressure range.
- (e) Manufacturer's model and part number or identification.
- (f) Manufacturer's drawing numbers (assembly and CD).
- (g) Technical manual number.
- (h) 9-digit CID/APL number

3.8 Technical data. The contractor shall prepare engineering drawings and a technical manual in accordance with the data ordering documents included in the contract or order (see 6.2.2).

3.8.1 Engineering drawings. The contractor shall prepare engineering drawings in accordance with the data ordering document included in the contract or order (see 6.2.2), the following technical features shall be included:

- (a) Calculated average fluid velocity through various portions of the valve. These shall include the inlet and outlet ports and, at minimum, enough sections within the valve to cover any velocity change in excess of 25 percent.
- (b) Construction details of the "quiet" throttling element, including:
 - (1) Data on maximum particulate sizes that can be passed without clogging, (2) brief discussion or rationale on the mechanics by which pressure breakdown is achieved without generating the noise level normally associated with orificial throttling, (3) method of fabrication: configuration and process of fabrication shall be described in sufficient detail to illustrate that adequate structural strength and freedom from flow passage obstruction is assured during production
- (c) Calculations verifying compliance with the flow passage and overall flow-rate consistency requirements specified in 3.4.11. Required dimensional inspections shall be detailed.

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- (d) Complete production details of the seat, disc, and stem assembly and all other replaceable internal trim.
- (e) Layout of the pressure-containing envelope (body, bonnet, and bottom cap) giving dimensions which control compression of the spiral-wound gaskets. This is to assure that where remachining is necessary to repair the gasket-sealing surfaces on these parts, that compensating cuts can be accurately made to restore original gasket compression. This layout shall also specify the dimensional limits of such corrective remachining within which function of the valve remains unaffected.
- (f) Recommended assembly torques, or equivalent procedures, for making up all joints and threaded assemblies.
- (g) Tabulation of required gasket characteristics including all dimensions (with tolerances) and load versus compression characteristics (with tolerances).
- (h) Mark areas to be radiographic, magnetic particle, or dye penetrant inspected.

3.8.2 Limited rights legend. When the Government has only limited rights in the data shown on the drawings, as determined by the contractual provisions regarding rights in technical data, the drawings furnished may be marked with the following restrictive legend:

"Furnished under United States Government Contract No. _____. Shall not be either released outside the Government, or used, duplicated, or disclosed in whole or in part for manufacture or procurement, without the written permission of _____, except for: (a) emergency repairs or overhaul work by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work; or (b) release to a foreign government, as the interests of the United States may require; provided that in either case the release, use, duplication or disclosure hereof shall be subject to the foregoing limitations. This legend shall be marked on any reproduction hereof in whole or in part."

3.8.3 Technical manual. The contractor shall prepare a technical manual in accordance with the data ordering document included in the contract or order (see 6.2.2). The following technical feature shall be included:

- (a) Table listing wrench sizes and assembly torques (or other equivalent procedures) for making up all joints and threaded assemblies.

4. QUALITY ASSURANCE PROVISIONS

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

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.3)
- (b) Quality conformance inspection (see 4.6)

4.3 First article inspection. The first valve furnished under a contract or order shall undergo the examination and tests specified in 4.4 through 4.5.7. For purposes of noise measurements, the first article shall have an accelerometer block welded to the body and an accelerometer block welded to the outlet flange. The accelerometer block on the body shall as far as possible be centered over the region of exit flow from the quiet-flow regulating element. Blocks shall be circular steel, 1-inch in diameter and 3/8-inch thick. They shall have a surface flatness of 700 micro-inches root mean square or better and shall be tapped to a depth of at least 1/4-inch with 10-32 N.F. threads. The tapped holes shall be perpendicular to the finished surfaces within plus or minus 1 degree. The blocks shall be preserved with rust inhibiting coating. If the valve fails to meet the performance requirements, exhibits leakage, shows evidence of excessive wear or degradation, fails to meet interchangeability requirement, or fails to meet the noise requirements, the valve shall have failed first article examination and testing.

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4.4 Examination prior to testing. The first article valve shall be disassembled and visually and dimensionally examined to determine conformance with the requirements of this specification and the valve drawings. Particular emphasis shall be placed on the dimensions, finishes and condition of the guiding and seating surfaces. Any difficulty encountered in assembly or disassembly shall be noted.

4.4.1 The maintenance actions specified in 3.4.2.1 shall be demonstrated.

4.5 Tests.

4.5.1 Nondestructive tests. Nondestructive tests shall be as specified in MIL-STD-278 and in accordance with MIL-STD-271. Acceptance criteria shall be in accordance with MIL-STD-278. This shall include RT, MT/PT, pressure and visual testing.

4.5.2 Hydrostatic test. The valves shall be pressurized with water at a pressure gage of 2175 lb/in². There shall be no external leakage, permanent distortion, or structural failure. The diaphragm assembly may be blanked off during this test to prevent damage.

4.5.3 External leakage test. With steam at maximum inlet pressure (see 3.5 (b) and 6.2.1), at the inlet, the valve shall be tested for external leakage. There shall be no external leakage which can be detected by use of a mirrored surface.

4.5.4 Functional test. The valve shall be subjected to the tests specified in 4.5.4.1 through 4.5.4.3. The extreme values of delivered pressure shall at all times be held within the accuracy specified in 3.6.1. There shall be no evidence of hunting, chatter or any other unstable or unsatisfactory operation of the valve either continuous or transient, at any time during these tests. The valve shall be monitored for noise measurements during these tests, and at all times shall meet the noise criteria of 3.6.4. In addition to the above specific testing, functional testing shall comprise a total of not less than 20 hours steam system testing.

4.5.4.1 Flow-droop test. With minimum inlet pressure, (see 3.5(b) and 6.2.1), steam maintained at the inlet and the minimum flow rate, (see 3.5(e) and 6.2.1) the valve shall be set to deliver the minimum setting (see 3.6.3 and 6.2.1). Flow shall then be increased, at a rate approximately equal to that specified (see 3.5(f) and 6.2.1), until the maximum flow rate, (see 3.5(e) and 6.2.1), is reached and then decreased in the same manner back to the minimum flow rate (see 3.5(e) and 6.2.1). Without readjusting the valve, inlet pressure shall be increased to the maximum setting, (see 3.6.3 and 6.2.1), and the above flow change sequence shall be repeated. A continuous record of delivered pressure shall be maintained. The extremes of delivered pressure during all of the above operations shall be noted and the maximum difference shall not violate the accuracy of regulation limits specified (see 3.6.1 and 6.2.1).

4.5.4.2 The test of 4.3.5.1 shall be repeated except with the initial delivered pressure setting at equal to the maximum setting (see 3.6.3 and 6.2.1). The same accuracy of regulation acceptance criteria shall apply.

4.5.4.3 Inlet pressure transient test. With inlet steam pressure equal to the minimum (see 3.5(b) and 6.2.1), the valve shall be set at the mid-point of its adjustable range (see 3.6.3 and 6.2.1), at a flow rate equal to the mid-point of the range specified (see 3.5(f) and 6.2.1). Inlet pressure shall be varied between the extreme specified (see 3.5(b) and 6.2.1), at a rate approximately equal to that specified (see 3.5(g) and 6.2.1), in both increasing and decreasing directions. All performance parameters shall be recorded, with particular emphasis on detection of transient noise exceeding the levels permitted in 3.6.4. The extremes of delivered pressure during all of the above operations shall not violate the accuracy of regulation limits specified (see 3.6.1 and 6.2.1).

4.5.5 High-impact shock test. The valve shall be subjected to and meet the high-impact shock tests for grade A, class I of MIL-S-901 pressurized to design pressure (see 3.5 and 6.2.1) with water.

4.5.6 Vibration test. Valve shall be vibration tested in accordance with type I of MIL-STD-167-1 pressurized to design pressure (see 3.5 and 6.2.1) with water. There shall be no resonance in the range of frequency tested.

4.5.7 Noise test. The valves shall be airborne and structureborne noise tested under normal operating conditions to duplicate shipboard installation in accordance with MIL-S-740 and the Appendix to this specification.

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4.5.8 Post test examination. After completion of the tests specified in 4.5.1 through 4.5.8 the test valve shall be disassembled and visually and dimensionally examined. Any damage, excessive wear, or signs of galling or pitting shall be cause for rejection.

4.6 Quality conformance inspection. Each production valve shall be examined and tested as specified in 4.6.1 through 4.6.4.

4.6.1 Visual and dimensional examination. Each valve shall be visually and dimensionally examined to verify conformance with the requirements of this specification not requiring tests and the engineering drawings.

4.6.1.1 The quiet-flow regulating element shall have undergone, during production, the inspections detailed in 3.8.1(c). A complete record of the inspection results for each element shall be supplied with the valve (or element).

4.6.2 Nondestructive tests. Nondestructive tests as specified in 4.5.1 shall be conducted on each valve.

4.6.3 Hydrostatic tests. Hydrostatic tests as specified in 4.5.2 shall be conducted on each valve.

4.6.4 External leakage. External leakage tests as specified in 4.5.3 shall be conducted on each valve.

4.7 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. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.5.)

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

5.1.1 Special marking. In addition to the marking, as applicable, required in 5.1 and 5.1.2, shelf life marking shall be applied. Shipping containers (see 5.1) shall be stenciled in accordance with the marking instructions of MIL-STD-740.

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

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

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

5.2 Use of polystyrene (loose-fill) material

5.2.1 For domestic shipment and early equipment installation and level C packaging and packing. Unless otherwise approved by the procuring activity (see 6.2.1) 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."

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5.2.2 For level A packaging and level A and B packing. Use of polystyrene (loose-fill) material is prohibited for level A packaging and level A and B packing applications such as cushioning, filler and dunnage.

5.3 Unpacking instructions. Unpacking instructions, as specified in MIL-STD-740, shall be provided.

5.4 Technical manuals. Technical manuals, which accompany shipments that are packed level A or B, shall be packaged in a transparent waterproof plastic bag, minimum 4 mil thick. Closure shall be by heat sealing. Technical manuals shall not be placed within any flexible sealed barrier enclosing components. The copy(s) of the manual shall be placed in the shipping container housing the main unit. Packing lists shall indicate which container contains the technical manual(s) and shall also state the approximate location therein. For ease of removeability the location of the manual shall be such that it is readily accessible when the container is opened. Technical manuals, when shipped in bulk quantities, shall not be individually wrapped, but shall be packed in accordance with the requirements of the applicable technical manual specification or packed in containers conforming to the requirements for level A, B, or C, as specified (see 6.2.1).

5.5 Data (see 3.8). Data shall be prepared for delivery in such a manner as to insure the required information is protected against deterioration, physical damage or loss during shipment from the supplier to the receiving activity. Packages or shipping containers shall as a minimum conform to the level C requirements of 5.1.

6. NOTES

6.1 Intended use. The quiet-design steam pressure reducing valve specified herein is intended for services in a submarine distilling plant.

6.2 Ordering data.

6.2.1 Procurement requirements. Procurements documents should specify the following:

- (a) Title, number and date of this specification.
- (b) End connection sizes (see 3.4.7).
- (c) Face-to-face distance (see 3.4.7).
- (d) Maintenance envelope allowed (see 3.4.7).
- (e) Inlet and outlet bore diameter (see 3.4.7).
- (f) Service and ambient conditions (see 3.5 and 4.5.3).
 - (1) Steam moisture content
 - (2) Range of inlet pressures (see 4.5.4.1, and 4.5.4.3).
 - (3) Design pressure (see 4.5.5 and 4.5.6).
 - (4) Temperature
 - (5) Flow demand range (see 4.5.6.1)
 - (6) Rate of flow demand variation
 - (7) Rate of inlet pressure variation (see 4.5.4.3)
- (g) Capacity range (see 3.5 and 3.6.2).
- (h) When valve is tested for external leakage (see 4.5.3).
- (i) Accuracy of regulation (see 3.6.1 and 4.5.4.3).
- (j) Combinations of service and ambient conditions occurring at operating conditions (see 3.6.1 and 4.5.4.3).
- (k) Set pressure adjustable range (see 3.6.3 and 4.5.4.3).
- (l) Applicable levels of preservation-packaging and packing required (see 5.1).
- (m) Levels of preservation-packaging and packing required for repair parts (see 5.1.2).
- (n) Use of polystyrene (loose-fill) material (see 5.2.1).
- (o) Packing of technical manuals (see 5.4).

6.2.2 Contract data requirements. When this specification is used in a procurement which incorporated a DD Form 1423 and invokes the provisions of 7-104.9(n) of the Armed Services Procurement Regulations, the data requirements identified below will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of ASPR-7-104.9(n) are not invoked, the data specified below will be delivered by the contractor in accordance with the contract requirements. Deliverable data required by this specification is cited in the following:

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	<u>Paragraph</u>	<u>Data requirement</u>	<u>Applicable DID</u>
(a)	3.8.1	Drawing, Engineering and Associated Lists Level I, (Conceptual and Developmental Design	DI-E-7013
(b)	3.8.3 and 5.4	Technical manual	DI-M-2043

(Copies of data item descriptions required by the contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously procured 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 procurement.

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

Preparing activity:

Navy - SH

(Project 4820-N347)

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NOISE TESTING DETAILS

10. SCOPE

10.1 Scope. This appendix details noise testing for quiet design valves.

20. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

MILITARY

MIL-M-17185 - Mounts, Resilient, General Specifications and Tests for (Shipboard Application).

MIL-M-17508 - Mounts, Resilient: Types 6E2000, 6E900, 6E900BB, 7E450, 7E450BB, 6E150, and 6E100.

MIL-M-19379 - Mounts, Resilient, Mare Island Types 11M15, 11M25, and 10M50.

MIL-M-19863 - Mounts, Resilient: Type 5B5000H.

MIL-M-21649 - Mount, Resilient, Type 5M10,000-H.

DRAWING

MILITARY

NAVSHIPS 810-2145600 - Mounts, Resilient, Unbonded, Spool, Portsmouth Type.

PUBLICATION

MILITARY

NAVSHIPS 0939-LP-001-2010 - A Guide to Structural Damping for Naval Applications.

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

30. QUIET VALVE TEST FACILITY

30.1 The test facility shall be capable of reproducing the shipboard operational conditions for the valve being tested. Operational parameters such as pressure, temperature, flow rate, flow velocity, etc. shall be as specified in this specification. The valve shall be connected between straight pipe of appropriate schedule and nominal diameter for which the valve pipe connections were designed. In order to minimize system noise influence on the valve and to provide a standardized basis for comparison, the straight pipe sections shall be at least 10 pipe diameters in length and shall be damped in accordance with Navy pipe damping procedures of NAVSHIPS 0939-LP-001-2010 for at least 10 pipe diameters. In order to reduce system noise, and when conditions permit their use, flexible hoses, acoustic filters or other noise attenuating or isolating devices may be incorporated in the piping system at distances greater than 10 pipe diameters from the valve. System background noise should be at least 10 dB below the valve's acceptance criteria. Piping needing support within 10 pipe diameters of the valve being tested shall be isolation mounted from its supports. Generally, low frequency mounts will be used in accordance with MIL-M-17508, MIL-M-19379, MIL-M-19863, MIL-M-21649 and NAVSHIPS drawing 810-2145600. Where other than Navy standard mounts are used they shall be in accordance with MIL-M-17185. However, distributed isolation material, such as Isomode, or equal, if considered sufficient to eliminate influence of the test facility from background noise sources, may be used.

40. QUIET VALVE TRANSDUCER LOCATIONS

40.1 Transducer locations shall be selected so as to determine as closely as possible the vibratory excitation that would be transmitted by the valve to the ship either through the piping system or foundation. For those valves which are supported only by piping, the transducers shall be located on the appropriate inlet(s) and outlet(s) connections of the valve. Structureborne noise measurements shall be made at these locations in directions

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perpendicular and parallel to the flow at the piping connections. For valves which are also supported by foundations, additional transducer locations at the attachment points (feet) of the valve are required. Transducers shall be located on the base of the valve at two diagonally opposite corners above mounts and as close as possible to the valve's designed attachment points. At least two mutually perpendicular measurement directions are required for each location.

50. QUIET VALVES FOR TEST

50.1 In all cases the quiet valve shall be oriented in its normal operating position and supported by its designed piping attachment points directly to the hard piping without flexible pipe connections. Foundations and supports shall be provided for those valves which, because of the size and weight, require same in shipboard systems. These valves shall be isolation mounted to their foundations during the noise test.

