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SUPERSEDING
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MILITARY SPECIFICATION

VALVES, CHECK: BRONZE, CAST-IRON, AND STEEL BODY

This specification is approved for use by the Naval Facilities Engineering Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers bronze, cast-iron, and steel body check valves with regrinding, renewable, or regrinding-renewable disks and seats.

1.2 Classification. The check valves shall be of the following groups, types, styles, trim, end connections, sizes, and classes, as specified (see 6.2).

Group A - Bronze-body valves (1/8-4 inch, see table I).
Group B - Cast-iron body valves (1/4-24 inch, see table II).
Group C - Steel-body valves (1/4-12 inch, see table III).

Type I - Lift check, horizontal installation.
Type IS - Lift check, spring-loaded, horizontal installation.
Type II - Lift check, vertical installation.
Type IIS - Lift check, spring-loaded, vertical installation.
Type III - Swing check.
Type IV - Tilting-disk check.
Type V - Butterfly, spring-loaded, dual-disk check.

Style A - Disk type, swing- or post-guided flow control device (types I, IS, II, IIS, and III).
Style B - Piston type, cylinder-guided, air-cushioned flow control device (types I and II).
Style C - Ball type flow control device (types I and II).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (Code 156), Naval Construction Battalion Center, Port Hueneme, CA 93043-5000, 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

Trim 1 - Nonmetallic disk; integral seat (group A).
Trim 2 - Nonmetallic disk; renewable seat ring (group B, type III).
Trim 3 - Metallic, regrinding disk; integral seat (group A).
Trim 3A - Metallic, nonregrinding disk, renewable (group A, type III).
Trim 4 - Metallic, regrinding disk; renewable seat ring (group A, type I).
Trim 5 - Metallic flow control device; renewable seat ring (groups B and C).
Trim 6 - Metallic flow control device; integral or welded in seat (style B and C).
Trim 7 - As specified (wafer-body valves).

End connections: Thread
Flanged
Solder (group A)
Wafer body
Hub, lead-calked (group B, type III)
Butt welding (group C)
Socket welding (group C 2 inch and smaller)

Sizes - 1/8 inch through 24 inches (see Tables I, II, and III).

Classes - Class 125 to class 300 (see Tables I, II, and III).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specification and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be 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

MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein); Packaging of.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-248 - Welding and Brazing Procedure and Performance Qualification

(Copies of specifications and standards, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS shall be the issue of the non-Government documents which is current on the date of the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

A21.14 - Gray-Iron and Ductile-Iron Fittings, 3 Inch through 24 Inch for Gas.
B1.20.1 - Pipe Threads (Except Dryseal).
B16.1 - Cast-Iron Pipe Flanges and Flanges Fittings.
B16.5 - Steel Pipe Flanges and Flanged Fittings (Including Rating for Class 150, 300, 400, 600, 900, 1500, and 2500).
B16.10 - Face-to-Face and End-to-End Dimensions of Ferrous Valves.
B16.18 - Cast Copper Alloy Solder-Joint Pressure Fittings.
B16.24 - Bronze Pipe Flanges and Flanged Fittings.
B16.25 - Butt Welding Ends.
B16.34 - Steel Valves (Flanged and Buttwelded End).
B31.1 - Code for Pressure Piping.

(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)

A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
A182 - Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
A278 - Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650F (345C).
A351 - Austenetic Steel Castings for High-Temperature Service.
A479 - Stainless and Heat-Resisting Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
A582 - Free Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished.
B61 - Steam or Valve Bronze Castings.
B62 - Composition Bronze or Ounce Metal Castings.
B140 - Copper-Zinc-Lead (Leaded Red Brass or Hardware Bronze) Rod, Bars, and Shapes.
B164 - Nickel-Copper Alloy Rod and Bar.
B584 - Copper Alloy Sand Castings for General Application.
D2240 - Rubber Property-Durometer Hardness.

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

FLUID CONTROLS INSTITUTE

Specification for Lift Disc Check Valves.

(Application for copies should be addressed to the Fluid Controls Institute, 12 Bank Street, Summit, NJ 07901.)

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.
SP-45 - Bypass and Drain Connection Standard.
SP-61 - Pressure Testing of Steel Valves.
SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
SP-80 - Bronze Gate, Globe, Angle and Check Valves.

(Application for copies should be addressed to the Manufacturers Standardization Society of the Valve and Fittings Industry, 127 Park Street, N.E. Vienna, VA 22180.)

UNDERWRITERS LABORATORIES (UL)

UL 312 - Swing Check Valves for Fire Protection Service.

(Application for copies should be addressed to the Underwriters Laboratories Inc., 333 Pfingsten Road, Chicago, IL 60062.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which 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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. The check valves shall consist essentially of a body, flow control device, and except as otherwise specified herein, a removable threaded cap or bolted cover. The valves shall permit flow in one direction only and shall close automatically when flow is reversed. The inter-relationship of groups, t classes shall be as specified in 1.2 and tables I, II, III, IV, V, and VI.

3.1.1 Lift checks. The design of lift check valves shall be in conformance with the Fluid Controls Institute specifications for lift disk check valves. The seating surface in type I, IS, II, and IIS lift check valves shall be located on the horizontal segment of an integral bridge wall separating the lower inlet chamber from the upper outlet chamber so that incoming flow will lift the flow control device upward from the seat. The flow control device shall be beveled or flat metallic disk; a nonmetallic disk secured in a metallic disk holder; a metallic, piston-shaped or piston-guided disk; or a spherical metal ball in accordance with the specified style and trim. On style B valves, the design of the piston disk or guide shall provide a cushioning effect to minimize hammering resulting from repeated openings encountered under pulsating flow conditions. Spring-loaded type IS and IIS valves shall also be designed to cushion the disk on opening. The spring action on these valves shall, in addition, serve to effect rapid closure to eliminate hydraulic hammer of the disk caused by frequent flow reversals. On all lift check valves, the lift of the flow control device in the direction perpendicular to the seat shall be not less than one-quarter the diameter of the seat port opening.

3.1.2 Swing checks. The closure assembly on type III swing check valves shall consist essentially of a strap or hanger; hinge pins; disk bolt and nut; metallic disk with a nonmetallic facing or encapsulated steel disk with a flexible hinge portion that bends a flexer as the flow opens up the valve. In type III valves, the fluid flow shall swing the closure assembly away from the seat. The seating mechanism on all swing check valves shall be such that the disk assembly will close by the force of gravity when the valve is installed in a horizontal line. On regrinding type valves the seats shall be inclined such that the angle between the central axis perpendicular to the seating surface and the centerline of the stream flow is not less than 30 degrees () nor more than 60. All type III valves, except those with wafer bodies, shall be equipped with stops on the body, cover, or hanger strap to prevent disks from sticking or wedging in the wide open position. Swing check valves shall be suitable for installation both in a horizontal run of piping and for vertical runs in which the flow is the upward direction. All class 175, cast-iron body swing check valves, except clear-way swing check, when wide open, shall have face-to-face and end-to-end dimensions conforming to ANSI B16.10; valves having a clear-way swing check shall have face-to-face and end-to-end dimensions conforming to UL 312. Cast iron swing check valves shall be designed in accordance with MSS SP-71.

3.1.3 Tilting-disk checks. When specified (see 6.2), the tilting-disk check valve shall be free-acting cast-split body design, or spring-loaded cylindrical body design. The closure assembly on type IV, tilting disk check valves shall have a bottom hydraulic snubber designed to contact the disk during the last 10 percent of closure and control the final closing of the valve to prevent water hammer. The pivot point for the disk shall be located between the centerline of the flow and the top of the disk and shall be offset from the plane of the seating surface. The housing shall be equipped with flanges or welding ends, or shall be of wafer-type construction in accordance with the end connections specified.

3.2 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.2.1, 6.2, and 6.5).

3.3 Standard commercial product. The check valve shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the check valve being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.4 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible 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 are allowed under this specification unless otherwise specified.

3.4.1 Bronze. Bronze for group A valve bodies and caps shall conform to MSS SP-80.

3.4.2 Cast iron. Cast iron castings for group B valve bodies, shall conform to the requirements of ASTM A126, class B; ASTM A278, class 40; or better.

3.4.3 Steel. Steel for group C valves shall conform to ANSI B16.34.

3.4.4 Copper-nickel alloy. Copper-nickel alloy specified in table IV for disks and seat rings shall conform ASTM B584, alloy No. C97600 to C97800. Alternate copper-nickel alloys used commercially for valve trim will be acceptable provided alloying elements are in the range of 57 to 63 percent for copper and 24 to 35 percent for nickel.

3.4.5 Nickel-copper alloy. Nickel-copper alloy specified in table IV as an optional trim material shall conform to ASTM B164, class B.

3.4.6 Stainless steel. When specified (see 6.2), stainless steel trim specified in table IV for disk and seat rings on steel-body valves shall be type 304, 316, CF3M, or CF8M conforming to ASTM A182, A276, A351, or A582, as

applicable. Application of stainless steel facing by welding is permitted where 13 percent chrome filler metal is used. Stainless steel parts shall be type 410, 416, 420, or 440 conforming to ASTM A276, A479, or A582, as applicable.

3.4.7 Spring material. Springs furnished on type IS and IIS spring-loaded lift check valves and on type IV and V valves shall be stainless steel, nickel-chromium, or nickel-copper alloy except that on bronze body valves, phosphor bronze springs will be acceptable.

3.4.8 Wrought copper alloys. Wrought copper alloys specified herein as alternate materials for caps, disks, disk holders, and disk hangers on valves less than 3/4-inch nominal size shall conform to ASTM B140, alloy 314 or 316. Wrought copper alloys shall not be used as an alternate to ASTM B61 for pressure-containing parts on valves having a service temperature rating exceeding 400F.

3.5 Identical items. All valves of the same classification, furnished under any specific contract shall be physically and mechanically identical. This requirement includes parts, assemblies, components, and accessories. Disks and seats will be lapped, as required, after installation to effect satisfactory replaceability of renewable seating surfaces. No deviation will be acceptable without prior written approval of the contracting officer.

3.6 Definitions. The following definitions shall be mandatory for use in interpreting and implementing the requirements of this specification.

3.6.1 Steam rating. The steam rating consists of two mutually interdependent conditions: pressure and temperature. The specified nonshock steam pressure rating in pound-force per square inch gage (psig) is applicable when the coincident temperature conditions are expressed in conjunction with the pressure rating to give the overall steam rating. In the actual application of bronze, cast iron, and steel body valves, the pressure can be increased up to the water, oil, gas (WOG) rating as the temperature decreases but in no case, except for steel-body valves, can the temperature be increased above the maximum steam temperature rating specified herein. Except for class 175 cast iron valves, the class designation used herein reflect the steam pressure ratings and are equivalent to ratings expressed in terms of maximum operating pressure or maximum working pressure. The class designations applied herein to steel body valves are referred to in ANSI B16.34 as the primary service pressure ratings.

3.6.2 WOG rating. The WOG rating is the maximum nonshock pressure, expressed in psi for which the pressure-containing parts of the valve are rated when the coincident media temperature is between -20F and 150F for bronze-body and cast-iron body valves and -20F and 100F for steel-body valves. The WOG rating indicates the ability of the valve to withstand the pressure effect of water, oils, and gases and does not imply that a WOG-rated valve will necessarily withstand the potentially deleterious effect of all aqueous solutions, petroleum products, and gaseous media unless appropriate material selectivity has been exercised.

3.6.3 Regrinding valve. A regrinding valve (lapping) is one on which the seat can be reground using the metallic disk as the rotating surface to which the grinding compound is applied. For regrinding purposes, the stem on regrinding-type disks shall be slotted to receive a screw driver or, for style B valves, the disk shall be equipped with an internally threaded cylindrical section to receive a stem which will extend outside the valve for manual rotation. Except for vertical lift check valves, all hard faced valve seats and disks (trim 3, 4, and 5) shall be capable of being reground without removal of the valve from the pipeline. Valves to which the regrinding feature does not apply, include wafer-body swing checks, tilting disk checks, and butterfly checks.

3.6.4 Renewable parts. The term renewable as applied herein to disks and seat rings shall mean that the part is affixed or contained by a threaded element and can be readily removed for replacement. Seat rings requiring the use of special seat ring wrenches for removal shall be considered renewable. Pressed-in seat rings on wafer-body swing check valves which can be readily dislodged from the body casting by tapping shall be considered renewable. Seat rings shall be renewable when trims 2, 4, and 5 are specified; all flow control devices, whether disks, pistons, or balls, shall be renewable. Weld deposited seats that are regrindable will be acceptable on group C valves.

3.7 Design and performance. All steam-rated check valves shall be designed for the applicable steam pressure and coincident temperature specified herein.

3.8 Detail of components.

3.8.1 Bodies. Bodies for bronze, cast-iron, and steel valves shall be a unidirectional flow valve having a single disk and a seat which provide a controlled closing rate, proportional to the flow. Vertical, angle pattern valve shall be amply proportioned with the vertical axis of the cap parallel to the stream flow and in which the inlet and outlet are perpendicularly right-angle. Horizontal, bronze body swing check valves shall be either of the conventional T-pattern with the vertical axis of the cap inclined at an angle of 30 to 50 with the stream flow. Bronze-body, T-pattern, regrinding valves shall be equipped with a threaded, plugged, regrinding port. The minimum wall thickness of steel valves of threaded, flanged and butt welding construction shall be as specified in ANSI B16.34. For flanged, cast valves, the flanges shall be cast integrally with the body. For flanged, forged steel valves, the flanges shall be forged integrally with the body or the flanges may be forged separately and welded to the body. Welding for attachment of forged flange shall meet the requirements of ANSI B31.1 applicable to the welding of pipe joints.

3.8.2 Caps or cover plates. All type I, IS, and III check valves shall be equipped with a readily removable and replaceable threaded cap or bolted cover plate designed to permit access to and removal of replaceable working parts for the valve without removal of the valve from the line. Caps for bronze body and cast iron body valves, in sizes up to and including 3 inches, shall

be of the inside screw, one-piece screw-over, union-ring, or bolted plate type. For all other valves, bolted cover plates shall be furnished. Caps and cover plates shall be fabricated of the same material or material superior to that specified herein for the body except that steel plate may be used on cast iron and steel valves in lieu of the casting material specified herein for the bodies; wrought copper alloys specified in 3.4.10 may be used on class 125 and 150 bronze body valves 3/4 inch and smaller in lieu of ASTM B62. Type II and IIS vertical lift check valves shall be designed with a separable, two-section, threaded-connected casing or shall otherwise be designed so that, after the valve is removed from the line, the ball or disk assembly can be removed. On bronze body, Y-pattern valves with trim 3 or 4, the threaded cap shall provide access for regrinding operations. Caps or cover plates will not be required on type III valves furnished with wafer bodies. The body-cover joint of group C valves shall be in accordance with the manufacturer's standard practice.

3.8.3 Seats. Seats shall be integral or renewable in accordance with the trim specified. Material for seats shall be as specified in table IV. Renewable seat rings shall be equipped with lugs, grooves, or similar means for removal and shall have sufficient threaded surface to prevent leakage between the seat ring and body under the applicable service conditions.

3.8.4 Flow control devices. The flow control device shall be a ball, piston, swing disk, lift disk, tilting disk, or butterfly disk in accordance with the specified valve type and, when applicable, style. Materials for the flow control devices shall be as specified in table IV. All flow control devices shall be renewable. Disk hangers and disk holders on bronze body and cast iron body valves shall be fabricated of bronze conforming to ASTM B61 or B62 cast iron, malleable iron, ductile iron or steel, except that for class 200 bronze body valves, the disk holder shall be ASTM B61 only. Disk hangers and disk holders for valves 3/4 inch or less with a service temperature rating not exceeding 400F may be fabricated of a wrought copper alloy specified in 3.4.10 in lieu of ASTM B61 or B62. All disks on style A lift check valves shall be guided both above and below the seat by wing guides, or a combination of the two except a single upper or lower post guide will be acceptable on 3 inch and smaller valves.

3.8.5 End connections. End connections for type I through type IV check valves shall be as specified in table VI. Valves furnished with wafer-type bodies shall be suitable for installation between the standard flanges specified (see 6.2). Bolting for installation of wafer-body valves shall be located on the outside circumference of the valve and not through the peripheral area of the body itself as in conventional flanged connections. Face-to-face and end-to-end dimensions for class 125 and 250 cast-iron body valves and flanged and butt weld classes of steel body valves shall be as specified in ANSI B16.34. The end-to-end dimensions for threaded and socket welded steel body valves shall be manufacturers standard.

3.9 Special features.

3.9.1 Bosses. When specified (see 6.2), flanged cast iron and steel body check valves 2 inches and larger shall be furnished with tapped bosses. The number and location of the bosses shall be as specified and shall be in accordance with MSS SP-45 with respect to locations and designations. Tappings shall be of the size recommended in MSS SP-45 unless an alternate size is specified in the contract or order (see 6.2).

3.9.2 Operating levers. When specified (see 6.2), type III swing check cast-iron and steel-body valves over 2 inches in nominal size shall be equipped with an auxiliary operating lever. The lever shall be weight- or spring-loaded as specified (see 6.2). In either case the torque on the lever shall be controlled either by manual movement of the weight or adjustment of the spring tension. The lever assembly shall be designed and initially installed to provide more rapid closure on flow reversal to reduce hydraulic hammering of the disk against the seat. The lever and weight assembly shall also be designed to be repositioned so as to provide a force balancing the disk thereby minimizing the pressure at which the disk will open.

3.10 Finish. The finish on the valves shall be the same as provided by the manufacturer on valves produced for industrial applications.

3.11 Identification marking. Unless otherwise specified (see 6.2), valves shall be marked in accordance with MSS SP-25.

3.12 Seat wrenches and grinding compound. When specified in contracts for valves with renewable seats (see 6.2), seat ring wrenches shall be furnished. The ratio of the number of wrenches to the number of valves shall be as specified in the contract. When specified in contracts for regrinding-type valves (see 6.2), regrinding compound in the quality indicated shall also be furnished.

3.13 Workmanship.

3.13.1 Fabrication. Metal used in the fabrication of equipment shall be free from fractures, splits, punctures, dents, deterioration, and shall not be bowed or malformed. The metal shall have no sharp edges, burrs, slivers, or splinters.

3.13.2 Welding. Welding procedures shall be in accordance with MIL-STD-248. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

3.13.3 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.13.4 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the castings ability to perform its intended function.

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 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 assure supplies and service conform to prescribed requirements.

4.1.1 Material inspection. The valve manufacturer will not be required to perform test on materials to verify compliance with the requirements for materials specified herein or in referenced documents. The manufacturer shall, however, be responsible for the receipt, identification, and proper utilization of materials and for maintaining a general quality certification of materials used based on data or reports furnished by the material contractor. When required, the manufacturer shall make available to the contracting officer or his authorized representative suitable quality certification for the specific materials required under this specification, including materials for nonmetallic disks specified in table V (see 6.3).

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

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).
c. Packaging inspection (see 4.6).

4.2.1 First article inspection. First article inspection shall be performed on one valve when a first article sample is required (see 3.2, 6.2, and 6.5). This inspection shall include the examination of 4.4.1 and 4.4.2, and the applicable test of 4.5.

4.2.2 Quality conformance inspection. Quality conformance inspection shall be as follows:

a. In-process inspection shall be performed on each valve to be offered for acceptance by the Government and shall include the examination specified in 4.4.1 and the applicable test of 4.5.

b. End-item inspection shall be performed on samples selected in accordance with 4.3. This inspection shall include the examination of 4.4.2 and the applicable test of 4.5.

4.3 Sampling.

4.3.1 Sampling for examination. A random sample of valves shall be selected from each lot offered to the Government in accordance with inspection level II of MIL-STD-105. The Acceptable Quality Level (AQL) shall be 1.5 percent defective.

4.3.2 Sampling for tests. A random sample of valves shall be selected from each lot offered to the Government in accordance with inspection level S-4 of MIL-STD-105. The AQL shall be 2.5 percent defective.

4.3.3 Lot. A lot shall consist of all valves of the same classification offered for delivery to the Government at one time under a specific contract. A sample valve shall consist of one completely assembled check valve.

4.4 Examination.

4.4.1 In-process examination. Valves furnished under this specification shall be examined during production in accordance with the manufacturer's established quality control procedures. These procedures shall assure compliance with all requirements of this specification which can be checked visually and with those elements of the manufacturer's drawings or specifications normally verified during the inspection process. In-process examination shall apply to all areas of contract performance including the receipt and identification of material fabrication of the components, finishing of parts, and final assembly of the valves. Quality control procedures shall be subject to surveillance by the procuring agency or designated representatives thereof. Failure of the manufacturer to demonstrate that adequate quality control was applied to lots submitted for acceptance by the Government may be cause of rejection of the lots.

4.4.2 End item examination. Sample valves selected in accordance with 4.3.1 shall be examined to verify compliance with the nonoperational requirements of this specification. This examination shall verify that the items are complete and that all components for the specified classification of valve are in conformance with applicable requirements. The end item inspection shall also confirm that such requirements as interchangeability, material, marking, and similar provisions are complied with. Defects shall be classified in accordance with MIL-STD-105 and if the number of defective valves is equal to or greater than the rejection number applicable to the specified AQL, the lot represented by the sample units shall be rejected.

4.5 Tests. Tests for bronze-body valves shall be in accordance with MSS SP-80. Tests for cast-iron valves shall be in accordance with MSS SP-71, except for class 175 cast-iron body valves which are not steam rated shall be tested in accordance with UL 312. Test for steel-body valves shall be in

accordance with MSS SP-61. Any leakage exceeding the maximum permissible rates shall be the cause of rejection of the valves unless corrective action is taken and the valves are satisfactorily retested. Unless a commercial laboratory is used for inspection, the manufacturer shall furnish all measuring and testing equipment required to conduct the examination and tests. The quality control procedures specified in 4.4.1 shall provide for regular calibration of instrumentation and test equipment in accordance with the manufacturer's established practice.

4.6 Packaging inspection. Requirements for the packaging inspection shall be in compliance with Section 4 of MIL-V-3.

5. PACKAGING

5.1 Packaging. Cleaning, drying, and preservation, shall be level A, or commercial and, packing shall be level A, B, or commercial in accordance with MIL-V-3 as specified (see 6.2).

6. NOTES

6.1 Intended use. Check valves are intended for use in pipelines to automatically prevent a reversal of flow through the line. Swing check valves offer less resistance to flow than lift checks and are generally used in systems where gate valves are employed. Lift checks are generally used in frequent reversals of direction are encountered and a pressure drop comparable to globe or angle valves is allowable. Ball lift checks are specially suited for viscous fluids. Nonmetallic disks, when rated for media temperatures involved, result in quieter operation, will seat even when the media contains small particulate matter, and provide tighter closure at lower pressures, especially for air and gas service. Tilting disk check valves and spring-loaded check valves minimize flow reversal and resultant hydraulic hammer. Class 125, 150, and 200 bronze-body swing check valves and class 150 and 200 bronze-body horizontal, guided-disk lift check valves with metallic disks should be procured under MSS SP-80 if the regrindable seats covered by this specification are not required.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Classification of valve required (see 1.2 and tables I, II, III, IV, V, and VI.)

(1) Group.
(2) Type.
(3) Style (for list check valves).
(4) Trim.
(5) End connections.
(6) Nominal size.
(7) Class.

c. When optional rather than standard trim material is required for disks and seat rings (see table IV).
d. When alternate facings for flanged valves are required (see table VI).
e. When spring-loaded disks are required on type IV, tilting disk check valves (see 3.1.3).
f. When a sample valve is required for first article inspection and approval (see 3.2, 4.2.1, and 6.5).
g. When stainless steel trim material is required for disk and seat rings on steel-body valves (see 3.4.7).
h. Type and rating of flanges between which wafer-body valves will be mounted (see 3.8.5).
i. Number and location of tapped bosses, if required; when tappings shall be a size other than as required under MSS SP-45 (see 3.9.1).
j. When operating levers are required and, if so, whether levers shall be weight- or spring-loaded (see 3.9.2).
k. When marking other than MSS SP-25 is required (see 3.11).
l. When special wrenches for removing seat rings are required and the quantity to be furnished; when regrinding compound is required and the quantity to be furnished (see 3.12).
m. Level of cleaning, drying, preservation, and packaging required (see 5.1).

6.3 Material requirements. Records of chemical analysis and tension tests on materials furnished in accordance with ASTM specifications are systematically maintained by the material producer. However, materials for valve components are usually produced well in advance of orders and are furnished to the valve industry from the contractor's current stocks. Valve manufacturers maintain a general quality certification on the materials used without specific reference to the lot and samples representative of the particular stock being used. If the quantity and criticality of valves furnished under this specification warrant production of special lots of materials which can be identified with specific tests for chemical and tensile requirements, the contract should state that records of these specific tests shall be made available to the procuring agency by the valve manufacturer.

6.4 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data shall be delivered by the contractor in accordance with the contract or purchase order requirements.

6.5 First article. When a first article is required, it shall be tested and approved under the appropriate provisions of paragraph 7-104.55 of the DAR. The first article should be a first production item consisting of one complete valve or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The contracting officer should include specific instructions in all acquisition instruments regarding arrangement for examinations, tests, and approval of the first article.

6.6 Subject term (key word) listing.

Bronze Body
Butterfly check valves
Cast Iron check valves
Check valves
Lift check valves
Steel check valves
Swing check valve
Tilting-Disk check valves
Valves, check

6.7 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

6.7.1 Previously covered classes. Due to procurement problem with check valves in classes 600 through 6000 regarding data requirements, provisioning of spare parts, shock testing and other NAVSEA (SH) requirements, those classes were deleted and will be included in NAVSEA's specification MIL-V-22052(SH). Other military activities having requirements for these valves should contact SH and register an interest in MIL-V-22052(SH).

Custodians:
Army - ME
Navy - YD

Preparing activity:
Navy - YD

(Project 4820-0507)

Review Activity:
DLA - CS

User Activity:
Navy - SH

TABLE I. Group A, bronze-body check valves.

End connections			Steam rating		WOG
Class	Type 1/, 4/	Size (inches)	psi	F 2/	rating 3/ psi
125	T, S	1/8-3	125	353	200
150	T, S	1/8-4	150	366	300
150	F	1/8-4	150	366	225
200	T	1/8-3	200	550	400
	T	1/8-3	300	550	600
300	F	1-2	300	550	500

NOTES: 1/ Legend for types: T-Threaded; F-Flanged; S-Solder.

2/ Nonmetallic disks, if specified, may reduce maximum temperature rating. See tables IV and VI.

3/ WOG - Water, oil, gas nonshock pressure rating at -20 Fahrenheit (F) to 150F.

4/ The safe pressure - temperature rating of a solder-joint pipe system is dependent not only on valve, fitting, and tubing strength, but also on the composition of the solder used. It shall be the responsibility of the user to select a solder composition that is compatible with service conditions.

TABLE II. Group B, cast-iron body check valves.

Class	End connections Type 1/	Size (inches)	Steam rating psi	F 3/	WOG rating 4/ psi
125	T	1/4-6	125	350	175
125	F	1-12	125	353	175
		14-24	100	337	150
150 2/	T	1/4-4	150	366	250
175 3/	T	2-6	---	---	175
175 3/	F, H	2-12	---	---	175
250	T	1/4-4	250	400	400
250	F	1-12	250	406	400
		14-24	200	387	300

NOTES: 1/ Legend for types: T-Threaded; F-Flanged; H-American Water Works Association (AWWA) hub-ends.

2/ Class 150 applied to lift check valves only.

3/ Class 175 shall conform to UL 312 for use in systems supplying water for fire extinguishment.

4/ WOG - Water, oil, gas nonshock pressure rating at -20F to 150F.

TABLE III. Group C, steel-body check valves.

Class	End connections Type 1/	Size (inches) 2/	Steam rating psi	F3/	WOG rating 3/ psi
150	T	1/4-4	150	500	275
150	F, W	1/4-12	150	500	275
300	T	1/4-3	300	850	720
300	F, W	1/4-12	300	850	720

NOTES: 1/ Legend for types: T-Threaded; F-Flanged; W-Butt welding.

2/ 1/4 inch up to 2 inch are socket welding.

3/ WOG-Water, oil, gas nonshock pressure rating at -20F to 100F.

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TABLE IV. Trim requirements.

Valve applicability					Material requirements for disks & seat rings 2/		
Group	Trim	Type	Style	Classes	Standard	Optional (see 6.2)	
A (Bronze body)	1	I	A	150, 200	ND1 1/	ND2 1/	ND2 1/
		IS	A	150, 200	ND1	ND2	ND3
		II	A	150	ND1	ND2	ND2
		IIS	A	150	DD1	ND2	ND2
		III		125, 150, 200	ND1	ND2	ND3
	3	I	A	150, 200, 300	Bronze disk	None	
		I	B	300	Bronze disk	None	
		II	A	125, 200	Bronze disk	None	
		III	-	125, 150, 200, 300	Bronze disk	None	
	4	I	A	150, 200, 300	Copper-nickel alloy disk and seat ring.	Stainless steel or nickel-copper alloy disk and seat ring.	
	6	I	C	125, 150 200	Stainless steel or bronze ball.	None	
		II	A	125	Bronze disk.	None	
		II	C	125, 200	Stainless steel or bronze ball.	None	
B (Cast iron-body)	2	III	-	125, 175	ND1 disk, bronze seat ring.	ND2, ND3, or ND4 disk; bronze seat ring.	
	5	I	A	125, 150	Bronze disk or		
		III		125, 175, 250	bronze-faced cast-iron disk; bronze seat ring.	None	
C (Steel)		III	-	150, 300	Stainless steel disk and stainless steel, threaded seat rings. Hard faced steel seat rings, shall be seal welded in the body.	Nickel-copper alloy, bronze or hard faced disks and seats; seat shall be hard faced weld-deposited on body.	

NOTES: 1/ See table V for definition of nonmetallic-disk designations.
2/ Trims 1 and 3 include integrally cast, bronze seats.

TABLE V. Nonmetallic disks.

Designation	Material	Psi	F	Applications
ND1	Tetrafluorethylene	400	400	Oxygen; acids, alkalis, and other corrosive solvents; gasoline; oil; gas; steam; hot and cold water.
ND2	Asbestos composition with natural or synthetic binders or impregnants.	200	400	Steam; hot and cold water; air; gases.
ND3	Synthetic nitril butadiene rubber; Durometer A hardness (ASTM D2240) in the range of 65 to 75.	300	200	Gasoline; oil; butane, and other liquified petroleum gases; air; hot and cold water.
ND4	Leather	200	115	Cold water

TABLE VI. End connections.

End connection	Group (see 1.2)	Classes	Applicable ANSI	Flange facing 1/
Threaded	A	All	B1.20.1	-
	B	All	B1.20.1	-
	C	150, 300	B1.20.1	-
Flanged	A	150, 300	B16.24	Plain face 2/
	B	125, 175	B16.1	Plain face
	B	250	B16.1	1/16-inch raised face
	C	150, 300	B16.5	1/16-inch raised face 3/
Solder	A	125, 150	B16.18	-
Hub	B	175	A21.14	-
Welding, butt	C	All	B16.25	-

NOTES: 1/ Standard facings; alternate facings to be furnished only when specified (see 6.2).

2/ Plain face flanges shall be smooth-faced without projection or raised rings.

3/ When class 150 steel flanges are to be bolted to class 125 cast iron flanges, it is recommended that the steel flanges be plain face.