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WW-V-58B
January 19, 1971
SUPERSEDING
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August 18, 1966

NISCO OF TEXAS
— RECEIVED — FEDERAL SPECIFICATION

VALVES, GATE, CAST IRON;
THREADED AND FLANGED (FOR LAND USE)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers bolted-bonnet, handwheel-operated, bronze-mounted, cast iron body gate valves.

1.2 Classification. The gate valves shall be of the following types, classes, designs, end connections, and sizes, as specified (see 6.2):

Type I - Wedge disk, tapered seats, steam-rated.

Class 1 - 125 p.s.i.g. steam working pressure at 353° F.
(saturation); 200 p.s.i.g. WOG, nonshock.

Class 2 - 250 p.s.i.g. steam working pressure at 450° F.; 500
p.s.i.g. WOG, nonshock.

Type II - Double disk, parallel seats, hydraulic-rated.

Class 1 - 200 p.s.i.g. WOG, nonshock.

Class 2 - 500 p.s.i.g. WOG, nonshock.

Design NRS - Nonrising stem, inside screw.

Design OSY - Rising stem, outside screw and yoke.

End connection T - Threaded.

End connection F - Flanged.

Sizes - 2, 2-1/2, 3, 4, 5, 6, 8, 10, and 12 inch.

FSC 4820

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 this specification to the extent specified herein.

Federal Standard:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in The Index of Federal Specifications, and Standards, at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specification:

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

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-130 - Identification Marking of U. S. Military Property.

(Copies of Military Specifications and Standards 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American National Standards Institute (ANSI) Standards:

- B2.1 - Pipe Threads (Except Dryseal).
- B16.1 - Cast Iron Pipe Flanges and Flanged Fittings 25, 125, 250, and 800 Lb.
- B16.10 - Face-to-face and End-to-end Dimensions of Ferrous Valves.

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

American Society for Testing and Materials (ASTM) Standards:

- A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- B21 - Naval Brass Rod, Bar and Shapes.
- B61 - Steam or Valve Bronze Castings.
- B62 - Composition Bronze or Ounce Metal Castings.
- B132 - Leaded High-Strength Yellow Brass (Manganese Bronze) Sand Castings.
- B138 - Manganese Bronze Rod, Bar, and Shapes.
- B140 - Copper-Zinc-Lead (Leaded Red Brass or Hardware Bronze) Rod, Bars, and Shapes.
- B147 - High-Strength Yellow Brass (Manganese Bronze) and Leaded High-Strength Yellow Brass (Leaded Manganese Bronze) Sand Castings.
- B198 - Silicon Bronze and Silicon Brass Sand Castings.
- B371 - Copper-Zinc-Silicon Alloy Rod.

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

Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) Standard Practices:

- SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions.
- SP-45 - Bypass and Drain Connection Standard.

(Application for copies should be addressed to the Manufacturers Standardization Society of the Valve and Fittings Industry, 1815 North Fort Myer Drive, Arlington, Va. 22209.)

(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 Description. The gate valves shall consist essentially of a body, bonnet, disk assembly, seat rings, stem, stuffing box, and handwheel. The valves shall be furnished with wedge disks or double disks and with rising stems or nonrising stems in accordance with the type and design specified. Disks for type I valves shall be of the solid wedge type unless split wedge disks are specified as an alternate to or in lieu of solid wedge disks (see 6.2).

Table I. Valve size ranges for both nonrising stem (NRS) and outside screw and yoke (OSY) designs

Types	Class	End connections	Nominal pipe sizes, inches
I	1	T	2-8
I, II	1	F	2-12
I, II	2	T	2-4
I, II	2	F	2-12
II	1	T	2-6

End connections: T - Threaded, F - Flanged.

3.2 First article. When specified (see 6.2), the contractor shall furnish a valve for first article inspection. This inspection shall be performed by the contractor and shall consist of the examinations and tests specified in 4.2.1. The first article inspection shall be scheduled and administered in accordance with the applicable provisions of the contract.

3.3 Standard product. Valves furnished under this specification shall be standard products of the manufacturer which meet or exceed the requirements specified herein and are identifiable by the manufacturer's established style number, figure number, or equivalent designation. The valves and component parts thereof shall be new and unused except to the extent required to perform the tests specified herein.

3.4 Interchangeability. Except for the individual fit of disks in the body, all valves of the same type, class, design end connection and size furnished under a specific contract shall be identical to the extent required to insure interchangeability of other renewable parts, such as stems and seat rings, and to the extent required to permit interchangeable installation of valves once the required spacing in piping systems is established.

3.5 Material. Material for valve components shall be as specified herein. When material for a part is not definitely specified, the material shall be of the type normally used by the manufacturer. A class or grade of material having mechanical and physical properties equal to or better than the grade or class specified herein may be substituted, subject to approval of the procuring agency. Materials shall be free from defects or imperfections that would contribute to failure of the valve or would materially reduce the usability and performance of the valve.

3.6 Design and performance. Type I wedge disk valves shall be designed for steam service at the applicable temperature specified in 1.2 and for nonshock, water-oil-gas (WOG) service at temperatures from - 20° F. to 150° F. Type II double disk valves shall be designed for nonshock WOG service at temperatures from - 20° F. to 150° F. Pressure-containing parts of all valves shall be capable of withstanding a hydrostatic test pressure equal to 1.75 times the applicable WOG nonshock pressure rating. All valves, when fully opened, shall permit straight and unobstructed flow. The area of the flow passage through the valves shall at all points be not less than the area of a circle having a diameter equal to the nominal pipe size of the valve, except that, for valves with seat rings having lugs for insertion and removal of the rings, this area may be reduced by not more than three percent. Valve seats, at a hydrostatic test pressure equivalent to the applicable WOG nonshock pressure rating, shall be tight to the extent that the leakage rate does not exceed 10 cubic centimeters per hour per inch of nominal valve size. If tested with air or other gas, the leakage rate for each gate at a pressure of 80 pounds per square inch, gage (p.s.i.g.) shall not exceed 1/10 cubic foot per hour per inch of nominal valve size under standard conditions (14.7 pounds per square inch, absolute atmospheric pressure; 70° F. ambient temperature). The number of handwheel turns required to move the disk assembly from the fully opened to the fully closed position shall be not less than the number obtained by doubling the nominal valve size. In no case, however, shall the number of turns be less than required to develop the mechanical advantage necessary to adequately seat the disk(s) by manual operation of the handwheel without the use of any auxiliary torque-multiplying device.

3.7 Details of components.

3.7.1 Body and bonnet. The body and bonnet shall be made of cast iron conforming to class B or class C of ASTM A126. The joint between the body and bonnet shall be flanged, gasketed, and bolted. Saddle-type, U-bolts will not be acceptable under this specification for securing the bonnet. Yokes on valves with rising stems shall be cast integrally with the bonnet or flange-connected to the bonnet. Disk guides shall be cast integrally with the body and formed to support the disk(s) in all positions.

3.7.2 Seat rings. Seat rings shall be fabricated of bronze conforming either to ASTM B61 or B62. The seat rings shall be secured in the body by threaded connections to permit removal and replacement of the rings. Seats shall be tapered on type I valves and parallel on type II valves.

3.7.3 Disks. Disks shall be fabricated of bronze conforming either to ASTM B61 or B62 or shall consist of a cast iron disk faced with bronze disk rings. The disk rings shall be fabricated of either ASTM B61 or B62 and shall be permanently secured to the disk by rolling into accurately machined dovetail slots or by equivalent means. Cast iron disks on nonrising-stem valves shall be furnished with threaded bronze or copper-nickel neck bushings at the stem connection. Disks shall be equipped with integral guides to mate with guides cast in the body. Each disk assembly shall be so attached to the stem as to insure full engagement in all positions of the disk(s) and shall be so constructed as to withstand full pressure from either side and to seat tight without binding. Disks for type I valves shall be of the wedge design. Disk assemblies for type II valves shall consist of two separate circular or oval disks so arranged and machined that on reaching the point of closure, a thrust from the stem causes the disks to make contact with and bear evenly against the seats. In valves having spreaders that cause the disks to contact and bear on the seats, one of the spreaders shall either be bronze or cast iron faced with bronze.

3.7.4 Stems. Stems shall be fabricated of any copper alloy listed in table II. Alternate copper-base alloys that meet all of the following requirements will also be acceptable as stem materials:

- a. Tensile strength equal to or greater than 60,000 p.s.i.
- b. Yield strength equal to or greater than 24,000 p.s.i.
- c. Elongation not less than 10 percent in a length equal to four times the diameter of a prescribed ASTM tensile test specimen.
- d. Copper content not less than 70 percent.
- e. Zinc, if present, not to exceed 15 percent.

Stems shall be threaded with general purpose Acme threads; 60-degree stub threads; or modified Acme threads. Stem diameters shall be as specified in table III. The length of thread engagement in all positions of the stem shall be not less than the outside diameter of the thread. Threads shall be so formed that the valve will open when the handwheel is rotated counter-clockwise.

3.7.4.2 Rising stems. Rising stems on outside-screw-and-yoke valves shall have exposed threads operating through a threaded brass or bronze bushing housed in the upper portion of the yoke assembly. The stem threads shall not extend into the stuffing box when the valve is closed.

3.7.5 Handwheels. Handwheels shall be ductile iron, malleable iron, cast iron conforming to class B or C of ASTM A126, or steel, and shall have not less than three spokes or other suitable reinforcement. Webbed or disk type handwheels will not be acceptable. Handwheel diameters shall be as specified in table III and shall be clearly marked to show the opening direction. For valves having a nonrising stem, the handwheel shall be constructed to mount on the tapered square of the stem and a threaded extension beyond the square of the stem shall be provided to permit securing the handwheel by engagement of a nut.

3.7.6 Stuffing box and packing. Type I valves shall be packed for the maximum steam service temperature applicable to the class specified. Type II valves shall be packed for WOG service at temperatures to 150° F. Multi-service packing suitable for both steam and WOG service will be acceptable on type II valves. The length of packing in contact with the stem shall be at least equivalent to one diameter of the stem passing through the packing. Packing shall be lubricated or graphited asbestos of the braided, twisted, or formed ring type, or shall be of the tetrafluoroethylene - impregnated asbestos type. The valve shall be so designed that the packing can be replaced or replenished when the valve is wide open and under pressure. Stuffing boxes of the gland-follower type shall either be of solid or two-piece, self-aligning construction and the bottom of the stuffing box and inner end of the gland shall be beveled. The gland follower shall be adjustable by a flanged and bolted gland. Gland nuts shall be commercial brass. When specified for type I, class 1 valves (see 6.2), stuffing boxes of the packing injector type will be acceptable as an alternate to, or shall be furnished in lieu of gland-follower type stuffing boxes in accordance with the provisions of the contract. Injector type stuffing boxes shall be equipped with a ball check valve and an injector screw through which pellet-formed packing can be adjusted and injected into the stuffing box while the valve is under pressure and with the disk in any position. The pellet packing shall consist essentially of a homogenous mixture of asbestos fibers, tetrafluoroethylene resin, and suitable additives to provide nonhardening and nonaging characteristics.

3.7.7 End connections. Flanges shall be faced and drilled and shall conform to ANSI Std. B16.1. Face-to-face dimensions of flanged valves shall conform to ANSI Std. B16.10. Threads for threaded end connections shall be American Standard taper pipe threads conforming to ANSI Std. B2.1. Bodies of threaded-end valves shall have hexagon, octagon, or round ends with ribs.

3.8 Valve accessories. When specified (see 6.2), valves shall be furnished with one or more of the following accessories:

- a. By-pass (4-inch valves and over).
- b. Drains.
- c. Indicator (design NRS).
- d. Floor stand.
- e. Extension stem.
- f. Chainwheel operators (for design OSY).

3.8.1 By-passes. By-passes shall conform to MSS SP-45 and, unless otherwise specified (see 6.2), shall be sized for steam service (series A) for type I valves and liquid service (series B) for type II valves.

3.8.2 Drains. Drain locations shall be as specified and shall be sized and designated in accordance with MSS SP-45.

3.8.3 Indicators. Indicators shall be of corrosion-resisting material and shall clearly show the open and closed positions of the disk on non-rising stem, inside screw valves.

3.8.4 Floor stands. Floor stands shall be constructed for bolting to the floor, and shall include a corrosion-resisting steel extension stem and an operating handwheel. Extension stems shall be designed for connection to the valve stem by a sleeve coupling or universal joint and shall be adequately supported and guided. Stands shall be cast iron or steel and shall be suitable for the following specified conditions (see 6.2):

- a. Distance from centerline of valve to floor level.
- b. Thickness of floor.
- c. Rotation of handwheel in closing.
- d. Amount of movement of valve, if any, resulting from temperature changes or other causes and direction of movement.

3.8.5 Extension stems. Extension stems shall be of the length specified (see 6.2), shall be designed for nonrising or rising stems, as applicable, and shall otherwise be of the manufacturer's standard design.

3.8.6 Chainwheel operators. Chainwheel operators for outside-screw-and yoke valves shall be fabricated of iron or steel and shall consist of a wheel, a chain, and a guide to keep the chain on the wheel. The length of the chain shall be as specified (see 6.2).

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

3.10 Marking. Valves shall be marked in accordance with MSS SP-25.

3.10.1 Military marking. When specified (see 6.2), an identification tag shall be securely attached to each valve. The identification tag shall conform to the requirements of MIL-STD-130 and shall be marked with the information required by MIL-STD-130 or with those portions thereof specified by the procuring agency (see 6.2).

3.11 Workmanship. The quality of workmanship shall be consistent with the level of quality established by the valve and fittings industry for valves produced for commercial distribution. Castings shall be free from cracks, hot tears, blowholes, porosity or other defects affecting structural soundness. Castings which must be plugged, impregnated, brazed, or burned-in to correct such defects will not be acceptable. Inside and outside surfaces of castings shall be clean. Machined parts shall be free of cracks or other defects which will interfere with the proper functioning of the valve.

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 that supplies and services conform to prescribed requirements.

4.1.1 Inspection of components and materials. The supplier is responsible for insuring that components and materials used were manufactured, examined, and tested in accordance with the requirements of this specification and of referenced specifications and standards to the extent specified herein (see 4.5.3).

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

- a. First article inspection.
- b. Quality conformance inspection.
 - (1) In-process examination.
 - (2) End-item inspection.

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). This inspection shall include the examinations of 4.4.1 and 4.4.2, and the tests specified in 4.5.1 and 4.5.2.

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 tests specified in 4.5.1 and 4.5.2.

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.

4.3 Sampling. 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 levels (AQL's) shall be 2.5 percent defective.

4.3.1 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 unit shall consist of one completely assembled 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. This examination 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 for rejection of the lots.

4.4.2 End item inspection. Sample valves selected in accordance with 4.3 shall be examined to verify compliance with the nonoperational requirements of this specification. This examination shall verify that the valves are complete and meet dimensional requirements and that all components and accessories are furnished as specified for the applicable classification of the valves. 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. Unless a commercial laboratory is used for inspection, the manufacturer shall furnish all measuring and test equipment required to conduct the examination and tests specified herein. 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 standards and procedures. Water used as the test medium for hydrostatic seat leakage tests shall be clean and free of sediment. Additives with a potential for diminishing leakage by altering such fluid properties as viscosity or surface tension shall not be used. Oil, grease, or other compounds shall not be applied to seating surfaces as a means of effecting a tighter seal. Valves shall be shell tested before the final coat of paint is applied. For seat tests, the valves shall be closed by handwheels normally furnished on the valve without wrenches or other auxiliary means for applying abnormal closure force.

4.5.1 Shell test. Each valve shall be subjected to the hydrostatic test pressure specified in 3.6. The pressure shall be applied with both ends blanked and the gate in the open position. The duration of the test shall be not less than 60 seconds. Any leakage attributable to defective workmanship or castings shall be cause for rejection of the valve. Gas test pressure may be used for the shell test in lieu of hydrostatic pressure at the option of the supplier. Gas test pressures shall be equal to the specified hydrostatic test pressures.

4.5.2 Seat test. Each valve shall be subjected to a seat leakage test to verify compliance with 3.6. Tests shall be conducted using air, gas, or water as the test medium. The test pressure specified in 3.6 shall be applied successively to each side of the closed gate with the opposite side open for inspection. As an alternate method for type II, double disk valves, the pressure may be applied inside the body or bonnet with the disks closed and both sides open for inspection. If no leakage occurs within 30 seconds after the test pressure has been applied, the test may be discontinued. If measurable leakage occurs within the 30 second observation period, the test shall be continued for a length of time sufficient to permit an accurate determination of the leakage rate. (For hydrostatic seat tests, leakage per inch of nominal valve size exceeding two drops during the 30 second initial observation period shall be considered as sufficient measurable leakage for continuance of the tests). Any leakage exceeding the maximum permissible rates specified in 3.6 shall be cause for rejection of the valve unless corrective action to renew or recondition seating surfaces is taken and the valve is satisfactorily retested.

4.5.3 Material tests. Material tests shall be performed by the material supplier in accordance with the sampling procedures and test methods specified in the referenced specifications and standards. Valve manufacturers will not be required to perform material tests but shall be responsible for the receipt, identification, and proper application of material. The valve manufacturer shall maintain a general quality certification of the materials used and, when requested, shall make available to the contracting officer or his authorized representative the quality certification applicable to these materials.

4.6 Inspection of preparation for delivery. The preservation, packaging, packing and marking of the valves shall be examined to determine compliance with the requirements of section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Cleaning, preservation, packaging and packing. Valves shall be cleaned, preserved, packaged, and packed in accordance with the specified level(s) of MIL-V-3 (see 6.2).

5.2 Marking. (see 6.2).

5.2.1 Civil agencies. Each unit package shall be marked to show the Federal stock number, nomenclature, and quantity. Each shipping container shall be marked in accordance with Fed. Std. No. 123 and shall include the contract and purchase order number.

5.2.2 Military agencies. Marking shall be in accordance with MIL-V-3.

6. NOTES

6.1 Intended application. Gate valves are intended for installations where the valve will normally be fully opened or fully closed and where a minimum pressure drop is required. These valves are designed for free unobstructed flow and are not suitable for throttling. Type I, solid wedge disk valves are suitable for steam service where double disks would tend to vibrate or chatter. Type II, double disk valves are suited especially for WOG service. Double disks with parallel seats are more readily refaced than wedge disks and tapered seats. Valves with outside screw and yokes are used to advantage in pipelines handling materials which might be deleterious to stem threads, and where the rising stem serves to provide a required visual indication of the disk position. Valves with nonrising stems are suited for installations with low headroom for handwheel operation. This specification does not cover nut-operated gate valves such as used on buried water lines and which conform to the American Water Works Association standard AWWA C500; Gate Valves for Ordinary Water Works Service.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type, class, design, end connections, and size required (see 1.2 and table I).
- (c) When split wedge disks for type I valves will be an acceptable alternate to solid wedge disks, or when split wedge disks only shall be furnished on type I valves (see 3.1).
- (d) When a sample valve for first article inspection is required (see 3.2).
- (e) When, for class 1 valves, injector-type stuffing boxes will be an acceptable alternate design or when injector-type stuffing boxes only shall be furnished (see 3.7.6).
- (f) Accessories required, if any, and pertinent options applicable thereto (see 3.8, 3.8.1, 3.8.4, 3.8.5 and 3.8.6).
- (g) When military marking in accordance with MIL-STD-130 is required (see 3.10.1).
- (h) Level of preservation and packaging and level of packing required (see 5.1).
- (i) Whether marking shall be as required for civil or military agencies (see 5.2).

6.2.1 Special materials. Valves covered by this specification are available with nickel cast iron bodies for special applications involving severe conditions requiring increased resistance to corrosion. These alloys include cast iron having a nominal three-percent nickel content and a copper-free, austenitic, ductile iron alloy containing 18 to 22 percent nickel. This alloy is similar to type D2 of ASTM A439. Nickel-cast iron body valves are normally furnished with seat rings, disks, and stems of various corrosion- and wear-resistant alloys such as 18-8 stainless steel or nickel-copper alloy, as specified by the purchaser.

6.3 First article inspection. When first article inspection is required, appropriate provisions should be included in the contract to allow the contracting officer to waive completely or in part the first article inspection and reduce the bid price accordingly if

the successful bidder has previously performed any or all of the first article tests in recent procurements. When the contract allows for waiver of first article inspection, the contract should require that the successful bidder seeking such a waiver submit satisfactory evidence, including test and inspection reports, that the inspection has been performed, and additional information such as the contract identification, the procuring activity, the date, and other pertinent data deemed necessary by the contracting officer.

6.4 Material requirements. Records of chemical analyses 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 supplier's current stocks. Valve manufacturers maintain a general quality certification of 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 or order should state that records of these specific tests shall be made available to the procuring agency by the valve manufacturer.

6.5 Copper alloy designations. Standards applicable to the CDA numbers specified in table II for stem materials are available in hand-book form from the Copper Development Association, Inc., 405 Lexington Avenue, New York, N.Y. 10017.

MILITARY CUSTODIANS:

Army - ME
Navy - YD
Air Force - 82

Preparing activity:

/ Navy - YD

Review activities:

Army - CE
Navy - SH

CIVIL AGENCY INTEREST:

GSA
INT

User activity:

Navy - MC

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 15 cents each.

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.		
SPECIFICATION WW-V-58B Valves, Gate, Cast Iron; Threaded and Flanged (For Land Use)		
ORGANIZATION		
CITY AND STATE		CONTRACT NUMBER
MATERIAL PROCURED UNDER A ☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? ☐ YES ☐ NO (If "yes", in what way?)		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity - Optional)		DATE

DD FORM 1426
1 JAN 66

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

S/N-0102-014-1801

G-25254

NIBCO001373

FOLD

Commanding Officer
Naval Construction Battalion Center
Davisville, Rhode Island 02854

OFFICIAL BUSINESS



POSTAGE AND FEES PAID
NAVY DEPARTMENT

Commanding Officer
U.S. Naval Construction Battalion Center
Code 310
Davisville, Rhode Island 02854

FOLD

WW-V-51F
March 4, 1977
SUPERSEDING
Fed. Spec. WW-V-51E
November 30, 1973

RECEIVED
MAY 6 1977
NIBCO INC

FEDERAL SPECIFICATION

VALVE, ANGLE, CHECK, AND GLOBE, BRONZE
(125, 150 AND 200 POUND) THREADED END, FLANGE
ENDS, SOLDER ENDS, AND BRAZED END, FOR LAMP USE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION.

1.1 Scope. This specification covers copper alloy globe, angle and check valves.

1.2 Classification.

1.2.1 Types, classes, and end connections. Valves furnished under this specification shall be of the following types, classes, and end connections, as specified (see 6.2):

- Type I - Globe.
- II - Angle.
- III - Lift check (horizontal).
- IV - Swing check.

- Class A - 125 pound (125 p.s.i., 8.6 Bars)
- B - 150 pound (150 p.s.i., 10.3 Bars)
- C - 200 pound (200 p.s.i., 13.8 Bars)

- End connection 1 - Threaded, classes A, B, and C.
- 2 - Flanged, classes B and C.
- 3 - Soldered, classes A and B.
- 4 - Brazed, classes A, B, and C.

1.2.2 Nominal pipe sizes. Size of valves shall be as follows, and as specified (see 6.2).

Threaded, solder, and brazed end valves.

1/8, 1/4, 3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, and 3 inches.

Flanged valves.

1, 1-1/4, 1-1/2, 2, 2-1/2, and 3 inches.

2. APPLICABLE DOCUMENTS

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

Federal Specification:

WW-F-406 - Flanges, Cast-Iron (Classes 125 and 250) and Bronze (Classes 150 and 300).

Federal Standard:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

ISC 4820

NIBCO001375

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

- MIL-V-3 - Valves, Fittings and Flanges Except for Systems Indicated Herein, Packaging of.
- MIL-F-1183 - Fitting, Tube, Cast Bronze, Silver Brazing.

Military Standards:

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

American National Standards Institute, Inc. (ANSI) Standards:

- B2.1 - Pipe Threads (Except Dryseal).
- B16.18 - Cast Bronze Solder-Joint Pressure Fittings.
- B16.24 - Bronze Flanges and Flanged Fittings.

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

American Society for Testing and Materials (ASTM) Standards:

- A276 - Stainless and Heat-Resisting Steel Bars and Shapes.
- A296 - Corrosion-Resistant Iron-Chromium, Iron-Chromium-Nickel, and Nickel Base Alloy Castings for General Applications.
- B16 - Free-Cutting Brass Rod, Bar, and Shapes for Use on Screw Machines.
- B61 - Steam or Valve Bronze Castings.
- B62 - Composition Bronze or Ounce Metal Castings.
- B98 - Copper-Silicon Alloy Rod, Bar and Shapes.
- B99 - Copper-Silicon Alloy Wire for General Purposes.
- B124 - Copper and Copper Alloy Forgings, Rod, Bar, and Shapes.
- B140 - Leaded Red Brass (Hardware Bronze, Rod, Bar, and Shapes.)
- B148 - Aluminum Bronze Sand Castings.
- B149 - Leaded Nickel Brass and Leaded Nickel Bronze Sand Castings.
- B150 - Aluminum Bronze Rod, Bar, and Shapes.
- B164 - Nickel-Copper Alloy Rod and Bar.
- B371 - Copper-Zinc-Silicon Alloy Rod.
- B505 - Copper-Base Alloy Continuous Casting.
- B584 - Copper Alloy Sand Castings for General Applications.
- D2240 - Indentation Hardness of Rubber and Plastics by Means of a Durometer.

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

Manufacturers Standardization Society of the Valve and Fittings Industry:

MSS-SP-25 - Standard Marking System for Valves, Flanges, Fittings and Unions.

(Application for copies should be addressed to the Manufacturers Standardization Society of the Valve and Fittings Industry, 1815 North Fort Myer Drive, Arlington, VA 22209).

3. REQUIREMENTS

3.1 Material.

3.1.1 Valve body, all types.

3.1.1.1 Classes A and B, with metallic, and nonmetallic disc, and class C with nonmetallic disc. The valve body shall be copper alloy 836 or 922 meeting the chemical requirements of ASTM B62 or B61 respectively (see 4.3.1).

3.1.1.2 Class C with metallic disc. The valve body shall be copper alloy 942, meeting the chemical requirements of ASTM B61 (see 4.3.1).

3.1.2 Types I and II, bonnet, and types III and IV, cap.

3.1.2.1 Classes A and B, with metallic, and nonmetallic disc, and class C with nonmetallic disc. Bonnets or caps shall be any of the following copper alloys and shall meet the chemical requirements of the following ASTM designations for all valve sizes (see 4.3.1):

COPPER ALLOY

ASTM

377

B124

675

B144

836

B62 or B584

922

B61 or B584

3.1.2.2 Class C with metallic disc. Bonnets or caps shall be copper alloy 922 meeting the chemical requirements of ASTM B61 for all valve sizes (see 4.3.1).

3.1.2.3 Classes A, B, and C, with metallic, and nonmetallic disc. Copper alloy 360 meeting the chemical requirements of ASTM B16 may be used for the bonnet or cap on valve sizes 3/4 and smaller in size (see 4.3.1).

3.1.3 Types I, II and III, union ring or nut and type IV, screw-in cap.

3.1.3.1 Classes A and B, with metallic, and nonmetallic disc and class C with nonmetallic disc. Unless otherwise specified (see 6.2), the copper alloy for union ring, nut, or screw-in bonnet shall be at the manufacturer's option.

3.1.3.2 Class C with metallic disc. The union ring or nut shall be copper alloy 922 meeting the chemical requirements of ASTM B61. Copper alloy 360 meeting the chemical requirements of ASTM B16 may be used for the union ring or nut on valve sizes 3/8 and smaller in size (see 4.3.1):

3.1.4 Types I and II, stem.

3.1.4.1 Classes A, B, and C with metallic and nonmetallic disc. Stems shall be of the following alloys, and shall meet the chemical requirements of the following ASTM designations for all valve sizes (see 4.3.1):

COPPER ALLOY

ASTM

COPPER ALLOY

ASTM

642

B124 or B150

874

B584

651

B98 or B99

875

B584

694

B371

876

B584

697

B371

922

B61

836

B62

956

B148

864

B62

3.1.4.2 Classes A, B and C, valve sizes 1/2 and smaller. Unless otherwise specified (see 6.2), classes A, B, and C, shall meet the chemical requirements of ASTM B61 or alloy 922 of ASTM B505 or alloys specified in 3.1.4.1 (see 4.3.1):

3.1.5 Types I, II, III and IV, discs.

3.1.5.1 Class A, metallic discs. Discs shall be any of the following copper alloys, and shall meet the chemical requirements of the following ASTM designations (see 4.5.1):

<u>COPPER ALLOY</u>	<u>ASTM</u>	<u>COPPER ALLOY</u>	<u>ASTM</u>
316	B140	922	B61
320	B140	973	B149
642	B124 or B150	976	B149
675	B124	978	B149
936	B62		

Copper alloy 360 meeting the chemical requirements of ASTM B16 may be used for discs in valves size 3/4 and smaller.

3.1.5.2 Class B, discs. Unless otherwise specified (see 6.2), discs for class B valves shall be nonmetallic.

3.1.5.3 Class C, metallic discs. Discs shall be copper alloy, nickel-copper alloy, nickel-copper-silicon alloy, or stainless steel, as specified (see 4.3.1 and 6.2):

(a) Copper alloy discs. Copper alloys shall meet the chemical requirements of the following ASTM designations:

<u>COPPER ALLOY</u>	<u>ASTM</u>	<u>COPPER ALLOY</u>	<u>ASTM</u>
314	B140	922	B61
642	B124 or B150	973	B149
651	B98 or B99	976	B149
B36	B62	978	B149

(b) Nickel-copper alloy. Wrought discs shall meet the chemical requirements for class A of ASTM B164. Cast discs shall meet the chemical requirements for grade M-35 or M35W of ASTM A296.

(c) Nickel-copper-silicon discs. Discs shall contain 60 percent or more of nickel, and silicon in amounts of 2.7 to 3.7, 3.3 to 4.3, or 3.5 to 4.5 percent, as specified (see 6.2).

(d) Stainless steel meeting the requirements of ASTM A276, type 416, may be used for discs in valves size 3/4 and smaller.

3.1.5.4 Classes A, B and C, nonmetallic disc. Unless otherwise specified (see 6.2), material for nonmetallic discs shall be at the manufacturer's option except that material shall meet the requirements of 3.2.3.

3.1.6 Types I, II, III and IV, disc holder or guide.

3.1.6.1 Class A. The disc holder shall be copper alloy. Unless otherwise specified (see 6.2), the type of copper alloy shall be at the manufacturer's option.

3.1.6.2 Classes B and C. Disc holders shall be any of the following copper alloys, and shall meet the chemical requirements of the following ASTM designations (see 4.3.1):

<u>COPPER ALLOY</u>	<u>ASTM</u>	<u>COPPER ALLOY</u>	<u>ASTM</u>
316	B140	836	B62
320	B140	922	B61
377	B124		

Copper alloy 360 meeting the chemical requirements of ASTM B16 may be used for the disc holders in valves size 3/4 and smaller.

3.1.7 Types I, II and III, seats. Unless otherwise specified valve seats shall be integral or inserted at the manufacturer's option (see 6.2).

3.1.8 Types I and II, packing nut and follower. Packing nuts and followers shall be commercial copper alloy of suitable composition.

3.1.9 Types I and II, handwheels.

3.1.9.1 Class A valves. Handwheels shall be gray, malleable or ductile iron, steel, aluminum alloy die casting, or zinc alloy die casting.

3.1.9.2 Class B and C valves. Handwheels shall be gray, malleable or ductile iron, steel or aluminum alloy.

3.1.9.3 Class A, B and C, large handwheels. Handwheels 6 inches (152 mm) in diameter and larger shall be gray, malleable or ductile iron, steel, or cast aluminum alloy.

3.2 Construction and design. All valves shall be of a construction for resisting distortion as well as pressure under normal service conditions. The design shall provide rounded corners and surfaces on valve bodies and bonnets, except at ends. When valve is wide open, the area of the passage through the valve at all points shall be not less than the area of a circle having a diameter equal to the nominal pipe size of the valve, except that the area through seat opening may be reduced by the guides for the disc or driving lugs for seats.

3.2.1 Body and bonnet. Bonnet joint shall be inside-screw, one-piece screw-over, or union-ring construction with contact surfaces of bonnet and body machined so as to provide a pressure-tight metal to metal joint without a gasket, except that the bonnet joint for valves sizes 2-1/2 and larger may be flanged and provided with a suitable gasket. Types I and II valve bonnets shall have a machined surface located below the stuffing box to contact the disc stem ring or back seating surface on the stem when the valve is wide open, to permit repacking while under pressure (see 4.3.3).

3.2.2 Seat and disc.

3.2.2.1 Types I and II, globe and angle valves.

3.2.2.1.1 Class A valves. Valves shall have the disc or disc holder disc securely fastened to the end of the stem with a stem ring which allows the disc or disc holder to swivel freely, except that for valves size 1/2 or smaller the disc may be formed on the end of the stem.

3.2.2.1.2 Class B valves. Valves shall have a slotted disc holder to slip on over an enlarged section of the disc end of the stem, except that valves size 2-1/2 and larger may be furnished with a disc stem ring connection between the stem and disc holder. The construction shall allow the disc holder to swivel freely. Disc holders of the slip-on type shall be guided for self-centering and shall be so constructed with relation to the body and bonnet that when the valve is wide open, the disc holder does not slip off the stem during assembling and disassembling. For valve sizes 1/2 and smaller, the disc may be formed on the stem. Unless otherwise specified (see 6.2), valve seats shall be integral or inserted at the manufacturer's option.

3.2.2.1.3 Class C valves. Valves with metallic discs shall have a renewable alloy seat ring with a swivel alloy disc of the locknut type, except that for valve sizes 1/2 and smaller, the disc may be formed on the end of the stem. Valves with nonmetallic discs may have an integral seat and shall have a disc holder of the slip-on or locknut type. The slip-on type shall be guided for self-centering on the seat and constructed in such a manner that they do not slip off the stem when the valve is in the wide open position during assembly and disassembly.

3.2.2.2 Classes A, B and C valves.

3.2.2.2.1 Type III, lift check (horizontal). Valves shall have the disc or disc holder guided to insure proper disc seating. Seats for classes A and B may be integral or renewable. Discs for classes A and B shall be metallic or nonmetallic at the manufacturer's option. Class C valves shall have renewable seat and an alloy metal disc, unless otherwise specified (see 6.2).

3.2.2.2.2 Type IV, swing check. Valve shall have a disc, or disc holder securely fastened to the hinge. The connection shall allow sufficient play so that the disc properly seats by gravity and swivels to distribute wear uniformly, except that the disc and hinge for class A valves may be in one piece. When in the wide open position, the disc or disc holder to hinge assembly shall bear on a stop. When specified (see 6.2), class A valves shall have a leather or other type of nonmetallic material disc facing for cold water.

3.2.3 Nonmetallic discs. Discs shall be suitable for the service specified (see 6.2), and shall conform to the applicable requirements for hardness given in table I, (see 4.5.2.3.1).

TABLE I. Hardness, nonmetallic discs		
Indentation	Service and designation	
	Hot and cold water HW and CW	Air and gas A and G
Minimum indentation, mm	0.01	0.10
Maximum indentation, mm	.65	1.05

3.2.4 Types I and II, stem. Each valve stem shall be threaded with either an Acme form thread or a 60° thread approximating the stub thread form so that the valve is open when handwheel or stem is rotated counterclockwise. The length of thread engagement of the stem shall be not less than the outside diameter of the thread when the valve is closed, and not less than 75 percent of the outside diameter of the thread when the valve is open. (Valves shall be provided with a backseating surface on bonnet to seal against stem or disc stem ring when the valve is in the wide open position. Unless otherwise specified (see 6.2), stem diameters shall be in accordance with table II. The handwheel end of the valve stem shall be square and tapered with its greatest diagonal approximately equal to the diameter of the stem or it may be of splined or serrated design. A threaded extension shall be provided to accommodate a wheel nut.

TABLE II. Minimum stem diameters, globe and angle valves						
Nominal pipe size	Diameter of stem 1/					
	Class A		Class B		Class C	
	Inch	mm	Inch	mm	Inch	mm
1/8	0.23	5.3	0.24	6.1	0.28	7.1
1/4	.24	6.1	.28	7.1	.28	7.1
3/8	.28	7.1	.28	7.1	.28	7.1
1/2	.31	7.9	.35	8.9	.35	8.9
3/4	.35	8.9	.39	9.9	.40	10.2
1	.39	9.9	.42	10.7	.44	11.2
1-1/4	.42	10.7	.49	12.4	.50	12.7
1-1/2	.49	12.4	.53	13.5	.53	13.5
2	.53	13.5	.59	15.0	.62	15.7
2-1/2	.59	15.0	.67	17.0	.67	17.0
3	.67	17.0	.75	19.0	.75	19.0

1/ Minimum diameter of stem refers to the diameter of that part of the stem which passes through the stuffing box (see 3.2.5.1).

3.2.5 Types I and II, stuffing box and packing.

3.2.5.1 Stuffing box. The stuffing box may be either the gland-follower type or the packing-nut type on all class A valves, and on classes B and C valves size 1/2 and smaller. Classes B and C valves size 3/4 and larger shall have a stuffing box of the gland follower type. The length of packing in contact with stem shall be at least one diameter of the stem passing through it. The thread shall be sufficient length to enable the nut to be screwed on the stuffing box at least two full turns when the full amount of packing is in place. The thread length shall be sufficient for full travel of the follower. Valves shall be constructed so that packing can be added to the stuffing box or repacked when valve is wide open and under pressure (see 4.3.J).

3.2.5.2 Packing. Unless otherwise specified (see 6.2), valves shall be packed for water service, with graphite impregnated asbestos or tetrafluoroethylene-impregnated asbestos valve stem packing of braided, twisted, or formed ring type.

3.2.6 Types I and II, handwheels. Handwheels smaller than 6 inches (152 mm) in diameter shall be the ventilating (nonheat) design with raised rim to protect the hand, and shall have three or more spokes. Handwheels 6 inches (152 mm) and larger may be the plain rim type marked to show the opening direction. Unless otherwise specified (see 6.2), diameter of handwheels shall be in accordance with table III.

TABLE III. Minimum diameter of handwheels, globe and angle valves

Nominal pipe size	Diameter of handwheels 1/					
	Class A		Class B		Class C	
	Inches	mm	Inches	mm	Inches	mm
1/8	1.50	38	1.50	38	1.50	38
1/4	1.50	38	1.75	44	1.75	44
3/8	1.75	44	2.00	51	2.00	51
1/2	2.00	51	2.25	57	2.50	64
3/4	2.50	64	2.62	66	2.75	70
1	2.75	70	3.00	76	3.00	76
1-1/4	3.00	76	3.50	89	3.50	89
1-1/2	3.50	90	3.75	95	4.00	102
2	4.00	102	4.38	111	4.75	120
2-1/2	4.75	120	5.00	127	5.38	137
3	5.38	137	5.75	146	6.00	152

1/ Handwheel diameters shall not exceed the specified minimum diameter by more than 50 percent. When irregular handwheels are furnished, the largest diameter of the shape shall be considered the handwheel diameter.

3.2.7 Types I, II, III and IV, valve-end connection.

3.2.7.1 Connection 1, threaded. The ends shall be threaded internally in accordance with ANSI B2.1. Threads shall be clean, smooth, true to form and concentric with the axis of the valves. Variations in alignment of threads shall not exceed 1/16 inch per foot. Threads shall be chamfered a distance not less than one-half the pitch of the threads at an angle of approximately 45° with the axis of the thread for the purpose of easy entrance in making a joint and for the protection of the thread. The chamfer shall be concentric with the thread, and shall be included in measurements of depth of thread chamber and thread length. All threads shall conform to table IV.

TABLE IV. Connection 1, thread dimensions

Nominal pipe size	Length of thread ^{1/}		Depth of thread chamber, minimum ^{2/}	
	Inch	mm	Inches	mm
1/8	0.25	6.4	0.35	8.9
1/4	.28	7.1	.40	10.2
3/8	.31	7.9	.42	10.7
1/2	.37	9.4	.54	13.7
3/4	.44	11.2	.57	14.5
1	.51	13.0	.70	17.8
1-1/4	.60	15.2	.71	18.0
1-1/2	.62	15.8	.75	19.0
2	.67	17.0	.79	20.1
2-1/2	.82	20.8	1.14	29.0
3	.88	22.4	1.20	30.5

^{1/} Distance parallel to axis from face of valve to inner end of thread.

^{2/} Distance parallel to axis from face of valve to nearest point of seat diaphragm wall.

3.2.7.2 Connection 2, flanged. Flanges shall conform to WW-F-406 or ANSI B16.24. Unless otherwise specified (see 6.2), flanged shall be faced and drilled.

3.2.7.3 Connection 3, solder. Solder-end valve connections shall conform to ANSI B16.18.

3.2.7.4 Connection 4, brazed welding ends. Dimensions of brazed-end valve connections shall conform to type B in table III of MIL-F-1183.

3.3 Types I, II, III and IV.

3.3.1 Temperature ratings. Unless otherwise specified (see 6.2), temperature ratings for valves shall be at the manufacturer's option.

3.3.2 Finish. Unless otherwise specified (see 6.2), valves shall have a natural or machined finish produced by commercial manufacturing process.

3.4 Performance requirements.

3.4.1 Hydrostatic test.

3.4.1.1 Types I and II. The shell shall not deform or leak, and the leak rate through the valve seat shall not exceed 10 ml. per hour per inch of valve size for valves size 1 or larger. Valves smaller than size 1 shall not have a leak rate through the valve seat to exceed 10 ml per hour (see 4.3.2.1 and 4.3.2.2).

3.4.1.2 Types III and IV. The shell shall not deform or leak, and the leak rate through the valve seat shall not exceed 40 ml. per hour per inch of valve size for valves size 1 or larger. Valves smaller than size 1 shall not have a leak rate through the valve seat to exceed 40 ml. per hour (see 4.3.4).

3.4.2 Pneumatic test.

3.4.2.1 Types I and II. The shell shall not leak, and the leak rate through the valve seat shall not exceed 0.10 standard cubic feet (2.83 liters) of air per hour per valve size (see 4.3.2).

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3.4.2.2 Type III and IV. The shell shall not leak, and the leak rate through the valve seat shall not exceed 0.40 standard cubic feet (11.33 liters) of air per hour per inch of pipe size (see 4.3.4).

3.4.3 Steam tests. The shell shall not leak and there shall be no visible leakage from the seat (see 4.3.2.1 and 4.3.2.2).

3.4.4 Types I, II, III and IV, nonmetallic discs.

3.4.4.1 Hardness. Discs shall not crack, chip, distort, or be otherwise adversely affected. The disc shall seat when the valve is closed and shall maintain a seal and shall not leak under pressure (see 4.3.5.1).

3.4.4.2 Dry heat. Discs shall not disintegrate or blister when tested in accordance with 4.3.5.2.

3.4.5 Types I and II, stuffing box packing. When tested in accordance with 4.3.3. Leakage shall not exceed 240 ml. per minute on removal of the packing. There shall be no leakage after repacking as specified.

3.4.6 Steam test. Nonmetallic discs shall not disintegrate or blister when tested in accordance with 4.3.5.3.

3.5 Marking. All valves shall be legibly marked in accordance with the requirements of MSS SP-25.

3.6 Workmanship. All parts of valves shall be new and free from injurious defects, and shall be fitted and finished in a workmanlike manner. Castings shall be free from blowholes, in line surface porosity, hard spots, cracks, or other injurious defects. They shall be smooth and cleaned, both inside and outside, and parting line and similar roughness shall be removed. Castings shall not be repaired, plugged, brazed or "burned in". Finish shall be free from noticeable imperfections.

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 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 that supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection.

4.2.1 Sampling.

4.2.1.1 Sampling for visual and dimensional examination. Sampling for these characteristics shall be in accordance with the provisions of MIL-STD-105 with the inspection levels and AQL's as specified in 4.2.2.1.

4.2.1.2 Sampling for tests. Sampling for tests shall be selected in accordance with the provisions of MIL-STD-105 inspection level S-1. The acceptable quality (AQL) shall be 2.5 percent defective.

4.2.2 Examination.

4.2.2.1 Inspection levels and acceptable quality levels (AQL's). The inspection levels and AQL's expressed in defects per 100 units shall be as follows:

	Level	AQL	
		Major	Minor
For visual examination.	II	1.5	4.0
For dimensional examination.	S-2	-	4.0

4.2.2.2 Visual examination. Samples selected in accordance with 4.2.1 shall be visually examined as specified in table V and examined for dimensions as specified in tables II, III and IV, for dimensions in WW-F-406 for flanged valves, and in ANSI B16.18 for solder-end valves. Any dimension not within specified tolerances shall be classified as a defect.

TABLE V. Classification of defects

Examine	Defects	Major	Minor
Design	Not type, class, end connection and size specified-----	X	
Construction and workmanship (as applicable)	Component parts missing-----	X	
	Component cracked, fractured, deformed, seamed, or with laminations, metal slivers, sharp edges or burrs, tears, holes or other injurious defects (exterior and interior surfaces)-----	X	
	Cast component not sound and smooth, porosity, fins, cracks, blowholes, depressions, hard spots, bumps or lumps, mold marks of parting line, or other injurious defects-----	X	
	Exterior and interior surfaces not clean, smooth (grooves, folds, indentations, flaws, grease, dirt or foreign matter imbedded in surfaces)-----		X
	Cast components repaired, plugged, brazed or burned in-----	X	
	Components not accurately and smoothly machined on contacting surfaces-----	X	
	Disc not securely fastened to stem with stem ring; disc does not swivel freely; disc holder of slip-on type not adequately guided for self-centering; disc holder slips off; or disc not tightly seated-----	X	
	Flanged valves not faced or drilled as specified-----	X	
	Handwheel not marked as specified-----		X
	Stem packing or packing in stuffing box is not as specified-----	X	
	Threading on screwed valves not as specified-----	X	
	Thread burred or damaged, or fit between threads loose-----	X	
Identification marking	Missing, illegible, incomplete or not in accordance with NSS-SF-25-----		X

4.2.3 Examination of preparation for delivery. An examination shall be made to determine that preservation, packaging, packing and marking requirements of the applicable contract or order are complied with. Defects shall be scored in accordance with table VI. The lot size shall be the number of shipping containers fully prepared for delivery with the exceptions that containers need not be sealed or closed, nor interior containers, or case liners sealed (if applicable). Examination shall be made in two phases; first as interior examination in process of packaging, and second, and examination of containers fully prepared for delivery. The sample unit for each of the two phases shall be one container prepared for delivery as set forth above. The inspection level shall be S-4, the acceptable quality level (AQL) shall be 4 percent defective.

TABLE VI. Classification of preparation for delivery defects

Examine	Defects
Marking (interior package or exterior container as applicable)	Omitted, incorrect, illegible, improper size, location, sequence or method of application.
Materials	Components missing, damaged, defective or not as specified.
Workmanship (as applicable)	Inadequate or improper packaging or packing, such as closure of interior packages or containers, closure of case liner or container flaps, taping of seams, corners, and manufacturer's joint, closure of alternate containers; loose strapping or tape banding; inadequate stapling; bulging or distortion of containers.
Contents (interior and exterior container as applicable)	Number per container not as specified.
Weight (exterior container)	Weight per container exceeds maximum.
Preservation (as applicable)	Preservation missing, improperly applied, or incorrect type.

4.2.4 Tests. Samples selected in accordance with 4.2.1.2 shall be tested as specified in 4.3.

4.3 Test methods.

4.3.1 Chemical analysis. Analyze compositions according to test methods in the documents listed in 3.1.1.1 to 3.1.6.2.

4.3.2 Types I and II pressure tests.

4.3.2.1 Shell. Apply pressure by one of the following methods at or near room temperature (see 3.4.1.1, 3.4.2.1 and 3.4.3).

- (a) Hydrostatically at twice the rated pressure (see 1.2.1).
- (b) Pneumatically at 80 to 100 psig (5.6 to 6.9 bars) underwater or automatically.
- (c) Steam tested at 125 psig (8.7 bars).

4.3.2.2 Seat. Apply pressure by one of the following methods at or near room temperature (see 1.4.1.1 and 3.4.2.1):

- (a) Hydrostatically at the rated pressure (see 1.2.1).
- (b) Pneumatically at 80 to 100 p.s.i.g (5.6 to 6.9 bars) underwater or automatically.
- (c) Steam tested at 125 psig (8.7 bars).

4.3.3 Stuffing box, packing test. When specified (see 6.2), test the completely assembled valve in a fixture with the valve outlet plugged and with the valve in the wide open position. Apply hydrostatic pressure equal to the maximum working pressure through the inlet side of the valve. The water for test purpose shall not exceed 212°F (100°C). Remove the packing from the stuffing box and repack the valve maintaining the required internal hydrostatic pressure. Adjust (tighten) the gland follower or pack nut, as applicable, so no leakage occurs when the valve is being opened or closed. If unacceptable leakage occurs on removal of the packing or if the stuffing box cannot be packed under the specified conditions the valve shall be classified as defective. However, any evidence of leakage after repacking, with the valve disc open or in any other position, with the valve under the specified pressure, the valve shall be considered defective (see 3.2.1, 3.2.5.1 and 3.4.5).

4.3.4 Types III and IV pressure tests. Apply pressure at the outlet side of the disc by one of the following methods at or near room temperature (see 3.4.2.2):

- (a) Hydrostatically at 50 p.s.i.g. (3.4 bars) minimum.
- (b) Pneumatically at 50 p.s.i.g. (3.4 bars) minimum, underwater or automatically.

4.3.5 Types I, II, III and IV, discs, nonmetallic hardness, dry heat and steam tests. When specified (see 6.2), test for hardness, dry heat and steam test as follows.

4.3.5.1 Hardness. Test for hardness in accordance with ASTM D2240, and at a temperature of $270^{\circ} \pm 5^{\circ}\text{F}$ ($132^{\circ} \pm 2.8^{\circ}\text{C}$) for 60 ± 5 minutes (see 3.2.3 and 3.4.4.1).

4.3.5.2 Dry heat. Heat one half of a disc in air to a temperature of $270^{\circ} \pm 5^{\circ}\text{F}$ ($132^{\circ} \pm 2.8^{\circ}\text{C}$) for 60 ± 5 minutes (see 3.4.4.2).

4.3.5.3 Steam test. Expose one half of a disc to saturated steam at $400^{\circ} \pm 5^{\circ}\text{F}$ for 60 ± 5 minutes (see 3.4.6).

5. PREPARATION FOR DELIVERY

5.1 Commercial packaging and packing. Unless otherwise specified (see 6.2) the valves shall be packaged in a manner to assure protection against deterioration and damage from the contractor to the initial destination. The packaged valves shall be packed to assure acceptance and safe delivery at destination in containers complying with Uniform Classification rules or National Motor Freight Classification rules.

5.2 Preservation, packaging, and packing. When specified, the valves furnished in quantities as specified (see 6.2), shall be preserved, packaged, and packed in accordance with MIL-V-3. The level of preservation and packaging shall be A or C and the level of packing shall be A, B, or C, as specified (see 6.2).

5.3 Marking. Marking shall be in accordance with 5.2.1 or 5.2.2, as specified (see 6.2).

5.3.1 Civil agencies. In addition to any special markings required by the contract or order, all interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to any special markings required by the contract or order, all interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Valves covered by specification are intended for normal service with liquids and gases.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type, class, end connection, and size (see 1.2.1 and 1.2.2).
- (c) Material (see 3.1.3.1, 3.1.4.2, 3.1.5.2, 3.1.5.3, 3.1.5.4 and 3.1.7).
- (d) Types I and II, seat for classes A and B valves, when required (see 3.2.2.1.1 and 3.2.2.1.2).
- (e) Type III, seat and disc, when required (see 3.2.2.2.1).
- (f) Type IV, when and service required for class A valves (see 3.2.2.2.2).
- (g) Types I to IV, designation for nonmetallic discs (see 3.2.3).
- (h) Types I and II, stem diameters, and stem packing, when required (see 3.2.4 and 3.2.5.3).
- (i) Types I and II, handwheel size, when required (see 3.2.6).
- (j) Types I to IV, connection 2 flanges (see 3.2.7.2).
- (k) Types I to IV, temperature ratings, and finish, when required (see 3.3.1 and 3.3.2).
- (l) Types I and II, stuffing box test, when required (see 4.3.3).
- (m) Level of preservation and packaging, and level of packing if other than specified (see 5.2).
- (n) Marking (see 5.3).
- (o) Nonmetallic disc tests, when required (see 4.3.5).

6.3 Dezincification. Copper-zinc alloys (brasses) which do not contain any inhibitors such as tin, antimony, silicon, silver, phosphorus or arsenic, and which contain zinc in amounts greater than 16 percent by weight should not be used for valve parts in contact with waters having a pH less than 6 or greater than 8.

6.4 Copper alloys. Consult the following publications for information on copper alloys:

Copper Development Association (CDA) Publications:

Copper alloys 300 and 600 series.

Standard Handbook, Copper, Brass, Bronze, Wrought Mill Products, Alloy Data /2.

Standards Handbook, Copper, Brass, Bronze, Wrought Mill Products, Specification Index /6.

Copper alloys 800 and 900 series.

Standard Handbook, Copper, Brass, Bronze, Cast Products, Data Specifications /7.

(Application for copies should be addressed to the Copper Development Association, Inc. 405 Lexington Avenue, New York, NY 10017).

6.5 Solder ends, connection 3. The maximum recommended pressure temperature ratings for solder end connections should conform to the requirements of ANSI Std. B16.18. The solder used to make joints should be compatible with service conditions, and should not be used on pipe lines that carry flammable gases or liquids. Maximum working pressures and temperatures are according to table VII.

TABLE VII. Maximum working pressure and temperature, solder joint and valves

Solder	Valve class-	Temperature		Pressure rating, water tube size					
		°F	°C	1/4 to 1 inch	1-1/4 to 2 inches	2-1/2 and 3 inches	3-1/2 and 4 inches	4-1/2 and 6 inches	6 inches and larger
Tin	A,B	100	37.8	200	13.8	175	12.1	150	10.3
lead	A,B	150	65.6	150	10.3	125	8.6	100	6.9
alloy	A,B	200	93.3	100	6.9	90	6.2	75	5.2
(50-50)	A,B	250	121.1	35	5.9	75	5.3	50	3.4
Tin	A	100	37.8	200	13.8	200	13.8	200	13.8
antimony	A	150	65.6	200	13.8	200	13.8	200	13.8
alloy	A	200	93.3	185	12.4	185	12.8	185	12.8
(95-5)	A	250	121.1	170	11.4	170	11.7	150	10.3
	B	100	37.8	300	20.7	300	20.7	300	20.7
	B	150	65.6	300	20.7	300	20.7	275	19.0
	B	200	93.3	270	17.2	250	17.2	200	13.8
	B	250	121.1	200	13.8	175	12.1	150	10.3

6.6 Civil agency procurements. When level B packaging is required for civil agency procurements, the level A in 5.1 shall apply.

6.7 Types I and II, stem packing. Valves are ordinarily shipped with the stem packing uncompressed. The packing nut should be tightened prior to placing valves in service.

MILITARY INTERESTS:

Custodians:

Army - ME
Navy - YD
Air Force - 82

Review activity:

Army - ME, CE

User activity:

Navy - MC

Preparing activity:

GSA-FSS

Civil Agency Coordinating Activities:

GSA-PCD
HEX-FEC
INT-BPA
NASA-JFK
USDA-AFS

U. S. GOVERNMENT PRINTING OFFICE : 1977 - 241-233/1035

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WW-V-51F
CANCELLATION
April 5, 1983

FEDERAL SPECIFICATION

VALVE, ANGLE, CHECK, AND GLOBE, BRONZE (125, 150 and 200 POUND)
THREADED END, FLANGE ENDS, SOLDER ENDS, AND BRAZED END,
FOR LAND USE

This cancellation was approved by the Assistant Administrator,
Office of Federal Supply and Services, General Services
Administration.

Federal Specification WW-V-51F, dated March 4, 1977, is hereby canceled. The Manufacturers Standardization Society of the Valve and Fitting Industry (MSS) Standard SP-80, Bronze Gate, Globe, Angle and Check Valves, dated February 18, 1983, provides an adequate description of these items for procurement purposes.

U.S. GOVERNMENT PRINTING OFFICE : 1983-381-706/1933

FSC 4820

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NIBCO001389

A2
FXI

MSS SP-70-84
15 November 1985
SUPERSEDING
MSS SP-70-76
19 May 1983
USED INSTEAD OF
WW-V-58B
19 January 1971

ADOPTION NOTICE

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Title of Document:

Cast Iron Gate Valves, Flanged and Threaded Ends

Date of Specific Issue Adopted:

1984 Edition

Releasing Industry Group:

Manufacturers Standardization Society

Custodians:

Army - ME
Navy - YD
Air Force - 99

Military Coordinating Activity:

Navy - YD
(Project 4820-0500)

Review Activity:

DLA - CS

User Activity:

Navy - MC

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