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MILITARY SPECIFICATION

VALVES, PLUG: CAST-IRON OR STEEL, MANUALLY OPERATED

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers manually operated, lubricated and nonlubricated, tapered plug valves designed for gas, liquid or gaseous petroleum products, or water. This specification also includes special requirements for low-temperature-service valves.

1.2 Classification. The valves shall be of the following types, styles, patterns, classes, and sizes, and ends (see 6.2 and 6.9):

A	1	B	1	C	1
Type (1.2.1)	Style (1.2.2)	Class (1.2.3)	Pattern (1.2.4)	Size (1.2.5)	End (1.2.6)

1.2.1 Type. The valve type is identified by a one letter symbol as shown in Table I.

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Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Mobility Equipment Research and Development Command, ATTN: DRDME-DS, Fort Belvoir, VA 22060 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

TABLE I. Type

Symbol	Characteristics
A	Type I, Lubricated, tapered plug
B	Type II, nonlubricated, wedge-mechanism or tapered lift plug
C	Type III, nonlubricated, trunion-mounted plug

1.2.2 Style. The valve style is identified by a single code numeral as shown in Table II.

TABLE II. Style.

Code No.	Characteristics
1	Style A, without operating gears
2	Style B, with operating gears

1.2.3 Class. The valve class is identified by a one letter symbol as shown in Table III.

TABLE III. Class

Symbol	Pressure rating
A	125 PSI (4 inch and smaller)
B	125 PSI (6 inch and greater)
C	150 PSI
D	250 PSI
E	300 PSI
F	400 PSI
G	600 PSI
H	900 PSI
I	1500 PSI

1.2.4 Pattern. The valve pattern is identified by a single code numeral as shown in Table IV.

TABLE IV. Pattern

Code No.	Characteristics
1	Short
2	Venturi
3	Full round opening (except classes 125 and 250)
4	Regular

1.2.5 Size. The valve size is identified by a one letter symbol as shown in Table V.

TABLE V. Size

Symbol	Dimensions
A	2 inch
B	2-1/2 inch
C	3 inch
D	4 inch
E	6 inch
F	8 inch
G	10 inch
H	12 inch

1.2.6 The valve end is identified by a single code numeral as shown in Table VI.

TABLE VI. End

Code No.	Characteristics
1	Flanged
2	Threaded
3	Beveled (for welding)

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

L-P-403	- Plastic Molding Material, Polytetrafluoroethylene (TFE-Fluorocarbon).
P-D-680	- Dry Cleaning Solvent.
PPP-B-601	- Boxes, Wood, Cleated-Plywood.
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.

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MIL-V-3	- Valves, Fittings, and Flanges (except for Systems Indicated Herein): Packaging of.
MIL-P-116	- Preservation-Packaging, Methods of.
MIL-T-704	- Treatment and Painting of Materiel.
MIL-R-6855	- Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes.
MIL-A-7021	- Asbestos Sheet, Compressed, for Fuel, Lubricant, Coolant, Water, and High Temperature Resistant Gaskets.

STANDARDS

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	- Marking for Shipment and Storage.
MIL-STD-130	- Identification Marking of US Military Property.
MIL-STD-1188	- Commercial Packaging of Supplies and Equipment.

(Copies of 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 otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B16.25 - Buttwelding Ends.
B18.2.1 - Square and Hex Bolts and Screws, Including Askew Head Bolts, Hex Cap Screws and Lag Screws.
B18.2.2 - Square and Hex Nuts.

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

AMERICAN PETROLEUM INSTITUTE (API)

API STD 5B - Threading, Gaging and Thread Inspection of Casing, Tubing, and Line Pipe Threads.
API SPEC 6D - Pipeline Valves.

(Application for copies should be addressed to the American Petroleum Institute, Division of Production, 300 Corrigan Tower Building, Dallas, TX 75201.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 350 - Forgings, Carbon and Low-Alloy Steel, Requiring Notch Toughness Testing for Piping Components.
A 352 - Ferritic Steel Castings for Pressure-Containing Parts Suitable for Low Temperature Service.
A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
D 429 - Rubber Property - Adhesion to Rigid Substrates:
D 1229 - Rubber Property - Compression Set at Low Temperatures, Test for.

(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-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

(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.)

DEPARTMENT OF TRANSPORTATION (DOT)

CFR, Title 49, Part 192 - Transportation of Natural and Other Gas by Pipeline: Minimum Safety Standards.
CFR, Title 49, Part 195 - Transportation of Liquids by Pipeline.

(Application for copies should be addressed to a local DOT Office or the Superintendent of Documents, U.S. Government Printing Office Washington, DC 20402.)

(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 valves shall be designed for use with gas, liquid, or gaseous petroleum products as specified (see 6.2). Flow lines through the valves shall be streamlined to insure minimum pressure drop (loss). Plug ports shall be in alinement with both ports when the valve is fully open. Valves shall conform to the physical requirements shown in Table VII. Valves shall be right-handed (close clockwise). Valves may have the opening for removal of the plug at the top or bottom of the valve body. When the valve is subjected to the specified test pressures, seats and bodies shall not have a leakage rate of more than 0.07 cubic centimeter per minute (approximately one drip per minute).

TABLE VII. Physical requirements

Class	Maximum service pressure, at 100° F	Material	Hydrostatic test pressure	
			Body	Seat
	psig		psig	psig
125 (4-in. and smaller)	175	Cast iron	400	400
125 (6-in. and greater)	200	Cast iron	400	400
150	275	Steel	425	425
250	500	Cast iron	1000	500
300	720	Steel	1100	720
400	960	Steel	1450	960
600	1440	Steel	2175	1440
900	2160	Steel	3250	2160
1500	3600	Steel	5400	3600

3.1.1 Minimum safety standards. All valves shall conform to the minimum safety standards as specified in CFR, Title 49, Part 192 or 195, as applicable. The contractor shall certify conformance to the above prior to delivery of the first articles.

3.2 First article (first produced valves). The contractor shall furnish one or more valves as specified (see 6.2) for examination and testing within the time frame specified (see 6.2) to prove that his production methods and choice of design detail will produce valves that comply with the requirements of this specification. Examination and tests shall be as specified in Section 4 and shall be subject to surveillance and approval by the Government (see 6.3).

3.3 Material. Material shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification (see 6.4).

3.4 Cast-iron valves. Cast-iron valves shall conform to MSS SP-78 and as specified herein. When specified (see 6.2), valve bodies shall be cast ferritic ductile iron conforming to ASTM A 395.

3.5 Steel valves. Steel valves shall conform to API SPEC 6D and as specified herein.

3.5.1 Low-temperature-service valves. When specified (see 6.2), low-temperature-service valves shall be furnished. The valve body and cover shall be steel castings or equal forged, wrought or cast material equivalent to ASTM A 352, Grade LCB, or ASTM A 350, Grade LF2.

3.6 Operating temperatures. The valves shall perform as specified herein at temperatures from plus 125° F to minus 20° F. The low-temperature-service valves shall perform as specified herein in temperatures from plus 125° F to minus 50° F.

3.7 Performance. The valve shall seal against the applicable hydrostatic seat test pressure applied to either side of the plug, or to one side of the plug when back-pressure-relief fittings are specified. The valves shall withstand 2000 cycles of opening and closing with mechanical components remaining free and easy to operate and without evidence of seizing, galling or scoring of the contacting surfaces. The manual force required to open and close the valve when operated under maximum working pressure shall be not more than 150 pounds at the operating temperature specified herein. The force shall be applied at the end of the specified wrench, bar, or breakover handle, or at the circumference of the handwheel.

3.8 Seating surfaces. Seating surfaces shall be as specified herein. Nonmetallic seats shall not be used on Type I valves.

3.8.1 Metal-to-metal seats. On steel valves, the metal seating surface of the plug shall be a different hardness than that of the metal body seats so as to prevent galling. The plug seating surface shall be free from tool marks or other irregularities. When properly lubricated, the metal-to-metal seats shall not leak when subjected to the hydrostatic seat test pressure specified in Table VII.

3.8.2 Nonmetallic seats. Nonmetallic seating surfaces may be installed either in the plug or in the valve body and shall be fabricated from either polytetrafluoroethylene conforming to L-P-403, Type IV, Class 1; or from nitrile rubber conforming to the performance requirements of MIL-R-6855, Class 1, Grade 60, as ordered, except that the maximum compression set after oven aging shall be 50 percent. The low-temperature compression set shall be conducted at minus 20° F for the regular valve seat material and at minus 50° F for the low-temperature-service valve seat material, and shall not exceed 60 percent set after being released for 30 minutes. The low-temperature compression set will be conducted for 94 hours according to ASTM D 1229. Flat seating surfaces shall be fabricated from synthetic fuel-resistant rubber with an adhesion to the metal of not less than 15 pounds per inch of width. O-ring-type seats shall be fabricated from either polytetrafluoroethylene or synthetic fuel-resistant rubber. With the seats in place, the valve shall not leak or show any distortion of the O-ring-type seats when subjected to the maximum service pressure specified in Table VII.

3.9 End connections. End connections shall be either flanged, threaded or beveled for welding, as specified (see 1.2). Threaded ends shall not be furnished on valves with end connections larger than 4 inches. Ends beveled for welding shall not be furnished on low-temperature-service valves.

3.9.1 End flanges.

3.9.1.1 End-flange gaskets. End-flange gaskets shall be fabricated from material conforming to MIL-A-7021, Class 1, 1/16-inch thick.

3.9.1.2 End-flange bolting. End-flange design shall conform to MSS SP-78. Bolting shall be of the stud-, bolt-stud- or bolt-type. Bolts and nuts shall be heavy semifinished hexagon conforming to ANSI B18.2.1 and B18.2.2.

3.9.2 Threaded ends. Threaded ends shall have internal line pipe threads conforming to API STD 5B.

3.9.3 Beveled ends. Beveled valve ends shall be beveled for welding in accordance with ANSI B16.25.

3.10 Protective cap. When specified (see 6.2), a removable, steel, weathertight cap shall be furnished to protect the valve stem or stem adapter and other exposed operating mechanism.

3.11 Bosses. When specified (see 6.2), valves shall be provided with two bosses on one side of the valve in the approximate location shown on Figure 1 (see 6.5). The bosses shall be tapped and plugged with an external square-head, hex-head, or hex-socket plug.

3.12 Back-pressure relief. When specified (see 6.2), provisions shall be made for back-pressure relief in the valve plug as shown on Figure 2 (see 6.5).

3.13 Operating mechanism. Valves shall be operated by wrench, bar, handwheel, or breakover handle, as specified (see 3.18, 3.19 or 3.20). The length of the wrench, bar, or breakover handle measured from the center of the valve stem to the end of the handle shall be as listed below for the following valve sizes:

Valve size (nominal) Inches	Handle length (maximum) Inches
2	15 (all types)
2-1/2	18 (all types)
3	21 (all types)
4	24 (all types)
6	36 (all types)
8	48 (Types II and III only)
10	48 (Types II and III only)
12	48 (Types II and III only)

3.13.1 Wrenches. A wrench shall be furnished with each wrench-operated valve.

3.13.2 Breakover handle. Breakover handles shall be fabricated from steel or malleable iron. The handle shall fold over without binding and shall be attached to the valve stem in such a manner as to permit ease of replacement and shall be held in place while in operation.

3.14 Locking device. When specified (see 6.2), valves shall be provided with a locking device for locking the plug assembly in either the open or closed position.

3.15 Identification marking. The valves shall be identified in accordance with the CFR and MIL-STD-130.

3.16 Treatment and painting. The portions of the valves normally painted shall be cleaned, treated and painted in accordance with MIL-T-704, Type A.

3.17 Patterns.

3.17.1 Short. The net cross-sectional area of the plug port shall be not less than 40 percent of the area of a circle with diameter equal to the nominal size of the valve.

3.17.2 Venturi. The net cross-sectional area of the plug port shall be not less than 35 percent of the area of a circle with diameter equal to the nominal size of the valve.

3.17.3 Full round. The plug port passage shall be circular in cross section throughout and shall have a diameter equal to the nominal size of the valve. The valve shall pass a brush-type pipeline cleaner without damage to either the plug or the cleaner.

3.17.4 Regular. The plug port passage shall be in trapezoidal form. The net cross-sectional area of the plug port shall be not less than 65 percent of the area of a circle with diameter equal to the nominal size of the valve.

3.18 Type I, lubricated tapered plug. Unless otherwise specified (see 6.2), valves 2-inch through 4-inch nominal size shall be Style A; shall be wrench, bar, handwheel, or breakover handle operated; and, shall require one-quarter turn from full open to full closed. All other valve sizes shall be Style B and shall be handwheel operated. The valve shall withstand 100 cycles of opening and closing without lubrication or adjustment when tested in accordance with 4.5.2.2.

3.18.1 Plug. The plug shall be the one-piece type and shall be fabricated from material compatible with that of the valve body.

3.18.2 Lubricant system. Lubricant grooves shall be provided in either the plug or the body of the valve. Lubricant channels shall distribute lubricants to all sealing surfaces of the valve. The channels shall form a complete lubricant seal around both body ports when the valve is in either the open or closed position. When a lubricant groove passes a body port in opening or closing the valve, the groove shall disconnect from the lubricant system. A ball check valve with corrosion-resistant steel balls shall be provided to prevent the backflow of lubricant.

3.18.3 Lubricant screw. The lubricant screw shall be either wrench or pin operated. The lubricant screw shall provide for lubricant either by stick lubricant using a wrench or by bulk lubricant using a lubricant gun. Lubrication may be accomplished by a screw type fitting in the plug stem or directly into a gun type fitting in the side of the body in the plug stem area.

3.18.4 Lubricant. The valves shall be lubricated before shipment with a lubricant impervious to the effects of water and moisture. A warning tag shall be affixed to each valve and shall state that, before the valve is used, the factory lubricant must be replaced with a lubricant that is suitable for use in petroleum products. Twenty-four sticks of lubricant for use with either liquid or gaseous service, as specified (see 6.2), shall be supplied with each valve. The lubricant shall be for use at a temperature from plus 125° F to minus 25° F; or, in the case of low-temperature valves, to minus 50° F. The containers for lubricants shall be marked to show the particular service for which the lubricant is intended and shall give instructions for use.

3.18.5 Valve packing. The valve shall have a resilient packing or O-ring which is resistant to aromatic and other hydrocarbon fluids. The packing material shall permit the plug to be hydraulically jacked with lubricant to obtain operating clearance. The plug shank shall be sealed against leakage by a combination of metal-to-metal closures and the resilient packing or O-ring.

3.19 Type II, nonlubricated, wedge mechanism, tapered lift plug. The opening operation of wedge mechanism or tapered lift plug valves shall consist of lifting or moving the plug from the seat and rotating the plug 90 degrees. Unless otherwise specified (see 6.2), the valves 2-inch through 4-inch nominal size shall be Style A; shall be wrench, bar, handwheel, or breakover handle operated; and shall require not more than 2-1/4 turns from full open to full closed including lifting, turning and reseating the plug. All other valve sizes shall be Style B and shall be handwheel or breakover handle operated.

3.19.1 Wedge mechanism and lift plug. The wedge mechanism and the lift plug shall be fabricated from steel having a strength not less than that of the valve body. The wedge mechanism may consist of up to three separate segments and shall be tapered or cylindrical in shape. The lift plug shall be one-piece type.

3.19.2 Wedge, plug or plug stem packing. The wedge or plug stem shall be sealed against leakage by an adjustable packing gland or replaceable O-ring resistant to aromatic and other hydrocarbon fluids.

3.20 Type III, nonlubricated, trunnion-mounted plug. The plug shall be supported by trunnion bearings in the body and cover. Two identical resilient pressure-energized seat seals shall be provided to seal between the plug and body. All seat seals shall be replaceable without removing the valve from the line. Unless otherwise specified 6.2), valves 2-inch through 4-inch nominal size shall be Style A; shall be wrench, bar, handwheel, or breakover handle operated; and shall require not more than 2-1/4 turns from full open to full closed. All other valve sizes shall be Style B and shall be handwheel or breakover handle operated.

3.20.1 Seat seal inserts. The seat seal inserts shall seal on the upstream or high-pressure side so the valve may be used for double block and bleed service. A suitable tap shall be provided as a bleed from the central cavity.

3.21 Workmanship. All parts, components and assemblies of the valves including castings, forgings, molded parts, stampings, bearings, seals, machined surfaces, and welded parts shall be clean and free from sand, dirt, fins, pits, sprues, scale, flux and other harmful extraneous material. External surfaces shall be free from burrs, sharp edges and corners except when sharp edges and corners are required.

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Component and material inspection. The contractor is responsible for insuring that components and materials used are manufactured, examined and tested in accordance with referenced specifications and standards.

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

(a) First produced valve inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).
(c) Inspection of packaging (see 4.6).

4.3 First produced valve inspection.

4.3.1 Examination. The first produced valves shall be examined as specified in 4.5.1. Presence of one or more defect shall be cause for rejection.

4.3.2 Tests. The first produced valves shall be tested as specified in 4.5.2.1 through 4.5.2.5. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling. Sampling for tests shall be in accordance with MIL-STD-105, Inspection Level S-2. Sampling for examination shall be in accordance with MIL-STD-105, Inspection Level II.

4.4.2 Examination.

4.4.2.1 Individual. Each valve shall be examined for the critical defects specified in 4.5.1. Presence of a critical defect shall be cause for rejection.

4.4.2.2 Samples. Samples selected in accordance with 4.4.1 shall be examined for the major and minor defects specified in 4.5.1. AQL shall be 0.4 percent defective for major defects and 1.0 percent defective for minor defects.

4.4.3 Tests.

4.4.3.1 Individual. Each valve shall be tested as specified in 4.5.2.1 through 4.5.2.1.2. Evidence that each valve has been tested in compliance with the Code of Federal Regulations (API SPEC 6D, Sec. V) shall be used to eliminate any duplicate quality conformance test required herein. Failure of a test shall be cause for rejection.

4.4.3.2 Samples. Samples selected in accordance with 4.4.1 shall be tested as specified in 4.5.2.2 through 4.5.2.4.2. AQL shall be 4.0 percent defective.

4.5 Inspection procedure.

4.5.1 Examination. The valves shall be examined as specified herein for the following defects:

Critical

1. Valves not certified in accordance with 3.1.1.
2. Holes in casting.

Major

101. Flow lines through valve not as specified.
102. Dimensions not as specified.
103. Materials not as specified.
104. Components not as specified or missing.
105. Assembly incorrect.
106. Seating surfaces not as specified.
107. Flow indication missing or incorrectly marked.
108. Plug port patterns not as specified.
109. Lubricant system not as specified (Type I only).
110. Lubricant screw not provided for both stick and gun lubrication (Type I only).
111. Packing or O-ring not as specified.
112. Workmanship not as specified.

Minor

201. Identification and special marking incorrect, illegible or missing.
202. Treatment and painting not as specified.

4.5.2 Tests.

4.5.2.1 Hydrostatic. The hydrostatic tests of the body and valve seats shall be in accordance with MSS SP-78 for cast-iron valves and API SPEC 6D for steel valves, and as specified herein. Test fluid shall be solvent conforming to P-D-680, Type I (Stoddard Solvent).

4.5.2.1.1 Body. Subject the valve body to the applicable hydrostatic body test pressure specified in Table VII, for not less than 15 minutes. Evidence of leakage or permanent deformation of the valve body shall constitute failure of this test.

4.5.2.1.2 Seat. Valves shall be subjected to the static seat test pressure specified in Table VII, applied successively on each side of the plug with the other side open to the atmosphere. While the test pressure is being applied on each side of the plug, lubricated plugs shall

be rotated approximately 10 degrees into and out of position in order to demonstrate satisfactory mechanical operation as well as continued tightness during, prior to, and after operation. Valves equipped with back-pressure relief fittings shall undergo a static seat test on one side only in the direction of flow as indicated on the valve body. Leakage shall not exceed the rate specified in 3.1.

4.5.2.2 Cycling. Subject the valve to 2000 operational cycles, each cycle consisting of one opening and one closing operation. Not less than 5 out of each 100 cycles shall be performed by filling one side of the valve with test fluid while the plug is closed, leaving the other side empty, then pressurizing the full side to the maximum service pressure specified in Table VII, and rotating the plug to open the valve. The pressure shall be maintained continuously up to the point when the plug rotates sufficiently to relieve the pressure. The remaining 95 cycles shall be performed with the valve plug in the open position and the valve body filled with the test fluid at the maximum service pressure specified in Table VII, Type I valves shall not be lubricated or adjusted during the last 100 cycles of opening and closing. Nonconformance to 3.8 and 3.18 shall constitute failure of this test.

4.5.2.3 Final seat. Immediately after completion of the cycling test specified in 4.5.2.2, resubject the valve to the valve seat test specified in 4.5.2.1.2 without lubrication or readjustment of the valve. Any evidence of leakage exceeding that specified in 3.1 shall constitute failure of this test.

4.5.2.4 Operating temperature. Prior to low-temperature testing, lubricate the Type I valve with the manufacturer's recommended low-temperature lubricant, and lubricate the Type II or Type III valve with a good grade of arctic grease where lubrication is normally required. Prior to testing in ambient temperatures to plus 125° F, lubricate the valve with the manufacturer's recommended lubricant. Conduct the tests of all valves at the following temperature levels: plus 125° F, plus 65° F, plus 25° F, 0° F, minus 20° F, and when low-temperature-service valves are furnished (see 3.5.1), at minus 50° F. Condition the valves for not less than 1 hour at each temperature level. Maintain temperature level throughout each test.

4.5.2.4.1 Manual operating torque. Determine the manual torque required for opening and closing the valve when the valve is subjected to the maximum service pressure specified in Table VII. Perform the test

by applying the pressure to one side of the plug only and cycle the valve from closed to open to closed position. The test shall be performed at each specified temperature level. A force of more than 150 pounds applied to the end of the wrench, bar or breakover handle, or at the circumference of the handwheel shall constitute failure of this test.

4.5.2.4.2 Low-temperature seat. Subject the low-temperature-service valve to the tests specified in 4.5.2.1.1 and 4.5.2.1.2. Perform the test at the following temperature levels: 0° F, minus 25° F, and minus 50° F. Evidence of leakage, mechanical malfunction or permanent distortion to the valve seats or any other part of the valve shall constitute failure of this test.

4.5.2.5 Adhesion to metal. The nonmetallic seating surfaces shall be tested for adhesion to metal in accordance with ASTM D 429, Method B. Adhesion to metal of less than 15 pounds per inch of width shall constitute failure of this test.

4.6 Inspection of packaging.

4.6.1 Quality conformance inspection of pack. The preservation, packing and marking of valves and components shall be in accordance with MIL-V-3 and as specified herein.

4.6.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

4.6.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

4.6.1.3 Examination. Samples selected in accordance with 4.6.1.2 shall be examined for the following major defects. AQL shall be 2.5 percent defective.

113. Materials, methods or containers not as specified. Each incorrect material, method or container shall constitute one defect.
114. Flange bolts or studs, flange gaskets, lubricant sticks or repair parts not preserved as specified.
115. Closure of consolidation boxes not as specified.
116. Marking illegible, incomplete, incorrect, or missing.

5. PACKAGING

5.1 Preservation. Preservation shall be Level A or Commercial, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Valves. The valves with fittings shall be preserved in accordance with MIL-V-3, Level A.

5.1.1.2 Flange bolts and studs. The bolts or studs required for each valve shall be coated with Type P-1 preservative conforming to the applicable specification listed in, and shall be applied in accordance with, MIL-P-116. Bolts or studs shall be installed in the flanges. Nuts shall be drawn hand-tight.

5.1.1.3 Flange gaskets. Flange gaskets required for each valve shall be preserved together in accordance with MIL-P-116, Method IC-1.

5.1.1.4 Lubricant sticks. Lubricant sticks for each valve, in the commercial container furnished, shall be preserved in accordance with MIL-P-116, Method IC-1.

5.1.1.5 Technical publications. Technical publications for each valve shall be preserved in accordance with MIL-P-116, Method IC-1.

5.1.1.6 Repair parts and maintenance tools. The preservative application criteria and applicable method(s) of preservation of MIL-P-116 shall be used to preserve the repair parts and maintenance tools.

5.1.1.7 Consolidation. Flange gaskets, lubricant sticks, technical publications, repair parts, and maintenance tools for each valve shall be consolidated in a box conforming to PPP-B-636, Class Weather-Resistant, style optional. Closure of the box shall be in accordance with the appendix to the box specification, Method V.

5.1.2 Commercial. Commercial preservation shall be in accordance with MIL-STD-1188.

5.2 Packing. Packing shall be Level A, Level B, or Commercial, as specified (see 6.2).

5.2.1 Level A. Valves and components shall be packed in accordance with MIL-V-3, Level A, except only boxes conforming to PPP-B-601, Overseas Type Or PPP-B-621, Class 2 shall be used.

5.2.2 Level B. Valves and components shall be packed in accordance with MIL-V-3, Level B, except fiberboard boxes shall be Class Weather-Resistant.

5.2.3 Commercial. Commercial packing shall be in accordance with MIL-STD-1188.

5.3 Marking. Marking for military levels of protection shall be in accordance with MIL-STD-129. Commercial marking shall be in accordance with MIL-STD-1188.

6. NOTES

6.1 Intended use. The valves covered by this specification are intended for use in high-pressure pipelines carrying gas or liquid or gaseous petroleum products, as specified. Specific uses for types and patterns are as follows:

Types:

Type I	- Lubricated tapered plug. Used generally for all applications where periodic lubrication is possible.
Type II	- Nonlubricated, wedge mechanism, or tapered lift plug. Used for applications where lubrication is difficult or impossible.
Type III	- Nonlubricated, trunnion-mounted plug. Used for same applications as Type II.

Patterns:

Short	- Generally used on normal applications.
Full round	- Used where a brush-type cleaner must be passed through the valve for periodic cleaning of the pipeline.
Venturi	- Used only where valve size and weight is of paramount importance.
Regular	- Employs a trapezoidal port opening, and is generally used on normal applications.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.

(b) Specification part number required (see 1.2 and 6.9).
(c) When valves shall be designed for use with gas, or liquid or gaseous petroleum products (see 3.1).
(d) The time frame required for submission of first produced valves, and number of valves required (see 3.2).
(e) When valve bodies shall be cast ferritic ductile iron (see 3.4).
(f) When low-temperature-service valves shall be furnished (see 3.5.1).
(g) When a protective cap shall be furnished (see 3.10).
(h) When bosses shall be provided (see 3.11).
(i) When back-pressure relief provisions shall be furnished (see 3.12).
(j) When plug-locking device shall be provided (see 3.14).
(k) When a specific means of operation is required for Type I, 2-inch through 4-inch valves (see 3.18).
(l) Whether lubricant sticks shall be for liquid or gaseous service (see 3.18.4).
(m) When a specific means of operation is required for Type II or Type III, 2-inch through 4-inch valves (see 3.19 and 3.20).
(n) Degree of preservation and degree of packing required (see 5.1 and 5.2).

6.3 First produced valves. Any changes or deviations of production valves from the approved first produced valve during production will be subject to the approval of the contracting officer. Approval of the first produced valve will not relieve the contractor of his obligation to furnish valves conforming to this specification.

6.4 Recycled material. It is encouraged that recycled material be used, when practical, as long as it meets the requirements of this specification (see 3.3).

6.5 Use of figures. Figures 1 and 2 show a valve and a plug which have been found acceptable; however, the figures are included for illustration only and are not intended to preclude the furnishing of other designs which conform to the specification.

6.6 Data requirements. The contracting officer should include requirements for such da as technical publications, instructional materials,

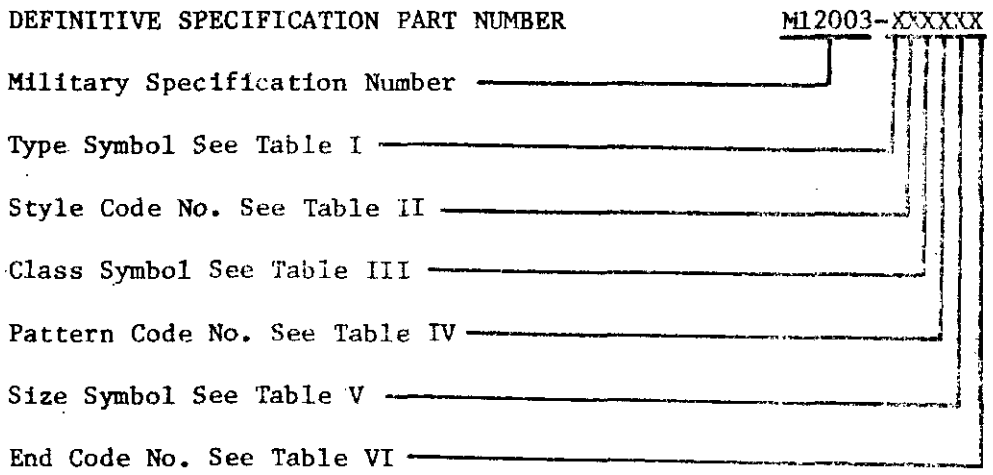
illustrated parts lists, and contractor's maintenance and operation manual to be furnished with each valve.

6.7 Provisioning. The contracting officer should include provisioning requirements for repair parts and maintenance tools as necessary (including any special tools), and instructions on shipment of valves. A suggested paragraph is as follows:

> "Shipment of valves shall include repair parts, maintenance tools, operational instructions, and accessories, unless exceptions are provided elsewhere in the contract."

6.8 International standardization agreement. Certain provisions of this specification are the subject of International Standardization Agreement NATO STANAG No. 2761 and QSTAG-240. When amendment, revision, or cancellation of this specification is proposed which will affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices,

6.9 Definitive specification part number: The specification part number is a definitive part number which will be formulated by selecting from the requirement options available in this specification as follows:



Example: M12003-A1C3E1 = Lubricated, Tapered Plug, without operating Gears, 150 PSI, Venturi, 6 inch, flanged.

Custodian:
Army - ME

Review activity:
DLA - CS

User activities:
Army - CE
Navy - MC
Air Force - 99

Preparing activity:
Army - ME

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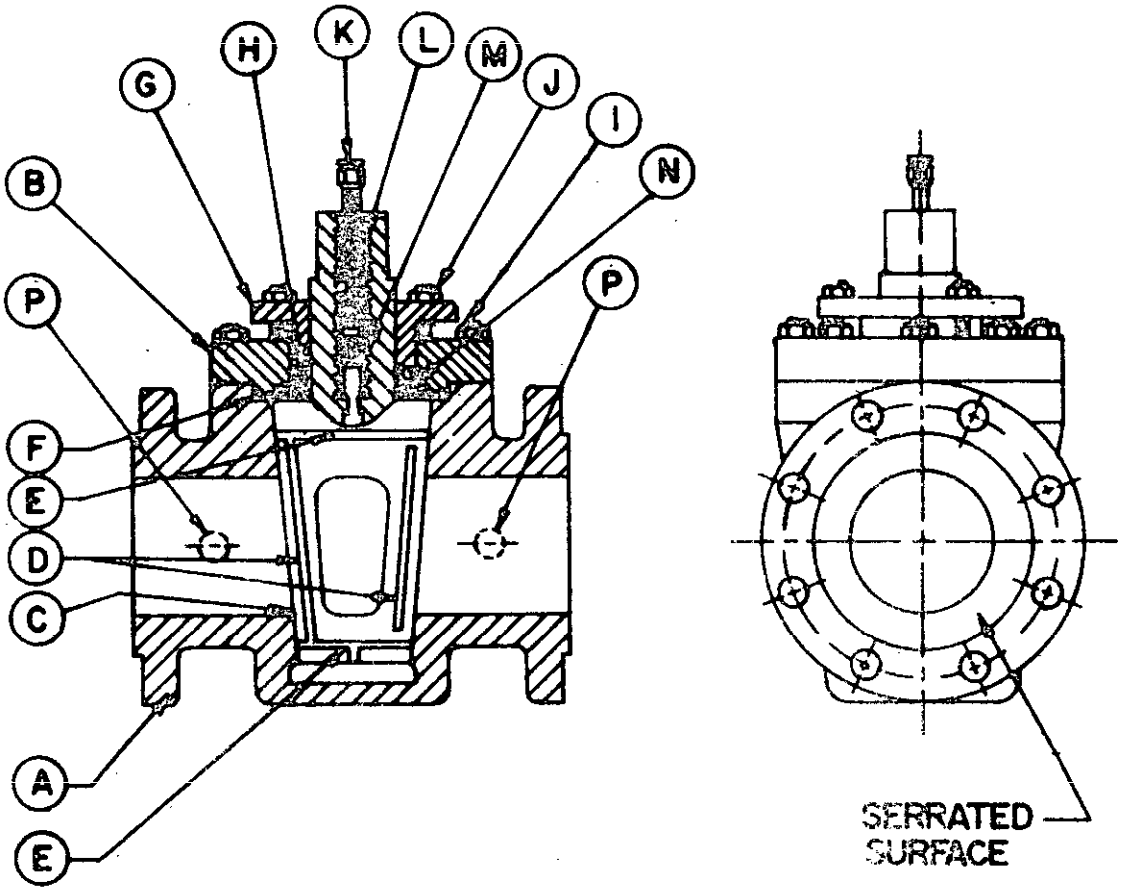

A	BODY	I	BONNET NUT
B	BONNET	J	GLAND NUT
C	PLUG	K	BUTTON HEAD FITTING
D	VERTICAL LUBRICANT GROOVES	L	LUBRICANT SCREW
E	HORIZONTAL LUBRICANT GROOVES	M	BALL CHECK VALVES
F	DIAPHRAGM & GASKET	N	PACKING RING
G	GLAND	P	LOCATION OF BOSS
H	RESILIENT PACKING		

FIGURE 1. Lubricated plug valves.

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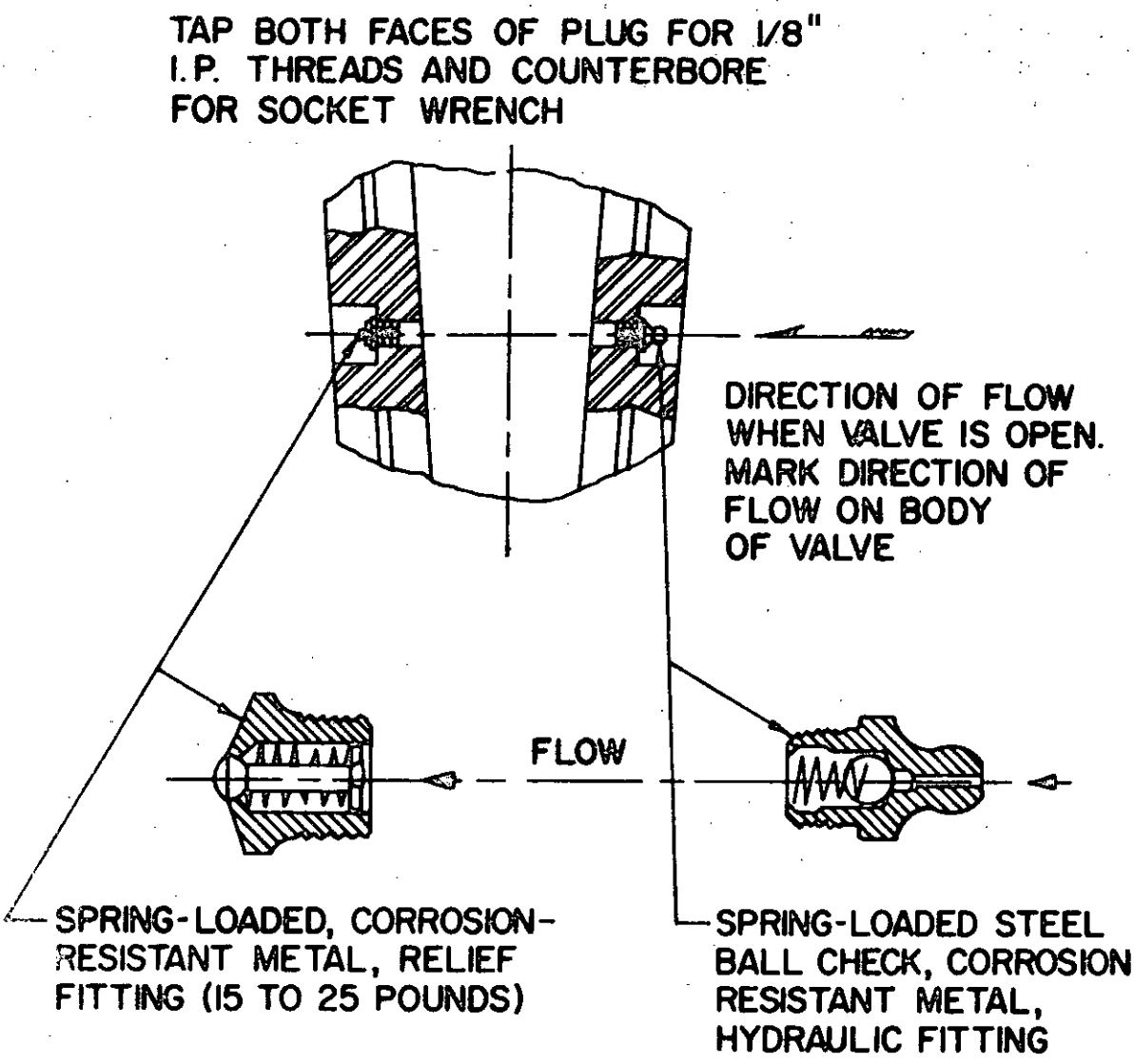

FIGURE 2. Plug equipped with relief fittings.

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