

METRIC
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MILITARY SPECIFICATION

VALVE, HOSE ASSEMBLY, AND ADAPTER, VENT AND TEST HYDRAULIC SERVICE, GENERAL SPECIFICATION FOR (METRIC)

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

1. SCOPE

1.1 Scope. This specification covers vent and test valves, hose assemblies and adapters suitable for hydraulic service to a maximum operating pressure of 310 bar (4,500 pounds per square inch (lb/in²)).

1.2 Classification. Vent and test valves, hose assemblies and adapters shall be furnished in the configuration and sizes listed in the applicable specification sheet (see 3.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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SPECIFICATIONS

FEDERAL

- QQ-A-225 - Aluminum and Aluminum Alloy Bar, Rod, Wire, or Special Shapes; Rolled, Drawn, or Cold Finished; General Specification for.
- QQ-A-225/8 - Aluminum Alloy 6061, Bar, Rod, Wire and Special Shapes; Rolled, Drawn or Cold Finished.
- QQ-N-281 - Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections.
- QQ-S-763 - Steel Bars, Wire, Shapes, and Forgings, Corrosion-Resisting.
- PPP-F-320 - Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes.

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- MIL-V-3 - Valves, Fittings, and Flanges (Except for Systems Indicated Herein); Packaging of.
- MIL-S-901 - Shock Tests, HI (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
- MIL-C-5501 - Caps and Plugs, Protective, Dust and Moisture Seal, General Specification for.
- MIL-L-17331 - Lubricating Oil, Steam Turbine and Gear, Moderate Service.
- MIL-H-17672 - Hydraulic Fluid, Petroleum, Inhibited.
- MIL-L-19140 - Lumber and Plywood, Fire Retardant Treated.
- MIL-H-19457 - Hydraulic Fluid, Fire-Resistant, Non-Neurotoxic.
- MIL-H-22072 - Hydraulic Fluid, Catapult, Nato Code Number H-579.
- MIL-V-24695/1 - Valve, Vent and Test Hydraulic Service.
- MIL-V-24695/2 - Vent and Test Valve Hose Assembly Hydraulic Service.
- MIL-V-24695/3 - Adapter, Vent and Test Valve Hose Assembly.
- MIL-R-83248 - Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant.
- MIL-R-83248/2 - Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant, O-rings, Class 2, 90 Hardness.
- MIL-R-83485 - Rubber, Fluorocarbon Elastomer, Improved Performance at Low Temperatures.

STANDARDS

MILITARY

- MIL-STD-167-1 - Mechanical Vibration of Shipboard Equipment, (Type I - Environmental and Type II - Internally Excited).
- MIL-STD-2193 - Hydraulic System Components, Ship. (Metric)

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- B46.1 - Surface Texture (Surface Roughness, Waviness, and Lay).
(DOD adopted)
- Y14.5 - Dimensioning and Tolerancing. (DOD adopted)
- B1.1 - Unified Inch Screw Thread.
- B2.1 - Pipe Thread (Except Dryseal).

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- A 582 - Standard Specification for Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished.
(DOD adopted)
- A 276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

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

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

- ARP 603 - Impulse Testing of Hydraulic Hose, Tubing, and Fitting Assemblies. (DOD adopted)
- J 1926 - Specification for Straight Thread O-Ring Boss Port.
- MA 2012 - Port Connection Internal Straight Thread. (Metric)
- MA 2039 - Plug, MJ Thread, O-Ring Seal.
- MA 3445 - Packing, Preformed O-Ring Seal Fluorocarbon (MIL-R-83485, Type I). (Metric)

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Valve and hose assemblies furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time of award of contract (see 4.3 and 6.3).

3.3 Materials.

3.3.1 Compatibility. The valve, hose assembly and adapters shall be constructed of materials that will not adversely affect or be affected by hydraulic fluid conforming to MIL-H-17672, MIL-H-19457, and MIL-H-22072 or by lubricating fluid conforming to MIL-L-17331.

3.3.2 Prohibited materials. The following materials shall not be used:

- (a) Toxic materials.
- (b) Zinc or zinc plated materials.
- (c) Mercury.
- (d) Magnesium or magnesium base alloys.
- (e) Radioactive materials.
- (f) Asbestos.
- (g) Cadmium.
- (h) Beryllium.

3.3.3 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.3.4 Alloys. Alloys for use in pressure containing valve parts shall be limited to the following:

- (a) Aluminum alloy: QQ-A-225 and QQ-A-225/8, 6061-T6.
- (b) Copper-nickel alloy: QQ-N-281, class A.

3.3.5 CRES. The use of chromium-nickel austenitic steel in pressure containing valve parts shall be limited to AISI type 302, 304, 304L, 316, 316L in accordance with QQ-S-763, or type 316Ti in accordance with ASTM A 276, type 303 in accordance with ASTM A 582, or other steel as approved by the qualifying activity.

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3.3.6 Nonmetallic materials. Except for O-ring seals, the use of parts made of nonmetallic materials shall be limited to secondary pressure containment. When nonmetallic parts are used, these parts shall be verified for compatibility by conducting the immersion test specified in MIL-STD-2193.

3.3.7 O-rings. Internal O-ring seals shall be compatible with all fluids specified herein. External O-ring seals shall be fluorocarbon elastomer in accordance with MIL-R-83248 and MIL-R-83248/2 and shall be provided with the valve.

3.4 Construction.

3.4.1 Valves. Vent and test valves shall be constructed as specified herein and in the applicable specification sheet. The vent and test valves furnished under this specification shall seal by means of a spring loaded check valve. A probe, integral to the end fitting of the hose and conforming to the configuration identified in the applicable specification sheet shall be used to open the check valve by depressing the ball or poppet, opening the flow passage. The valve shall pass a minimum of 250 milliliters (mL) per minute at a pressure differential of 10 bars (145 lb/in²). A lockwire hole on the hex portion of the valve shall be provided.

3.4.1.1 Strength. The valves shall withstand the structural loads imposed by the test requirements of this specification. Valves shall withstand the wrench loads required for installation. The use of aluminum alloys for threaded applications is prohibited.

3.4.1.2 Clearance. Within the most adverse dimensions, there shall be clearance of moving parts at 0 and at 70 degrees Celsius (°C). The room temperature reference point shall be 20°C.

3.4.1.3 Cap design. A knurled valve cap shall be attached to the valve for installation when the hose assembly is not connected. The cap shall be equipped with a male connection to mate with the probe seal in the valve. This male connection shall not be long enough to actuate the valve. This male connection and the probe seal shall form a seal that will prevent leakage at 310 bars (4,500 lb/in²).

3.4.2 Hose assemblies. The hose assembly shall have a probe which is integral to the reverse buttress thread end fitting. An O-ring seal, located within the valve, shall seal against the probe. Dimensions shall conform to the applicable specification sheet. The probe shall be used to depress the check valve ball or poppet, opening the flow passage. The minimum hose internal diameter shall be not less than 1.0 millimeter (mm). Hose concentricity shall be maintained within 0.2 mm total indicator reading.

3.4.3 Adapters. Adapters shall be constructed as specified herein and in the applicable specification sheet. Dimensions shall conform to the applicable specification sheet. Adapters shall be equipped with a locking elastomer ring to dampen shock and vibration that may loosen the adapter. The adapter shall be sized to mate with the vent valve hose fitting (see figure 1, MIL-V-24695/2).

3.5 Performance. Valves, hose assemblies and adapters, shall perform as follows (see 4.3).

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3.5.1 Valves.

3.5.1.1 Proof pressure. The valve shall withstand a proof pressure of 465 bars (6,750 lb/in²) without signs of external leakage, failure, or permanent set.

3.5.1.2 Shock. The valve shall meet the shock requirements as specified in MIL-S-901 for grade A, class I equipment (see 4.3.4.3).

3.5.1.3 Leakage. Leakage through the valve shall be insufficient to form a drop (see 4.3.4.4 and 4.3.4.5).

3.5.1.4 Operation. The torque required to couple the hose assembly to the valve under the maximum operating pressure of 310 bars (4,500 lb/in²) shall not exceed 2.0 newton-meters (18 inch-pounds) (see 4.3.4.6).

3.5.1.5 Endurance. The valves shall withstand 10,000 operating cycles at an operating pressure of 310 bars (4,500 lb/in²) at room temperature (see 4.3.4.6).

3.5.1.6 Vibration. The vent valves shall operate as specified herein after being subjected to vibration tests in accordance with MIL-STD-167-1. Presence of any of the following conditions resulting from vibration shall be cause for rejection:

- (a) Damage to parts.
- (b) Loosening of parts (including cap).
- (c) Leakage of one drop or more from the uncapped valve.
- (d) Loosening (unscrewing) of the valve when the cap is removed.

3.5.1.7 Burst pressure. The valve shall withstand a burst pressure of 620 bars (9,000 lb/in²) without any sign of rupture or permanent deformation (see 4.3.4.8).

3.5.2 Hose assembly.

3.5.2.1 Proof pressure. The hose assembly shall withstand a proof pressure of 620 bars (9,000 lb/in²) (see 4.3.5.2).

3.5.2.2 Flexibility. The hose assembly shall exhibit no evidence of permanent deformation when pressurized to 310 bars (4,500 lb/in²) operating pressure at a bend radius of 40 mm (see 4.3.5.3).

3.5.2.3 Impulse. The hose assembly shall withstand 200,000 impulse cycles (see 4.3.5.4). There shall be no sign of permanent deformation or leakage.

3.5.2.4 Leakage. The hose assembly shall show no sign of leakage after 2 hours under an operating pressure of 310 bars (4,500 lb/in²) (see 4.3.5.5).

3.5.2.5 Burst pressure. The hose assembly shall withstand a burst pressure of 1240 bars (18,000 lb/in²) with no sign of leakage (see 4.3.5.6).

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3.5.3 Adapters.

3.5.3.1 Proof pressure. The adapter shall withstand a proof pressure of 465 bars (6,750 lb/in²) without permanent deformation or damage (see 4.3.6.2).

3.5.3.2 Operation. The torque required to couple hose assembly to the adapter shall not exceed 2.0 Newton-Meters (18 inch-pounds) (see 4.3.6.4).

3.5.3.3 Vibration. The adapters shall operate as specified herein after being subjected to vibration test in accordance with MIL-STD-167-1. Damage to adapter or loosening (unscrewing) of the adapter shall be the cause for rejection (see 4.3.6.3).

3.5.3.4 Burst pressure. The adapter shall withstand a burst pressure of 620 bars (9000 lb/in²) without any sign of rupture or permanent deformation (see 4.3.6.5).

3.6 Marking. Each valve and each hose assembly shall be identified with a metal or plastic tag bearing the following information:

- (a) Manufacturer's name, trademark, or logo.
- (b) Specification sheet part number.
- (c) Manufacturer's part number.
- (d) Assembly date (by quarter and year).

3.7 Interchangeability. In no case shall parts be physically interchangeable or reversible unless such parts are also interchangeable or reversible with regard to function, performance, and strength.

3.8 Workmanship. Valve and hose assemblies shall be free from porosity, roughness, or any other defect which might affect their serviceability.

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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies

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submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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

- (a) Qualification inspection (see 4.3).
- (b) Quality conformance inspection (see 4.4).

4.3 Qualification inspection. Qualification inspection shall be conducted at a laboratory approved by the Naval Sea Systems Command (NAVSEA). Qualification inspection shall consist of the tests and examinations as specified in 4.3.1 through 4.3.6 and shall be conducted in the order as shown in tables I, II and III unless otherwise approved by the qualifying activity.

TABLE I. Valve qualification inspection.

| Inspection | Order of tests | Requirement | Test |
|--------------------|----------------|-------------|---------|
| Examination | 1 | 3.4.1 | 4.3.4.1 |
| Shock | 2 | 3.5.1.2 | 4.3.4.3 |
| Vibration | 3 | 3.5.1.6 | 4.3.4.7 |
| Assembly flow rate | 4 | 3.4.1 | 4.3.7 |
| Proof pressure | 5 | 3.5.1.1 | 4.3.4.2 |
| Leakage - uncapped | 6 | 3.5.1.3 | 4.3.4.4 |
| capped | | 3.5.1.3 | 4.3.4.5 |
| Operation | 7 | 3.5.1.4 | 4.3.4.6 |
| Endurance | 8 | 3.5.1.5 | 4.3.4.6 |
| Burst pressure | 9 | 3.5.1.7 | 4.3.4.8 |

TABLE II. Hose assembly qualification inspection.

| Inspection | Order of tests | Requirement | Test |
|----------------|----------------|-------------|---------|
| Examination | 1 | 3.4.2 | 4.3.5.1 |
| Proof pressure | 2 | 3.5.2.1 | 4.3.5.2 |
| Flexibility | 3 | 3.5.2.2 | 4.3.5.3 |
| Impulse | 4 | 3.5.2.3 | 4.3.5.4 |
| Leakage | 5 | 3.5.2.4 | 4.3.5.5 |
| Burst pressure | 6 | 3.5.2.5 | 4.3.5.6 |

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TABLE III. Adapter qualification inspection.

| Inspection | Order of tests | Requirement | Test |
|----------------|----------------|-------------|---------|
| Examination | 1 | 3.4.3 | 4.3.6.1 |
| Proof pressure | 3 | 3.5.3.1 | 4.3.6.2 |
| Operation | 4 | 3.5.3.2 | 4.3.6.4 |
| Vibration | 2 | 3.5.3.3 | 4.3.6.3 |
| Burst pressure | 5 | 3.5.3.4 | 4.3.6.5 |

4.3.1 Samples for qualification. Samples for the qualification tests shall consist of one valve, one adapter and two hose assemblies for each part number as specified on the applicable specification sheet.

4.3.1.1 Extension of qualification. Qualification of one hose assembly length can be extended to all lengths provided that the end fittings are identical for each assembly and only the hose length varies. For valves and adapters whose only difference is the end fitting configuration, qualification can be extended provided a burst pressure test is conducted.

4.3.2 Data submission. Before test authorization (preferably together with application for qualification) the manufacturer shall submit two sets of assembly drawings for each vent valve, adapter or hose assembly for which approval to conduct qualification tests is requested. The following data shall be furnished on, or together with, the assembly drawings:

- (a) Outline dimensions of the complete assembly.
- (b) Dimensional location of ports, and port sizes.
- (c) Bill of material, listing specifications, grade, and condition, or other data needed to identify the material. Part numbers shall be provided for maintenance replaceable parts.

Dimensioning and tolerancing on drawings shall be in accordance with ANSI Y14.5.

4.3.3 Test conditions. Unless otherwise specified herein, the hydraulic fluid used for all tests shall conform to MIL-H-17672, 2135TH. The fluid shall be maintained at a minimum temperature of 45°C.

4.3.4 Valves.

4.3.4.1 Examination. Each valve shall be examined for conformance to the requirements of this specification, applicable specification sheets and manufacturer's drawings.

4.3.4.2 Proof pressure. The valve shall withstand proof pressure of 465 bars (6,750 lb/in²) applied to the inlet with the outlet port blocked without evidence of permanent deformation, malfunction, or leakage other than a slight wetting at seals. Proof pressure shall be applied at least two successive times and held 2 minutes for each pressure application. The valve shall be operated between pressure applications. The pressure shall be reduced to zero between applications.

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4.3.4.3 Shock. The valve shall be subjected to high-impact mechanical shock tests in accordance with the requirements for grade A, subsidiary component, class I, lightweight, type B, fixture 4A of MIL-S-901. A valve shall be considered as having failed the shock test if it does not meet the leakage test of 4.3.4.4, or shows any signs of external or internal damage when examined in accordance with 4.3.4.1. The valve shall be pressurized to the maximum operating pressure of 310 bars (4,500 lb/in²) during the test.

4.3.4.4 Leakage. The valve shall be uncapped and subjected to the operating pressure of 310 bars (4,500 lb/in²). The valve shall then be actuated with the probe and the operating pressure maintained for 2 hours. There shall be no leakage other than a slight wetting of the seal. During connection to the probe, one drop shall be allowed. The test shall be repeated at 50 percent of the specified operating pressure and at 0.35 bars (5 lb/in²). The valve shall automatically close after disconnection from the probe without leakage.

4.3.4.5 Leakage (capped valve). The cap shall prevent leakage at 310 bars (4,500 lb/in²) in the event of total valve failure. This pressure shall be held for 2 hours. During this time, leakage shall be insufficient to form a drop. This test may be accomplished on a separate valve, with the check valve device removed, at any time in the testing sequence.

4.3.4.6 Valve operation. The torque required to connect the hose to the valve against the maximum operating pressure of 310 bars (4,500 lb/in²) shall not exceed 2.0 Newton-Meters (18 inch-pounds). In addition, the valve shall operate satisfactorily after 10,000 open-close cycles at 310 bars. After cycling, the leakage test of 4.3.4.4 shall be performed. Leakage shall not exceed one drop during the 2 hour holding period.

4.3.4.7 Vibration. The valve shall be pressurized and subjected to type I (environmental vibration) vibration tests in accordance with MIL-STD-167-1 for the frequency of 4 to 50 hertz (Hz). The valve shall be tested in each of three mutually perpendicular axes. However, if a component is symmetrical about a principal axis, vibration testing need only be accomplished along two orthogonal axes, one of which shall be the principle axis of symmetry. For the last axis tested, the valve cap shall not be installed. Any of following conditions resulting from vibration shall constitute failure of this test:

- (a) Damage to parts.
- (b) Loosening of parts (including cap).
- (c) External leakage.
- (d) Loosening (unscrewing) of the valve when the cap is removed [for vibration test, installation torque applied for installing valve shall be 11-13.5 Newton-Meters (99-121.5 inch-pounds) which is one-half the normal torque value of 22-27 Newton-Meters (198-243 inch-pounds)].

4.3.4.8 Burst pressure. Pressure shall be applied to the valve at a rate not to exceed 1,725 bars (25,000 lb/in²) per minute until 620 bars (9,000 lb/in²) burst pressure is obtained. After this pressure has been held for 2 minutes, the valve shall show no sign of leakage. The pressure may be further increased to determine the actual burst pressure.

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4.3.5 Hose assembly.

4.3.5.1 Examination. Each hose assembly shall be examined for conformance to the requirements of this specification, applicable specification sheets, and manufacturer's drawings.

4.3.5.2 Proof pressure. The hose assembly shall withstand proof pressure of 620 bars (9,000 lb/in²) without evidence of permanent deformation or external leakage. The proof pressure shall be applied at least twice and held for 2 minutes at each application. The pressure shall be reduced to zero between applications.

4.3.5.3 Flexibility. The hose assembly shall be pressurized to the 310 bars (4,500 lb/in²) operating pressure. The assembly shall be flexed to the minimum bend radius of 40 mm, and the pressure increased to the applicable proof pressure. Pressure shall be reduced to zero, and the test repeated. Any evidence of permanent deformation or leakage shall constitute failure of this test.

4.3.5.4 Impulse. The hose assembly shall be impulse tested based on a rated operating pressure of 310 bars (4,500 lb/in²) in accordance with SAE ARP 603 using MIL-H-17672 hydraulic fluid. The assembly shall be subjected to 200,000 cycles at room temperature. Any evidence of permanent deformation or leakage shall constitute failure of this test.

4.3.5.5 Leakage. The hose assembly shall be subjected to the 310 bars (4,500 lb/in²) operating pressure with each end connected to either a MIL-V-24695/1 vent and test fitting or a MIL-V-24695/3 adapter. After 2 hours there shall be no evidence of leakage.

4.3.5.6 Burst pressure. Pressure shall be applied to the hose assembly at a rate not to exceed 1,725 bars (25,000 lb/in²) per minute until the 1,240 bars (18,000 lb/in²) burst pressure is obtained. After this pressure has been held for 2 minutes, the hose and end fittings shall show no sign of leakage. The pressure may be further increased to determine the actual burst pressure.

4.3.6 Adapters.

4.3.6.1 Examination. Each adapter shall be examined for conformance to the requirements of this specification, applicable specification sheets and manufacturer's drawings.

4.3.6.2 Proof pressure. The adapter shall withstand proof pressure of 465 bars (6,750 lb/in²) applied to the inlet with the outlet port blocked without evidence of permanent deformation or damage.

4.3.6.3 Vibration. The adapter shall be pressurized and subjected to type I (environmental vibration tests in accordance with MIL-STD-167-1 for the frequency of 4 to 50 Hz. The adapter shall be tested in each of three mutually perpendicular axes. However, if a component is symmetrical about a principal axis, vibration testing need only be accomplished along two orthogonal axes, one of which shall be principle axis of symmetry. Loosening (unscrewing) of the adapter resulting from vibration shall constitute failure of this test.

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4.3.6.4 Adapter operation. The torque required to connect the adapter to the hose assembly against the maximum operating pressure of 310 bars (4,500 lb/in²) shall not exceed 2.0 Newton-Meters (18 inch-pounds).

4.3.6.5 Burst pressure. Pressure shall be applied to the adapter at a rate not to exceed 1,725 bars (25,000 lb/in²) per minute until 620 bars (9,000 lb/in²) burst pressure is obtained. The burst pressure shall be held for 2 minutes. The pressure may be further increased to determine the actual burst pressure.

4.3.7 Valve flow rate. It shall be demonstrated that the valve has a minimum flow rate of 250 mL per minute at a differential pressure of 10 bars (145 lb/in²).

4.3.8 Nonmetallic parts compatibility. Two samples of nonmetallic parts such as caps, plugs shall be subjected to the immersion test specified in MIL-STD-2193.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examination of 4.4.1.1 and the tests of 4.4.1.2. Each valve and each hose assembly shall be subjected to quality conformance inspection.

4.4.1 Examination and tests.

4.4.1.1 Examination.

4.4.1.1.1 Valves. Each valve shall be visually and dimensionally examined to determine conformance to the applicable specification sheet and any other requirements of this specification not involving tests.

4.4.1.1.2 Hose assembly. Each hose assembly shall be visually and dimensionally examined to determine conformance to the applicable specification sheet and any other requirements of this specification not involving tests.

4.4.1.1.3 Adapters. Each adapter shall be visually and dimensionally examined to determine conformance to the applicable specification sheet and any other requirement of this specification not involving test.

4.4.1.2 Tests.

4.4.1.2.1 Valves.

4.4.1.2.1.1 Proof pressure. The valve shall withstand proof pressure of 465 bars (6,750 lb/in²) applied to the inlet with the outlet port blocked without evidence of permanent deformation, malfunction or leakage other than a slight wetting at seals. The proof pressure shall be applied once.

4.4.1.2.1.2 Leakage. The valve shall be uncapped, actuated, and then subjected to a pressure of 310 bars (4,500 lb/in²) with no leakage other than wetting of the seal.

4.4.1.2.2 Hose assembly. The hose assembly shall withstand proof pressure of 620 bars (9,000 lb/in²) without evidence of permanent deformation or external leakage. Proof pressure shall be applied once.

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4.4.1.2.3 Adapters. The adapter shall withstand burst pressure of 620 bar (9,000 lb/in²) applied to the inlet with the outlet port blocked without evidence of permanent deformation or rupture.

4.5 Inspection of packaging. Sample packages and the inspection for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging or preparation for delivery requirements of referenced documents listed in section 2, see 6.5.)

5.1 Packaging requirements. The packaging (packing and marking) requirements shall be in accordance with MIL-V-3 for the level of packing (A, B, C, or commercial), marking, including bar coding and other packaging acquisition options therein as specified (see 6.2). In addition, for Navy acquisitions, the following applies:

(a) Navy fire retardant requirements.

- (1) Treated lumber and plywood. Unless otherwise specified (see 6.2); all lumber and plywood including laminated veneer materials used in shipping container and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated materials conforming to MIL-L-19140 as follows:

Level A and B - Type II - weather resistant.
Category I- general use.

Level C - Type I - non-weather resistant.
Category I- general use.

- (2) Fiberboard. Fiberboard used in the construction of interior (unit and intermediate) and exterior fiberboard boxes including interior packaging forms shall conform to the class-domestic/fire retardant or class-weather resistant/fire retardant material requirements as specified (see 6.2), of PPP-F-320 and amendments thereto.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The valves and hose assemblies covered by this specification are intended for use in hydraulic systems at a maximum operating pressure of 310 bars (4,500 lb/in²).

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6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Title, number, and date of the applicable specification sheet.
- (c) Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- (d) Specification sheet part number (see 1.2).
- (e) Level of packing and other acquisitioning options required (see 5.1).
- (f) When fire-retardant treated lumber and plywood is not required (see 5.1 (a)(1)).
- (g) Class of fire retardant fiberboard required (see 5.1 (a)(2)).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL-24695 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 and information pertaining to qualification of products may be obtained from that activity. Application for qualification tests must be made in accordance with "Provisions Governing Qualification SD-6" (see 6.3.1).

6.3.1 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

6.5 Subject term (key word) listing.

Aluminum alloy
 Burst pressure
 Copper-nickel alloy
 Impulse
 Leakage
 Proof pressure

Preparing activity:
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