MILITARY SPECIFICATION

VALVE, HYDRAULIC RELIEF, 1.5 - 35 BARS (22 - 500 POUNDS PER SQUARE INCH) CARTRIDGE TYPE, GENERAL SPECIFICATION FOR (METRIC)

This specification is approved for use within 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 the requirements for cartridge-type relief valves for use in hydraulic systems with a maximum operating pressure of 35 bars (500 pounds per square inch (lb/in^2)).

1.2 Classification. Cartridge-type relief valves shall be furnished in the sizes, adjustment type and pressure settings (classes) listed in the applicable specification sheet.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

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.

AMSC N/A FSC 4810

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, Wires, Shapes, and Forgings, Corrosion-Resisting.

PPP-B-566 - Boxes, Folding, Paperboard.

PPP-B-6ol - Boxes, Wood, Cleated-Plywood.

PPP-B-636 - Boxes, Shipping, Fiberboard.

PPP-B-676 - Boxes, Setup.

MILITARY

MIL-P-116 - Preservation, Methods of.

MIL-S-901 - Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for.

MIL-G-5514 - Gland Design; Packings, Hydraulic, General Requirements for.

MIL-H-6083 - Hydraulic Fluid, Petroleum Base, For Preservation and Operation.

MIL-H-17672 - Hydraulic Fluid, Petroleum, Inhibited.

MIL--H-19457 - Hydraulic Fluid, Fire Resistant, Non-Neurotoxic.

MIL-H-22072 - Hydraulic Fluid, Catapult, Nato Code Number H-579.

MIL-H-83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydro- carbon Base, Aircraft, NATO Code Number H-537. (Metric)

MIL-R-83485 - Rubber, Fluorocarbon Elastomer, Improved Perfor- mance at Low Temperatures.

MIL-R-83485/l - Rubber, Fluorocarbon Elastomer, Improved perfor- mance at Low Temperatures, O-Rings, Sizes and Tolerances.

MIL-V-24694/l - Valve, Hydraulic Relief, 1.5 - 35 Bar, 150 LPM Cartridge Type.

MIL-V-24694/2 - Valve, Hydraulic Relief, 1.5 - 35 Bar, 10 LPM Cartridge Type.

STANDARDS

MILITARY

MIL-STD-129 - Marking for Shipment and Storage.

MIL-STD-794 - Parts and Equipment, Procedures for Packaging of.

MS20995 - Wire, Safety or Lock.

MS33540 - Safety Wiring and Cotter Pinning, General Practices for.

MS33656 - Fitting End, Standard Dimensions for Flared Tube Correction and Gasket Seal.

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

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B46.1 - Surface Texture Surface Roughness, Waviness and Lay. (DoD adopted)

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)

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

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual valve 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. Valves 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 set for opening of bids (see 4.3 and 6.3).

3.3 Materials. Materials shall be limited to those specified herein and on applicable specification sheets, Metals shall be compatible with the fluid, temperature , service and performance requirements specified herein.

3.3.1 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.

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

(a) Toxic materials
(b) Zinc or zinc plated materials (see 3.3.4.1)
(c) Mercury
(d) Magnesium or magnesium base alloys
(e) Radioactive materials
(f) Asbestos
(g) Cadmium (see 3.3.4.1)

3.3.2.1 Beryllium. Beryllium is acceptable as a small percentage alloying material in parts that are not subjected to welding.

3.3.3 Metal alloys. Unless otherwise approved by the quailifying activity, alloys for use in pressure-containing parts of valves shall be limited to the following:

(a) Aluminum alloy: QQ-A-225 and QQ-A-225/8, 6061-T6.
(b) Nickel-copper alloy: QQ-N-281, class A.
(c) CRES: AISI type 302, 304, 304L, 316L in accordance with QQ-S-763, or type 303 in accordance with ASTM A 582.

3.3.4 Compatibility. The valve shall be constructed of materials which are compatible with fluids as specified in MIL-H-83282, MIL-H-19457, MIL-H-6083, MIL-H-22072, and MIL-H-17672.

3.3.4.1 Cadmium and zinc plating. Cadmium and zinc plating shall not be used for internal parts or on internal surfaces in contact with hydraulic fluid. This restriction does not prohibit the use of zinc or cadmium-plated parts such as nuts, bolts, and screws in locations that are external to the system where there is no danger of fluid contamination.

3.4 Construction. Cartridge-type relief valve construction shall be as specified herein and on the applicable specification sheet. Overall dimensions shall be as specified on the applicable specification sheet.

3.4.1 Preformed packing (O-rings). O-rings shall be fluorocarbon rubber in accordance with MIL-R-83485 and MIL-R-83485/1.

3.4.2 Special tools. Valves shall be adjustable throughout the pressure range without the use of special tools. The adjustment type, either external or internal, shall be as identified in the applicable specification sheet (see 3.1). (Special tools are those tools not listed in the Federal Supply Catalog, copies of which may be consulted in the Office of the Defense Contract Administration Services Management Area (DCASMA)).

3.4.3 Safety. Hand-adjustable threaded parts subject to tampering shall be securely locked by safety wiring or self-locking nuts. Safety wire shall be applied in accordance with MS33540 and shall conform to MS20995. Star washers, lock washers and jam nuts shall not be used as locking devices. Internal fasteners shall have features which prevent them from coming loose and interfering with system operation.

3.5 Performance. Valves shall perform as specified in 3.5.1 through 3.5.10.

3.5.1 Operating pressure. The valve shall wet the requirements specified herein at operating pressures specified in the applicable specification sheet (see 3.1).

3.5.2 Rated flow. Rated flow shall be in accordance with the values shown on the applicable specification sheet and shall occur at a differential pressure not greater than that shown on figure 1 for any nominal set pressure.

3.5.3 Proof pressure. The valve shall withstand a proof pressure of 69 bars (1000 lb/in^2) without external leakage, failure, or permanent set (see 4.7.2). If a spring is used that permits a pressure setting beyond 35 bars (500 lb/in^2), the proof pressure shall be 200 percent of the maximum pressure setting.

3.5.4 Internal leakage.

3.5.4.1 Reseat. For any pressure settling throughout the applicable operating range, the valve shall reseat at not less than the minimum reseat pressure shown on figure 1. The valve is considered to be reseated when leakage does not exceed that specified In the applicable specification sheet (see 3.1).

3.5.4.2 Leakage. As pressure is decreased after reseating, the leakage shall not exceed 1 milliliter (mL) per minute at a pressure equivalent to 75 percent of the set pressure. With pressure Increased from zero to the minimum reseat pressure, the leakage shall not exceed 1 mL per minute.

3.5.5 Endurance. The valve shall show no sign of damage to the seating surface, instability, or leakage in excess of twice the amount specified in the applicable specification sheet (see 4.7.7).

3.5.6 Vibration. The relief valves shall operate as specified herein after being subjected to exploratory, variable frequency and resonance dwell sinusoidal vibration tests in each of three mutually perpendicular axes (see 4.7.5). Any of the following conditions resulting from vibration are considered unacceptable:

(a) Damage to parts.
(b) Loosening of parts.
(c) Degradation of operational performance (including leakage) below specification requirements.

3.5.7 Shock. The valve shall met the shock requirements as specified in MIL-S-901 for grade A, class I equipment (see 4.7.6).

3.5.8 Reseat pressure. The reseat pressure for any nominal set pressure shall be as shown on figure 1 (see 4.7.3.2).

3.5.9 Burst pressure. Unless otherwise specified see 3.1), the valve shall withstand a burst pressure of 140 bars (2030 lb/in).

3.5.10 Operating temperature. Unless otherwise specified (see 3.1), the valves shall operate throughout a temperature range of minus 40 to 135 degrees Celsius (“C) when used with fluids suitable for the operating temperature.

3.6 Identification marking. Each valve shall be clearly and permanently identified by steel stamping, electrochemical etch or equivalent means with the following information and symbol:

(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 Drawings. When specified in the contract or purchase order (see 6.2.1), drawings shall be prepared (see 6.2.2).

3.9 Workmanship. The valve body and internal parts shall be free of burrs, sharp edges, or any other damage or defects that could prevent the part from performing its intended purpose.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perfom 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 Responsibility for compliance. All items must meet all requirement 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 the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of 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 satisfactory to NAVSEA. Qualification inspection shall consist of the examinations and tests shown in table I. Tests shall be conducted in the sequence listed in table I unless otherwise approved by the qualifying activity.

TABLE I. Qualification inspection.

Examination or test	Requirement paragraph	Examination or test paragraph
Visual examination	3.3, 3.4	4.7.1
Proof pressure	3.5.3	4.7.2
Shock	3.5.7	4.7.6
Vibration	3.5*6	4.7.5
Performance testing	3.5	4.7.3, 4.7.4
Rated flow differential pressure	3.5.2	4.7.3.1
Reseat pressure	3.5.8	4.7.3.2
Internal leakage	3.5*4	4.7.3.3
Operating temperature performance	3.5.10	4.7.8.1, 4.7.8.2
Endurance	3.5.5	4.7.7
Burst pressure	3.5.9	4.7.9

4.3.1 Qualification sampling Qualification inspection shall be conducted on one sample valve representative of pressure classes as specified on the applicable specification sheets.

4.3.2 Extension of qualification. Qualification may be extended on the basis of similarity if the following criteria are met:

(a) Qualification of a valve corresponding to a specific pressure range may be extended to all ranges by similarity if only the springs are changed to alter the pressure range,
(b) For the pressure range selected for qualification testing, the inspections shown in table I for qualification shall be accomplished.
(c) For additional pressure ranges of the same configuration valve, only the rated flow differential pressure, reseat pressure, and leakage qualification tests shall be required,

4.3.3 Data submittal. Prior to test authorization (preferably together with application for qualification) the manufacturer shall submit two sets of assembly drawings for each relief valve assembly for which approval to conduct qualification tests is requested. Assembly drawings shall show a cutaway section of details in their normal assembly positions and shall carry part numbers of details and subassemblies. The following data shall be furnished on, or together with, the assembly drawings:

(a) Outline dimensions of the complete assembly.
(b) Cross-sectional views showing internal flow paths.
(c) Bill of material, listing specifications, grade, and condition, or other data needed to identify the material proposed.
(d) Complete disassembly procedure and description of tools needed including handling of internal parts that are subject to reverse installation.
(e) Data on spring and spring rate.
(f) pressure setting adjustment instructions.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examination of 4.7.1 and the tests of 4.7.2 and 4.7.3.3. Each valve shall be subjected to quality conformance inspection.

4.4.1 Certificate of compliance. When specified in the contract or purchase order, a certificate of compliance shall be prepared (see 6.2.2).

4.5 Teat conditions.

4.5.1 Test fluid. Unless otherwise specified herein, the hydraulic fluid used for all qualification tests shall conform to MIL-H-17672, 2135TH at a minimum temperature of 40°C. For quality conformance, any of the fluids specified in 3.3.4 may be used as the test fluid, provided that the fluid temperature is adjusted to maintain a fluid viscosity of less than 75 centistokes. Increased leakage for quality conformance testing with lower viscosity fluids shall be justified in the qualification test report and approved by the qualifying activity.

4.5.2 Ambient temperature. Unless otherwise specified herein, the tests shall be conducted at a room temperature of 15 to 35°C, measured within 0.3 meter of the test sample.

4.6 Test methods. Cartridge-type relief valves shall be tested in a housing designed to accept the valve and having inlet and outlet ports. The valves shall be free of chatter, surging or squeal under any condition or combination of conditions in this specification.

4.7 Tests and examination.

4.7.1 Visual and dimensional examination. Valves shall be visually and dimensionally examined to determine conformance to the applicable specification sheet and any other applicable requirements of this specification.

4.7.2 Proof pressure. A proof pressure of 69 bars (1000 lb/in^2) or 200 percent of the maximum possible pressure setting, whichever is greater, shall be applied to the inlet port of the valve with the return port blocked and held for 2 minutes. There shall be no external leakage or evidence of permanent deformation. For quality conformance, proof pressure shall be applied for a minimum of 30 seconds to assure that no leakage is present.

4.7.3 Performance tests (minimum setting). The following tests shall be conducted with the valve adjusted to the minimum nominal set pressure specified for its class as identified in the applicable specification sheet. Valves adjustable to a range of more than one class need only be tested at the minimum setting of the range. Any evidence of chatter, surging, or squeal under any test condition shall be cause for rejection. Leakage measurements shall be taken in the third minute of a 3-minute period. For quality conformance, test time may be reduced to 1 minute.

4.7.3.1 Rated flow differential pressure- The pressure shall be increased until rated flow as identified in the applicable specification sheet is passed through the valve. The pressure at which this flow occurs shall be recorded as the rated flow pressure and its value shall be not greater than that identified on figure 1 for a given nominal set pressure. Fluid temperature shall not exceed 40°C for this test.

4.7.3.2 Reseat. With rated flow through the valve, the inlet pressure shall gradually be reduced until leakage not greater than the reseat leakage specified in the applicable specification sheet can be determined. The pressure at which this leakage rate occurs shall be recorded as the reseat pressure and its value shall be not less than that identified on figure 1.

4.7.3.3 Internal leakage.

4.7.3.3.1 Decreasing pressure leakage. The reduction of pressure shall be continued, and the leakage rate observed et a pressure equivalent to 75 percent of the set pressure. Unless otherwise specified (see 3.1), leakage at this pressure shall not exceed 1 cubic centimeter (mL^3) per minute.

4.7.3.3.2 Increasing pressure leakage. The pressure shall be decreased to zero, then increased to the minimum reseat pressure. Unless otherwise specified (see 3.1), leakage at the pressure equivalent to reseat pressure shall not exceed 1 mL^3 per minute.

4.7.4 Performance test (maximum setting). The valve shall be adjusted to the maximum pressure setting of its class (see 3.1) as identified in the applicable specification sheet. Valves adjustable to a range of more than one class need only be tested at the maximum setting of the highest class. With the valve set at the the maximum pressure setting, the tests of 4.7.3.1 through 4.7.3.3.2 shall be performed. Any evidence of chatter, surging, or squeal under any test condition shall be cause for rejection. leakage measurements shall be taken in the third minute of a 3-minute period. For quality conformance, test time may be reduced to 1 minute.

4.7.5 Vibration tests. The valve shall be mounted on a resonance-free fixture for testing. The vibration input accelerometer shall be mounted on the fixture close to the mounting point of the valve to the fixture. A second accelerometer shall be mounted directly on the valve for monitoring resonant frequencies. Valves need not be pressurized for the tests but shall be mounted in a test block. If a valve is symmetrical about a principal axis, vibration testing need only be accomplished along two orthogonal axes, one of which shall be the principal axis of symmetry.

4.7.5.1 Exploratory for resonance frequencies. Resonant frequencies of the valve shall be determined by varying the frequency of applied vibration slowly throughout the range specified in table II. For frequencies from 4 to 33 hertz (Hz), the table vibratory single amplitude shall be 0.25 ± .05 millimeter (mm). Above 33 Hz the table vibratory single amplitude shall be 0.10 + .02 mm. The change in frequency shall be made in discrete frequency intervals of 1 up to 50 Hz and maintained at each frequency for about 15 seconds. From 50 to 2000 Hz a logarithmic sweep of at least 10 minutes duration shall be made. As an alternative, a logarithirmic sweep from 4 to 2000 Hz back to 4 Hz may be conducted. The total time of the ascending plus descending sweep shall be not less than 40 minutes.

4.7.5.2 Variable frequency. The valves shall be vibrated from 4 (or lowest obtainable frequency) to 2000 Hz at the amplitude specified in table II. From 4 to 50 Hz the valves shall be vibrated in descrete frequency intervals of 1 Hz for 1 minute minimum at each frequency. From 50 to 2000 Hz a logarithmic ascending and descending sweep of not less than 20 minutes total shall be conducted.

4.7.5.3 Resonance dwell. Test valves shall be vibrated along each axis at the most severe resonant frequencies determined in 4.7.5.1 at the amplitudes specified in table II. The dwell test time shall be divided equally between the significant resonant frequencies. If more than four significant resonant frequencies are found for any one axis, the four most severe resonant frequencies shall be chosen for the dwell test. Total test time shall be 2 hours for each axis* If no resonant frequencies are identified the valve shall be tested at 50 Hz

TABLE II. Vibratory displacement, single amplitude.

Frequency range (Hz)	Table amplitude 1/	
	(mm-minimum)	(inches - minimum)
4 to 15	1.25	0.05
16 to 25	1.00	.04
26 to 33	0.75	.03
34 to 40	.50	.02
41 to 50	.25	.01
51 to 2000	.25	.01

1/ For Government-conducted tests, the maximum amplitude will not exceed the minimum required amplitude by more than 20 percent.

4.7.6 Shock. The valve shall be subjected to high-impact mechanical shock tests in accordance with the requirements for grade A, class I, lightweight, type B, fixture 4A of MIL-S-901. A valve shall be considered to have failed the shock test if it does not meet the leakage test of 4.7.3.3, or shows any signs of external or internal damage when examined in accordance with 4.7.1. The valve shall be pressurized to a setting not less than 75 percent of its maximum set pressure during shock testing.

4.7.7 Endurance. The valve shall be subjected to 100,000 cycles while set at the highest pressure setting for the class or group of classes. Each cycle shall consist of imposing rated flow through the valve and then reducing the pressure to zero. Cycling shall be accomplished at a rate not to exceed 60 cycles per minute. Fluid temperature shall be maintained at not less than 40°C. Leakage at the reseat pressure determined in 4.7.3.2 shall be not greater than two times the allowable reseat leakage identified in the applicable specification sheet.

4.7.8 Operating temperature.

4.7.8.1 Low temperature. Unless otherwise specified (see 3.1), the fluid for this test shall be in accordance with MIL-H-83282. The test setup shall include a handpump or power driven pump that shall provide a flow of not less than 1 liter per minute to the relief valve. The test shall be conducted on two valves, one adjusted to the lowest setting of the lowest pressure range tested and one adjusted to the highest setting of the highest pressure range tested. Operate the pump at room temperature at not less than the minimum flow rate and note the highest pressure developed at the relief valve inlet. Unless otherwise specified (see 3.1), the test setup shall then be maintained at a temperature not warmer than minus 40°C for 2 hours with the valve unpressurized. The valve shall then be pressurized to 75 percent of the set pressure and the low temperature maintained for 2 additional hours. The pump shall then be operated at the same rate as at room temperature and the highest pressure noted. The pressure value obtained at minus 40°C shall not vary more than plus or minus 10 percent from those obtained during the room temperature test.

4.7.8.2 Rapid warmup and high temperature. The low temperature shall then be allowed to warm rapidly to a temperature of 135°C. While the temperature 18 being raised and without waiting for the temperature to stabilize throughout the setup, the pump shall be operated at the same rate as previously operated at room temperature at temperature increments not to exceed 30°C. The pressure values obtained at these temperature increments and at 135°C shall not vary more than plus *or* minus 10 percent from those obtained during the room temperature test. After maintaining the 135°C temperature for at least 2 hours, the reseat test of 4.7.3.2 shall be conducted with MIL-H-83282 fluid at 135°C with a flow of not less than 1 liter per minute, The reseat pressure shall be not less than 90 percent of the minimum reseat pressure required by figure 1.

4.7.9 Burst pressure. Fluid pressure shall be applied to the inlet port with the outlet port blocked until the burst pressure specified in 3.5.9 or the applicable specification sheet (see 3.1) is obtained, This pressure shall be applied for a minimum of 2 minutes. At the end of this period, the valve shall be examined and any sign of external or internal damage shall be cause for rejection.

4.8 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment 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 requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation and packaging. Preservation and packaging shall be in accordance with MIL-STD-794, level A, B or C, as specified (see 6.2.1).

5.1.1 Level A.

5.1.1.1 Cleaning. Prior to preservation, the valve shall be cleaned ultrasonically (or equivalent method) until free from all metal chips, grit, dirt and other foreign matter. The cleaning method utilized shall not have deleterious effects on any material (for example, metals, plastics) elastomers, and so forth). Care shall be taken after cleaning to ensure that the valve is not contaminated prior to or during preservation or packaging.

5.1.1.2 Preservation. Unless otherwise specified in the contract or purchase order (see 6.2.1), the valve shall be flushed with hydraulic fluid conforming to MIL-H-6083, drained and packed in a heat-sealed plastic bag. Preservative fluids shall be as follows:

Petroleum base systems:	Use MIL-H-6083 and re-preserve at 1-year intervals.
Phosphate ester systems:	Use MIL-H-19457 and re-preserve at 6-month intervals.
Water glycol systems:	Use a 10 percent solution of E. F. Houghton Rust Veto 4221 (or equal) in water-glycol. Re-preserve at 9-month intervals. Flush with water glycol prior to installation.

5.1.1.3 Packaging. The valve shall be packed in accordance with method ICI of MIL-P-116 and placed in a fiberboard box conforming to W6s or W6c of PPP-B-636.

5.1.2 Level B. Valves shall be cleaned, preserved and packaged as for level A, except that the unit container may conform to paperboard boxes conforming to PPP-B-566 or PPP-B-676.

5.1.3 Level C. Valves shall be packaged in a manner to prevent deterioration and damage during handling and shipment from the supply source to the first receiving activity for immediate use.

5.2 Packing. Valve packages shall be packed level A, B or C, as specified (see 6.2.1).

5.2.1 level A. Valves shall be packed in wood-cleated plywood boxes conforming to PPP-B-601, grade A. Gross weight of each box shall not exceed 200 pounds.

5.2.2 Level B. Valves shall be packed in fiberboard boxes conforming to V3s, V4s or V3c of PPP-B-636.

5.2.3 Level C. Valves shall be packed in a manner to ensure carrier acceptance and cafe delivery to destination.

5.3 Marking In addition to special marking required, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129, and include the following:

(a) Part number (see 3.1).
(b) Month and year of manufacture.

5.3.1 Special marking. Preserved assemblies shall be tagged, and the individual unit container and exterior shipping container marked or labeled with the following:

Tags : "DO not disassemble. The interior of this item has been cleaned and examined and is coated with corrosion-preventative compound (brand name and Military Specification number), manufactured by (name of company). It was preserved on (date) and should be represerved (number of months) months from date if still in storage. Preservation replacement can be done by (state procedure)."

5.3.1.1 When the preservative fluid conforms to MIL-H-6083, the following additional information shall be added to the tag: "Removal of residual preservative fluid prior to installation in petroleum base systems is not required."

5.3.1.2 When the preservative fluid conforms to MIL-H-19457, the following additional information shall be added to the tag: "Removal of residual preservative fluid prior to installation in phosphate ester systems is not required."

5.3.1.3 When the preservative fluid conforms to E. F. Houghton Rust Veto 4221 (or equal) in water glycol, the following additional information shall be added to the tag: "Removal of residual preservative fluid by flushing with system fluid is required prior to installation."

6. NOTES

6.1 intended use. The valves described in this Specification are Intended for use in hydraulic systems operating at a maximum set pressure of 35 bars (500 lb/in^2 differential). The valves have an operating temperature range of minus 40 to 135°C and are intended for use with petroleum base, water-glycol and MIL-H-194S7 phosphate ester base hydraulic fluids.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) Title, number, and date of the applicable specification sheet.
(c) Applicable specification sheet part number.
(d) If drawings are required (see 3.8).
(e) Level of preservation, packaging and packing (see 5.1 and 5.2).
(f) preservatives fluid if other than specified (see 5.1.1.2).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

Paragraph no.	Data requirement title	Applicable DID no.	Option
3.8	Drawings, engineering and associated lists	DI-E-7031	Level 3
4.4.1	Certification data/report	UDI-A-23264	——

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L. , AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer).

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

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified products List QPL-24694 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 5523, 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 shall be made in accordance with “Provisions Governing Qualification SD-6" (see 6.3.1).

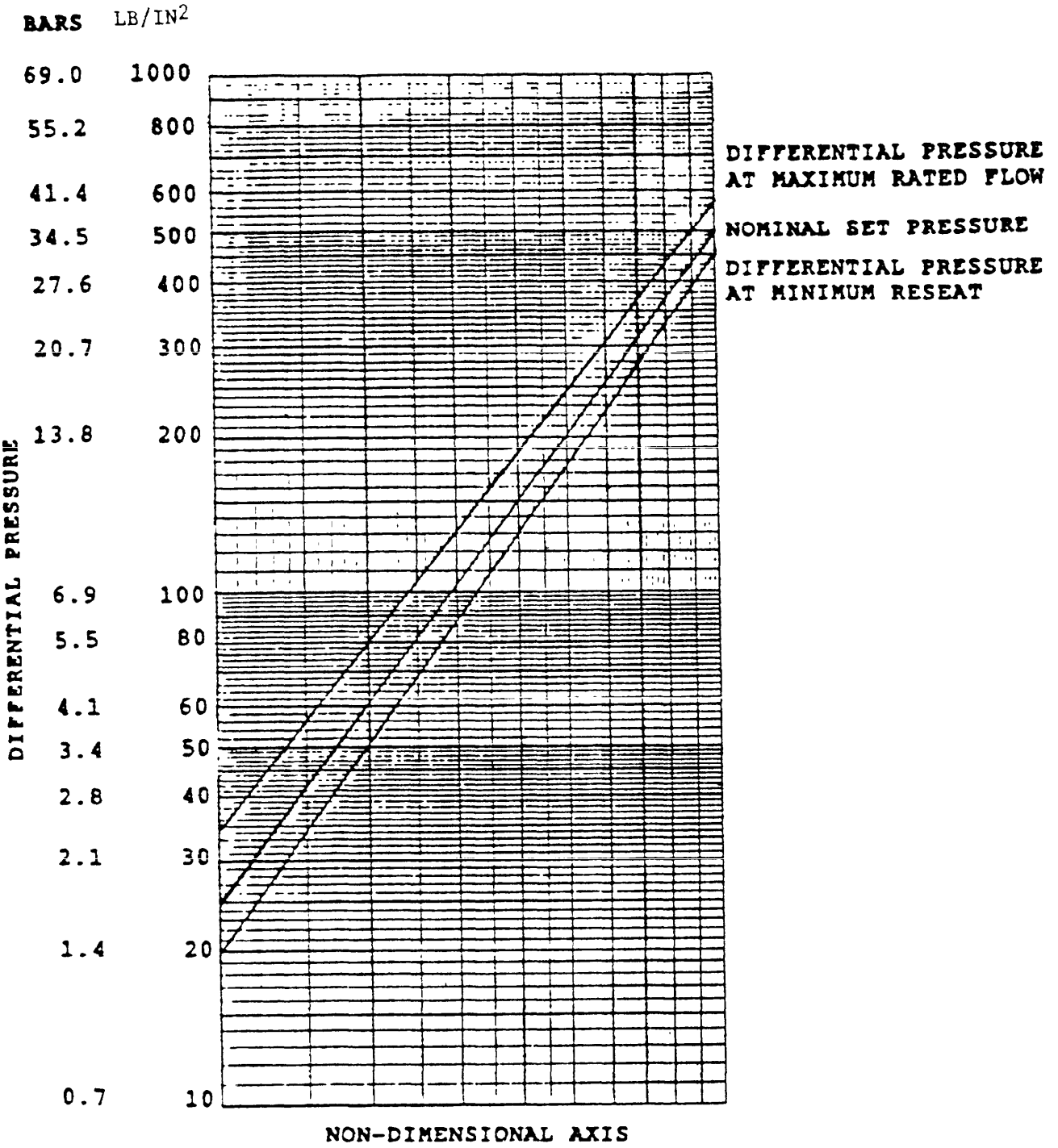
6.3.1 Copies of “Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

6.4 Subcontracted 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

Cartridge type
Qualification
Threaded
Valves

Preparing activity:
Navy - SH
(Project 4810-N057)



SH 132316940

Select differential pressure from the nominal set pressure curve, draw line vertically to obtain maximum differential pressure at rated flow or at reseat condition.

FIGURE 1. Low pressure hydraulic relief valve performance.

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