

INCH-POUNDMIL-V-81940B
30 August 1993
SUPERSEDING
MIL-V-81940A
31 JANUARY 1978

MILITARY SPECIFICATION

VALVE, SAMPLING AND BLEED, HYDRAULIC,
TYPE II SYSTEMS

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

1. SCOPE

1.1 Scope. This specification covers hydraulic sampling and bleed valves suitable for use in aircraft and missile high pressure hydraulic systems.

1.2 Classification. Hydraulic sampling and bleed valves are of class 3000 and to be operated with type II hydraulic fluid as defined in MIL-H-5440.

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 6.2c).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Warfare Center Aircraft Division Lakehurst, Code SR3, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

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FSC 1650

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SPECIFICATIONS

FEDERAL

- PPP-B-566 - Boxes, Folding, Paperboard
- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-B-676 - Boxes, Setup

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- MIL-B-117 - Bags, Sleeve and Tubing
- MIL-H-5440 - Hydraulic Systems, Aircraft, Types I and II, Design and Installation Requirements For
- MIL-C-5501 - Caps and Plugs, Protective, Dust and Moisture Seal
- MIL-H-5606 - Hydraulic Fluid, Petroleum Base; Aircraft, Missile and Ordnance
- MIL-H-6083 - Hydraulic Fluid, Petroleum Base, for Preservation and Operation
- MIL-H-8775 - Hydraulic System Components, Aircraft and Missiles, General Specification For
- MIL-H-25475 - Hydraulic System, Missile, Design, Installation and Tests, General Requirements For
- MIL-H-46170 - Hydraulic Fluid, Rust Inhibited, Fire-Resistant, Synthetic Hydrocarbon Base
- MIL-F-81836 - Filter and Disposable Element, Fluid Pressure, Hydraulic, 3 Micron Absolute
- MIL-V-81940/1 - Valve, Sampling and Bleed, Hydraulic, Type II Systems
- MIL-H-83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft

STANDARDS

MILITARY

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MIL-STD-100	-	Engineering Drawing Practices
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 U.S. Military Property
MIL-STD-280	-	Definitions of Items Levels, Item Exchangeability Models and Related Terms
MIL-STD-2073-1	-	DOD Materiel Procedures for Development and Application of Packaging Requirements
MS21344	-	Fittings, Installation of Flared Tube, Straight Threaded Connectors, Design Standard for

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

2.2 Non-Government publications. The following document forms 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 6.2c).

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

ARP 598	-	Determination of Particulate Contamination in Liquids by the Particle Count Method
AS 4059	-	Aerospace-cleanliness classification for hydraulic fluids

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D3951	-	Commercial Packaging
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(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

NATIONAL FLUID POWER ASSOCIATION

NFPA T2.9.6 R1 - Calibration Method for Liquid Automatic Particle Counters Using Latex Spheres Second Edition

(Application for copies should be addressed to the National Fluid Power Association, 3333 N. Mayfair Road, Milwaukee, WI 53222.)

(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 specification and the references cited herein (except for related associated detail specifications, specification sheets or MS standards), the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Qualification. The 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 of award of contract (see 4.3 and 6.4).

3.3 Materials.

3.3.1 Selection. Materials used shall be internally and externally protected against corrosion. Material selection shall be in accordance with MIL-H-8775 Type II components.

3.3.2 Compatibility. The valve shall be constructed of materials that will not adversely affect or be affected by hydraulic fluid conforming to MIL-H-5606, MIL-H-6083, MIL-H-83282 and the test fluids specified herein.

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3.3.3 Fungi nutrients. Materials which are not nutrients for fungi shall be used wherever possible. Where fungus-nutrient materials must be used, they shall be treated with a fungicidal agent.

3.4 Design and construction.

3.4.1 Sampling and bleed valves. Sampling and bleed valves, for hydraulic systems conforming to MIL-H-5440 for aircraft and MIL-H-25475 for missiles shall be designed and constructed as specified herein and the applicable specification sheet MIL-V-81940/1.

3.4.2 External loads. The valve shall be designed to withstand all the external loads. The valve shall be of such strength and rigidity as to withstand the wrench loads required for making tube connections. The installation torque and tubing connection shall be in accordance with MS21344.

3.4.3 Valve internal configuration. The internal configuration of the valve shall be inspected and shall be such that the minimum restriction in the flow path shall be 500 microns. The manufacturer shall verify compliance with this requirement by providing adequate detail drawings (see 6.3).

3.5 Performance. The valve shall meet the performance requirements as specified in 3.5.1 through 3.5.12.

3.5.1 Sampling efficiency (normal systems). The valve shall be designed to operate with hydraulic fluids with a contamination level as specified in 4.6.1.1. For each size range, the particle count from the sampling valve shall be equal to the particle count from the open port within $\pm 20\%$.

3.5.2 Sampling efficiency (dirty systems). The valve shall be designed to operate with hydraulic fluids having a contamination level higher than normal (class 12 and above contamination level per AS 4059) hydraulic fluid systems and shall be able to meet the test requirements as specified in 4.6.1.2.

3.5.3 Proof pressure. The valve shall be designed to withstand a proof pressure of 6000 psi and shall not leak, malfunction, or permanently deform when tested in accordance with proof pressure test as specified in 4.6.2.

3.5.4 Leakage (uncapped). The valve shall be designed to operate at 3000 psi with no cap installed in the outlet port and shall meet the leakage test requirements as specified in 4.6.3.

3.5.5 Leakage (capped). The valve shall be designed to operate at 3000 psi with cap installed in the outlet port and shall be able to meet the leakage test requirements when tested in accordance with 4.6.4.

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3.5.6 Valve operation. The valve shall be designed to operate at 3000 psi continuously for 2000 hours at 275°F fluid and ambient temperature without malfunction or leakage and shall meet the test requirements of 4.6.5.

3.5.7 Low temperature operation. The valve shall be designed to operate at -70°F (maximum) hydraulic fluid and ambient temperature and shall be able to pass the test requirements as specified in 4.6.6.1.

3.5.8 High temperature operation. The valve shall be designed to operate at 275°F (maximum) hydraulic fluid and ambient temperature without malfunction or leakage. The valve shall meet the test requirements as specified in 4.6.6.2.

3.5.9 Impulse. The valve shall be able to operate at the peak pressure of 150 percent of operating pressure with initial rate of pressure rise to 200,000 - 300,000 psi/sec and shall meet the test requirements for the impulse test (see 4.6.7).

3.5.10 Vibration. The valve shall be designed to meet the vibration test requirements as specified in 4.6.8.

3.5.12 Burst pressure. The valve shall be designed to meet the burst pressure of 12,000 psi and shall show no leakage when held at that pressure for 2 minutes.

3.6 Identification of product.

3.6.1 Markings. Each valve shall be clearly and permanently identified by steel stamping or by a permanently attached nameplate conforming to MIL-STD-130. The following information shall be provided.

VALVE, SAMPLING AND BLEED
 M81940/ (Insert slash number of specification sheet
 and designation for fitting end)
 Manufacturer part number
 Manufacturer stock number or serial number
 Manufacturer name
 Design activity CAGE CODE/part number

3.7 Part numbering of interchangeable parts. All parts having the same design activity CAGE CODE (Contracting and Government Entity) and part number shall be interchangeable as defined in MIL-STD-280. The item identification and part number requirements of MIL-STD-100 shall govern the design activity part numbers and changes thereto. The manufacturer's part number and drawing number shall be the same.

3.8 Workmanship. The workmanship and finish shall be of sufficiently high grade to ensure satisfactory operation, reliability, and durability consistent with the application and storage life requirements of the valve.

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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. The contractor(s) shall meet all the 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 the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all the requirements of the contract. Sampling inspection, as part of 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 (see 6.3):

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

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

4.3 Qualification inspection. The qualification inspection shall consist of all the examinations and tests specified in table I (listed sequence mandatory).

4.3.1 Qualification samples. The qualification sample shall consist of two specimens of each valve. The specimens shall be assembled of parts which conform to manufacturer's drawings/design's activity drawing. Samples shall be forwarded to a test facility set forth in the letter of authorization to submit samples (see 6.4). Samples shall be clearly identified by securely attached durable tags with the following information:

Sample submitted by (name) (date) for qualification inspection in accordance with the requirements of MIL-V-81940 (latest revision) and number under authorization (reference authorizing letter and number, see 6.4).

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TABLE I. Qualification inspection

Test in sequence	Test description	Requirements paragraph nos.	Test requirements paragraph nos.
1	Examination of product	3.4.3	4.4.2
2	Valve cleanliness	5.1.1	4.7.1
3	Sampling efficiency (normal system)	3.5.2	4.6.1.1
4	Sampling efficiency (dirty system)	3.5.3	4.6.1.2
5	Proof pressure	3.5.4	4.6.2
6	Leakage (uncapped)	3.5.5	4.6.3
7	Leakage (capped)	3.5.6	4.6.4
8	Valve operation	3.5.7	4.6.5
9	Low temperature operation	3.5.8	4.6.6.1
10	High temperature operation	3.5.9	4.6.6.2
11	Impulse	3.5.10	4.6.7
12	Vibration	3.5.11	4.6.8
13	Burst pressure	3.5.12	4.6.9

4.3.2 Test data. The manufacturer shall provide test data showing that adequate clearance of moving parts is provided using the worst possible combination of tolerances. The room temperature reference point shall be 70°F (see 6.3).

4.3.3 Retention of qualification. The retention of qualification shall consist of verification every two years to determine compliance of the listed items with the requirements of this specification. Verification shall be by manufacturer's certification unless otherwise specified by the activity responsible for the QPL and shall be included in the notice of qualification letter.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the following:

- a. Individual inspection (4.4.1).
- b. Sampling tests (4.4.2).

4.4.1 Individual inspection. The individual inspection specified in table II shall be conducted on each valve in the order listed. Any valve containing defects shall be rejected.

4.4.2 Examination of products. Each valve shall be carefully examined to determine conformance with the requirements of this specification and specification sheets with regard to design, construction, workmanship, product conformance to applicable drawings and for any visible defects.

4.4.3 Sampling tests. A sample shall be selected from each inspection lot (see 4.4.4) in accordance with MIL-STD-105 using Special Inspection Level S-1 with no rejects allowed. The sample valve shall be unpacked and the sampling tests, specified in table II, shall be conducted on each valve in the order listed.

4.4.4 Inspection lot. For purposes of quality conformance inspection, a lot shall be defined as all units of product manufactured under essentially the same conditions and offered for acceptance at the same time.

4.5 Test conditions.

4.5.1 Test fluid. Unless otherwise specified, the hydraulic fluid used for all tests shall conform to MIL-H-83282 for -40°F to +275°F temperature range or MIL-H-5606 for -65°F to +275°F temperature range (with no free water). For quality conformance tests, hydraulic fluid conforming to MIL-H-6083 or MIL-H-46170 shall be used.

4.5.1.1 Test fluid cleanliness. For quality conformance tests and cleanliness qualification test (see 4.7.1), the test fluid shall be pre-cleaned to a cleanliness level equal to class 1 of AS 4059.

4.5.1.2 Test fluid filtration. The test fluid shall be continuously filtered through a 3-micron absolute filter conforming to MIL-F-81836 or a filter with equivalent efficiency during testing.

4.5.1.3 Test fluid temperature. The actual temperature of the test fluid shall be $100^{\circ}\text{F} \pm 10^{\circ}\text{F}$.

4.5.2 Test temperature. The tests shall be conducted at a room temperature of 70°F to 90°F , measured within 12 inches of the test sample.

4.6 Test methods.

4.6.1 Valve characteristics.

4.6.1.1 Valve sampling efficiency (normal system). The clean-up filter on the figure 1 system shall be bypassed. Standardized fine air cleaner (AC) test dust per NFPA T2.9.6 R1 shall be added to the system until a contamination level of between class 6 and 8 of AS 4059 is obtained. The fluid sample for the above shall be drawn from the open port shown on figure 1. Flow shall be adjusted to 5 gpm with 400 psi maintained on the valve. The valve shall be uncapped, actuated and 200 ml flushed through the valve sampling port.

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With the valve kept in an open position, 100 ml of fluid shall be collected in a pre-cleaned bottle. The bottle shall be removed from the fluid stream prior to closing the valve. The fluid shall be analyzed in accordance with ARP 598 or with an automatic particle counter that has been calibrated using NFPA T2.9.6 R1.

TABLE II. Quality conformance inspection

Test sequence	Test description	Requirements paragraph no.	Test requirements paragraph no.
	<u>INDIVIDUAL INSPECTION</u>		
1	Examination of product	3.4.3	4.4.2
2	Proof pressure at room temperature	3.5.3	4.6.2
	<u>SAMPLING TESTS</u>		
1	Valve cleanliness	5.1.1	4.7.1
2	Leakage	3.5.6	4.6.3

4.6.1.2 Valve sampling efficiency (dirty system). The test specified in paragraph 4.6.1.1 shall be repeated except that standardized coarse AC test dust per NFPA T2.9.6 R1 shall be added to the system until a contamination level of class 12 or greater is obtained. Flow through the sampling valve shall be continuous with no blockage. Five 100 ml samples shall be collected. The sampling valve flow rate shall be as specified in paragraph 4.6.5. Circulate the system on figure 1 for 12 hours with the clean-up filter in bypass mode and repeat this test. Any blockage or discontinuous flow during the test shall be cause for rejection.

4.6.2 Proof pressure. The valve shall be filled with test fluid and maintained at 275°F for 72 hours for qualification test only. Proof pressure of 6,000 psi shall then be applied at least twice at 275°F and held for 2 minutes at each application. The pressure shall be reduced to zero between pressure applications. The activity responsible for qualification shall have the prerogative to conduct additional tests to validate compliance of the valve with the longevity requirements specified in 3.5.6, and verify the manufacturer's analysis. For quality conformance testing, proof pressure (6,000 psi) shall be applied at least twice at room temperature of 70°F and held for 2 minutes at each application.

The pressure shall be reduced to zero between pressure applications. Any leakage or malfunction during the test shall constitute failure of the test and rejection of the valve.

4.6.3 Leakage (uncapped valve). The valve shall be uncapped and subjected to 3,000 psi. The valve shall be actuated and a 100 ml sample of fluid collected. The valve knob or button shall be released and allowed to close by itself. The 3,000 psi pressure shall be maintained for 2 hours. There shall be no leakage from the valve. The test shall be repeated at 5 psi. The valve shall automatically and immediately close in each case and no leakage shall occur. Any leakage in the valve during the test shall constitute failure of the test and rejection of the valve.

4.6.4 Leakage (capped valve). The valve with cap installed shall be subjected to 3,000 psi. The valve shall be held in an open position for 2 hours. A mechanical means can be used to hold the valve open. There shall be no leakage from the valve, or from behind the push button or knob. Any leakage in the valve during the test shall constitute failure of the test and rejection of the valve.

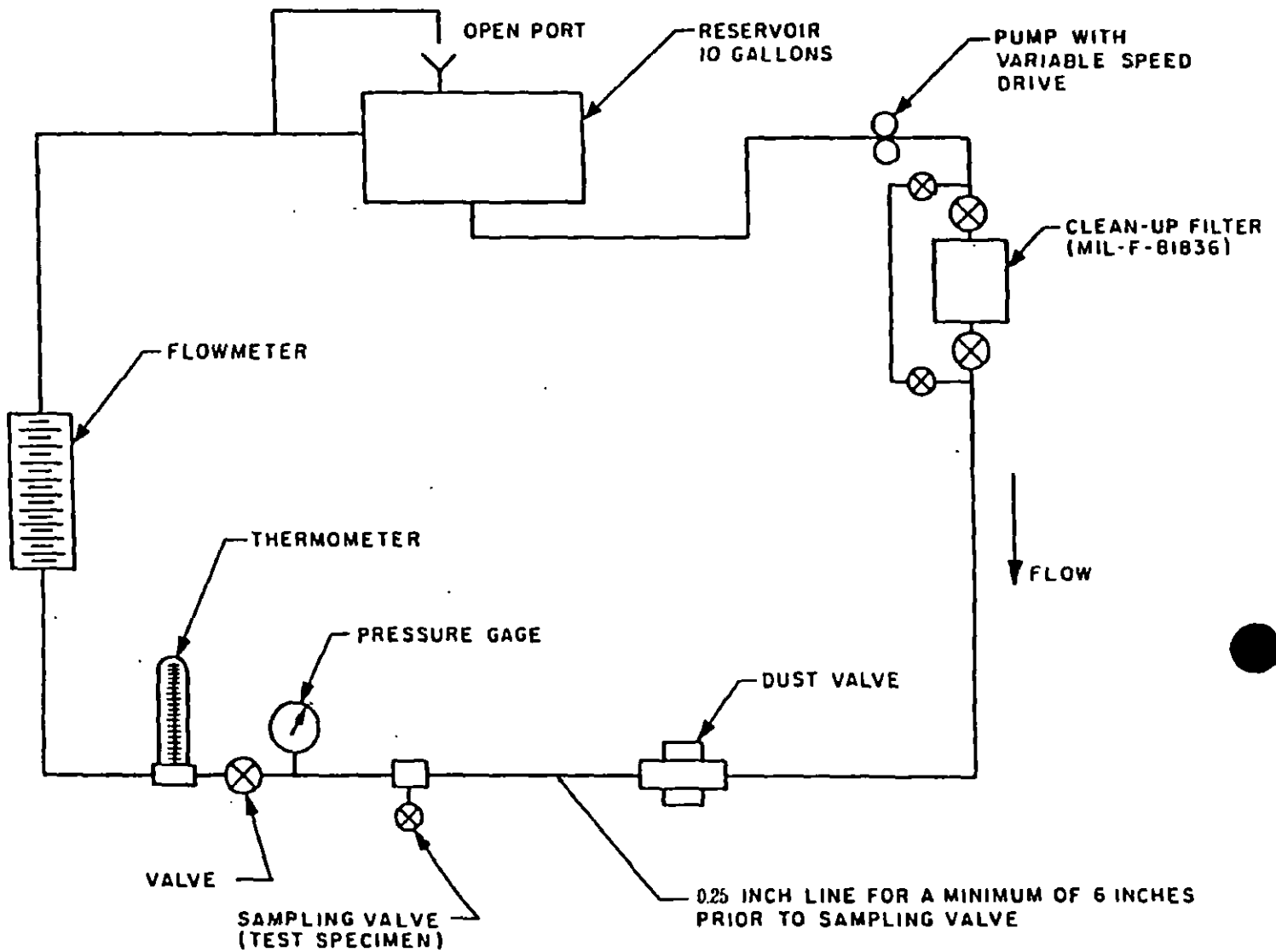
4.6.5 Valve operation. The valve tested shall be installed in the test set up as shown on figure 1. Flow shall be adjusted to 5 gpm with 3,000 psi maintained on the valve. The valve shall be uncapped and actuated to a full open position. The force or torque, as applicable, required to actuate the valve fully shall be measured and shall not exceed the value specified on the specification sheet. The valve knob shall be opened fully and a 100 ml sample of fluid collected. The valve shall be allowed to close. The flow rate shall be between 100 and 1500 ml per minute. The velocity of fluid exiting from the discharge port shall be 30 feet per second at the full open position. The valve shall be actuated 100 times with 100 ml of fluid collected each time. The valve shall be tested for leakage in accordance with 4.6.3. The above test shall be repeated with 50 psi maintained on the valve. Any malfunction or fluid flow less than 30 ft. per second shall constitute failure of the test and rejection of the valve.

4.6.6 Extreme temperature functioning

4.6.6.1 Low temperature functioning. The valve shall be uncapped and subjected to -65°F to -70°F for 24 hours. During this period the valve shall be filled with MIL-H-5606 hydraulic fluid. With fluid and ambient temperature maintained at -65°F to -70°F the tests specified in paragraphs 4.6.3 and 4.6.4 shall be conducted. There shall be no leakage from the valve. Any fluid leakage during the test shall constitute failure of the test.

4.6.6.2 High temperature functioning. The valve shall be subjected to a temperature of $275^{\circ}\text{F} + 5^{\circ}\text{F}$ for 24 hours. During this period the valve shall be filled with test fluid.

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NOTE: TOTAL SYSTEM VOLUME SHALL NOT EXCEED 15 GALLONS

FIGURE 1. Typical setup for determining sampling valve characteristics.

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With fluid temperature maintained at $275^{\circ}\text{F} \pm 5^{\circ}\text{F}$ the test specified in paragraph 4.6.3 and 4.6.4 shall be conducted. There shall be no leakage from the valve. Any fluid leakage during the test shall constitute failure of the test.

4.6.7 Impulse. The valve shall be subjected to 100,000 impulse cycles, 25,000 at a fluid temperature of 275°F and 75,000 at a fluid temperature of 225°F . Each impulse cycle shall consist of a pressure rise from zero to 3,000 psi and back to zero. During each pressure increase, a peak surge pressure of 1.43 to 1.57 times the working pressure, as shown by an oscillograph, shall be obtained. Cycling shall be performed at a rate of 300 cycles per minute (cpm) maximum. There shall be no evidence of external leakage or structural failure during the performance of this test. The impulse pattern shall be as shown on figure 2 and the actual impulse pattern shall be recorded and reported (see 6.3). Any fluid leakage during the test shall constitute failure of the test.

4.6.8 Vibration. A sinusoidal vibration test shall be conducted on the valve at room temperature on each of the valve's three mutually perpendicular axes. One of these axes shall be parallel to the valve poppet axis. The valve shall be mounted on a resonance-free fixture for the test. The vibration input accelerometer shall be mounted on the fixture close to the mounting point of the valve. A second accelerometer shall be mounted directly on the valve for monitoring resonant frequencies. The rate of change of frequency shall be logarithmic (see figure 3). Any leakage during the test shall constitute failure of the test.

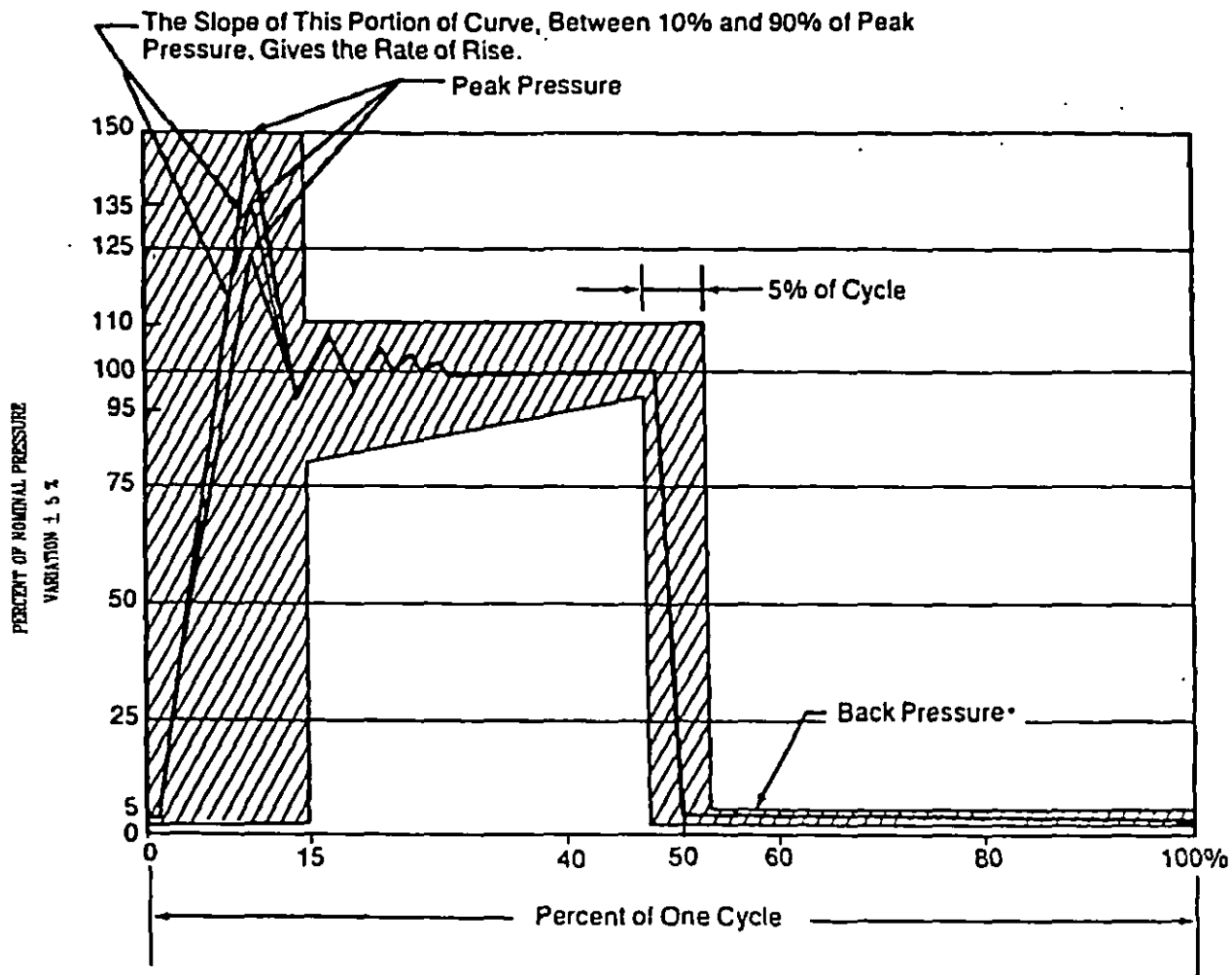
Vibration tolerances

Amplitude	$\pm 10\%$
Frequency	$\pm 2\%$
Acceleration	$\pm 10\%$

The following tests shall be conducted:

- a. Resonance search. Resonant frequencies of the valve assembly shall be determined by varying the frequency of applied vibration slowly through the range specified in table III, part 1, at reduced levels but with sufficient amplitude to excite them. This shall be repeated for each of the three axes.
- b. Resonance dwell. The valve shall be vibrated along each axis at the four most severe resonant frequencies (determined in the resonance search) for 30 minutes at each resonance. The vibration levels and test times shall be per table III, part 1.

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Note: The curve shown above is the approximate pressure-time cycle determined to be of proper severity for impulse testing. Although it is mandatory only that pressure peak rises to 150% of the operating pressure at some point prior to leveling off at rated pressure, it is considered highly desirable that the pressure-time curve be confined to the shaded area indicated. Initial rate of pressure rise shall be 200,000 - 300,000 psi per second. The back pressure shall be 50 ± 25 psi.

FIGURE 2. Impulse curve.

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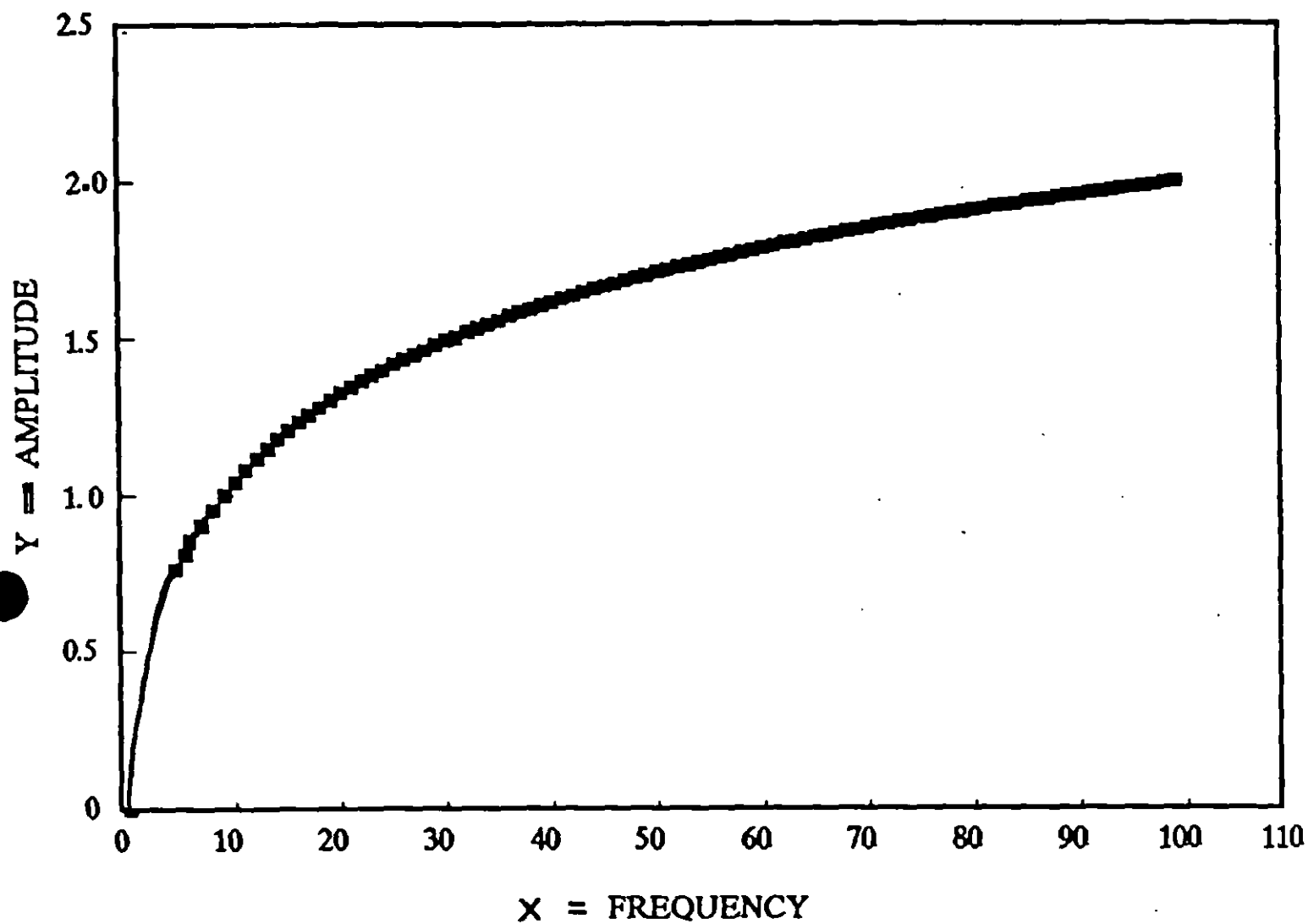


FIGURE 3. Logarithmic rate of change of frequency.

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TABLE III. Test procedure and time schedule

Test	Vibration level	Frequency band (Hz)				
Part 1	0.1 inch double amplitude 1.0 g 0.036 inch double amplitude 10.0 g	5 to 14	14 to 23	23 to 74	74 to 2000	
Part 2	0.2 inch double amplitude 1.0 g 0.06 inch double amplitude 20.0 g	5 to 10	10 to 18	18 to 81	81 to 2000	
Vibration time schedule - (time per one axis)						
Part 1	Number of resonances	0	1	2	3	4
	Total vibration time at each resonance	0	1/2 hr	1 hr	1-1/2 hr	2 hr
	Cycling time	2 hr	1-1/2 hr	1 hr	1/2 hr	0
Part 2	30 minutes cycling per axis no resonance dwell					

- c. Cycling test. The valve shall be vibrated along each axis in accordance with the test levels, frequency range and times from table III, parts 1 and 2. The frequency of applied vibration shall be swept over the frequency range of 5 to 2000 Hz and back to 5 Hz logarithmically. The time to sweep from 5 to 2000 Hz and back to 5 Hz shall be approximately 20 minutes. If a change in the resonant frequency occurs during the test, the time of occurrence shall be recorded and the frequency shall be adjusted immediately to maintain peak resonance condition. The final resonant frequency shall be recorded.
- d. Leakage test. Following the vibration test the valve shall be subjected to the leakage tests specified in 4.6.3 and 4.6.4. There shall be no leakage from the valve.

4.6.9 Burst pressure. Pressure shall be applied with a pump at a maximum rate of increase of 25,000 psi per minute until the specified burst pressure of 12,000 psi is reached. The valve shall show no leakage in the form of drops or rupture of internal or external parts at this pressure when held for 2 minutes. The pressure may be increased above that specified during qualification tests in order to secure data on actual burst pressure. The test shall be conducted at 275°F after a 5-hour soak at 275°F, and the valve filled with test fluid.

4.7 Preservation, packaging, and marking. Packaging shall be examined for conformance to section 5 and valve cleanliness test 4.7.1.

4.7.1 Valve cleanliness. The test fluid used in determining sampling valve characteristics (see figure 1) shall be pre-cleaned in accordance with paragraph 4.5.1.1. The valve shall be removed from its packaging and immediately installed on the figure 1 system. Flow shall be adjusted to 5 gpm through the system with 400 psi maintained on the valve. The valve shall be uncapped, actuated and 200 ml flushed through the valve sampling port. With the valve kept in an open position, 100 ml of fluid shall be collected in a pre-cleaned bottle. The bottle shall be removed from the fluid stream prior to closing the valve. The fluid shall be analyzed in accordance with ARP 598 or with an automatic particle counter that has been calibrated using NFPA T2.9.6 R1. The amount of contaminant shall not exceed class 1 of AS 4059. Fluid contamination above class 1 of AS 4059 shall constitute failure of the test.

5. PACKAGING

5.1 Preservation and packaging. Preservation and packaging shall be in accordance with MIL-STD-2073-1, level A only.

5.1.1 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 a deleterious effect on any material (e.g., metals, plastics, elastomers, etc.). Care shall be taken after cleaning to insure that the valve is not contaminated prior to or during preservation or packaging.

5.1.2 Preservation. The valve shall be flushed and filled 80 to 90 percent with hydraulic fluid conforming to MIL-H-6083 or MIL-H-46170 pre-filtered through a filter assembly conforming to MIL-F-81836 or a filter with equivalent efficiency and sealed with metal closures conforming to MIL-C-5501. The valve shall then be placed within a heat-sealed bag conforming to MIL-B-117, type I, class E.

5.1.3 Packaging. Each valve in its sealed bag shall be cushioned and snugly packaged within a carton or box conforming to PPP-B-566 or PPP-B-676.

5.2 Packing. Packing shall be in accordance with MIL-STD-2073-1, level A, B, or C, as specified in the contract or order (see 6.2d). Exterior containers shall contain identical quantities and shall have the minimum cube and tare consistent with the protection required.

5.2.1 Level A. Each valve packaged in accordance with 5.1.3 shall be packed in a snug-fitting fiberboard container conforming to PPP-B-636, weather resistant. Containers shall be closed and sealed as specified in the appendix of PPP-B-636.

5.2.2 Level B. Each valve packaged as in 5.1.3 shall be packed in a snug-fitting fiberboard container conforming to PPP-B-636, domestic. Containers shall be closed and sealed as specified in the appendix of PPP-B-636.

5.2.3 Level C. Each valve packaged as in 5.1.3 shall be packed in accordance with ASTM D3951.

5.3 Marking of shipments. Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129 and, in addition, shall include the following:

M81940/ (Insert slash number of specification sheet and designation for fitting end)
Month and year of manufacture
Style and size

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 valve covered by this specification is intended for use in aircraft and missile hydraulic systems covered by MIL-H-5440 and MIL-H-25475, and operating with hydraulic fluid conforming to MIL-H-5606 or MIL-H-83282 at a nominal operating pressure of 3,000 psi. For low pressure systems ground support application, see MIL-V-81940/2 and MIL-V-81940/3 and for non-aircraft application, see MIL-V-81940/4.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification, including any amendments.
- b. Applicable specification sheet part number.

- 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. Applicable levels of preservation, packaging, and packing (see 5.1, 5.2); including marking requirements (see 5.3).
- e. Data requirements (see 6.3).

6.3 Data requirements. The following Data Item Descriptions (DID's) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this specification is applied on a contract, in order to obtain the data, except where DOD FAR Supplement 277.475-70 exempts the requirement for a DD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
3.4.3	DI-DRPR-80651	Engineering drawings	Use contractor format
4.1.1	DI-NDTI-80809A	Tests/Inspection Reports	10.2.7
4.3.2, 4.6.7	DI-NDTI-80809A	Tests/Inspection Reports	Use contractor format

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 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 the applicable qualified products list whether or not such products have actually been listed by that date. The attention of the suppliers is called to this requirement, 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 orders for the products covered by this specification. The activity responsible for the qualified products list is: Commander, Naval Air Systems Command, Washington D.C. 20361; however, information pertaining to qualification of products should be obtained from the Commanding Officer, Naval Air Warfare Center, Aircraft Division, Warminster, Pennsylvania 18974-5000, Attention: Code 6061.

6.5 Subject term (key word) listing.

Aircraft, Control
Flow, Fluid
Flow, High pressure
Ground Support Equipment
Missiles, Weapons

6.6 Identification of changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue because of the extensiveness of the changes.

Custodians:

Army - AV
Air Force - 99
Navy - AS

Preparing activity:
Navy - AS

(Project 1650-0513)

Review activities:

Navy - SH
Air Force - 71
DLA - CS

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-V-81940B	2. DOCUMENT DATE (YYMMDD) 930830
3. DOCUMENT TITLE VALVE, SAMPLING AND BLEED, HYDRAULIC, TYPE II SYSTEMS		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed)		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	e. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME COMMANDING OFFICER, NAVAL AIR WARFARE CENTER AIRCRAFT DIVISION LAKEHURST SYSTEMS REQUIREMENTS DEPARTMENT	b. TELEPHONE (Include Area Code) (1) Commercial (908) 323-7488	(2) AUTOVON 624-7488
c. ADDRESS (Include Zip Code) CODE SR3 LAKEHURST, NJ 08733-5100	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	