

## MILITARY SPECIFICATION

VALVE, RELIEF, HYDRAULIC, HIGH RESPONSE,  
TYPE II SYSTEMS,  
GENERAL SPECIFICATION FOR

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 high response relief valves for use in Type II aircraft hydraulic systems.

1.2 Classification. Hydraulic high response relief valves shall be furnished in the sizes and pressure settings (classes) listed in the applicable specification sheet.

## 2. APPLICABLE DOCUMENTS

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

## SPECIFICATIONS

## Federal

|           |                            |
|-----------|----------------------------|
| PPP-B-566 | Boxes, Folding, Paperboard |
| PPP-B-601 | Box, Wood, Cleated Plywood |
| PPP-B-636 | Box, Fiberboard            |
| PPP-B-676 | Boxes, Setup               |

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 93) Naval Air Engineering Center, Lakehurst, NJ 08733, 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 (Continued)

## Military

|               |  |
|---------------|--|
| MIL-P-116     | Preservation, Methods of   |
| MIL-H-5440    | Hydraulic Systems, Aircraft, Types I and II, Design, Installation, and Data 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 Testing                                |
| MIL-H-8775    | Hydraulic System Components, Aircraft and Missiles, General Specification for                |
| MIL-F-81836   | Filter and Disposal Element, Fluid Pressure, Hydraulic 3 Micron Absolute                     |
| MIL-H-83282   | Hydraulic Fluid, Fire Resistant Synthetic Hydrocarbon Base, Aircraft                         |
| MIL-V-85245/1 | Valve, Relief, Hydraulic High Response, Inline   |
| MIL-V-85245/2 | Valve, Relief, Hydraulic, High Response, Cartridge Type                                      |

## STANDARDS

## Military

|             |  |
|-------------|--|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes  |
| MIL-STD-129 | Marking for Shipment and Storage                             |
| MIL-STD-130 | Identification Marking of US Military Property               |
| MIL-STD-794 | Parts and Equipment, Procedures for Packaging and Packing of |

## STANDARDS (Continued)

## Military (Continued)

MS21344 Fitting, Installation of Flared Tube, Straight Threaded Connectors, Design Standard for

(When requesting applicable documents, refer to both title and number. Copies of unclassified documents may be obtained from the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120. Requests for copies of classified documents should be addressed to the Naval Publications and Forms Center, via the cognizant Government representative.)

## 3. REQUIREMENTS

3.1 Specification sheet. The individual part requirement 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 sheet, the requirements of the specification sheet shall govern.

3.2 Qualification. The valve furnished under this specification shall be a product which has been qualified for listing on the applicable Qualified Products List at the time set for opening of bids (see 4.4 and 6.3). In addition, the retention of the qualification for the valve on the applicable Qualified Products List shall be dependent on periodic verification of continued compliance with the requirements of this specification (see 4.3(a)(1)).

3.2.1 Qualification test report. A certified test report shall be furnished to the agency responsible for qualification covering all the tests specified in 4.4 and any design analysis required by 3.5. The qualification test report shall be required only for qualification as specified in 6.3 and shall not be considered an item of deliverable data as specified in 6.2.2.

3.3 General specification. The requirements of MIL-H-8775 apply as requirements of this specification with the exceptions and additions specified herein. When the two specifications conflict, this specification shall govern.

3.4 Materials.

3.4.1 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-83282 and MIL-H-6083.

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3.4.2 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 acceptable to the procuring activity.

3.4.3 Reclaimed materials. Reclaimed materials shall be utilized to the maximum extent possible within the quality limits required by this document.

3.5 Design and construction. Relief valves, for hydraulic systems conforming to MIL-H-5440, shall be designed and constructed as specified herein and in the applicable specification sheet. The valve shall be capable of withstanding 2,000 hours of operation at 275°F fluid and ambient temperature without any degradation in material. The manufacturer shall verify compliance to this requirement by a material analysis which shall be included in the qualification test report (see 3.2.1). Packings shall be exempt from this requirement, providing they conform to the applicable packing specification as required by MIL-H-8775. The valve shall not permit reverse flow with rated flow pressure applied to the outlet port.

3.5.1 Strength. The valve shall be designed to withstand all structural loads imposed by the functional test requirements of this specification. In addition, the valve shall be of such strength and rigidity as to withstand the wrench loads required for installation in accordance with MS21344.

3.5.2 Adjustment. The valves shall be internally adjustable from the minimum to maximum pressure specified in the applicable specification sheet for the class or classes without the use of special tools.

3.5.3 Temperature range. The valves shall be designed to satisfactorily operate continuously throughout a temperature range of -65°F to +275°F. The manufacturer shall provide calculations showing that adequate clearance of moving parts is provided to prevent binding (interference) at -65°F and +275°F, using the most adverse drawing dimensional tolerance extremes including allowable eccentricities. The room temperature reference point shall be 70°F. These calculations shall be included in the qualification test report (see 3.2.1).

3.6 Performance. The valve shall perform satisfactorily when subjected to the tests specified under the subparagraphs of 4.7.

3.7 Identification of product.

3.7.1 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, Relief, Hydraulic High Response (insert appropriate title from slash sheet)

M85245/ (Insert slash number of specification sheet and appropriate dash number)

Mfr. P/N

Mfr. S/N

Mfr. name

3.8 Part numbering of interchangeable parts. The manufacturer's part number and drawing number shall be the same.

3.9 Workmanship. All details of workmanship shall be of a sufficiently high grade to insure proper operation.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 General. The quality assurance provisions shall be in accordance with MIL-H-8775 and as specified herein.

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

4.3 Classification of tests. The inspection and testing of valves shall be classified as follows: (During all tests, valve instability such as chatter squeal or irregular performance shall be cause for rejection.)

##### a. Qualification tests (4.4)

1. Retention of qualification. Retention of qualification consists of a periodic verification to determine compliance of the qualified product with the requirements of this specification (see 4.4.3).

##### b. Quality conformance inspection (4.5)

#### 4.4. Qualification tests.

4.4.1 Test samples. For qualification, two test specimens shall be selected for each size valve to be qualified. The first sample shall be subjected to all the qualification tests and the second sample

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held as a back-up to confirm any failures that may occur. The test specimens shall not have been subjected to any testing prior to submittal. When a class is specified for the valve setting, the maximum setting for that class shall apply unless otherwise specified. When the valve is adjustable to a range of more than one class the maximum setting for the highest class shall apply. The specimens shall be assembled of parts which conform to manufacturer's drawings.

4.4.2 Tests. The qualification tests shall consist of the tests specified in Table I.

Table I. Qualification tests

| Order of Tests | Title of Tests                  | Para. Ref. |
|----------------|---------------------------------|------------|
| 1              | Examination of Product          | 4.7.1      |
| 2              | Fluid Immersion                 | 4.7.2      |
| 3              | Proof Pressure                  | 4.7.3      |
| 4              | Functional                      |            |
|                | a. Minimum Setting              | 4.7.4      |
|                | b. Maximum Setting              | 4.7.5      |
| 5              | Response                        | 4.7.6      |
| 6              | Extreme Temperature             | 4.7.7      |
|                | a. Low Temperature Performance  | 4.7.7.1    |
|                | b. Rapid Warmup                 | 4.7.7.2    |
|                | c. High Temperature Performance | 4.7.7.3    |
| 7              | Endurance                       | 4.7.8      |
| 8              | Impulse                         | 4.7.9      |
| 9              | Vibration                       | 4.7.10     |
| 10             | Burst                           | 4.7.11     |

4.4.3 Retention of qualification. In order to retain qualification of valves approved for listing on the Qualified Products List (QPL), the manufacturer shall verify by certification to the qualifying activity that his valve(s) comply with the requirements of this specification. Unless otherwise specified by the qualifying activity, the time of periodic verification by certification shall be in two-year intervals from the date of original qualification.

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

- a. Individual inspection (4.5.1)
- b. Sampling tests (4.5.2)

4.5.1 Individual inspection. The individual inspection shall consist of the following:

- a. Examination of Product (4.7.1)
- b. Proof Pressure (4.7.3)
- c. Reseat (4.7.4.1)
- d. Internal Leakage (4.7.4.2)
- e. Rated Flow (4.7.4.3)
- f. Reverse Pressure Leakage (4.7.4.4)

4.5.1.1 Rejection and retest of valves submitted for acceptance. Valves that have been rejected may be reworked or have parts replaced to correct the defects and resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished the Government Inspector.

4.5.2 Sampling tests. A sample shall be selected from each inspection lot (see 4.5.3) in accordance with MIL-STD-105 using special inspection level S-1 with no reject allowed. The sample valve shall be unpacked and the tests specified in 4.5.1 and the response test, paragraph 4.7.6, shall be conducted.

4.5.3 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 one time.

4.5.4 Report of failure of sampling test. When a valve fails to pass a sampling test, the entire lot represented by the sample shall be rejected. All failures of the tested units shall be reported immediately by telephone or message within 24 hours. Full particulars

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concerning action taken to correct the defects shall be submitted to the procuring agency in a written test report conforming to DI-R-5299A (see 6.2.2). The lot represented by the unsatisfactory sample shall not be resubmitted until approval of resubmission has been issued by the procuring agency.

4.6 Test conditions.

4.6.1 Test fluid. Unless otherwise specified, the hydraulic fluid used for all tests shall conform to MIL-H-5606. For quality conformance tests, hydraulic fluid conforming to MIL-H-6083 or MIL-H-5606 may be used.

4.6.2 Test fluid temperature. Unless otherwise specified, the actual temperature of the test fluid shall be maintained  $100^{\circ} \pm 10^{\circ}\text{F}$  through the duration of the test.

4.6.3 Temperature. Unless otherwise specified, the tests shall be conducted at a room temperature of  $65^{\circ}$  to  $90^{\circ}\text{F}$ , measured within 12 inches of the test sample.

4.7 Test methods. Cartridge type valves shall be tested in a housing threaded to accept the valve and with suitable inlet and outlet ports. The valves shall be free of chatter, surging or squeal under any condition or combination of conditions in this specification.

4.7.1 Examination. Examine each valve for conformance to the applicable manufacturing drawing specification sheet and to the requirements of MIL-H-8775.

4.7.2 Fluid immersion. The valve shall be immersed in hydraulic fluid conforming to MIL-H-5606 for 72 hours, and hydraulic fluid conforming to MIL-H-83282 for 72 hours, at a fluid temperature of  $275^{\circ} \pm 5^{\circ}\text{F}$ , prior to conducting the qualification tests specified herein. All internal parts of the valve shall be in contact with the fluid during the immersion test. After the two 72 hour soak periods, the valve shall be subjected to the next test immediately or remain in the fluid at room temperature until ready for the next test.

4.7.3 Proof pressure. The proof pressure shall be applied while the valve is stabilized at a fluid and ambient temperature of  $275^{\circ}\text{F} \pm 5^{\circ}\text{F}$ . The rate of pressure rise shall not exceed 25,000 psi/min. With the return port plugged pressurize the inlet port to 4,500 psi and hold for 2 minutes. There shall be no measurable external leakage or evidence of permanent deformation. Pressure shall then be similarly applied and maintained on the return port with the pressure port plugged. For quality conformance testing, proof pressure shall be applied at  $70^{\circ}$  to  $100^{\circ}\text{F}$  and held for 2 minutes. There shall be no measurable external leakage, failure or permanent deformation.



4.7.4 Functional tests (minimum setting). The following tests shall be performed with a test setup similar to Figure 1. The valve shall be adjusted to deliver rated flow at a pressure differential equivalent to the minimum pressure setting specified for its class in Table I of the applicable specification sheet. Valves adjustable to a range of more than one class shall be tested for each class for which it is adjustable. All leakage measurements shall be taken in the third minute of a 3 minute period.

4.7.4.1 Reseat. Induce rated flow thru the valve. Then reduce the inlet pressure by the pressure differential specified in Table II of the applicable specification sheet. Measure leakage from the outlet port. Leakage shall not exceed the values shown in Table III of the applicable specification sheet.

4.7.4.2 Internal leakage.

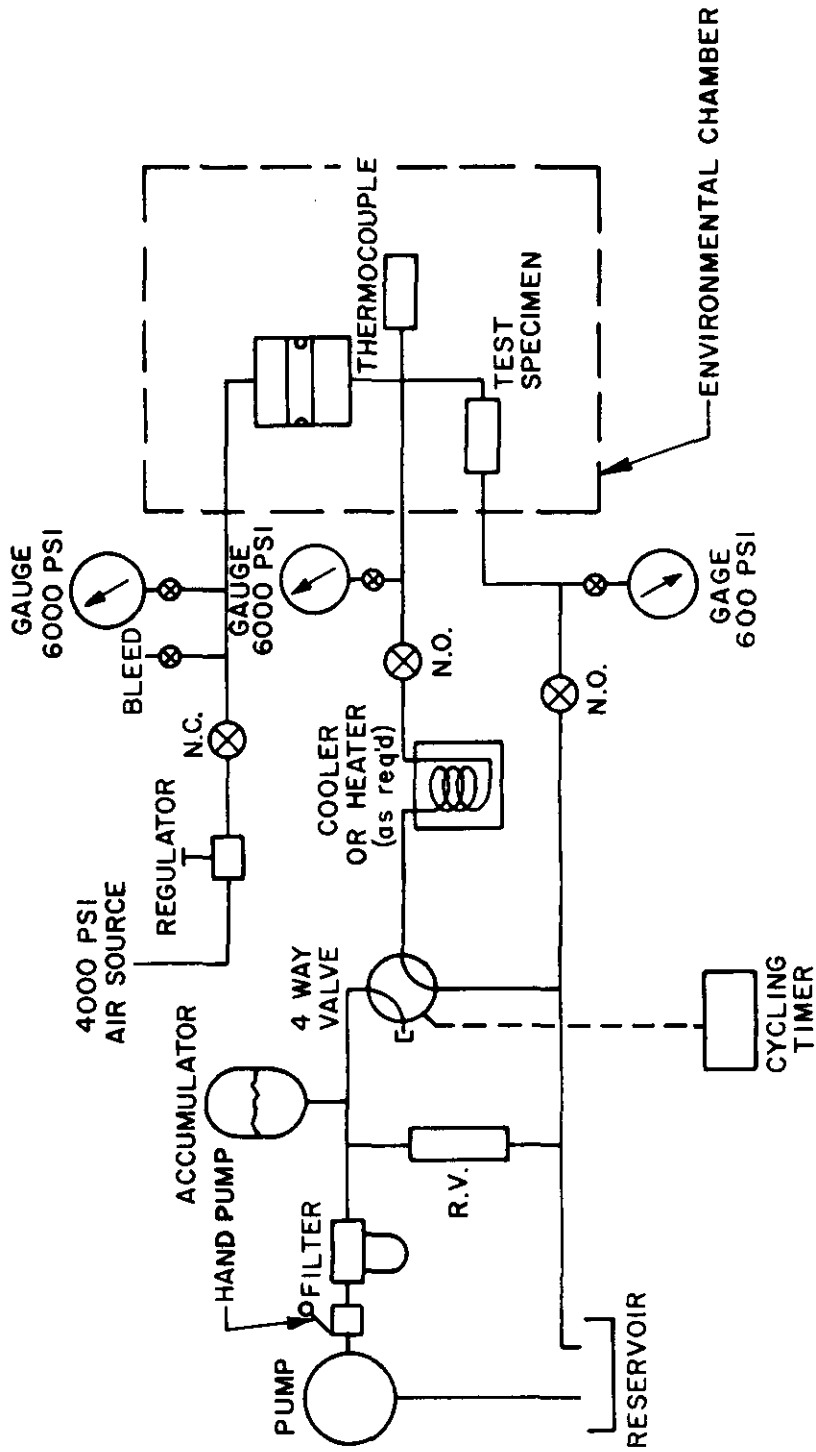
4.7.4.2.1 Decreasing pressure leakage. Decrease the inlet pressure to obtain 75% of the rated flow differential pressure setting and measure the internal leakage. Leakage shall not exceed the values specified in Table III of the applicable specification sheet.

4.7.4.2.2 Increasing pressure leakage. Decrease the inlet pressure to approximately zero and then increase the pressure to obtain 75% of the rated flow differential pressure setting. Measure the internal leakage from the outlet port. Leakage shall not exceed the values specified in Table III of the applicable specification sheet. Repeat the test at 25% of the rated flow differential pressure setting.

4.7.4.3 Rated flow. Increase the inlet pressure until rated flow is produced at the outlet. Maintain rated flow thru the valve and adjust the outlet shut off valve to obtain a back pressure of  $200 \pm 25$  psi. The differential pressure at which rated flow occurs with  $200 \pm 25$  psi back pressure shall not vary from the rated flow differential pressure setting specified in Table I of the applicable specification sheet. (A maximum variation of 10 psi or  $\pm 2\%$  whichever is larger is permitted.)

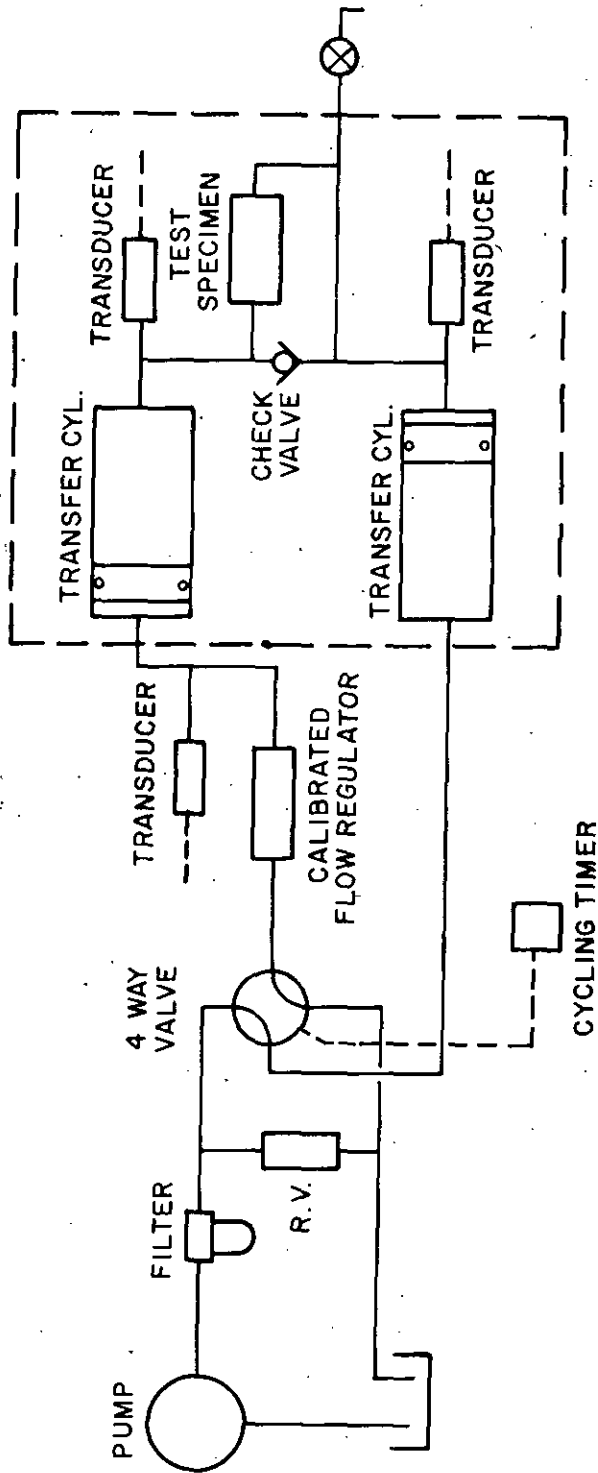
4.7.4.4 Reverse pressure leakage. Reverse the valve in the test circuit in order to pressurize the outlet port. Pressurize the outlet port to the rated flow pressure setting of the valve and measure internal leakage from the inlet port. Leakage shall not exceed 4 times the allowable reseat leakage shown in Table III of the applicable specification sheet.

4.7.5 Functional tests (maximum setting). The valve shall be adjusted to deliver rated flow at a pressure differential equivalent to the maximum pressure setting of its class in Table I of the applicable specification sheet. Valves adjustable to a range of more than one class shall be tested for each class for which it is adjustable. With the valve set at the maximum pressure setting the test of 4.7.4.1 through 4.7.4.3 shall be performed.



- NOTES:
1. The high pressure air is used for  $-65^{\circ}\text{F}$  tests.
  2. To measure internal leakage disconnect the outlet fitting at the outlet shut off valve.
  3. The cycling timer is used for the endurance test.
  4. Gauges or transducers shall be placed as close to valve parts as practicable to insure uniform test results.

FIGURE 1. Test circuit



- NOTES:
1. The cycling timer is used for the endurance test.
  2. Gauges or transducers shall be placed as close to valve parts as practicable to insure uniform test results.

FIGURE 1A. Alternate test circuit for low temperature test

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4.7.6 Response. Perform the response test with the valve set per its class in a test circuit similar to Figure 2. If a valve is adjustable to more than one class, the test shall be conducted for each of the designated classes. With the power pump set to deliver rated flow, energize a 4-way valve to apply pressure to the valve at a pressure rise rate of 300,000 psi/sec. minimum. The 4-way valve shall open to pass rated flow. The initial pressure spike shall not exceed the rated flow pressure setting by more than 200 psi. The valve shall then control the pressure within the performance limits of Table I of the applicable specification sheet. Record inlet and outlet pressures.

4.7.7 Extreme temperature tests. Perform each of the extreme temperature tests with the valve set to its class in Table I. If the valve is adjustable to more than one class, the tests shall be conducted for each of the designated classes.

4.7.7.1 Low temperature performance. With a test setup similar to Figure 1 or 1A pressurize the inlet to the valve and record the cracking pressure (defined as 30 cc/min) at room temperature. Stabilize the specimen, fluid and ambient temperature at  $-65^{\circ}\text{F}$  and soak for 2 hours. The valve shall then be pressurized to 90% of the cracking pressure for a minimum of 2 additional hours. Pressurize the inlet to the valve and record the cracking pressure at  $-65^{\circ}\text{F}$ . The pressure recorded shall not vary more than +10% or -5% from that obtained at room temperature.

4.7.7.2 Rapid warm up. The low temperature circuit shall be allowed to warm up rapidly at a rate of  $10^{\circ}\text{F}/\text{min.}$  to a temperature of  $275^{\circ}\text{F}$ . While the temperature is being raised and without waiting for the temperature to stabilize throughout the circuit, the cracking pressure shall be checked as described in paragraph 4.7.7.1 at approximately  $50^{\circ}\text{F}$  increments in ambient temperature. The pressure obtained at these temperature increments shall not vary more than +10% or -5% from that obtained at room temperature.

4.7.7.3 High temperature performance. With a test setup similar to Figure 1 and the fluid temperature stabilized at  $275^{\circ} + 5^{\circ}\text{F}$  conduct the reseal test of paragraph 4.7.4.1. Reseat pressure shall not be more than 30% below the values specified in Table II of the applicable specification sheet. Reseat leakage shall not exceed four times the amount specified in Table III of the applicable specification sheet.

4.7.8 Endurance. The valve set to the appropriate class (set to the highest pressure class if adjustable to more than one class) shall be subjected to a total of one million (1,000,000) cycles using a test circuit similar to Figure 1. Each cycle shall consist of imposing

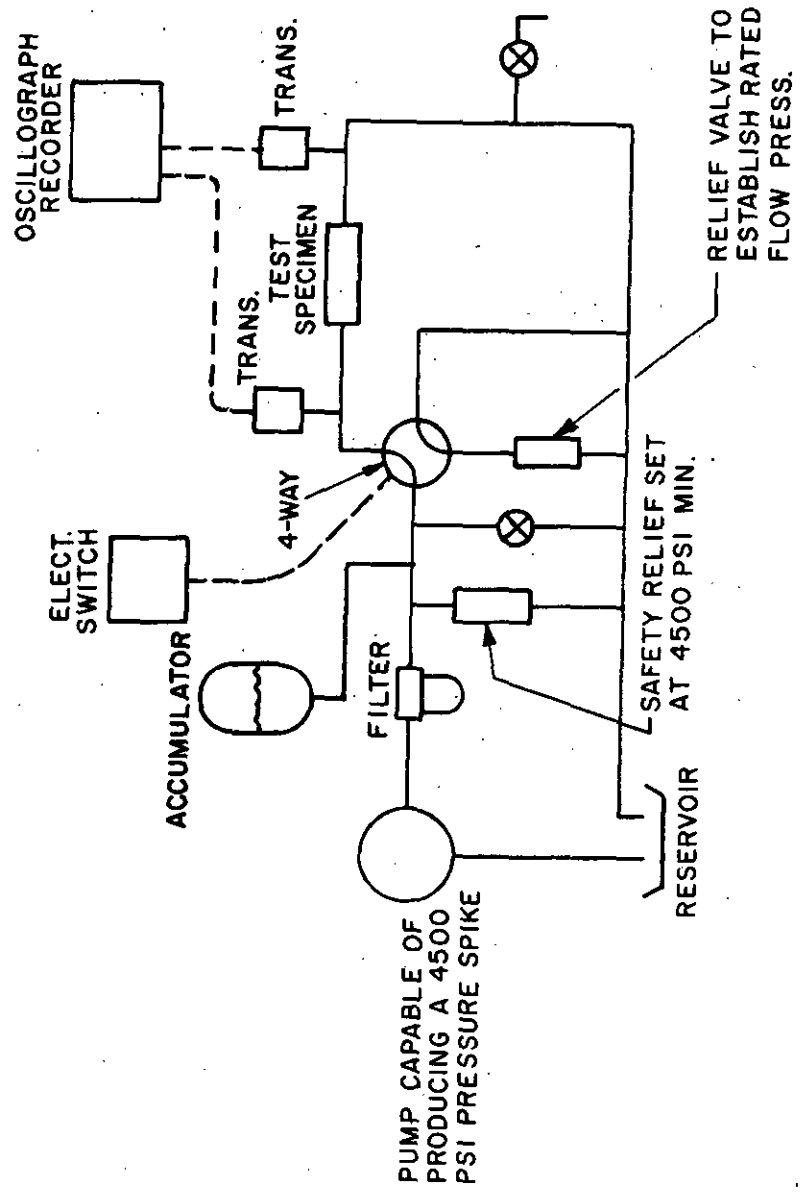


FIGURE 2. Response test circuit

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rated flow thru the valve and then reducing pressure to substantially zero. Cycling shall be accomplished at a rate of 35 to 300 cpm. Of the total number of cycles, 100,000 cycles shall be performed at high temperature as defined below. The balance shall be performed as defined below for intermediate temperature cycling.

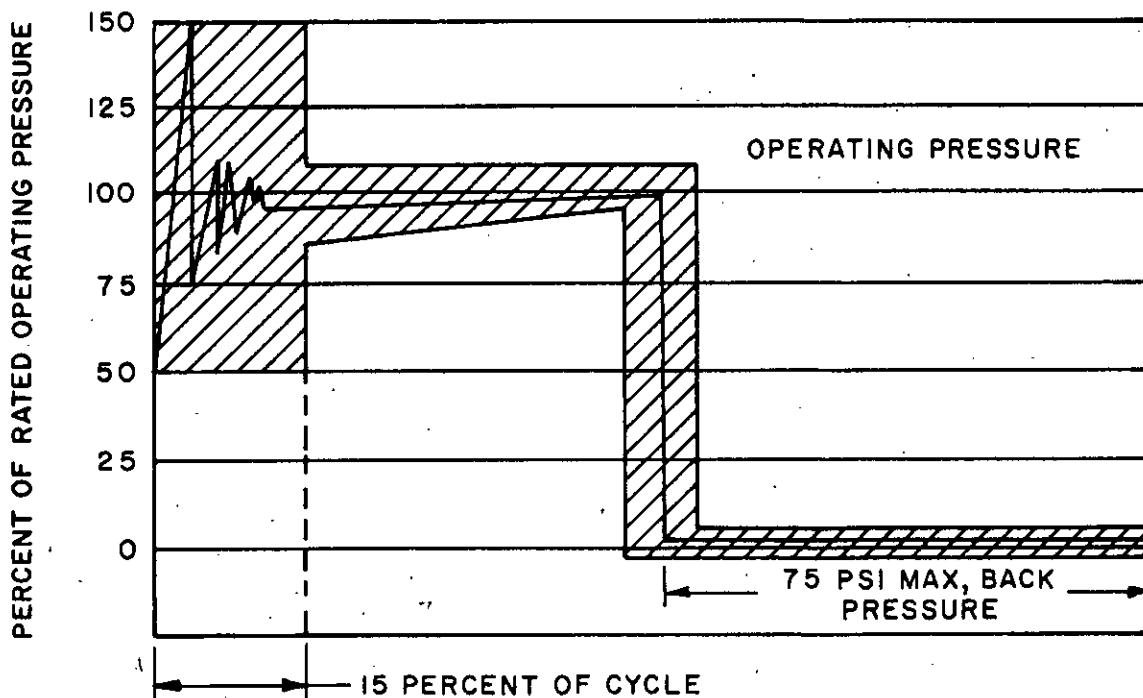
4.7.8.1 High temperature cycling. The valve shall be subjected to 100,000 cycles with the inlet fluid temperature at  $275^{\circ} \pm 5^{\circ}\text{F}$ . Upon completion of the 100,000 cycles the specimen shall be soaked at  $275^{\circ} \pm 5^{\circ}\text{F}$  for one (1) hour with 90% of the reseal pressure applied to inlet port. The pressure shall then be relieved and the specimen soaked for one (1) hour at  $275^{\circ} \pm 5^{\circ}\text{F}$ . The temperature shall then be stabilized at normal room temperature conditions and the performance tests of paragraph 4.7.4.1 through 4.7.4.3 shall be performed. Leakage shall be a maximum of 2 times the original values per Table III of the applicable specification sheet.

4.7.8.2 Intermediate temperature cycling. The valve shall then be subjected to 900,000 cycles with an inlet fluid temperature of  $180^{\circ}\text{F}$  to  $190^{\circ}\text{F}$ . At a minimum of three times during the endurance tests and upon completion of the test, stabilize the temperatures at normal room temperature conditions and conduct the performance tests of paragraph 4.7.4.1 thru 4.7.4.3. Leakage shall be a maximum of 2 times the original values per Table III of the applicable specification sheet.

4.7.9 Impulse. With the valve set to the appropriate class (set to the highest pressure class if adjustable to more than one class), and the outlet port plugged the valve shall be subjected to 100,000 impulse cycles, 25,000 at a fluid temperature of  $275^{\circ}\text{F}$  and 75,000 at a fluid temperature of  $225^{\circ}\text{F}$ . Each impulse cycle shall consist of a pressure rise from zero to 3,000 psi and drop to zero. During each pressure increase, a peak surge pressure of 1.43 to 1.57 times the working pressure (3000 psi), 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. See Figure 3 for impulse curve. The actual impulse pattern shall be recorded and reported.

4.7.10 Vibration. With the valve set to the appropriate class (set to the highest pressure class if adjustable to more than one class) a sinusoidal vibration test shall be conducted on the valve at room temperature in each of the valve three mutually perpendicular axes. One of these axes shall be that which is parallel to the valve poppet axes.

The valve shall be mounted on a resonance-free fixture for test. 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.



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 PERCENT 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. ONE VERY DESIRABLE BENEFIT TO BE GAINED IN THIS MANNER IS THAT RESULTS OF TESTS PERFORMED ON DIFFERENT TEST MACHINES WILL BE MORE NEARLY COMPARABLE.

INITIAL RATE OF RISE PRESSURE APPLICATION TO BE 200,000-300,000 PSI PER SECOND.

FIGURE 3. Impulse curve

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The rate of change of frequency shall be logarithmic.

Vibration Tolerances

|              |       |
|--------------|-------|
| Amplitude    | + 10% |
| Frequency    | + 2%  |
| Acceleration | + 10% |

The following tests shall be conducted:

- a. Resonance search. Resonant frequencies of the valve shall be determined by varying the frequency of applied vibration slowly through the range specified in Table II, 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 II, Part 1.
- c. Cycling test. The valve shall be vibrated along each axis in accordance with the test levels, frequency range and times from Table II, Parts 1 and 2. The frequency of applied vibration shall be swept over the frequency range of 5 to 2000 to 5 Hz logarithmically. The time to sweep from 5 to 2000 to 5 Hz shall be approximately 20 minutes. If a change in the resonant frequency occurs during the test, its time of occurrence shall be recorded and immediately the frequency shall be adjusted to maintain the peak resonance condition. The final resonance frequency shall be recorded.

4.7.10.1 Tests after vibration. After the vibration test, the valve shall be tested in accordance with paragraph 4.7.4.1 and 4.7.4.3 and meet the requirements therein.

4.7.11 Burst pressure. Pressure shall be applied to the pressure port with the return port plugged with a hand pump at a maximum rate of increase of 25,000 psi per minute until the specified burst pressure of 7,500 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 with the valve and fluid maintained at 275°F after a 5-hour soak at 275°F with the valve filled with test fluid.

4.8 Packaging. Packaging shall be examined for conformance to Section 5.



TABLE II. Test procedure and time schedule.

|   | Vibration Level   | Frequency Band, Hz |          |          |            |      |
|---|---|--------------------|----------|----------|------------|------|
| Part 1  | 0.1 inch double amplitude<br>1.0 g<br>0.036 inch double amplitude<br>10.0 g | 5 to 14            | 14 to 23 | 23 to 74 | 74 to 2000 |      |
| Part 2  | 0.2 inch double amplitude<br>1.0 g<br>0.06 inch double amplitude<br>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                  | ½ hr     | 1 hr     | 1½ hr      | 2 hr |
|   | Cycling Time  | 2 hr               | 1½ hr    | 1 hr     | ½ hr       | 0    |
| Part 2  | 30 minutes cycling per axis - no resonance dwell                            |                    |          |          |            |      |

## 5. PACKAGING

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)

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, grip, dirt, and other foreign matter. The cleaning method utilized shall not have deleterious effects 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.

5.1.1.2 Preservation. The valve shall be flushed and filled 80 to 90 percent with Hydraulic Fluid conforming to MIL-H-6083, pre-filtered through a filter assembly conforming to MIL-F-81836 and sealed with metal closures conforming to metal MIL-C-5501.

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5.1.1.3 Packaging. The valve shall be packed in accordance with method IC1 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. Valves packages per 5.1, shall be packed level A, B or C as specified (see 6.2).

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 assure carrier acceptance and safe delivery to destination.

5.3 Marking. In addition to special requirements of the contract or order, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129, and include the following:

M 85245/ (Insert slash number of specification sheet)  
 Month and year of manufacture  
 Class and size

## 6. NOTES AND CONCLUDING MATERIAL

6.1 Intended use. The valve covered by this specification is intended for use in Type II aircraft and missile hydraulic systems covered by MIL-H-5440 and operating with hydraulic fluid conforming to MIL-H-5606 or MIL-H-83282 at nominal operating pressures of 3,000 psi. The response of these valves is such that they may be used in place of surge suppression accumulators to limit the maximum applicable system or subsystem operating pressure.

6.2 Information for the contracting officer. Contracts or orders should specify the following:

- a. Title, number, and date of this specification.

- b. Applicable specification sheet part number.
- c. Applicable levels of preservation, packaging and packing (see section 5).

d. For contractor procurement only, the valve setting pressure as a code number in psi, shall be noted on a temporary tag or equivalent, securely attached to the valve, in order to indicate a specified pressure setting. Relief valve nameplate and applicable government records such as parts catalogs, spares, documents, etc., shall not contain this coded number indicating pressure setting. The services shall not procure or stock valves adjusted to any specific pressure setting. Notations on airplane contractor's assembly and installation drawings shall contain the proper dash number, as shown in Table I of the applicable specification sheet followed by the pressure setting parenthetically listed.

e. The number of copies of pressure setting instructions required for the using activities.

6.2.1 Procurement requirements.

6.2.2 Contract data requirements. Items of deliverable data required by this specification are cited in the following paragraphs.

| <u>Paragraph</u> | <u>Data Requirement</u>            | <u>Applicable DID</u> |
|------------------|------------------------------------|-----------------------|
| 4.5.4            | Report of failure of Sampling Test | DI-R-5299A            |

Such data will be delivered as described on approved (numbered) DID's (Data Item Description/DD Form 1664) when specified on DD Form 1423 (Contract Data Requirements List) and incorporated into the applicable contract.

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 the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the contractors 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 the Naval Air Systems Command, Attn: AIR-530312, Department of the Navy, Washington, D.C. 20360; however, information pertaining to qualification of products such as test reports, test fees and test samples may be obtained from the Commanding Officer, Naval Air Development Center, Attn: 30211, Warminster, Pennsylvania 18974.

MIL-V-85245

Custodians:

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Navy - AS  
Air Force - 11

Preparing Activity:

Navy - AS  
(Project No. 1650-0235)

Review:

Air Force - 99

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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

**INSTRUCTIONS:** This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

**NOTE:** This form shall not be used to submit requests for waivers, deviations or clarification of specification 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.

DOCUMENT IDENTIFIER (Number) AND TITLE MIL-V-85245 VALVE, RELIEF, HYDRAULIC, HIGH  
RESPONSE, TYPE II SYSTEMS, GENERAL SPECIFICATION FOR

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

VENDOR       USER       MANUFACTURER

1.  HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?       IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO.

DATE

DD FORM 1426  
1 OCT 76

EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.