

INCH-POUND

MIL-V-5529C(USAF)
30 August 1993SUPERSEDING
MIL-V-5529B
16 February 1977

MILITARY SPECIFICATION

VALVES, HYDRAULIC DIRECTIONAL
CONTROL, ROTARY SELECTOR

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

1. SCOPE

1.1 Scope. This specification establishes the requirements for rotary selector hydraulic directional control valves for use in type I (-650 to 1600F fluid temperature range) aircraft hydraulic systems as defined in MIL-H-8775.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATIONS

FEDERAL

A-A-1898
PPP-B-636Cushioning material, packaging
Box, shipping, fiberboard

MILITARY

MIL-P-116

Preservation, Methods of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Oklahoma City Air Logistics Center/TICLA, Tinker AFB, OK 73145-5990 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4820

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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- MIL-C-5501 Cap and plug, protective, dust and moisture seal
- MIL-H-5440 Hydraulic systems, aircraft, types I and II, design and installation requirements for
- MIL-O-6083 Hydraulic fluid, petroleum base, for preservation and operation
- MIL-S-7742 Screw threads, standard, optimum selected series; general specifications for
- MIL-H-8775 Hydraulic system components, aircraft and missiles, general specifications for
- MIL-S-8879 Screw threads, controlled radius root with increased minor, diameter, general specification for

STANDARDS

MILITARY

- MIL-STD-129 Marking for shipment and storage, the selection of
- MIL-STD-2073-1 Procedures for development and application of packing requirements
- MS-33649 Boss, fluid connection - internal-straight thread

AIR FORCE-NAVY AERONAUTICAL

- AN6210 Valve-In line type, 3 1/2 GPM, Hydraulic Directional Control
- AN6211 Valve-In line type, 6 GPM, Hydraulic Directional Control
- AN6213 Valve-In radial type, 3 1/2 GPM, Hydraulic Directional Control
- AN6214 Valve-In radial type, 6 GPM, Hydraulic Directional Control
- AN6293 Valve-4 Way Selector, 3000 PSI, Non-Interflow
- AN6294 Valve-4 Way Selector, 3000 PSI Interflow
- AND10050 Bosses-Standard Dimensions for Gasket Seal Straight Thread

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Ave, Building #4, Section D, 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 6.2)

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASIM)

ASIM D 3951 - Packaging, commercial

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19013-1137)

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

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

3. REQUIREMENTS

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

3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.2) in accordance with 4.3.

3.3 Materials. All materials shall be as specified herein. Materials not specified shall be of the best quality used for the purpose in commercial practice. The materials shall be free from all defects or imperfections that might affect the serviceability of the finished product. Recovered or recycled materials may be used provided the end product is capable of passing the first article tests.

3.3.1 Reclaimed materials. The use of reclaimed materials shall be encouraged to the maximum extent possible without jeopardizing the intended end use of the item.

3.4 Requirements. The requirements section of MIL-H-8775 shall specify the performance, design, and testing requirements for all the components in the hydraulic system and also shall be the controlling document for components not otherwise covered by an applicable detail component specification, with the following exceptions:

3.4.1 Bosses. If called for on the specification sheet, ports shall be in accordance with AND10050 or MS33649.

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3.4.2 Electrically operated components. Not applicable to this specification.

3.4.3 Valves supplied. Valves supplied shall be type I (-650 to +1600F fluid temperature range) components and subject only to the requirements applicable to type I components (see 1.1).

3.4.4 Threads. Threads may be per MIL-S-7742 or MIL-S-8879.

3.5 Interior. Interior surfaces of all parts of each valve shall be flushed with rust-inhibiting fluid conforming MIL-H-6083. The parts shall be sealed with closures conforming to MIL-C-5501.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility of 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 compliances. All items shall meet all requirements of Sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in 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 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.

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

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

4.3 First article inspection. The first article, submitted in accordance with 3.2, shall be inspected as specified in 4.4.

4.4 Quality conformance inspection. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in Section 4 of MIL-H-8775, applicable to type I components.

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4.4.1 Inspection conditions. The test conditions and requirements shall be as specified in 4.4, with the following exceptions:

a. Unless otherwise specified in MIL-H-8775, fluid temperature shall be between 700 and 1100F.

b. The rates of internal leakage shall not exceed those specified in the detail specification.

c. The pressure drop observed at rated flow shall not exceed the value permitted by the applicable detail specification.

d. Variation of actuating forces or regulation, measured during low temperature, shall not exceed that permitted by the detail specification. The quality conformance tests for leakage shall be performed after each actuation and the requirements of the detail specification satisfied.

e. The endurance tests shall be as follows: Using a test set-up as illustrated in Figure 1; oil at rate pressure, at rated flow capacity, and at a temperature of 1000 + 200F, shall be applied for 20,000 cycles. Each cycle shall consist of motion of the handle or shaft from one extreme position to the opposite extreme position and return. Leakage shall be checked at 50 and 100 percent of the number of cycles required. At the conclusion of the endurance test, the component shall operate satisfactorily and shall be disassembled and carefully inspected. There shall be no evidence of external leakage during or after cycling. The internal leakage after cycling shall not exceed the values specified on the applicable detail specification. There shall be no evidence of excessive wear in any part of the component.

4.4.2 Tests not applicable. Tests concerning vibration, humidity, fungus, sand and dust, icing, actuation above system pressure, and reliability are not applicable.

4.5 Sampling for inspection and testing. Unless otherwise specified in the contract, order, or by the contracting officer, two articles shall be submitted for quality conformance inspection as specified in 4.4.

4.6 Inspection tests. Section 4.5 and 4.7 of MIL-H-8775 shall delineate the prescribed inspection test methods.

5. PACKAGING

5.1 Preservation. Preservation shall be level A, C, or Commercial, IAW MIL-STD-2073-1, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1. Cleaning. Item shall be cleaned IAW MIL-P-116, process C-1.

5.1.1.2 Preservation application. Valves shall be preserved in accordance with Submethod IA-8 of MIL-P-116.

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5.1.1.3 Unit Packaging. Each valve shall be packaged in quantity unit packs of one each in accordance with Method IA of MIL-P-116.

5.1.1.4 Drying. Valves shall be dried in accordance with process D-4 Wiping of MIL-P-116.

5.1.2 Level C. Each valve shall be clean, dry, and individually packaged in a manner that will afford adequate protection against corrosion, deterioration, and physical damage during shipment from supply source to the first receiving activity.

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

5.2.1 Level A. Valves preserved as specified in 5.1.1, shall be packed in non-fiberboard exterior type, weather resistant, shipping containers. Valve cushioning/wrap material shall conform to A-A-1898 and provide sufficient density and thickness to protect the unit container from punctures.

5.2.2 Level B. Valves preserved as specified in 5.1.1, shall be packed in fiber-board exterior containers conforming to PPP-B-636, class weather-resistant, style optional, special requirements. Closures shall be in accordance with the PPP-B-636 appendix.

5.2.3 Level C. Valves preserved as specified in 5.1.1, shall be packed in fiber-board containers in accordance with PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the PPP-B-636 appendix.

5.2.4 Commercial. The packaged valve shall be packed IAW ASTM D 3951.

5.3 Marking. In addition to any special or other identification marking required by the contract, each unit, supplementary, intermediate and exterior container shall be marked IAW MIL-STD-129.

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 directional control valve covered by this specification is intended for use in aircraft hydraulic systems, as specified in MIL-H-5540, at operating pressures that do not exceed the values specified herein.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Inspection for first article (see 4.4).

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c. Level of preservation, packaging (see 5.1), and packing (see 5.2) required.

d. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).

6.3 First article. When a first article inspection is required, the valve shall be tested and should be a first article sample. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests and approval of the first article.

6.4 Detail and assembly drawings.

6.4.1.1 Control valve. Assembly drawings of the directional control valve shall be furnished, in duplicate, for each model valve. Assembly drawings shall show a cutaway section of all details in their normal assembled position and shall carry part numbers of all details and subassemblies. The following data shall be furnished on or together with all assembly drawings.

- a. Port dimensions
- b. Over-all dimensions
- c. Actual flow capacity (GPM)
- d. Dry weight
- e. Dismantling procedure

6.4.1.2 Changes to drawings. Changes to any detail or assembly drawings involving qualified items shall be subject to specific approval of the group responsible for qualified products. When considered necessary, changes shall require new qualification tests.

6.5 Subject term (key word) listing.

Four-way type
Hydrated system
Infinite positioning
Rate pressure
Rated flow

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

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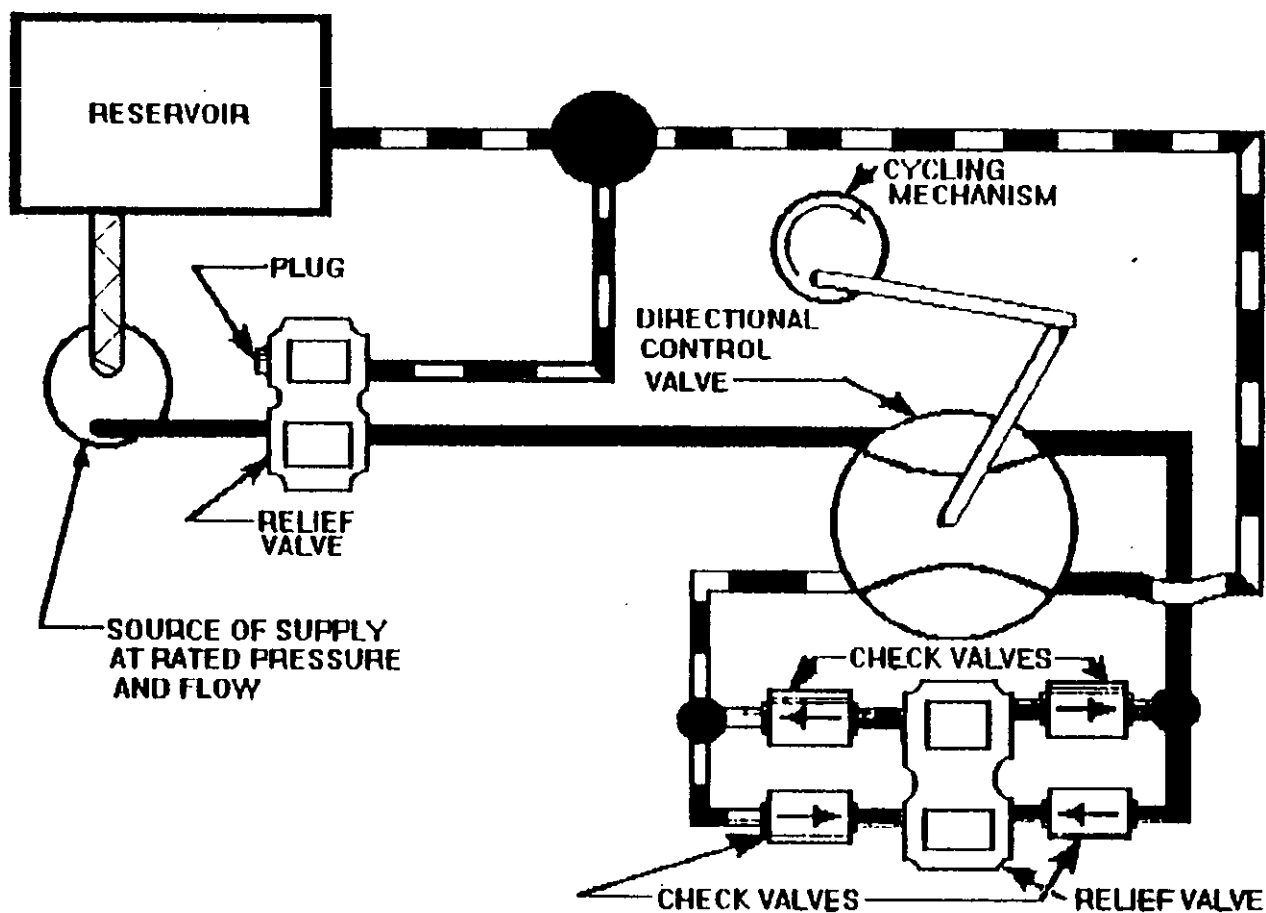


FIGURE 1. SET-UP for ENDURANCE TEST

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Custodians:
Air Force - 99

Preparing Activity:
Air Force - 71

Project Number:
4820-F082

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-5529C	2. DOCUMENT DATE (YYMMDD) 30 August 1993
3. DOCUMENT TITLE VALVES, HYDRAULIC DIRECTIONAL CONTROL, ROTARY SELECTOR		
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME <i>(Last, First, Middle Initial)</i>	b. ORGANIZATION	
c. ADDRESS <i>(Include Zip Code)</i>	d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) AUTOVON <i>(if applicable)</i>	7. DATE SUBMITTED (YYMMDD)
B. PREPARING ACTIVITY		
a. NAME OC-ALC/FICLA	b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial 405-736-5960	(2) AUTOVON DSN 336-5960
c. ADDRESS <i>(Include Zip Code)</i> TINKER AFB OK 73145-5990	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	