

NOT MEASUREMENT SENSITIVE
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MIL-C-5500D

5 August 1992

SUPERSEDING

MIL-C-5500C

11 JANUARY 1974

## MILITARY SPECIFICATION

## CAP; HIGH PRESSURE AIR VALVE

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

## 1. SCOPE

1.1 Scope. This specification covers one type and grade of high-pressure air valve cap suitable for use in aircraft hydraulic systems.

## 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).

SPECIFICATIONSFederal

PPP-B-566	Box, Folding, Paperboard
PPP-B-601	Boxes, Wood Cleated Plywood
PPP-B-621	Box, Wood, Nailed And Lock-Corner
PPP-B-636	Box, Shipping, Fiberboard
PPP-B-676	Boxes Setup
PPP-T-60	Tape, Packaging, Waterproof

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 73145-5090 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSC N/A

FSC 1650

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## MIL-C-5500D

MIL-H-5606

Hydraulic Fluid, Petroleum Base,  
Aircraft, Missile, And Ordnance

MIL-R-6855

Rubber, Synthetic, Sheet, Strips,  
Molded Or Extruded ShapesSTANDARDSMilitary

MIL-STD-130

Identification Marking Of U. S.  
Military Property

MS20813

Cap, High-Pressure Air Valve

MS28889

Valve, Air, High-Pressure Charging,  
5000 PSI

(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 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 Qualification. The caps furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids.

3.2 Materials. Materials shall conform to applicable specifications as specified herein.

3.3 Design and construction. The cap shall be designed and constructed in accordance with Standard MS20813.

3.3.1 Size and dimensions. The cap shall have limiting dimensions in accordance with Standard MS20813. No part of the cap shall project outside the overall dimension indicated.

3.3.1.1 The cap shall fit an MS28889 valve stem.

3.3.2 Shell and swivel seat plate. Metal used in the shell and swivel seat plate shall be as specified on Standard MS20813.

3.3.3 Seat. The valve seat material shall be in accordance with Specification MIL-R-6855, class 2, type A, grade 60 or 80, or approved equivalent, that is resistant to hydraulic oil which conforms to Specification MIL-H-5606, and shall be suitably bonded to the swivel seat to withstand service usage without separation of the bond.

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3.3.3.1 Resistant. The material shall be resistant to abrasion to prevent disintegration under pull-up tests, or during normal service usage.

3.3.3.2 Compression resistant. The material shall have suitable compression set resistance and flexibility at all operating temperatures between  $-54^{\circ}$  to  $+71^{\circ}$  C ( $-65^{\circ}$  to  $+160^{\circ}$  F) to seal all operating pressures up to 5,000 psi with maximum wrench torque of 30 pound-inches.

3.3.3.3 Homogeneous. The material shall be homogeneous to insure consistent swell, strength, and hardness characteristics throughout the entire batch.

3.3.3.4 Physical properties. When subjected to accelerated aging in either air or hydraulic oil which conforms to Specification MIL-H-5608, the tensile strength, elongation, and hardness characteristics of material shall not change more than the values indicated in table I.

TABLE I		
Seat material physical properties		
Property	Change increase (max)	Percent decrease (max)
Tensile strength	- - -	20
Elongation	- - -	30
Hardness shore durometer	10	10

3.3.4 Finish. Finish shall be as specified in Standard MS20813. The swivel seat need not be finished.

3.3.5 Assembly. The bonded valve seat assembly shall swivel freely in the housing after assembly, but shall not fall out during normal service handling or usage.

3.4 Proof and burst pressures. Caps shall withstand a proof pressure of 10,000 psi and a burst pressure of 20,000 psi.

3.5 Pull-up. The caps shall withstand 30 pull-ups at a wrench torque of 30 pound-inches. Ten of these pull-ups shall be after the caps have been exposed a minimum of 72 hours to a temperature of  $-54^{\circ}$  C ( $-65^{\circ}$  F).

3.6. Impulse. During the impulse test there shall be no leakage in excess of 1 drop per 10,000 cycles at room temperature or 1 drop per 1,000 cycles at  $-54^{\circ}$  C ( $-65^{\circ}$  F).

3.7 Leakage. The cap shall not leak or malfunction in any manner at all operating conditions up to the design operating pressure of 5,000 psi at a wrench tightening torque of 15 to 30 pound-inches when seated on an MS28889 valve stem.

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**3.8 Identification of product.** Each cap shall be permanently marked for identification with the part number and the manufacturer's name, symbol, or trade-mark in accordance with Standard MIL-STD-130. This marking shall be placed in the recessed diameter as shown on Standard MS20813.

**3.9 Reclaimed materials.** The use of reclaimed materials are encouraged to the maximum extent possible.

**3.10 Workmanship.** All details of workmanship shall be in accordance with the best practice for high-quality aircraft parts.

#### 4. QUALITY ASSURANCE PROVISIONS

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

**4.1.1 Responsibility for compliance.** All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in 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 inspections.** The inspection requirements specified herein are classified as follows:

- a. Qualification Inspection and Tests (See 4.3).
- b. Quality Conformance Inspections and Tests (See 4.4).

**4.3 Inspection conditions.** Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.3.1 in this specification.

**4.3.1 Sampling instructions.** Qualification test samples shall consist of 12 caps, 144 square inches of 1/8-inch-thick platen press sheets of the seat material compounded as in the production seat and given an equivalent cure, and detail and assembly drawings. Identify samples as required.

**4.3.2 Preparation of valve caps for qualification testing.** Three caps to be subjected to Qualification tests shall be airaged in a Geer oven, or equivalent, at  $70^{\circ} \pm 1^{\circ} \text{ C}$  ( $158^{\circ} \pm 2^{\circ} \text{ F}$ ) for 7 days, and a second group of three shall be aged in hydraulic fluid conforming to Specification MIL-H-5606, held at a temperature of  $70^{\circ} \pm 1^{\circ} \text{ C}$  ( $158^{\circ} \pm 2^{\circ} \text{ F}$ ), in a closed container or reflux condenser for 7 days.

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4.3.3 Tests. The Qualification tests of the caps shall consist of all the tests specified under Acceptance tests and; in addition, the following tests.

4.3.3.1 Seat material. The seat material shall be tested in accordance with MIL-R-6855.

4.3.3.2 Burst pressure. The caps, when seated on a body conforming to MS28889, shall withstand a burst pressure up to 20,000 psi, without failure, distortion, or evidence of leakage in any manner.

4.3.3.3 Pull-up. Three new caps and the three, each, caps aged in air and hydraulic oil, shall be assembled and disassembled on an MS28889 valve at least 30 times at a wrench torque of 50 pound-inches minimum. Each assemble and disassembly shall consist of a complete tightening to the specified torque and then loosened until the seat has ceased making contact with the valve body.

4.3.3.3.1 Cold-soak pull-up. At least 10 of these pull-ups shall be made at a temperature not warmer than  $-54^{\circ}\text{C}$  ( $-65^{\circ}\text{F}$ ) after the caps have been exposed to this temperature for a minimum of 72 hours. During this cold-soaking period, the caps shall not be tightened on the bodies.

4.3.3.4 Impulse. The same caps as used in the pull-up test shall be installed on an MS28889 valve and impulse cycled from 0 to 1,500 psi pressure at the rate of  $25 \pm 10$  cycles per minute for 50,000 impulses minimum. The impulsing medium shall be hydraulic oil conforming to Specification MIL-H-5606. At least 5,000 of these impulses shall be made with the impulsing medium and the caps at a temperature not warmer than  $-54^{\circ}\text{C}$  ( $-65^{\circ}\text{F}$ ). The caps shall be held at this temperature for 72 hours prior to the start of the  $-54^{\circ}$  ( $-65^{\circ}\text{F}$ ) impulse cycles. Leakage shall not exceed the values of 3.6.

4.3.3.5 Leakage. The caps used on the Impulse test specified in 4.3.3.4 shall be loosened and retightened on MS28889 valves with 15 to 20 pound-inches torque. The caps shall be tested for 1 hour at 10 psi and for 1 hour at 5,000 psi. No leakage shall occur during the 1-hour test periods.

4.3.3.5.1 Caps. The caps, still on the bodies at the same torque, shall be chilled to at least  $-54^{\circ}\text{C}$  ( $-65^{\circ}\text{F}$ ) for 24 hours while maintaining air pressure of not less than 1,000 psi in the inside of the caps. No leakage shall occur.

4.3.3.5.2 Leakage. Leakage may be checked by immersion under water or other transparent liquid or by securely fastening a deflated rubber bag on the valve body in such a manner that all leakage from the cap would be trapped in the bag.

4.3.4 Examination after test. After completion of the tests enumerated herein, all the caps shall be examined for deterioration and failure. There shall be no separation of the seat from the swivel seat plate, and the swivel shall not be tightly jammed into the housing. There shall be no evidence of excessive wear or deterioration, such as flaking, cracking, or cutting of the seat material. A compression set of the seat in the form of a circular groove at the contact point of the seat on the MS28889 stem, and a slight roughening of the seat material, shall not be interpreted as excessive wear or deterioration.

4.4 Quality conformance inspections and tests. The quality conformance inspections and tests shall consist of individual tests and sampling tests.

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4.4.1 Individual tests. Each cap shall be subjected to the following test.

4.4.1.1 Examination of product. Each cap shall be carefully examined to determine conformance with this specification with respect to dimensions, finish, material, and workmanship.

4.4.2 Sampling tests. One-half of 1 percent of the order shall be selected at random by the Inspector and subjected to the proof pressure test as specified in 4.4.2.1. In addition, these caps shall be subjected to any of the tests described under qualification tests which the inspector considers necessary to determine conformance with the requirements of this specification.

4.4.2.1 Proof pressure. The caps seated on a body conforming to MS28889 shall be subjected to a proof pressure of up to 10,000 psi without failure, distortion, or evidence of leakage in any manner.

4.4.3 Rejection and retest. When an item selected from a production run fails to meet the specification, no items still on hand or later produced shall be accepted until the extent and cause of failure have been determined and appropriately corrected. The contractor shall explain to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the tests shall be repeated.

4.4.3.1 Individual tests may continue. For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. But final acceptance of the items on hand or items produced later shall not be made until it is determined that all items meet all the requirements of the specification.

4.5 Inspection of preservation, packaging, and packing. The inspection of preservation, packaging, and packing shall be in accordance with the instructions in section 5 and the specifications referenced therein.

4.6 Retention of qualification. Each vendor listed on the Qualified Products List (QPL) will be required to certify their product on DD form 1718 every two years. Contractor shall repeat the qualification requirements of paragraph 4.3 under the following circumstances: a. Contractor has not manufactured the item for a period in excess of ten years. b. Contractor has relocated the facility in which the items were manufactured.

## 5. PACKAGING

5.1 Preservation. Preservation shall be Level A as specified (See 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Caps shall be cleaned in accordance (IAW) with MIL-P-116, Process C-1.

5.1.1.2 Drying. Caps shall be dried (IAW) MIL-P-116.

5.1.1.3 Preservative application. Preservatives shall not be used.

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5.1.1.4 Unit packs. Caps shall be preserved Level A, Method III, (IAW) MIL-P-116. The unit container shall be a box conforming to PPP-B-566. The quantity per unit package shall be fifty (50) each.

5.1.1.5 Intermediate packs. Unit packages as specified in 5.1.1.4 shall be packaged in intermediate containers conforming to PPP-B-636 or PPP-B-676. Intermediate containers shall not exceed 1 1/2 cubic feet and/or 40 lbs.

5.2 Packing. Packing shall be Level A or C as specified (See 6.2) and sealed at all joints and seams with tape conforming to PPP-T-60.

5.2.1 Level A. Items preserved and packaged as shown in paragraph 5.1 thru 5.1.1.5 shall be overpacked into a wood box, conforming to PPP-B-601 or PPP-B-621. Closure shall be IAW box specifications.

5.2.2 Level C. Items preserved and packaged as shown in paragraph 5.1 thru 5.1.1.5 shall be packed in a domestic style PPP-B-601 or PPP-B-621. Box closure shall be IAW box specification.

## 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 caps covered by this specification are for use in connection with high-pressure air valves as used in hydraulic accumulators, shock struts, etc.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Quantity desired.
- (c) Selection of applicable levels of preservation, and packing.  
(See section 5.)
- (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 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved 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 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 OC-ALC/TICLA, Tinker AFB, Oklahoma 73145-8990 and information pertaining to qualification of products may be obtained from that activity.

6.4 Subject term (key word) listing.

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Filler stem  
Hydraulic accumulator  
Shock struts

6.5 International standardization. Certain provisions of this specification are the subject of international standardization agreement ABC 17/6C and STANAG 3209. When amendment, revision or cancellation of this specification is proposed which affects or violates the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

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.

## Custodians:

AIR FORCE -99  
ARMY -AV  
NAVY -AS

## Preparing Activity:

AIR FORCE -71

## Project No:

1650-0470

## Reviewer:

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

2. DOCUMENT DATE (YYMMDD)

3. DOCUMENT TITLE

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)

7. DATE SUBMITTED (YYMMDD)

(1) Commercial  
(2) AUTOVON  
(If applicable)

### 8. PREPARING ACTIVITY

a. NAME

b. TELEPHONE (Include Area Code)

(1) Commercial

(2) AUTOVON

c. ADDRESS (Include Zip Code)

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:  
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5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466  
Telephone (703) 756-2340 AUTOVON 289-2340