

INCH-POUND
MIL-DTL-45300C
20 July 2011
SUPERSEDING
MIL-C-45300B
16 February 1988

DETAIL SPECIFICATION
CAP, FUEL TANK: FOR MILITARY
COMBAT AND TACTICAL TRANSPORT VEHICLES

Inactive for new design after 22 January 1999.

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

1. SCOPE

1.1 Scope. This specification covers three types of fuel tank caps intended for use on military vehicles. The type I and type II are vented, while the type III fuel tank cap is non-vented (see 6.1)

1.2 Classification. Fuel tank caps are of the following types as specified (see 6.2):

Type I Vented cap with pressure relief valve and float assembly (MS51300).

Type II Vented cap with pressure relief valve and fording valve (MS35645).

Type III Non-vented cap (MS53075).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130	- Identification Marking of US Military Property.
MS35644	- Filler Neck Assembly, Fuel Tank – Military Vehicles.
MS35645	- Cap, Fuel Tank: Tactical Vehicles, Fording.
MS51300	- Cap, Fuel Tank: Combat Vehicle, Spill Proof.
MS53075	- Cap, Fuel Tank: Tactical Vehicle Non-Vented.

(Copies of these documents are available online at <https://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

Comments, suggestions, or questions on this document should be addressed to DLA, Land and Maritime, ATTN: VAI, P.O. Box 3990, Columbus, OH 43218-3990, or email to FluidFlow@dlam.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>.

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

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 17025 - General requirements for the competence of testing and calibration laboratories

(Copies of these documents are available online at <http://www.iso.ch> or from the International Organization for Standardization American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

NCSL INTERNATIONAL

NCSL Z540.3 - Laboratories, Calibration, and Measuring and Test Equipment

(Copies of these documents are available online at <http://www.ncsli.org> or from NCSL International 2995 Wilderness Place, Suite 107 Boulder, Colorado 80301-5404)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.4.

3.2 Materials (all types). Materials shall be as specified herein and in referenced specifications, standards and drawings. Materials shall be free of defects which adversely affect performance or serviceability of the finished product (see 4.6.1).

3.2.1 Recycled, virgin and reclaimed materials. There are no requirements for the exclusive use of virgin materials. The use of recycled or reclaimed (recovered) materials is acceptable provided all other requirements of this specification are met (see 6.3.1).

3.3 Construction (all types) (see 4.6.1 and 4.6.2).

3.3.1 Type I. Type I caps shall conform to MS51300.

3.3.2 Type II. Type II caps shall conform to MS35645.

3.3.3 Type III. Type III caps shall conform to MS53075.

3.4 Performance.

3.4.1 Torque.

3.4.1.1 Caps (all types). When connecting the cap to a filler neck conforming to MS35644 at temperatures of plus 125 to minus 65 degrees Fahrenheit (°F), the torque shall be no greater than 70 inch-pounds attained before the cap hits the stop limit. The torque required to disconnect the cap from the filler neck at temperatures of plus 125 to minus 65°F shall be not greater than 70 nor less than 25 inch-pounds. There shall be no visible evidence of binding (see 4.6.3.1).

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3.4.1.2 Fording valve (type II only). The torque required to move the fording valve out of closed or open position shall be not less than 10 inch-ounces (see 4.6.3.2).

3.4.2 Leakage (all types). When tested as specified in 4.6.4, with a pressure of 2 pounds per square inch (psi) for type I and 1 psi for type II (with fording valve closed) and type III caps, the leakage shall not exceed 0.5 ounce per minute.

3.4.3 Pressure relief valve opening.

3.4.3.1 Type I. When tested as specified in 4.6.5.1, the pressure relief valve for type I caps shall open at between 4 to 5 psi, when the float is in the actuated condition.

3.4.3.2 Type II. When tested as specified in 4.6.5.2, the pressure relief valve for type II caps shall open at between 2 to 3 psi, when the fording valve is in the closed position.

3.4.4 Free breathing (types I and II). When tested as specified in 4.6.6, type I and type II caps (type II cap with fording valve open) shall have an air flow through them of not less than 0.010 cubic foot per minute (cfm), at room temperature with 1 psi vacuum.

3.4.5 Shear strength (all types). When tested as specified in 4.6.7, type I and type II caps shall withstand not less than 25 foot-pounds of applied torque before showing any rotation of the inner member with respect to the outer shell. Type II and type III caps shall withstand not less than 25 foot-pounds of applied torque before showing any rotation of cup on inner plate or inner plate on shell.

3.4.6 External pressure (types II and III). When tested as specified in 4.6.8, type II (with fording valves closed) and type III caps shall not leak.

3.5 Finish (all types). Unless otherwise specified (see 6.2), caps shall be finished on the interior or exterior as specified in the applicable MS standard (see 3.3 and 4.6.2).

3.6 Identification marking (all types). Caps shall be marked in accordance with the applicable MS standard and the requirements of MIL-STD-130 (see 3.3 and 4.6.2).

3.7 Cleaning. The caps and all cap parts in contact with fuel shall be cleaned.

3.8 Workmanship (all types). The workmanship of the cap shall be of such quality as to assure a product free of defects affecting its serviceability and appearance (see 4.6.2).

4. VERIFICATION

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

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.5).

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be used. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with ISO 17025 and NCSL Z540.3 as applicable.

4.1.1.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable documents.

4.2 First article inspection. First article inspection shall be performed on one complete cap assembly when a first article sample is required (see 3.1). This inspection shall include the examination of 4.4 and the tests of 4.5.1 through 4.5.3.

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4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

- a. Air temperature 73 + 18°F
- b. Barometric pressure 28.5 + 2/ -3 inches mercury (Hg)
- c. Relative humidity 50 + 30%

4.3.1 Cleaning. The caps and all cap parts in contact with fuel shall be cleaned prior to tests.

4.3.2 Filler neck. When the use of a filler neck is specified during testing, the filler neck shall conform to MS35644.

4.4 First article inspection. Unless otherwise specified (see 6.2), the Government shall select five (5) sample caps, of the specified type, produced under the production contract for first article inspection. First article samples shall be inspected as specified in table I. Approval of the first article sample by the Government shall not relieve the contractor of his obligation to supply caps that are fully representative of those inspected as a first article sample. Any changes or deviation of the production units from the first article sample shall be subject to the approval of the contracting officer. The applicability of cap types to tests shall be as specified in table II.

TABLE I. Classification of inspections.

Title	Requirement	Inspection	First article <u>1/</u>	Conformance	
				Examination	Tests <u>1/</u>
Materials and Construction	3.2 and 3.3	4.6.1	X		
Defects (see table III)	3.3, 3.5 thru 3.8	4.6.2	X	X	
Torque, cap	3.4.1.1	4.6.3.1	X		X
Torque, fording Valve	3.4.1.2	4.6.3.2	X		X
Leakage	3.4.2	4.6.4	X		X
Pressure relief valve opening	3.4.3	4.6.5	X		X
Free breathing	3.4.4	4.6.6	X		X
Shear strength	3.4.5	4.6.7	X		X
External pressure	3.4.6	4.6.8	X		X

1/ See table II.

TABLE II. Applicability of cap types to tests.

Tests	Cap type		
	I	II	III
4.6.3.1	X	X	X
4.6.3.2		X	
4.6.4	X	X	X
4.6.5.1	X		
4.6.5.2		X	
4.6.6	X	X	
4.6.7	X	X	X
4.6.8		X	X

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4.4.1 First article inspection failure. A sample of parts shall be randomly selected, as specified in table III. If one or more defects are found, the lot shall be re-screened and defects removed. After screening and removal of defects, a new sample of parts shall be randomly selected, as specified in table III. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification. Re-inspected lots shall be clearly identified.

TABLE III. Conformance zero defect sampling plan.

Lot size	Sample size
2 to 8	5
9 to 15	5
16 to 25	5
26 to 50	5
51 to 90	7
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1,200	19
1,201 to 3,200	23
Over 3,200	29

4.5 Conformance inspection.

4.5.1 Sampling.

4.5.1.1 Lot formation. An inspection lot shall consist of all the caps of one type and part number, from an identifiable production periods from one manufacturer, submitted at one time for acceptance.

4.5.2 Examination.

4.5.3 Tests. Sample caps selected as specified in 4.5.1 shall be subjected to the quality conformance tests specified in table I.

4.6 Methods of inspection.

4.6.1 Materials and construction (all types). Conformance to 3.2 and 3.3 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.6.2 Defects (all types). Conformance to 3.3, 3.5, 3.6 and 3.7 shall be determined by examination for the defects listed in table III. Examination shall be visual or by measurement with standard inspection equipment.

4.6.3 Torque.

4.6.3.1 Caps (all types). To determine conformance to 3.4.1.1, the cap shall be connected to and then disconnected from the filler neck using a torque wrench. This procedure shall be repeated five times, observing the torque required. In connecting the cap, the maximum torque value shall be attained before the cap reaches the end of travel.

4.6.3.2 Fording valve (type II only). To determine conformance to 3.4.1.2, actuate the fording valve control from the "opens" to the "closed" position and from the "closed" to the "open" position, using a torque wrench and noting the torque required.

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4.6.4 Leakage (all types). To determine conformance to 3.4.2, a filler neck, with cap mounted, shall be placed in an airtight chamber (see figure 1). The chamber shall be 3/4 filled with a liquid of the viscosity of gasoline. It shall be rotated to place the cap below the liquid level. An internal pressure of 2 psi shall be applied for type I and 1 psi for types II and III caps and any leakage shall be recorded.

4.6.5 Pressure relief valve opening.

4.6.5.1 Type I. To determine conformance to 3.4.3.1, fabricate an air pressure chamber from a MS35644 filler neck assembly. Gradually increase the air pressure to verify that the relief valve opens at 4 to 5 psig. The vent opening may be plugged with a rubber stopper. For safety reasons, the air supply system should be designed to preclude exceeding 10 psig. Since the effective area of the relief valve is approximately 1 square inch, an equivalent mechanical force may be used in lieu of air pressure. Visually observe the relief valve opening with a 4 to 5 lb force applied to the ball chamber by a suitable means, such as a spring scale.

4.6.5.2 Type II. To determine conformance to 3.4.3.2, the cap shall be placed on a filler neck and the fording valve shall be closed. Internal pressure of the filler neck shall be increased at a rate not exceeding 0.1 psi per second until pressure relief valve opens at a maximum of 6 psi is obtained.

4.6.6 Free breathing (types I and II). To determine conformance to 3.4.4, the cap shall be installed on a filler neck that is mounted on testing apparatus conforming to figure 2. One psi of vacuum shall be applied and the air flow meter shall be checked for resulting air flow through the cap.

4.6.7 Shear strength (all types). To determine conformance to 3.4.5, the cap shall be mounted on a filler neck. Torque shall be applied with a torque wrench until the rotation of the inner member of the type I cap with respect to its outer shell and until rotation of cup on inner plate or inner plate on shell for type II and type III caps occur. The value of torque in foot-pounds shall be recorded.

4.6.8 External pressure (types I and II). To determine conformance to 3.4.6, the cap shall be mounted on a filler neck. The assembly shall be inverted and placed in an airtight container (see figure 1) filled 3/4 full of water. The cap shall be below the water surface and the filler neck shall be vented to atmospheric pressure. A pressure of 5 psi shall be applied to the airtight container and maintained for 60 to 70 seconds after which the assembly shall be disassembled and inspected for leakage.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

6.1 Intended use. Caps covered by this specification are used on the following vehicles.

6.1.1 Type I. The cap is used on military tactical vehicles which are not used in fording operations.

6.1.2 Type II. The cap is used on military tactical vehicles with fuel supply systems designed for atmospheric venting through the fuel cap (fording valve open) and fuel systems incorporating a vacuum relief valve or combination vacuum and pressure relief valve (fording valve closed).

6.1.3 Type III. The cap is used on military combat and tactical vehicles with fuel supply systems designed for atmospheric venting by way of the engine air induction system or direct-to-atmospheric above the water line on fording.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of cap required (see 1.2).
- c. If first article inspection is not required (see 3.1).
- d. If cap finish is other than as specified (see 3.5).
- e. If responsibility for inspection is other than as specified (see 4.1).
- f. If responsibility for inspection equipment is other than as specified (see 4.1.2).
- g. If inspection conditions is other than as specified (see 4.3)
- h. If first article inspection sample size is other than as specified (see 4.4).
- i. Packaging requirements (see 5.1)

6.3 Definitions.

6.3.1 Recovered materials. "Recovered materials" means materials that have been collected or recovered from solid waste (see 6.3.2).

6.3.2 Solid waste. "Solid waste" means (a) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and (b) other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It does not include solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, (33 U.S.C. 1342 et seq.) or source nuclear, or byproduct material as defined by the atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) (Source: Federal Acquisition Regulations, section 23.402).

6.4 Subject term (key word) listing.

Fording valve
Free breathing
Non-vented

6.5 Changes from previous issue. Asterisks (or vertical lines) 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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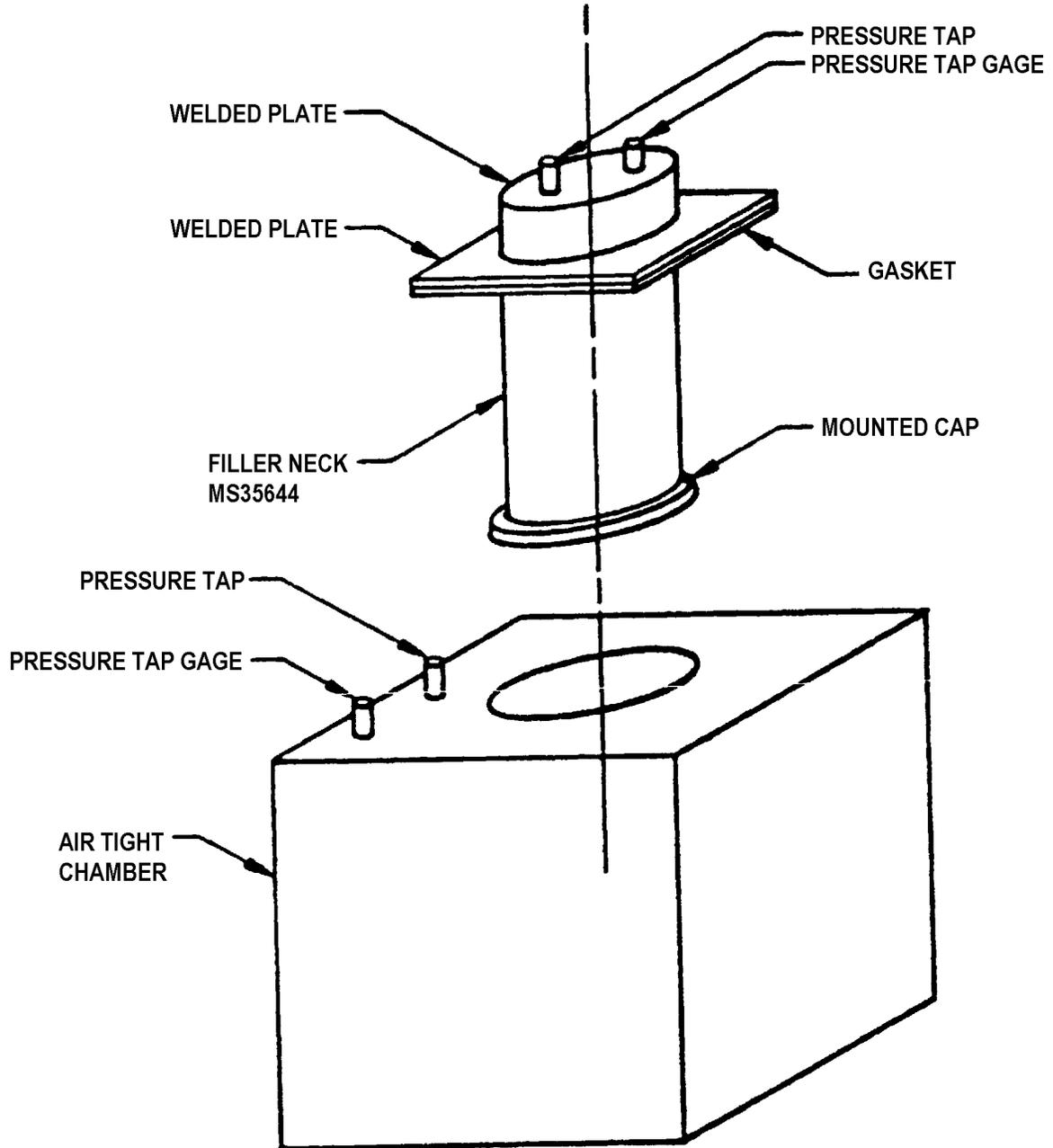


FIGURE 1. Schematic diagram of air tight chamber and modified filler neck.

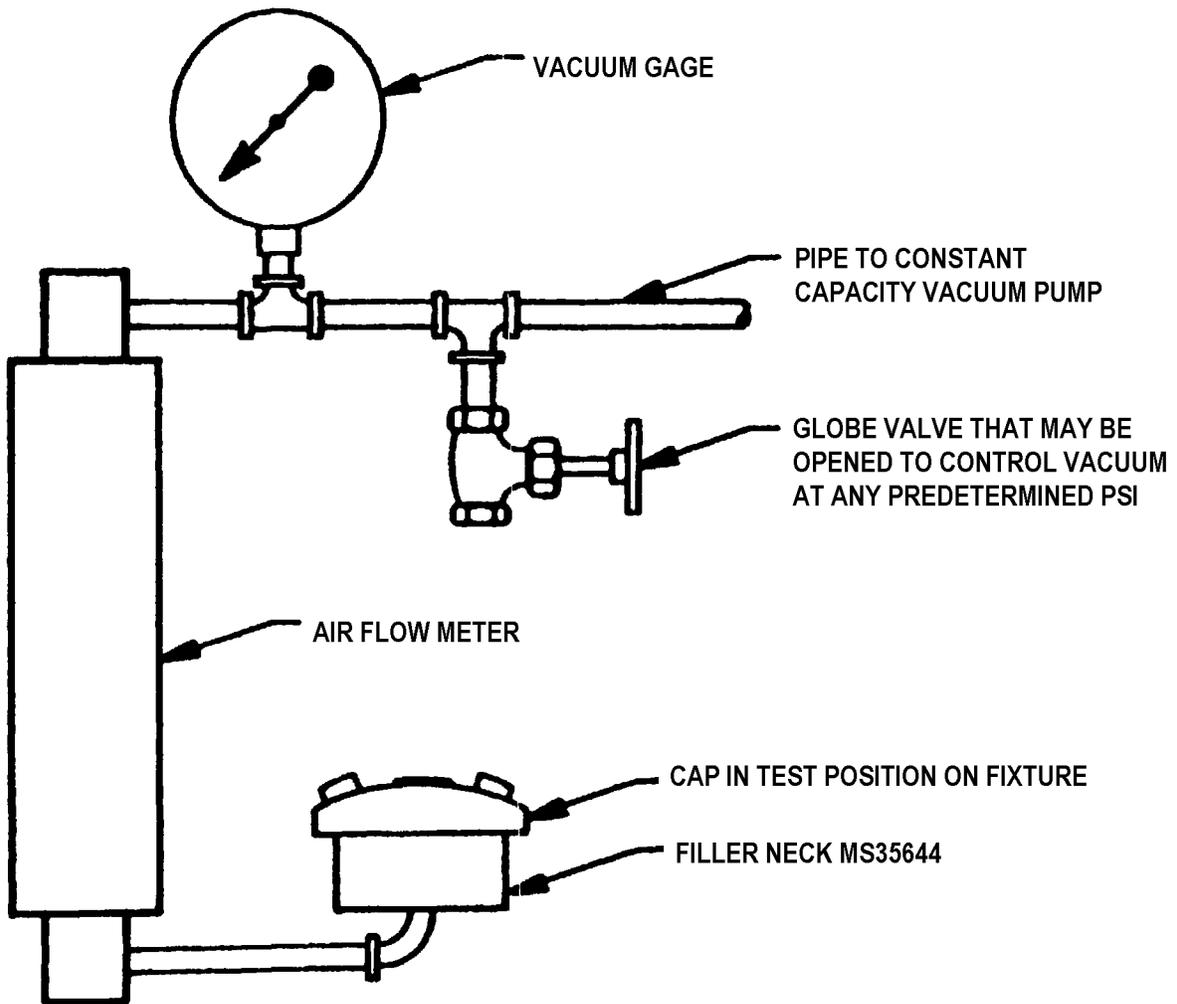


FIGURE 2. Set up for determining air flow through the type II cap.

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CONCLUDING MATERIAL

Custodians:
Army – AT
Navy – MC
Air Force – 99
DLA – CC

Preparing activity:
DLA – CC

(Project 2910-2011-002)

Review activities:
Army – MI, GL
Navy – YD
Air Force – 70

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.daps.dla.mil>.