

INCH-POUND
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MIL-PRF-25962G

13 May 2020

SUPERSEDING

MIL-PRF-25962F

19 December 2013

## PERFORMANCE SPECIFICATION

## VALVE, LIQUID OXYGEN DRAIN

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 of valve for draining 70 and 300 pounds per square inch gage (psig) liquid oxygen converters.

## 2. APPLICABLE DOCUMENTS

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

Comments, suggestions, or questions on this document should be addressed to Oklahoma City Air Logistics Center, 3001 Staff Drive, Tinker AFB, OK 73145. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <a href="https://assist.dla.mil">https://assist.dla.mil</a> .
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## FEDERAL SPECIFICATIONS

BB-A-1034	Compressed Air, Breathing (For guidance only)
MIL-PRF-27210	Performance Specification, Oxygen, Aviator's Breathing,

Liquid and Gas

## COMMERCIAL ITEM DESCRIPTIONS

A-A-59503	-	Nitrogen, Technical
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(Copies of these documents are available online at <https://quicksearch.dla.mil/> )

2.3 Non-Government publications. The following documents 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.

## ASME INTERNATIONAL

ASME B1.20.1	-	Pipe Threads, (Inch) General Purpose
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(ASME documents may be obtained online at <http://www.asme.org/> or from ASME International, Three Park Avenue, New York, New York 10016-5990, USA.)

## SAE INTERNATIONAL

SAE-ARP1176	-	Oxygen System and Component Cleaning and Packaging
SAE-AS4396	-	Tube Connection, Bulkhead Flared, Fitting End, Design Standard

(SAE documents may be obtained online at <http://www.sae.org/> or from SAE World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001 USA.)

2.4 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 Qualification. The valves furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

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3.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Materials. All materials shall be suitably treated to resist corrosion due to electrolytic decomposition, salt air, and any other atmospheric condition that may be encountered during operational use or storage (see 6.4). Materials that come into contact with liquid oxygen (LOX) shall not contain hydrocarbons, shall be non-impact sensitive and non-degradable, and shall have a brittle point below -297°F.

3.4 Interface.

3.4.1 Dimensions. The valve shall conform to the dimensions in FIGURE 1 (see 4.5.1).

3.4.2 Threads. All pipe threads shall conform to ASME B1.20.1 (see 4.5.1).

3.4.3 Markings. The word "OUTLET" and an arrow pointing in the direction of the outlet shall be stamped on the valve body. In addition, the words "OPEN" and "CLOSED" with an arrow pointing to these directions shall conform to FIGURE 1 (see 4.5.1).

3.4.4 Weight. The weight of the valve shall be not greater than 0.25 pounds (see 4.5.1).

3.5 Performance.

3.5.1 General. The valve shall operate only when the handle is placed in the "OPEN" or "CLOSED" position, and shall not change operating conditions without handle actuation. In addition, the valve shall operate in any mounting position (see 4.5.10).

3.5.2 Flow rate. The valve flow shall be not less than 150 liters per minute (L/min) when subjected to a pressure not greater than 5 psig (see 4.5.2).

3.5.3 Outlet port leakage. The outlet port leakage shall be not greater than 0.02 L/min when pressurized to 70 psig, 300 psig, and 10 inches of water (see 4.5.3).

3.5.4 High temperature operation. The valve shall withstand a temperature not less than 260°F for not less than 4 hours (see 4.5.4).

3.5.5 Low temperature operation. The valve shall withstand a temperature not greater than -65°F for not less than 4 hours (see 4.5.5).

3.5.6 Vibration. The valve shall be subjected to a vibration at double amplitude of 0.02 inches and a frequency changing from 10 to 50 to 10 Hz (see 4.5.6).

3.5.7 Overall leakage. The valve body shall not leak with an internal pressure of not less than 500 psig (see 4.5.7).

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3.5.8 Reliability. The mean cycles between failures (MCBF) of the valve shall be not less than 1,000 cycles (see 4.5.8 and 6.2).

3.6 Cleanliness. All surfaces shall be free of visible particulates (50 microns and larger), free of visible fluorinated lubricants, and free of hydrocarbon contamination to a level not greater than 3 milligrams per square foot (mg/ft<sup>2</sup>) (see 4.5.9 and 6.5).

3.7 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable.

#### 4. VERIFICATION

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

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Qualification inspection. If required (see 3.1 and 6.3), qualification shall be performed on four valves. The four valves shall be subjected to all the tests in 4.5.

4.3 Conformance inspection. Conformance inspection shall include the individual tests (see 4.3.1) and the sampling tests (see 4.3.2).

4.3.1 Individual tests. Each valve shall be subjected to the following tests:

- a. Examination (see 4.5.1).
- b. Cleanliness (see 4.5.9).
- c. Outlet port leakage (see 4.5.3).

4.3.2 Sampling tests. Two valves selected at random from each lot not greater than 500 shall be subjected to the following sampling tests:

- a. Flow rate (see 4.5.2).
- b. High temperature operation (see 4.5.4).
- c. Low temperature operation (see 4.5.5).
- d. Overall leakage (see 4.5.7).

4.4 Inspection conditions.

4.4.1 Temperature and pressure. Unless otherwise specified, tests shall be conducted at ambient atmospheric conditions.

4.4.2 Test medium. Gas used in testing shall conform to MIL-PRF-27210, Type I; air referencing BB-A-1034 for guidance only, Grade A or C; nitrogen conforming to A-A-59503,

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Class I, Grade A; or liquid oxygen conforming to MIL-PRF-27210, Type II.

TABLE I. Requirements cross reference matrix.

Requirement	Verification	Requirement	Verification
3.1	4.2	3.5.3	4.5.3
3.2	4.5.1	3.5.4	4.5.4
3.3	4.5.1, 4.5.11	3.5.5	4.5.5
3.4.1	4.5.1	3.5.6	4.5.6
3.4.2	4.5.1	3.5.7	4.5.7
3.4.3	4.5.1	3.5.8	4.5.8
3.4.4	4.5.1	3.6	4.5.9
3.5.1	4.5.10	3.7	4.5.1
3.5.2	4.5.2		

#### 4.5 Tests.

4.5.1 Examination of product. Each valve shall be inspected to determine conformance to dimensions, thread size, materials, weight, markings, and handle operation.

4.5.2 Flow rate. With the valve in the "OPEN" position, a pressure not greater than 5 psig shall be applied to the inlet port and the flow rate through the valve shall be not less than 150 L/min.

4.5.3 Outlet port leakage. With the valve in the "CLOSED" position, pressures equaling 70 psig, 300 psig, 10 inches of water shall be applied to the inlet port. Leakage from the outlet port shall be not greater than 0.02 L/min.

4.5.4 High temperature operation. The valve shall be subjected to a temperature of not less than 260°F for not less than 4 hours. While at this temperature, the valve shall be subjected to the outlet port leakage test (see 4.5.3).

4.5.5 Low temperature operation. With the valve in the "OPEN" position, liquid oxygen shall be flowed through the valve; then the valve shall be switched to the "CLOSED" position. This procedure shall be repeated three times. The valve shall then be subjected to a temperature of not greater than -65°F for not less than 4 hours. While at this temperature, the valve shall be subjected to the outlet port leakage test (see 4.5.3).

4.5.6 Vibration. The valve shall be subjected to vibration of constant double amplitude of 0.02 inches. The frequency shall change from 10 to 50 to 10 Hz. This test shall continue for not less than 9 hours. After 9 hours, while continuing vibration, the valve shall be subjected to the outlet port leakage test (see 4.5.3).

4.5.7 Overall leakage. With the valve in the "OPEN" position and the outlet port plugged, a pressure of 500 psig shall be applied to the inlet port. There shall be no leakage from the valve. The valve shall then be subjected to the outlet port leakage test (see 4.5.3).

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4.5.8 Reliability. Four valves shall be tested for reliability. The valves shall be operated under cryogenic conditions simulating actual usage. Reliability of the equipment shall be expressed in terms of mean cycles between failures (MCBF) and shall be not less than 1,000 cycles. A cycle shall consist of operating the valve between the "OPEN" and "CLOSED" position with liquid oxygen at a pressure of 300 psig applied to the inlet port of the valve. Liquid must pass through the valve each cycle. Every 400 cycles, the valve shall be subjected to outlet port leakage test (see 4.5.3) and the overall leakage test (see 4.5.7). The valves shall be cycled until failure. Any evidence of leakage or malfunction shall constitute a failure.

4.5.9 Cleanliness. All surfaces shall be free of visible particulates (50 microns or larger), free of visible fluorinated lubricants, and free of hydrocarbon contamination to a level not greater than 3 mg/ft<sup>2</sup>. Cleanliness shall be demonstrated by subjecting the valves to the tests specified in SAE-ARP1176 or industrially accepted test methods (see 6.5).

4.5.10 Orientation. While the valve is in three mutually perpendicular positions, it shall be subjected to the outlet port leakage test (see 4.5.3) and the vibration test (see 4.5.6).

4.5.11 Corrosion. A corrosion test or materials certification shall be used to demonstrate satisfactory compliance with requirement 3.3.

## 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

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The valve covered by this specification is intended to be used to drain 70 and 300 psig liquid oxygen converters.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Item identification.
- c. Reliability (see 3.5.8).
- d. If qualification data is required (see 4.2).

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- e. Packaging requirements (see 5.1).
- f. The requirement for the vendor to identify proposed cleaning methods (see 4.5.9).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL-25962 whether or not such products have actually been listed by that date. The attention of the contractors is called to these requirements, 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. Information pertaining to qualification of products may be obtained from Oklahoma City Air Logistics Center, 3001 Staff Drive, Tinker AFB, OK 73145. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.dla.mil>.

6.4 Materials. The corrosion resistant materials used satisfactorily in the past have been brass, bronze, phosphor bronze, 18-8 corrosion-resistant steel, and anodized aluminum alloys.

6.5 Cleaning. Reference MIL-STD-1330 and SAE-ARP1176 for guidance on proven cleaning methods and verifications.

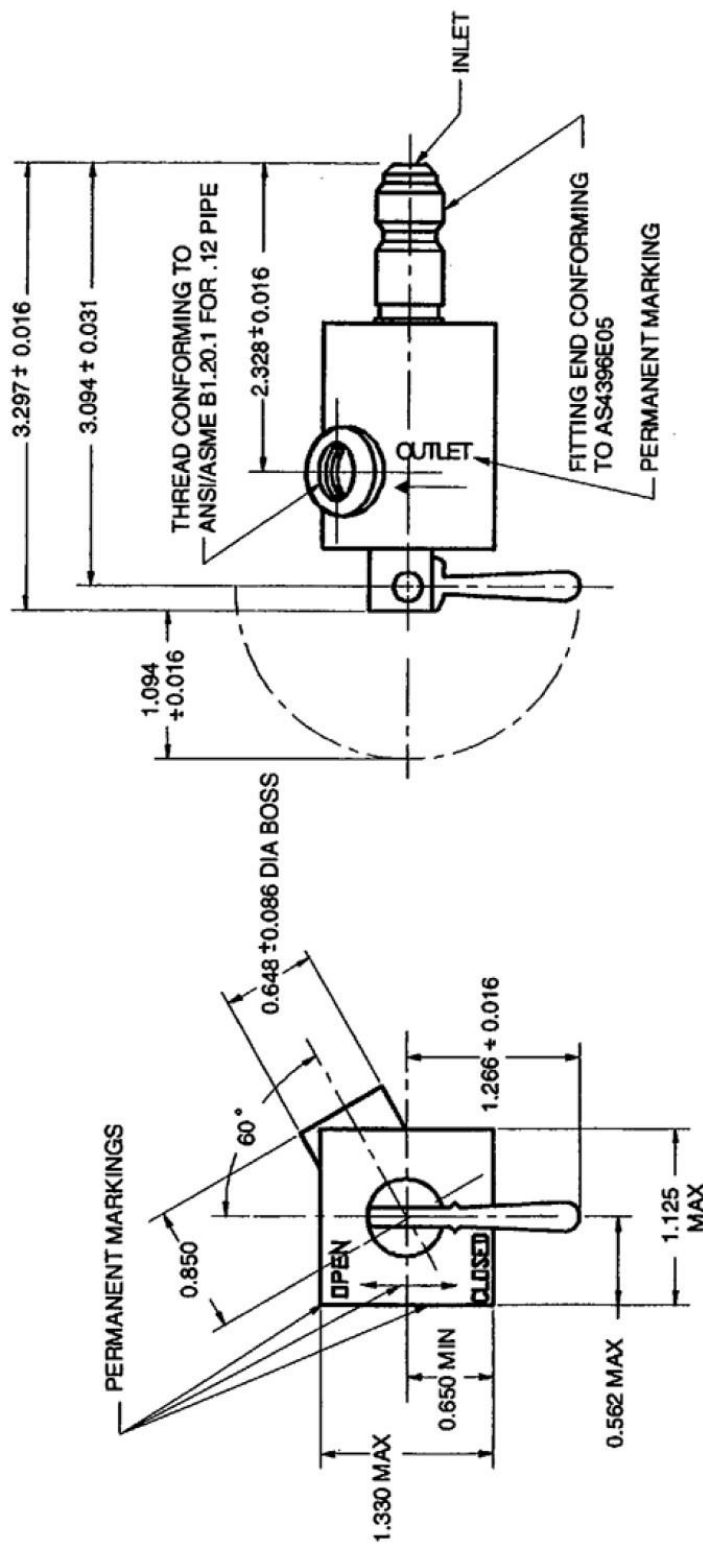
6.6 Subject term (key word) listing.

#### Converters

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

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NOTE: This figure has been replaced, rotated 90, and enlarged. The existing figure was illegible.



NOTE: UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND TOLERANCES ARE DECIMALS:  $\pm 0.005$ , ANGLES  $\pm 1/2^\circ$

FIGURE 1. Valve envelope and port locations.



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Preparing activity Air  
Force - 71

Custodians:  
Air Force - 71

Reviewer activities:  
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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 database at <https://assist.dla.mil/>.