INCH-POUND
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26 NOVEMBER 1997
SUPERSEDING
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PERFORMANCE SPECIFICATION

VALVE, FILL-BUILDUP-VENT, LIQUID OXYGEN CONVERTER, CRU-50/A

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 liquid oxygen converter fill-buildup-vent valve for use in 70 and 300 pounds per square inch gage (psig) liquid oxygen (LOX) systems in aircraft. The valve is designated CRU-50/A.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited in sections 3 and 4 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 the requirements specified in the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to: Oklahoma City Air Logistics Center/TICLA, 3001 Staff Drive, Suite 1AE1-101A, Tinker AFB, OK 73145-3036 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

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

SPECIFICATION

FEDERAL

BB-N-411	Nitrogen, Technical

DEPARTMENT OF DEFENSE

MIL-V-38201	Valve, Filler, Liquid Oxygen, Female CRU-59E

STANDARD

DEPARTMENT OF DEFENSE

MS27566	Cap Assembly, Liquid Oxygen Fill Valve

(Unless otherwise indicated, copies of the above specifications and standard are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the applicable issues of the documents which have been adopted by the DoD are those listed in the specific issue of the DoDISS cited in the solicitation. Unless otherwise specified, the documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AS 8010	Aviator's Breathing Oxygen Purity Standard

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B1.20.1	Pipe Threads, General Purpose (Inch)(DoD adopted)
ASME B46.1	Suface Texture (Surface Roughness, Waviness, and Lay) (DoD adopted)

(Application for copies should be addressed to ASME, United Engineering Center, 345 East 47th St., New York, NY 10017.)

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ANSI/ASQC Z1.4-1993	Sampling Procedures And Tables For Inspection By Attributes (DoD adopted)

(Application for copies should be addressed to America Society for Quality Control, 611 East Wiconsin Avenue, P.O. Box 3005, Milwaukee, WI 53201-3005, or to the America National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F371	Standard Test Method for Compatibility of Materials with Liquid Oxygen (Reaction Intensity Method)
ASTM B117	Standard Practice for Operating Salt Spray (Fog) Testing Apparatus (DoD adopted)

(Application for copies should be addressed to America Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103-1187.)

2.3 Order of precedence. 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 valve furnished under this specification shall be the product that is authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.1 and 6.3).

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 promote economically advantageous life cycle cost.

3.3 Workmanship. The valve, including all parts, shall be constructed in accordance with commonly accepted industrial workmanship standards.

3.4 Materials. All materials shall be corrosion resistant or 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. Materials shall be compatible with LOX at -297°F.

3.4.1 Nonmetallic Materials. Unless otherwise specified, all nonmetallic materials shall be tested in accordance with ASTM F371 and shall not demonstrate peak reaction pressure in excess of 2 psig. For additional guidance selecting nonmetallic materials for LOX usage see 6.5.

3.5 Interface.

3.5.1 Dimensions. The dimensions of the valve shall conform to Figures 1 through 5.

3.5.2 Cap. The fill inlet port shall have a cap conforming to MS27566.

3.5.3 Filler valve CRU-59/E. The CRU-50/A valve shall have a fill inlet port that mates with a CRU-59/E valve as specified in MIL-V 38201 (see Figure 5).

3.5.4. Threads. All pipe threads shall conform to ASME B1.20.1.

3.6 Environmental conditions. The valve shall operate in the following conditions:

a. Temperature: -65° to 260°F.

b. Vibration: An acceleration power spectral density (APSD) of 0.04 g^2/Hz from 15 to 50 Hz, and then an increase at a rate of ±4 dB per octave to 300 Hz. Also, an APSD of 0.3 g^2/Hz from 300 to 1,000 Hz, and then a decrease at a rate of 6 dB per octave to 2,000 Hz.

3.7 Performance.

3.7.1 General. The valve shall be an automatic type that controls liquid and gaseous oxygen flow during filling and operation of LOX converters in the fill, vent, and buildup circuits of 70 and 300 psig LOX systems.

3.7.2 Operating positions. The valve shall have two operating positions: buildup (closed) and fill-vent (open). When the CRU-59/E valve is disconnected, or connected but not rotated to full engagement, the CRU-50/A valve shall be in the buildup position. When the CRU-59/E valve is connected and rotated clockwise to full engagement, the CRU-50/A valve shall be in the fill-vent position. The required flow patterns for each position are shown in Figure 6.

3.7.3 Cleanliness. All surfaces of the valve shall be free from contaminants.

3.7.4 Fill check element. The fill check element in the fill outlet port shall prevent a reverse flow through the fill inlet port in excess of 0.25 standard liter per minute (SLPM)(see 6.4) when a pressure of 70 psig is applied to the fill outlet port and the CRU-59/E valve in fully engaged.

3.7.5 Leakage.

3.7.5.1 Fill inlet port and vent port back pressure leakage. Leakage from the fill inlet and vent ports shall not exceed 0.02 and 0.04 SLPM, respectively, when the gas port is plugged, the cap is removed from the fill inlet port, and pressures of 10 inches of water, 70 psig, and 300 psig are applied to the fill outlet and the buildup ports.

3.7.5.2 Gas port leakage. The leakage from the gas port shall not exceed 0.25 SLPM when the vent and fill outlet ports are plugged and a pressure of 30 psig is applied to the buildup port and through the CRU-59/E valve into the fill inlet port.

3.7.5.3 Mating valve leakage. The CRU-50/A valve shall not leak LOX when fully engaged with the CRU-59/E valve.

3.7.6 Flow rate.

3.7.6.1 Fill cycle flow rate. When the valve is in the fill-vent position and there is a gas flow of 40 SLPM, the pressure drop shall not exceed 2.4 psig.

3.7.6.2 Vent cycle flow rate. The gaseous oxygen flow from the vent port shall be a minimum of 70 SLPM when a CRU-59/E valve is connected to the fill inlet port and a pressure of 34 inches of water is applied to the gas port.

3.7.6.3 Buildup cycle flow rate. The gaseous oxygen flow from the gas port shall be a minimum of 40 SLPM with a pressure of 21 inches of water applied to the buildup port.

3.7.7 Pressure.

3.7.7.1 Proof pressure. The valve shall withstand a proof pressure of 500 psig.

3.7.7.2 Actuation pressure. The valve shall actuate with a maximum internal pressure of 350 psig.

3.7.8 Orientation. The valve shall operate in any orientation.

3.7.9 Opening force. When the valve is pressurized to 350 psig, the force applied to the valve stem to actuate the valve from the buildup to the fill-vent position shall not exceed 50 pounds.

3.7.10 Weight. The valve weight shall not exceed 1.25 pounds.

3.7.11 Reliability. The valve shall have a mean cycles between failures (MCBF) of 200 cycles.

3.7.12 Venting endurance. The valve shall withstand 200 vent cap (see 6.10) installation and removal cycles with a minimum system pressure of 50 psig without leakage.

3.8 Item identification. The valve shall be marked with the following information:

a. Manufacturer's name

b. Manufacturer's CAGE code

c. Manufacturer's part number (PN)

d. Manufacturer's lot number

e. CRU-50/A

f. MIL-PRF-25961

3.8.1 Port indentification. The port locations shall be marked (see Figure 2).

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

3.10 Toxic chemical, hazardous substances, and ozone depleting chemicals (ODCs). The use of toxic chemicals, hazardous substances or ODCs shall be avoided, whenever feasible.

4. VERIFICATION

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

a. Qualification (see 4.2).

b. Conformance inspection (see 4.3).

4.2 Qualification inspection. Qualification inspection shall be performed on a minimum of two valves and shall include all the tests and examinations in 4.6.

4.2.1 Verification inspection. When required by the procuring activity (see 6.2), verification inspection shall be performed on two valves and shall include all the tests and examinations in 4.3 and in 4.6.14 and 4.6.17. Verification inspection shall be performed when a qualified manufacturer has not produced a CRU-50A valve for three years or there has been a change in manufacture's design, materials, or procedures.

4.3 Conformance inspection. Conformance inspection shall include the tests in 4.3.1 and 4.3.2.

4.3.1 Individual tests. Each valve shall be subjected to the tests below.

a. Visual examination (see 4.6.1).

b. Cleanliness (see 4.6.2).

c. Fill check element leakage (see 4.6.3).

d. Fill inlet port and vent port back pressure leakage (see 4.6.4).

e. Gas port leakage (see 4.6.5).

4.3.2 Sample tests. In addition to the tests indicated in 4.3.1, valves shall be sample inspected based on ANSI/ASQC Z1.4 (see 6.7 for guidance). A sample of valves shall be subjected to the following examinations and tests and shall not be used as deliverable items.

a. Visual examination (dimensional only) (see 4.6.1).

b. Fill cycle flow rate (see 4.6.7).

c. Vent cycle flow rate (see 4.6.8).

d. Buildup cycle flow rate (see 4.6.9).

e. Functional test (see 4.6.13).

f. Proof pressure (see 4.6.15).

4.4 Inspection condition.

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

4.4.2 Female filler valve. A CRU-59/E valve shall be used in testing.

4.4.3 Oxygen. All tests requiring LOX shall use oxygen conforming to SAE AS 8010, Type II, or nitrogen in accordance with BB-N-411, Type II, Class I, Grade B. Testing requiring gases shall use oxygen in accordance with SAE AS 8010, Type I, or nitrogen in accordance with BB-N-411, Type I, Class I, Grade B.

4.5 Requirements cross-reference matrix. Table I provides a cross-reference matrix of the section 3 requirements tested or verified in the paragraphs below.

TABLE I. Requirements cross-reference matrix

Requirements	Verification	Requirements	Verification
3.1	4.2	3.7.5.2	4.6.5
3.3	4.6.1	3.7.5.3	4.6.6
3.4	4.6.1, 4.6.13,.4.6.19	3.7.6.1	4.6.7
3.4.1	4.6.1, 4.6.20	3.7.6.2	4.6.8
3.5.1	4.6.1	3.7.6.3	4.6.9
3.5.2	4.6.1	3.7.7.1	4.6.15
3.5.3	4.6.1, 4.6.13	3.7.7.2	4.6.13.3
3.5.4	4.6.1	3.7.8	4.6.12
3.6	4.6.10, 4.6.11, 4.6.16	3.7.9	4.6.14
3.7.1	4.6.13	3.7.10	4.6.1
3.7.2	4.6.13	3.7.11	4.6.17
3.7.3	4.6.2	3.7.12	4.6.18
3.7.4	4.6.1, 4.6.3	3.8	4.6.1
3.7.5.1	4.6.4		

4.6 Tests.

4.6.1 Examination of product. Each valve shall be inspected to determine conformance to workmanship, weight, port locations, thread size, dimensions, fill check element, fittings, materials, cap requirements, and item identification.

4.6.2 Cleanliness. All valve surfaces shall be free of contaminants such as rust, scale, dirt, paints, oils, hydrocarbons, and cleaning compounds. Cleanliness of the surfaces shall be demonstrated by industrially accepted methods and these test methods shall be identified (see 6.2 and 6.6).

4.6.3 Fill check element leakage. A pressure of 70 psig shall be applied to the fill outlet port of the CRU-50/A valve. A CRU-59/E valve shall be connected to the fill inlet port of the CRU-50/A valve. While maintaining 70 psig, the reverse flow through the CRU-59/A valve shall not exceed 0.25 SLPM.

4.6.4 Fill inlet port and vent port back pressure leakage. The gas port shall be plugged and the cap shall be removed from the fill inlet port. Pressures of 10 inches of water, 70 psig, and 300 psig shall be applied in steps for a minimum of 2 minutes each to the fill outlet and buildup ports. While maintaining the specified pressures at each step, the leakage from the fill inlet and vent ports shall not exceed 0.02 and 0.04 SLPM, respectively.

4.6.5 Gas port leakage. A CRU-59/E valve shall be connected to the fill inlet port of the CRU-50/A valve. Then the vent and fill outlet ports shall be plugged. A pressure of 30 psig shall be applied for a minimum of 2 minutes to the buildup port and through the CRU-59/E valve into the fill inlet port. While maintaining 30 psig, the leakage from the gas port shall not exceed 0.25 SLPM.

4.6.6 Mating valve leakage. A CRU-59/E valve shall be connected to the fill inlet port of a rigidly mounted CRU-50/A valve. With a constant 30 psig flow of LOX being maintained through the valves, the following tests shall be performed. First, a force of 13-pounds shall be applied at the rear (hose connection) of the CRU-59/E valve in a direction perpendicular to the charging hose (major axis of the valve) in all four 90° quadrants. Next, a force of 13-pounds then shall be applied at the rear (hose connection) of the CRU-59/E valve in line with the charging hose to establish a pull on the mating valve surfaces. No LOX leakage shall occur from the CRU-50/A valve.

4.6.7 Fill cycle flow rate. The pressure drop through the CRU-59/E valve, as installed on a test apparatus, shall be measured at a flow of 40 SLPM with the fill poppet stem held depressed. The CRU-50/A valve shall be mated with the CRU-59/E valve, and the pressure drop shall be measured at the same specified flow from the fill outlet port. The difference in pressure drop shall not exceed 2.4 psig.

4.6.8 Vent cycle flow rate. A CRU-59/E valve shall be connected to the fill inlet port and a pressure of 34 inches of water shall be applied to the gas port. The flow from the vent port shall be a minimum of 70 SLPM.

4.6.9 Buildup cycle flow rate. A pressure of 21 inches of water shall be applied to the buildup port. The flow from the gas port shall be a minimum of 40 SLPM.

4.6.10 High temperature exposure. The valve shall be exposed to 260° ± 2°F for a minimum of 4 hours. The valve then shall be subjected to tests in 4.6.3 through 4.6.5.

4.6.11 Low temperature exposure. The valve shall be exposed to -65° ± 2°F for a minimum of 4 hours. The valve then shall be subjected to tests in 4.6.3 through 4.6.5.

4.6.12 Orientation. The valve shall be subjected to tests in 4.6.3 through 4.6.5, and 4.6.7 through 4.6.9 while the valve is in each of the following orientations: major axis vertical with the fill inlet port at the bottom, major axis horizontal with the fill outlet port up, and major axis horizontal with the fill outlet port down.

4.6.13 Functional test.

4.6.13.1 Functional test setup. The CRU-50/A valve shall be set up to simulate installation on a LOX converter and be capable of being filled with LOX from a 30 psig source through a CRU-59/E valve. The setup shall be also capable of holding and flowing LOX from the fill outlet to the gas port, and of supplying gaseous oxygen to the fill outlet, gas, and buildup ports at 350 psig. In addition, when gaseous oxygen is applied to the setup, liquid oxygen shall be forced toward the fill outlet port.

4.6.13.2 Functional test process. Filling shall be simulated by performing the filling cycle as specified in 4.6.13.3. When the fill process is complete, pressurize the CRU-50/A valve again to 350 psig and then connect another CRU-59/E valve to the CRU-50/A valve. The CRU-50/A valve shall vent and there shall be no visible LOX leakage through the CRU-59/E valve. Remove the CRU-59/E valve, repeat 4.6.13.3, and then perform the test in 4.6.6 during LOX transfer. After the final LOX transfer and the temperature is stabilized between -65° and 32°F, the valve shall be subjected to the test in 4.6.4. There shall be no malfunction preventing the repetition of normal filling cycles or resulting in liquid oxygen leakage.

4.6.13.3 Filling cycle. The CRU-50/A valve shall be pressurized to 350 psig through the fill outlet, gas, and buildup ports of the valve. With the flow off, the CRU-59/E valve in 4.6.13.1 shall be connected. This will cause the CRU-50/A valve to actuate from the buildup to the fill-vent position. Venting shall occur from the CRU-50/A vent port. The flow shall be turned on and the LOX shall flow through the valves until LOX emerges from the vent port. The CRU-59/E valve then shall be disconnected.

4.6.14 Opening force. The valve shall be connected in the setup as specified in 4.6.13.1 and pressurized to 350 psig. A push scale, or any other suitable device that can interface with the poppet assembly, shall be used to apply and measure the level of a gradually increasing force that is required to actuate the valve to the fill-vent position. The force required to actuate the valve and initiate venting shall not exceed 50 pounds.

4.6.15 Proof pressure. With the gas port plugged, a pressure of 500 psig shall be applied to the fill outlet and buildup ports for a minimum of 2 minutes. The valve then shall be inspected for permanent deformation and material damage and subjected to the tests in 4.6.3 through 4.6.5.

4.6.16 Vibration. The valve shall be mounted rigidly by its mounting provisions on the vibration table and then exposed to random vibration for 1 hour along each axis. The APSD shall be $0.04g^2/Hz$ from 15 to 50 Hz and then increased at a rate of ±4 dB per octave to 300 Hz. Next the APSD shall be $0.3g^2/Hz$ from 300 to 1,000 Hz and then decreased at a rate of 6 dB per octave to 2,000 Hz. For half the test time, along each axis and with the gas port capped, the valve shall have 70 to 90 psig applied to the fill outlet and buildup ports. The valve shall meet the leakage limits specified in 4.6.3 through 4.6.5 while being vibrated along each of the three axis (see 6.8).

4.6.17 Reliability. When required (see 6.2), perform a reliability test. With the valve connected as specified in 4.6.13.1, the filling cycle in 4.6.13.3 shall be conducted with sufficient duration to obtain a 90% confidence that an MCBF of 200 cycles has been achieved. The test also may be used to demonstrate an MCBF of 133 cycles and 99.5% probability of completing a one-cycle mission. At the conclusion of the reliability testing, the valve shall be subjected to the tests in 4.6.3 through 4.6.5. There shall be no malfunction preventing the repetition of normal filling cycles or LOX leakage exceeding maximum limits.

4.6.18 Venting endurance. The CRU-50/A valve shall be connected as specified in 4.6.13.1 and the fill outlet, gas, and buildup ports shall be pressurized to 50 psig. The vent cap (see 6.10) shall be installed and removed 200 cycles while allowing for venting and repressurizing the system to 50 psig. When cycling is complete, the valve shall be subjected to the tests in 4.6.4 and 4.6.6. There shall be no LOX leakage exceeding maximum limits.

4.6.19 Corrosion. The valve, with the ports plugged, shall be subjected to a 50 hour salt fog test specified in ASTM B117. The valve then shall be examined for corrosion and internal contamination and subjected to the tests in 4.6.3, 4.6.4, and 4.6.5. Material certification may be used to demonstrate compliance with the requirement in 3.4.

4.6.20 Compatibility. Nonmetallic materials when tested using ASTM F371 shall demonstrate a peak reaction pressure no greater than 2 psig (see 6.5). Also material certification may be used to demonstrate compliance.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department or Defense Agency 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 used to control the flow of gaseous oxygen in the pressure buildup and vent circuits and the flow of LOX in the fill circuit of oxygen converter systems of 70 and 300 psig operating pressure.

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Item identification

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

d. When reliability testing is required (see 4.6.17).

e. Identification of proposed test methods (see 4.6.2).

f. Packaging requirements (see 5 and 6.9).

g. When verification inspection is required (see 4.2.1).

6.3 Qualification. The attention of the contractors is called to the requirements with respect to products requiring qualification. Award will be made only for products which are, at the time of award of contract, qualified for inclusion in the Qualified Products List (QPL No. 25961) whether or not such products have actually been listed by that date. In order that the manufacturers may be eligible to be awarded contracts or purchase orders for the products covered by this specification, they are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification. Information pertaining to qualification of products may be obtained from Oklahoma City Air Logistics Center/TICLA, 3001 Staff Drive, Suite 1AE1-101A, Tinker AFB, OK 73145-3036.

6.4 SLPM. One SLPM is equal to one liter flow at a pressure of 760 millimeter of Mercury at the temperature of 0° Celsius per one minute.

6.5 Nonmetallic materials. For additional guidance selecting nonmetallic materials for use with LOX see ASTM G63. A proven nonmetallic material for usage with LOX is polytetrafluoroethyene (Teflon).

6.6 Cleaning. For a proven method of cleaning see MIL-STD-1359 for guidance.

6.7 Sampling. For sampling guidance see Table II.

TABLE II. Sample guidance

Lot Size	Sample Size
1-15	2
16-25	3
26-90	5
91-150	8
151-500	20

6.8 Vibration. For vibration guidance see MIL-STD-810, test method 514.2, procedure IA, and Figure 514.2-2A.

6.9 Packaging. The valve will be packaged in such a way to protect and maintain the internal and external cleanliness requirements as specified in 3.7.4. Also the openings of the valve will be plugged to prevent thread damage.

6.10 Vent cap. Essex part number 50C-0020-1 or equivalent vent cap may be used to perform test specified in 4.6.18. Vent cap must interface with the slots on the CRU-50/A valve and cause it to vent when rotated to full engagement.

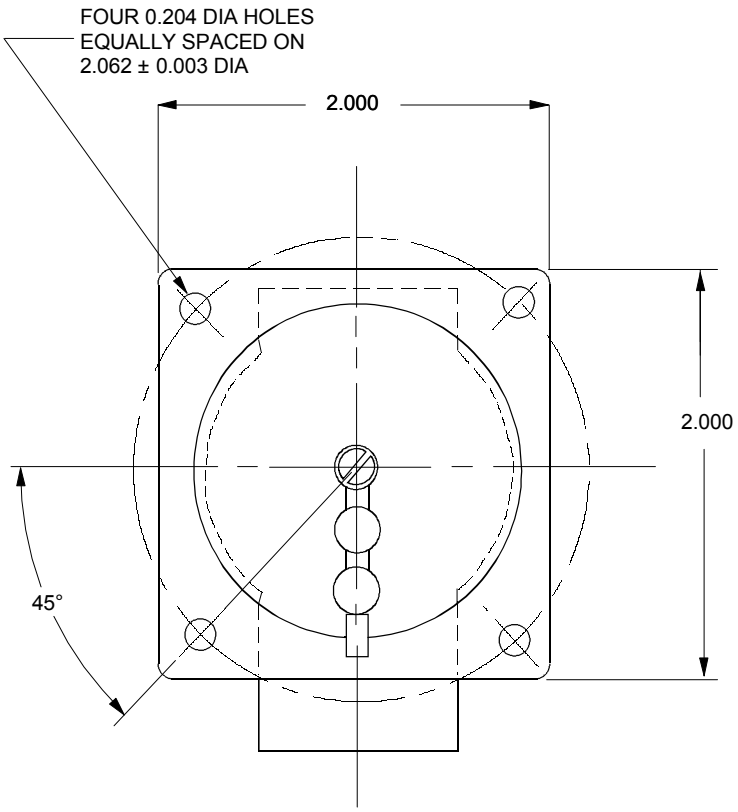
6.11 Subject term (key words) listing.
Breathing oxygen
CRU-59/E
LOX
70 psig system
300 psig system

6.12 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.

Custodian:
Air Force - 99
Navy - AS

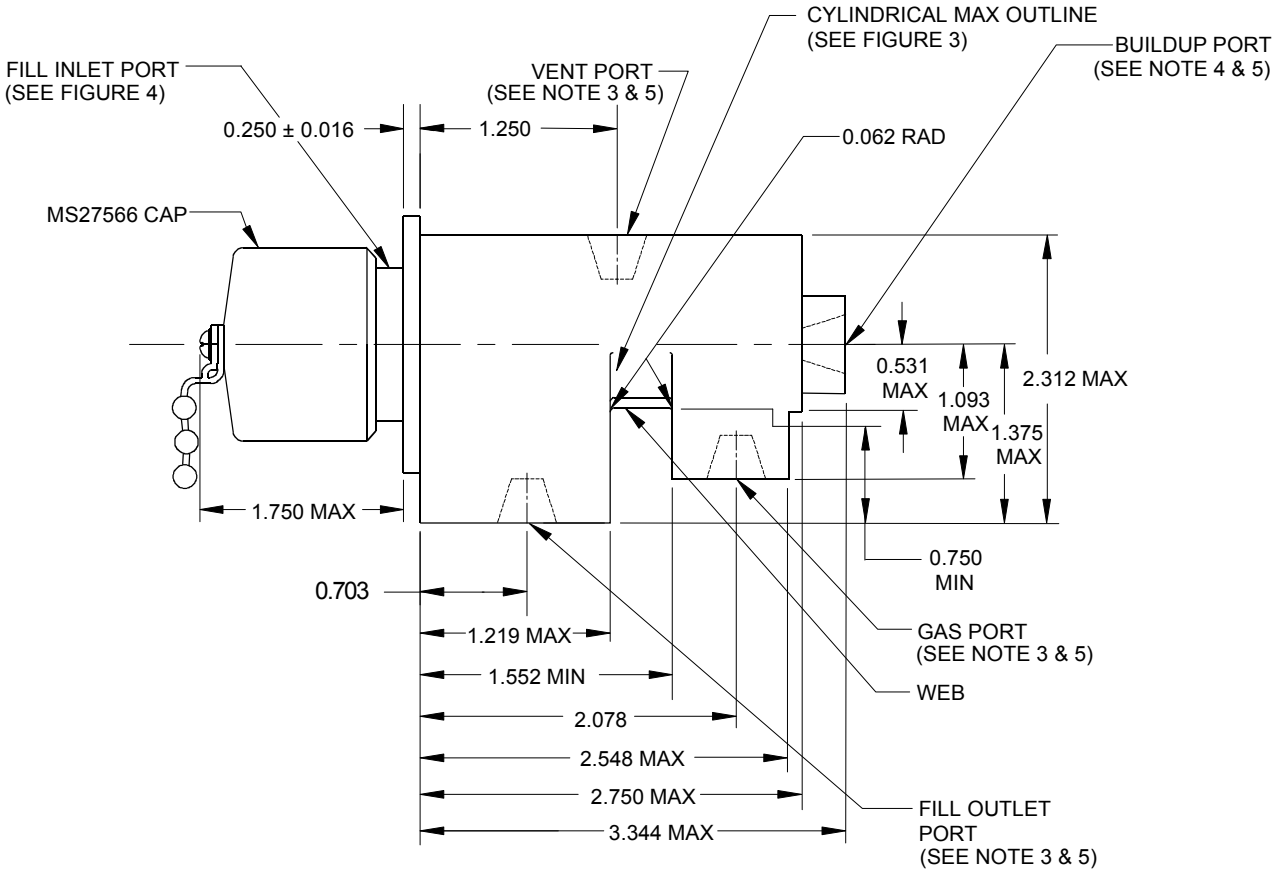
Preparing activity:
Air Force - 71

Reviewer:
DLA - CS



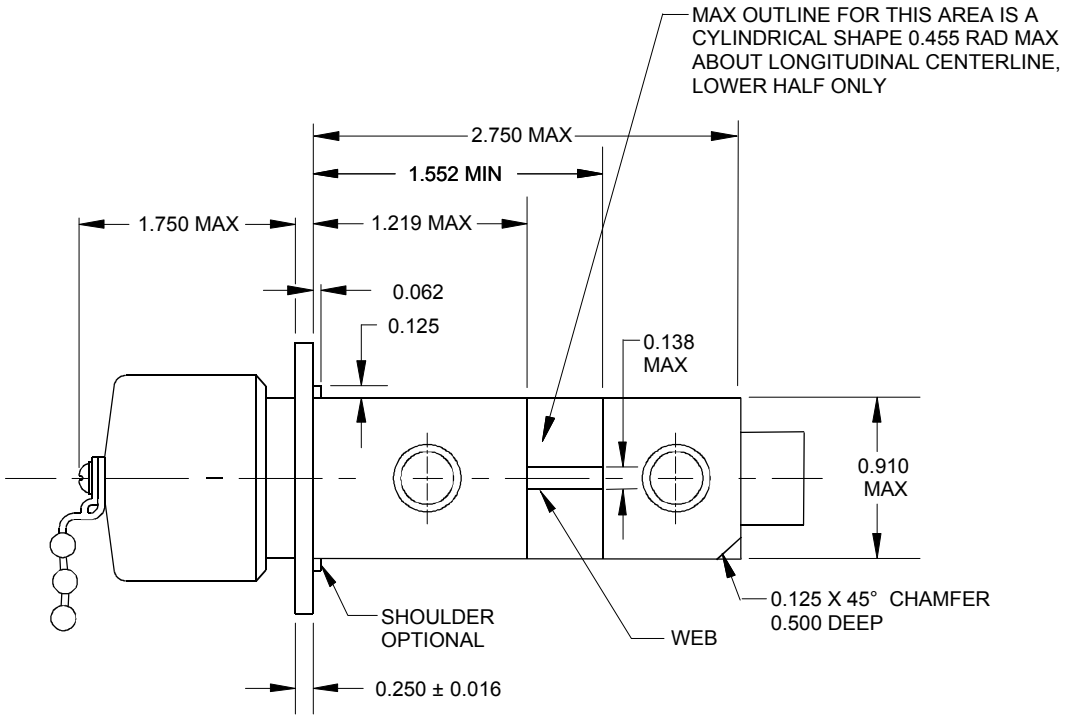
NOTES: 1. DIMENSIONS IN INCHES.
2. UNLESS OTHERWISE SPECIFIED, TOLERANCES ± 0.031.
3. FIGURE NOT TO SCALE.

FIGURE 1. Valve - capped end view



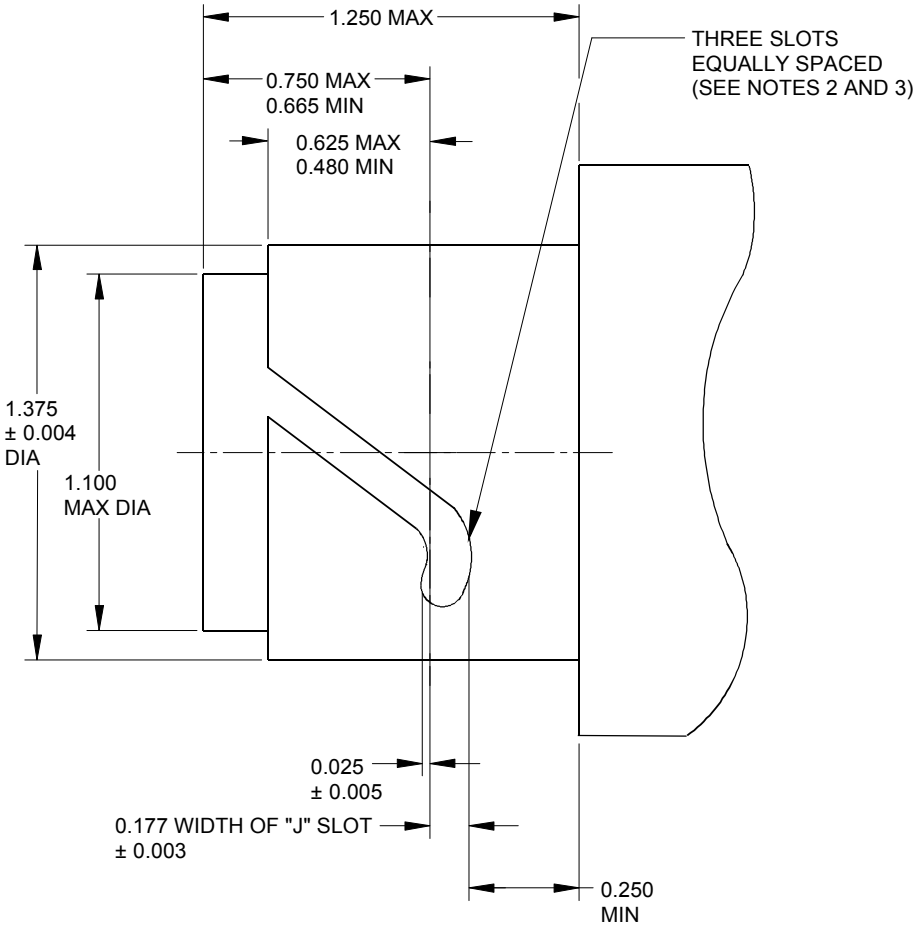
NOTES:
1. ALL PORT DIMENSIONS ± 0.015.
2. DIMENSIONS IN INCHES.
3. BOSS 0.375 NPT
   MIN THREAD DEPTH 0.468
   MAX BOSS DIA 0.910.
4. BOSS 0.125 NPT
   MIN THREAD DEPTH 0.312
   MAX BOSS DIA 0.593.
5. ALL PORTS SHALL BE MARKED.
6. FIGURE NOT TO SCALE.

FIGURE 2. Valve - side view



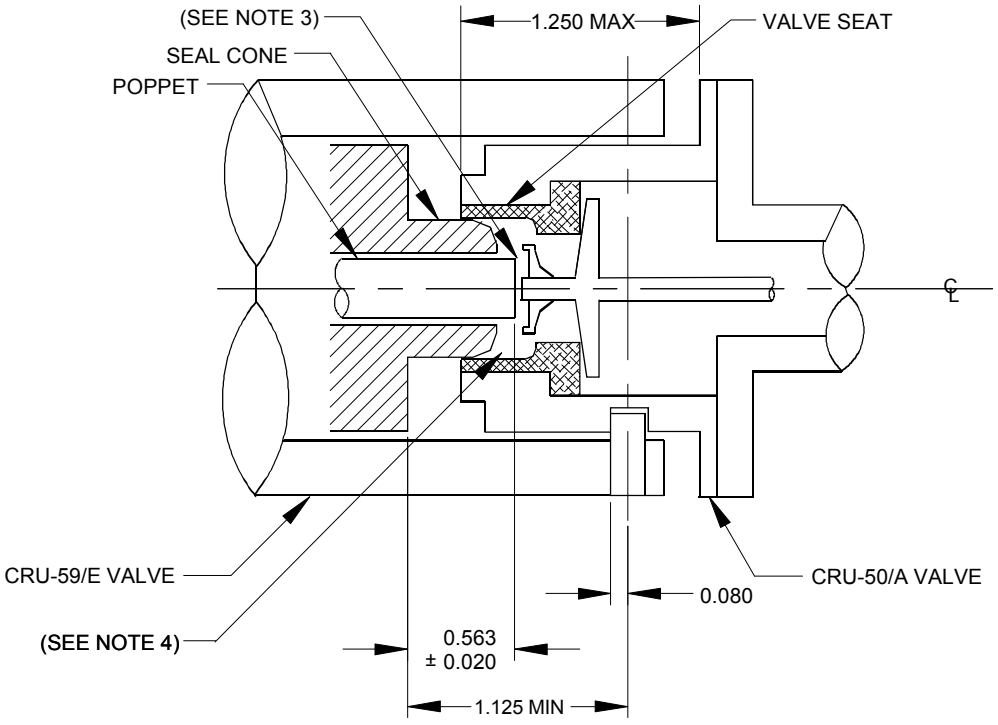
NOTES: 1. DIMENSIONS IN INCHES.
2. UNLESS OTHERWISE SPECIFIED, TOLERANCES ± 0.031.
. 3. FIGURE NOT TO SCALE.

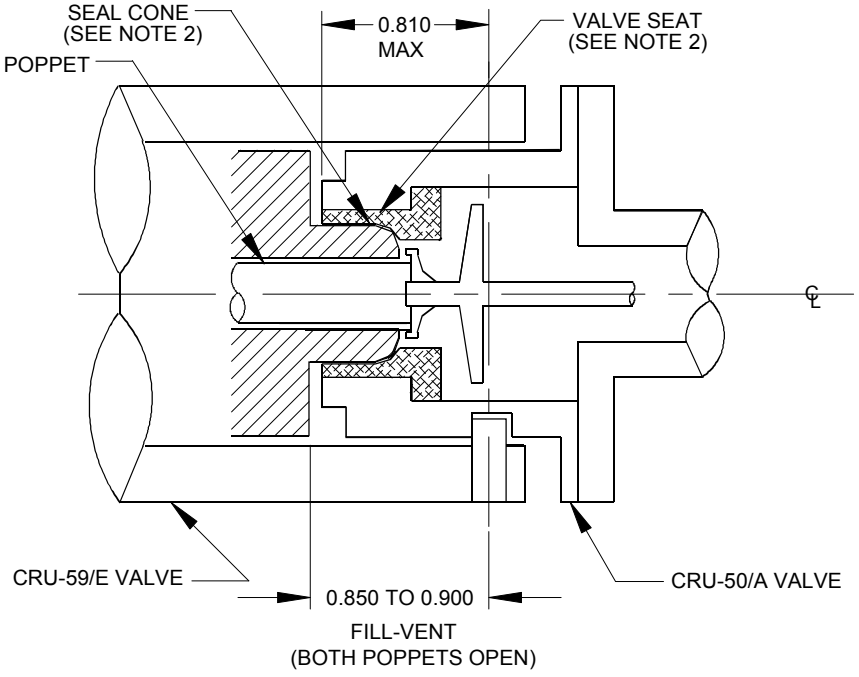
FIGURE 3. Valve - bottom view



NOTES: 1. DIMENSION IN INCHES.
2. SLOTS LOCATED ON CIRCUMFERENCE OF 1.375 DIA.
3. MAXIMUM SURFACE ROUGHNESS OF THE SLOTS SHALL BE 63 IN ACCORDANCE WITH ASME B46.1.
4. FIGURE NOT TO SCALE.

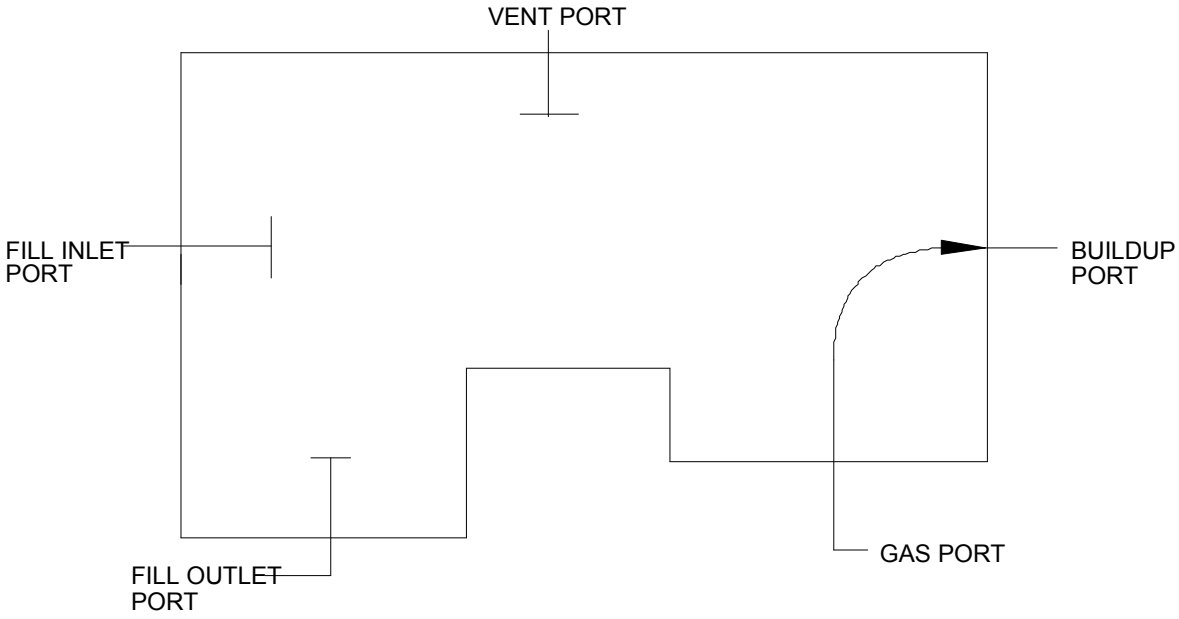
FIGURE 4. Critical dimensions - mating portion of valve



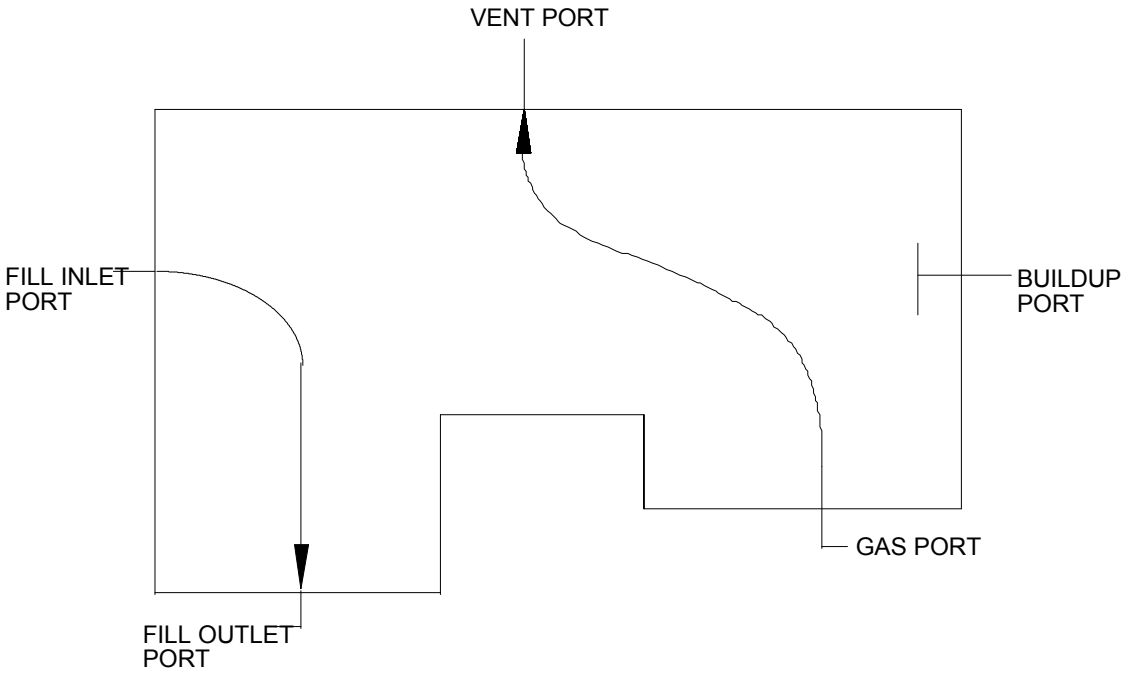


NOTES: 1. DIMENSION IN INCHES.
2. THE CRU-50/A VALVE SEAT SHALL SEAL ON THE CRU-59/E VALVE CONE AND MAINTAIN THE POSITION ILLUSTRATED WHILE UNDER A TOTAL VALVE-TO-VALVE FORCE OF 45 TO 55 POUNDS.
3. MINIMUM CLEARANCE TO AVOID OPENING POPPETS SHALL BE 0.030.
4. MINIMUM CONE TRAVEL BEFORE CONTACT SHALL BE 0.225.
5. FIGURE NOT TO SCALE.

FIGURE 5. Seal and striker interface



BUILDUP
(CRU-59/E VALVE DISCONNECTED)



FILL-VENT
(CRU-59/E VALVE CONNECTED)

FIGURE 6. Flow pattern of CRU-50/A valve in fill-vent and buildup

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.
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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-PRF-25961G	960417

3. DOCUMENT TITLE

Valve, Fill-Buildup-Vent, Liquid Oxygen Converter, CRU-50A

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)* (1) Commercial (2) Autovon *(if applicable)*	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE *(Include Area Code)*	
Harlena Edwards	(1) Commercial (405) 736-5960	(2) DSN 336-5960
c. ADDRESS *(Include Zip Code)* *OC-ALC/TICLA* *3001 Staff Drive, Suite 1AE1-101A* *Tinker AFB, OK 73145-3036*	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3446 Telephone (703) 756-2340/2343 DSN 289-2340/2343	