

3 JUNE 1987

SUPERSEDING

MIL-C-83867(USAF)

17 July 1974

MILITARY SPECIFICATION

CONNECTOR, OXYGEN MASK HOSE
NON-EJECTION TYPE

- * This specification is approved for use within 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 covers the connector assembly used in conjunction with the aviator oxygen mask or aircraft fire fighter's mask.

2. APPLICABLE DOCUMENTS

- * 2.1 Government documents.

- * 2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONSFEDERAL

BB-A-1034	Air, Compressed, For Breathing Purposes
BB-N-411	Nitrogen, Technical
QQ-P-416	Plating, Cadmium (Electrodeposited)

MILITARY

MIL-P-116	Preservation Packaging, Methods Of
MIL-S-5002	Surface Treatments and Inorganic Coatings For Metal Surfaces of Weapon Systems
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: the Engineering Division, San Antonio ALC/MMEDO, Kelly AFB, Texas 78241 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1425) appearing at the end of this document or by letter.

AMSC N/A

FSC 1660

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

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STANDARDSFederal

FED-STD-595

Colors

Military

DOD-STD-100

Engineering Drawing Practices

MIL-STD-129

Marking for Shipment and Storage

MIL-STD-130

Identification Marking of U.S. Military Property

MIL-STD-143

Standards and Specifications, Order of Precedence for the Selection Of

MIL-STD-756

Reliability Modeling and Prediction

MIL-STD-781

Reliability Tests Exponential Distribution

MIL-STD-831

Test Reports, Preparation Of

MIL-STD-889

Dissimilar Metals

MIL-STD-2073

DOD Materiel Procedures For Development and Application Of Packaging Requirements

MS22058

Connector Oxygen Hose to Regulator

MS27796

Connector Bayonet, Three Pin, Oxygen Mask

- * 2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGSAir Force

56A3696

Gasket - Connector, Oxygen Mask to Regulator

57B3623

Ring - Retaining, Demand Mask to Regulator Tube, Internal

- * SPECIAL PACKAGING INSTRUCTION 00-794-0585 dated 24 December 1984 For Cleaning and Packaging Life Support Oxygen Equipment.
- * (Request for copies of Special Packaging Instructions should be addressed to San Antonio ALC/DSTD, Kelly AFB, Texas 78241.)
- * (Copies of specifications, standards, and other Governments documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)
- * 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.

* AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

* ASTM B-633 Zinc On Iron and Steel, Electrodeposited Coatings Of

* (Application for copies of ASTM publications should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

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

3. REQUIREMENTS

3.1 Qualification. The oxygen mask connector 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 (see 4.3 and 6.4).

3.1.1 Drawings for acceptance. Drawings of the individual manufacturer's oxygen connectors shall be furnished to the approving activity for original acceptance. Any revisions to the original oxygen connector, which has previously been accepted for the Qualified Products List, shall be submitted to the approving activity for acceptance. Necessary information and drawings on the revision or modification shall be submitted to the approving activity for evaluation. At the discretion of the approving activity, the revised or modified oxygen connector shall be listed on the Qualified Products List.

3.2 Selection of specification and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 Materials. Materials shall conform to applicable specifications and shall be as specified herein and on applicable drawings. Materials which are not covered by specifications, or which are not specifically described herein, shall be of the best quality, of the lightest practicable weight, and suitable for the purpose intended.

3.3.1 Nonmetallic materials. Any nonmetallic material that is easily deteriorated or otherwise affected adversely by continued use with oxygen shall not be used. Plastics which crack, chip, or permanently set under a compressive load of 200 psi during a ten year service period shall not be used. Any nonmetallic material which has any objectionable odor shall not be used (see 3.6.6).

3.3.2 Metals. Metals shall be of the corrosion-resistant type or suitably treated to resist corrosion due to fuels, salt spray, or atmospheric conditions likely to occur in storage or normal service. Metals shall be protected against such corrosion in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective treatment that will crack, chip, or scale with age or extremes of atmospheric conditions shall be avoided.

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3.3.3 Dissimilar metals. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.

3.3.4 Nonmagnetic materials. Nonmagnetic materials shall be used for all components.

3.3.5 Anodizing. All aluminum parts shall be anodized in accordance with Type II, Class 2, Color black, of MIL-A-8625. All exposed parts shall be processed after anodizing with a potassium dichromate seal.

3.3.6 Cadmium or zinc plating. Unless made of corrosion-resisting steel or otherwise protected in accordance with MIL-S-5002, all steel parts shall be cadmium or zinc plated in accordance with QQ-P-416 and ASTM B-633.

3.4 Design. The oxygen mask connector shall consist of one aircraft supply port with a disconnect anti-suffocation valve, and hose connection with restraint pin (Figure 1). The assembly shall be complete when all elements, mentioned above, are contained within or attached to the main housing. The connector shall meet the desired envelope dimensions and pass the required performance characteristics as specified herein.

3.4.1 Aircraft supply port. The aircraft supply port of the connector (Figure 1) shall have a restrictor valve, which has disconnect anti-suffocation capabilities, that will permit the user to breathe normally when the valve is inserted into a connector conforming to MS22058. The restrictor valve shall be guided internally to prevent tilting or jamming of the valve mechanism. The valve actuator shall be positively locked to the restrictor valve. When disconnected, the valve shall permit inhalation, but a noticeable resistance shall be introduced to indicate that disconnection has occurred.

3.4.2 Restraint pin. A restraint pin shall be attached to the hose connection part of the oxygen connector to provide an attachment point for the oxygen mask hose restraint cord (see Figure 1).

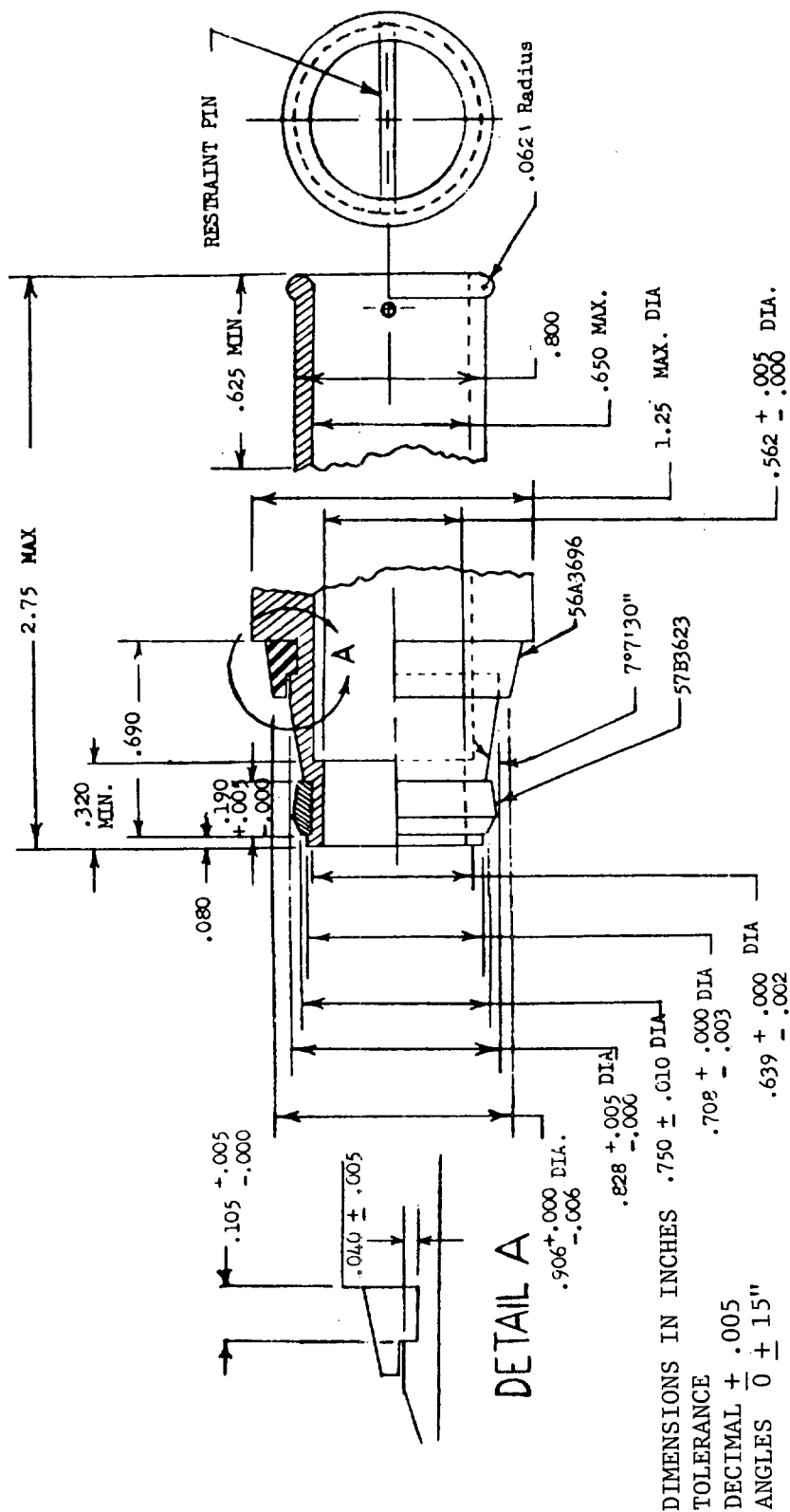
3.5 Construction. The connector shall be constructed so that no parts will become loose in service. The alignment of fitting and mating surfaces shall be accurate to a degree that will permit the proper functioning of the unit in expected normal service conditions. The connector shall be built to withstand the strains, jars, vibrations, and any other conditions incident to shipment, storage, installation and service.

3.5.1 Screw assemblies. Assembly screws and bolts shall be tight. Tight shall be defined to mean that the screw or bolt cannot be appreciably tightened further without damage or injury to the screw, bolt, nut, or the component parts retained by the screw or bolt.

3.5.2 Installation of threaded parts. All threaded parts shall be positively installed by self-locking nuts, sealants, or any other approved methods so that the threaded parts will not work loose in service.

3.5.3 Lubrication. The connector assembly shall be free from oil, grease, or any other combustible material. Lubrication used in the components of the connector that might be subject to exposure to oxygen shall be of the type approved by the procuring activity.

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CONNECTOR-OXYGEN MASK HOSE

FIGURE 1

3.6 Performance.

3.6.1 Leakage. Total leakage of the connector shall not exceed 0.01 liters per minute (LPM), when tested per paragraph 4.6.2.

3.6.2 Pressure drop through connector with jig. The pressure drop through the assembly shall not exceed the values specified in Table I, when the connector is connected to a jig, and tested per paragraph 4.6.3.

TABLE I - Pressure Drop In Assembly

Flow of Oxygen (LPM)	Pressure Drop (Inches of Water)
135	1.40
90	0.60
70	0.36
50	0.18
30	0.06
0	0

3.6.3 Disconnection force. The connector shall disconnect from the aircraft port at loads of 12 to 20 pounds when tested per paragraph 4.6.4.

3.6.4 Pressure drop through connector. The pressure drop through the connector shall be within the range of 4 to 6 inches of water, when tested per paragraph 4.6.5.

3.6.5 Reliability. The connector shall have a minimum Mean-Time-Between-Failure (MTBF) of 600 hours when tested per paragraph 4.6.7. Accept-reject criteria for Test Plan III of MIL-STD-781 shall apply.

3.6.5.1 Longevity. The connector shall have a minimum life span (equipment longevity as defined in MIL-STD-756) of not less than 2,000 hours when tested per paragraph 4.6.7 before wearout failures occur or the equipment consistently fails to meet the specified MTBF index.

3.6.6 Odor. The connector shall have no objectionable odor and shall pass the test specified in paragraph 4.6.9.

3.6.7 Restraint pin. The restraint pin shall not separate from the connector at a force of less than 110 pounds when tested per paragraph 4.6.10.

3.7 Color. The color of the connector shall be black approximately matching color No 37038 of FED-STD-595.

3.8 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirements of DOD-STD-100 shall govern the manufacturer's part numbers and changes thereto.

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3.9 Identification of product. The following information shall be stamped or permanently affixed to the connector assembly in accordance with MIL-STD-130.

Connector
*Part Number
*Contract Number
*Manufacturer's Name or Code
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*Manufacturer shall supply the necessary information.

3.10 Cleaning. The connector shall be thoroughly cleaned. All oils and foreign materials that might adversely affect the operation of the connector shall be removed during and after final assembly.

3.11 Workmanship. The oxygen mask hose connector shall be uniform in quality and shall be free from irregularities, defects or foreign matter which could adversely affect safety, performance, reliability or durability.

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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

* 4.1.1 Responsibility for compliance. All items must 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspection. The examination and testing of the oxygen mask hose connector shall be classified as follows:

a. Qualification inspection.-Qualification inspection consists of examinations and tests performed on samples submitted for approval as qualified products.

b. Quality conformance inspection.-Quality conformance inspection consists of examinations and tests performed on individual products or lots to determine conformance of the products or lots with the requirements set forth in this specification.

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4.3 Qualification inspection. Qualification inspection shall consist of all the examinations and tests of this specification. (Reference paragraph 6.4).

4.3.1 Qualification samples. The qualification samples shall consist of three connector assemblies prepared in accordance with this specification and representative of production. The test samples that were tested shall be furnished to the qualifying activity at the same time as the test reports. The samples shall be identified with such information as required in this specification and the procuring activity.

4.3.2 Test report. Three copies of a test report prepared in accordance with MIL-STD-831 shall be furnished to the qualifying activity. The test report shall include the results of all tests and a detailed statement of compliance or noncompliance with each requirement of this specification, identified by the applicable paragraph number. (Reference paragraph 6.3).

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the following examinations and tests.

4.4.1 Individual tests. The tests specified in paragraph 4.6.1 and paragraph 4.6.4 shall constitute individual tests.

4.4.2 Sampling tests. Three connector assemblies, selected at random from each lot of 100 or less, shall be subjected to the following tests as described in paragraph 4.6.

- a. Leakage (Room Temperature) (See 4.6.2).
- b. Pressure Drop Through Connector (See 4.6.5).
- c. Odor (See 4.6.9).

4.4.2.1 Rejection and retest. When one or more items from a lot fail to meet the specification, acceptance of all items in the lot shall be withheld until the extent and cause of failure have been determined. The contractor shall explain fully to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the sampling tests shall be repeated.

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

4.4.3 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procuring activity of all the defects likely to be found and the method of correcting them.

4.5 Test conditions. The connector shall be tested in the normal operating attitude.

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4.5.1 Atmospheric conditions. Unless otherwise specified, all tests required by this specification shall be made at an atmospheric pressure of 28 to 32 inches of mercury, at a temperature of 77 degrees (plus or minus 18 degrees) Fahrenheit, and at a relative humidity of 80 percent or less. When tests are made with atmospheric pressure or temperature substantially different from these values, proper allowance shall be made for the change in instrument reading.

4.5.2 Gas. The gas used in testing the connectors shall be oxygen conforming to type I of MIL-O-27210, water-pumped nitrogen conforming to type I, class 1, grade B of BB-N-411, or compressed air conforming to grade A of BB-A-1034. If either nitrogen or air is used, appropriate density correction factors shall be applied to the flowmeter and to the performance of the connector.

4.6 Test methods.

4.6.1 Visual examination. The connector shall be visually inspected for defects according to Table II. One major defect or two minor defects constitute rejection of the assembly.

4.6.2 Leakage. A jig that is acceptable to the procuring activity and conforming to the internal dimensions of the connector specified in MS22058 shall be used for this test. An internal pressure of one pound per square inch shall be applied at plus 160 Fahrenheit, room temperature (+65° to +100° F), and minus 65 degrees Fahrenheit. The mask connection port shall be blocked by the insertion of a blanked off bayonet connector externally conforming to MS27796. Total leakage shall not exceed the value specified in paragraph 3.6.1.

TABLE II. Classification of Defects For Visual Examination

Major	Minor
1. Dimensions not within tolerance limits.	101. Identification incomplete or illegible
2. Grease, oil, or other impurities on connector	102. Colors not conforming to specification
3. Any impairment which hinders use of connector	
4. Materials not meeting specifications requirements	
5. Finish or protective coating chipped or incomplete.	
6. Identification missing or workmanship faulty	
7. Screws, bolts, or nuts not properly sealed or locked	

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4.6.3 Pressure drop through connector with jig. The connector shall be connected to a jig having the internal dimensions shown on MS22058. With the valve open, pressure shall be applied to the jig to obtain flows in the range of 0 to 135 LPM from the regulator end to the mask end. The pressure drop through the assembly shall be measured by a piezometer ring located 2 inches from the applicable end of the connector. For use of the piezometer ring see 4.6.5. Pressure drops through the assembly in excess of the values specified in paragraph 3.6.2 shall be cause for rejection.

4.6.4 Disconnection force. A jig that is acceptable to the procuring activity and that has the internal dimensions of the connector specified in MS22058 shall be used for this test. A sufficient force applied along the longitudinal axis of the aircraft supply port to cause disconnect of the port from the jig shall be measured. The test shall be performed three times. The connector shall meet the requirements of paragraph 3.6.3.

4.6.5 Pressure drop through connector. With the valve closed, pressure or suction shall be applied to the connector to obtain a flow of 15 LPM from the regulator end to the mask end. The pressure tap shall be a piezometer ring located approximately 2 inches from the end of the connector. The tap shall be located on the mask side if suction is used and on the regulator side if pressure is used. The flow duct shall be constructed to assure a straight flow for at least 6 inches immediately after leaving the connector if suction is used or for at least 6 inches immediately before entering the connector if pressure is used. The connector housing shall be mounted in a vertical position and its location shall permit free flow into the connector if suction is used and free flow out of the connector if pressure is used. The pressure drop through the connector shall be as specified in paragraph 3.6.4.

4.6.6 Disconnection reliability and longevity. The jig specified in paragraph 4.6.4 shall be used for this test. The mating connector shall be inserted and disconnected from the aircraft supply port for 20 cycles each 24-hour period. The average force for disconnect of the three initial and three final cycles of each 20-cycle run shall be measured and reported. The restrictor valve shall fully close during each disconnection. During the cycles involved in the test, failure to meet required force specified in paragraph 3.6.3 or failure of any component within the connector shall be cause for rejection.

4.6.7 Reliability test. At room temperature, two connectors shall be subjected to simulated breathing cycles at a rate of between 10 and 20 breathing cycles per minute. Cyclic breathing of the connectors shall be accomplished with peak flow rates of 30 LPM, inhalation and exhalation, with the restrictor valve in the open position. During 20 percent of the time the connectors are subjected to breathing cycles, they shall be vibrated at a frequency ranging from 500 to 2,500 cycles per minute, at a double amplitude of not less than 0.018 inch nor more than 0.020 inch. The connector shall be vibrated alternately on each of the three axis for 6 hours on each axis. At least once every 24 hours of the breathing cycle test, each connector shall be subjected to and shall meet the tests specified in 4.6.4 (room temperature), 4.6.5 and 4.6.6. No parts shall be replaced as preventive maintenance during reliability testing. Two connectors shall be tested by the contractor for reliability in accordance with MIL-STD-781 and one of the connectors shall be continued through a longevity test in accordance with MIL-STD-781 and 4.6.5. A failure is defined as the occurrence of any condition which will interfere with meeting the performance levels specified herein. Recording, data

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handling, and reporting procedures shall be in accordance with MIL-STD-756. The connector shall meet or exceed the requirements stated in paragraph 3.6.5.

4.6.8 Longevity verification. Verification of the longevity requirements of the connector shall be in accordance with MIL-STD-756. In accordance with the concepts projected in MIL-STD-756, if more than four failures occur during the last half (four MTBF's equivalent) of the reliability test, all failure data will be submitted to the procuring agency for evaluation for possible wearout failures. Evidence of wearout failures shall be the criteria for rejection of the sample. Recording, data handling and reporting procedures shall be in accordance with MIL-STD-756.

4.6.9 Odor. Gaseous oxygen shall be allowed to pass through the assembled connector at a rate not greater than 10 liters per minute for one minute. A test of smell shall be conducted in a manner that shall prevent exterior odors from influencing the test. If two out of six persons judge the connector to have an objectionable odor, the connector will be unacceptable.

4.6.10 Restraint pin shear. The restraint pin shall be pulled at its midpoint while installed in the hose connector until the pin breaks or deforms to such an extent as to become dislodged from its position. The force required to cause this failure or deformation shall not be less than specified in paragraph 3.6.7.

5. PACKAGING

- * 5.1 Preservation, Packaging and Packing. Preservation, packaging and packing shall be in accordance with Special Packaging Instruction No. 00-794-0858, For Cleaning and Packaging Life Support Oxygen Equipment.

6. NOTES

6.1 Intended use. The oxygen connector shall be used on non-ejection aircraft for use in conjunction with the full face fire fighter's mask or other oxygen masks as necessary.

- * 6.2 Ordering data.

- * 6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification
- b. Level of packing (see 5.1)
- c. Manufacturer's qualification test report (see 4.3.2)

6.3 Data. Data generated by this document is not deliverable unless specified on the Contract Data Requirements List (DD Form 1423) referencing the appropriate data item description in the military departments' Authorized Data List (ADL). The data produced by this standard is as follows: None. Data for qualification inspection referenced in paragraph 4.3.2 is not a contract item.

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* 6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL No.) whether or not such products have actually been so 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 purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is San Antonio ALC/MMIRLC, Kelly AFB, Texas 78241 and information pertaining to qualification of products may be obtained from that activity.

6.5 Subject term (key word) listing.

Aviator oxygen mask, connector
Connector, oxygen Mask Hose
Non-ejection aircraft type,
Oxygen, connector
Oxygen, non-ejection aircraft

* 6.6 Changes from previous issue. The margins of this specification are marked with asterisks (or vertical lines) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian:
Air Force - 99

Preparing Activity:
Air Force - 82

Project Number:
1660-F541

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL*(See Instructions – Reverse Side)***1. DOCUMENT NUMBER**

MIL-C-83867A

2. DOCUMENT TITLE

Connector, Oxygen Mask Hose Non-Ejection Type

3a. NAME OF SUBMITTING ORGANIZATION**4. TYPE OF ORGANIZATION (Mark one)**☐

VENDOR

☐

USER

☐

MANUFACTURER

☐

OTHER (Specify): _____

b. ADDRESS (Street, City, State, ZIP Code)**5. PROBLEM AREAS****a. Paragraph Number and Wording:****b. Recommended Wording:****c. Reason/Rationale for Recommendation:****6. REMARKS****7a. NAME OF SUBMITTER (Last, First, MI) – Optional****b. WORK TELEPHONE NUMBER (Include Area Code) – Optional****c. MAILING ADDRESS (Street, City, State, ZIP Code) – Optional****8. DATE OF SUBMISSION (YYMMDD)**