INCH-POUND

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MILITARY SPECIFICATION

DESIGN AND INSTALLATION OF LIQUID OXYGEN SYSTEMS IN AIRCRAFT, GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers, the general requirements for the design and installation of liquid oxygen (70 and 300 pounds per square inch gauge) (psig) (483kPa and 2068 kPa) systems in aircraft.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specification 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 are those listed in the issue of the Department of Defense Index of specifications and Standards (DoDISS} and supplement thereto, cited in the solicitation (see 6.2b).

SPECIFICATIONS

MILITARY

MIL-B-5087	-	Bonding, Electrical, and Lighting Protection, For Aerospace Systems
MIL-H-5088	-	Wiring, Aerospace Vehicle

Beneficial comments (recommendations, additions, deletions} and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 53) Naval Air Engineering Center, Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by 1 letter.

AMSC N/A FSC 1660

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

MIL-E-5400	Electronic Equipment, Aerospace, General Specification For
MIL-V-7908	Valve, Check, Aircraft Low-Pressure Oxygen Systems
MIL-T-8506	Tubing, Steel, Corrosion-Resistant, (304), Annealed, Seamless and Welded
MIL-S-8805/3	Switch, Push, 10 Amperes and Low Level, Dusttight
MIL-V-9050	Valves, Oxygen, Pressure Relief, Aircraft
MIL-C-19328	Converter, Liquid Oxygen, 5 Liter, MBA-5A
MIL-C-19803	Converter, Liquid Oxygen, 10 Liter, GCU-24/A
MIL-H-22343	Hose Assemblies, Metal, Liquid Oxygen
MIL-A-23121	Aircrew Environmental, Escape and Survival Cockpit Capsule System, General Specification For
MIL-R-25410	Regulators, Oxygen, Diluter-Demand, Automatic Pressure-Breathing
MIL-V-25513	Valve, Check, For 300 PSI Liquid Oxygen Converter System, Type MH-1
MIL-C-25516	Connector, Electrical, Miniature, Environment Resistant Type, General Specification For
MIL-L-25567	Leak Detection Compound, Oxygen Systems
MIL-I-25645	Indicator, Liquid Oxygen Quantity, Capacitance Type, General Specification For
MIL-C-25666	Converter, Liquid Oxygen, Capacitance Type Gauging, General Specification For
MIL-V-25962	Valve, Liquid Oxygen Drain
MIL-T-26069	Trailer, Compressed Gas Cylinder, AF-M32R-3, High Pressure, 2 Wheel 6 Cylinder Capacity
MIL-D-26392	Dummy Converter, Liquid Oxygen Indicator System, 10 Liter, CRU-23/A
MIL-D-26393	Dummy Converter, Liquid Oxygen Indicator System, 25 Liter, CRU-24/A
MIL-H-26626	Hose Assembly, Non-metallic Tetrafluoroethylene, Oxygen
MIL-O-27210	Oxygen, Aviator’s Breathing, Liquid and Gas
MIL-O-27335	Oxygen System, Survival Container and Oxygen Kit, General Specification For
MIL-G-27617	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant
MIL-T-27730	Tape, Antiseize, Tetrafluoroethylene, With Dispenser
MIL-T-38170	Tank, Mobile Storage, Liquid oxygen, TMU-27/M
MIL-S-81018	Survival Kit Container, Aircraft Seat, With Oxygen, General Specification For
MIL-I-81387	Indicator, Liquid Oxygen Quantity
MIL-I-81388	Indicator Repeaters, Liquid Oxygen Quantity
MIL-R-81553	Regulator, Chest Mounted, 100 Percent Oxygen, Positive Pressure, CRU-79/P

MIL-H-81581/5	Hose Assemblies, Breathing Oxygen, Low Pressure, Connector to Regulator
MIL-R-83178	Regulator, Oxygen, Diluter-demand, Automatic-pressure-breathing, General Specification for
MIL-E-87235	Emergency Escape, Aircraft
MIL-H-87961	Nose and Hose Assemblies, Air Duct, Air Breathing, Oxygen Systems, General Specification for

STANDARDS

MILITARY

MIL-STD-17B	Mechanical Symbols for Aeronautical and Spacecraft Use
DOD-STD-100	Engineering Drawing Practices
MIL-STD-203	Aircrew Station Controls and Displays For Fixed Wing Aircraft
MIL-STD-889	Dissimilar Metals
MIL-STD-970	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-1247	Marking, Functions and Hazard Designations of Hose, Pipe, and Tube Lines for Aircraft, Missile and Space Systems
MIL-STD-1359	Cleaning Methods and Procedures for Breathing Oxygen Equipment
MS22032	Recharger Assembly, Portable Oxygen
MS22055	Hose Assemblies, Oxygen-Breathing Connector to Regulator
MS22059	Oxygen System, Portable, 295 Cu. In., High Pressure, Aircraft
MS22061	Oxygen System, Portable, 96 Cu. In., High Pressure, Aircraft
MS22062	Regulator, Oxygen, Diluter Demand, Automatic, Pressure Breathing
MS22068	Coupling Assemblies, Quick Disconnect, Aircraft Liquid Oxygen Systems
MS24548	Hose Assembly, Tetrafluroethylene, Oxygen.
MS27599	Regulator, Oxygen, Diluter Demand
MS33583	Tubing End, Double Flare, Standard Dimensions For
MS33584	Tubing End, Standard Dimensions For Flared
MS33611	Tube Bend Radii
MS33656	Fitting End, Standard Dimensions For Flared Tube Connection and Gasket Seal
MS33739	Aircraft Markings, Servicing, and Precautioning
MS90341	Mounting Bracket Configuration, Mating Portion for 5 and 10 Liter Liquid Oxygen Converter
MS90457	Hose Assembly, Metal, Liquid Oxygen

AIR FORCE-NAVY AERONAUTICAL

AN929	Cap Assembly, Tube, Pressure Seal
AND10104	Tubing, Steel, Corrosion-Resistant, Round; Standard Dimensions For

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

* 2.1.2 Other Government documents,drawings, and publications. The following ether Government documents, drawings, and publications form 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.

DRAWINGS

AIR FORCE

44A25450	-	Sleeve, Oxygen Coupling
44B24627	-	Bracket Assembly, Portable Oxygen Cylinder
46A16236	-	Clip, Recharger Low Pressure Oxygen System
53C3794		Cylinder and Regulator, Breathing Oxygen, Portable
53D3970		Mask-Cylinder-Regulator, Oxygen, Portable, Aircraft, Firefighters
60D3570		Cylinder and Regulator, Breathing Oxygen, Portable A/U26S-3, Assembly of

(Copies of drawings 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 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified. the issues of the documents which are DoD adopted are those listed in the issue-of the DoOISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2b).

SOCIETY OF AUTOMOTIVE ENGINEERS

AMS 4071	Aluminum Alloy Tubing, Hydraulic, Seamless, Drawn, Round 2-5Mg-O.25 Cr (5052-0) Annealed

Applications for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

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

3. REQUIREMENTS

3.1 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-970.

* 3.2 Design. The installation of an aircraft liquid oxygen system shall comprise, as required, liquid oxygen converters, tubing, fittings, filler valves, build-up and vent valves, relief valves, check valves, quantity gauges, regulators, portable units, adapters, mask to regulator hoses, brackets, shut-off valves, and all other necessary items specified herein and required for a complete installation. For permanently installed converters, the filler valve shall be located such that filling from a portable servicing trailer can be easily accomplished by servicing personnel standing on the ground outside of the aircraft. Removable converters shall be capable of being removed and replaced in the aircraft within a 5 minute time period. Sufficient access shall also be provided for the removable converters to permit filling of the converter by conventional means when they are installed in the aircraft. Components of the oxygen system shall not be installed where they will be subjected to temperatures in excess of that specified in the individual component specifications, and no part of the system shall be installed in an area which will be subjected to a temperature in excess of 260 F {126.6 C).

3.3 oxygen systems.

* 3.3.1 Systems utilizing oxygen delivery equipment. Aircraft having flight ceilings over 10,000 feet (3,048 meters] shall have oxygen supply and the necessary delivery and personal equipment to support the physiological needs of all aircraft occupants.

3.3.1.1 Fighter and attack aircraft supply. These aircraft shall have an oxygen system of sufficient capacity to supply the entire crew for the total duration of any specified design mission. The oxygen supply system shall be sized to ensure mission completion in the event of loss of cabin pressure enroute to or at the combat zone. If applicable, the oxygen system shall be sized to include range extension due to auxiliary fuel stores and/or aerial refueling.

3.3.1.2 Bomber aircraft supply. Bomber aircraft shall have an oxygen system of sufficient capacity to supply breathing oxygen to the entire crew for 75 percent of the duration of the longest specified design mission, or to the entire crew for the total time the cabin altitude is above 8,000 feet (2,438 meters), whichever condition establishes the larger amount. The oxygen supply system shall be sized to ensure mission completion in the even of loss of cabin pressure enroute to or at the target. If applicable, the oxygen system shall be sized to include range extension due to auxiliary fuel stores and/or aerial refueling.

3.3.1.3 Transport aircraft supply. Transport aircraft shall have an oxygen system of sufficient capacity to supply all of the primary crewmembers and all of the passengers with breathing oxygen whenever the cabin altitude exceeds 10,000 feet (3,048 meters). In the event of loss of cabin pressure, the oxygen system shall provide the full primary aircrew with breathing oxygen for at least 50 percent of the design mission duration. The passenger oxgen supply shall be dispensed from a continuous flow system and shall have sufficient capacity to provide breathing oxygen to a full passenger load for 50 percent of the design mission duration or for a shorter period if so specified by the acquiring activity, but in no case for less than 15 minutes. When therapeutic oxygen capability is specified, a supplemental quantity shall be included within the passenger oxygen supply. Therapeutic oxygen usage shall be independent from passenger oxygen usage and the quantity shall be adequate for 100 percent of the design mission plus two hours to allow for patient loading and unloading.

* 3.3.1.4 Mission specialist and training aircraft supply. Mission specialist and training aircraft shall have an oxygen system of sufficient capacity to supply the entire flight crew, mission specialists, trainees, and any passengers (if applicable) with breathing oxygen whenever the cabin altitude exceeds 10,000 feet (3,048 meters). The flight crew and mission specialists may need additional oxygen supply for extended flight at higher altitudes to continue the mission, inflight refueling, and night flight. The oxgen system shall support all aircraft occupants during repressurization at cabin altitudes and durations as specified by the acquisition activity.

* 3.3.1.5 Systems utilizing demand and pressure demand breathing equipment. Aircraft having flight ceilings over 10,000 feet 3.048 meters), but not over approximately 35,000 feet (7,620 meters) of altitude and the capability of descending immediately to 10,000 feet (3.048 meters) or below following a decompression, shall use demand breathing equipment. USAF equipment shall incorporate air dilution where possible. Aircraft having flight ceeilings over 35,000 feet (7,620 meters) of altitude and the capability of descending immediately to 10,000 feet (3,048 meters) or below following a decompression, shall use pressure demand breathing equipment. The appropriate pressure breathing schedule shall be incorporated as necessary to provide altitude protection. The crew station equipment shall support the use of pressure breathing or pressure demand oxygen masks, regulators, hoses and any other equipment as necessary to support this capability.

* 3.3.1.6 High altitude aircraft supply. Aircraft having a sustained flight capability above 50,000 feet (15,240 meters), or the requirement to remain above 42,000 feet (12,081 meters) for a period over 5 minutes, but not equipped with emergency pressurization capsule provisions, shall be provided with an installed oxygen system designed to support high altitude pressure suits and helmets, or pressure breathing masks and counter pressure garments, as appropriate. The quantity shall be adequate to provide for 93-100 percent oxygen for the entire mission, including, if appropriate, a period of oxygen breathing at ground level prior to flight. In addition, provisions shall be made for the use of pressure breathing masks and counter pressure garments during flight operations if emergency descent is possible. If emergency descent is not possible for the required mission, then a full pressure suit capability shall be provided.

* 3.3.1.7 Systems utilizing capsules. The pressurization requirements and the oxygen requirements shall be as specified in MIL-E-87235 or MIL-A-23121, as applicable. The system to be installed shall be capable of meeting the specified mission profile.

* 3.3.1.8 Portable oxygen systems. When crew mobility within the aircraft is required, as is normally the case in bomber and transport aircraft, portable oxygen systems shall be provided in a ratio not less than one system for two crewmembers. At least one portable oxygen system shall be provided in each compartment of the aircraft including lavatories. Smoke masks suitable for respiratory and eye protection with communications capabilities shall be available for use by the pilot and any other critical crewmembers and be usable with the crew station regulators well as with the portable systems. Portable oxygen systems shall be selected in accordance with 3.6.14. A critical crewmember is any crewmember that performs flight duties, all flight crewmembers including any crewmembers that operate flight essential equipment for navigation, even if located in the passenger compartment, and any crewmembers that must move about to dispense oxygen-equipment and check on passengers.

3.3.1.9 Emergency oxygen. Aircraft equipped with a seat pan or back pack emergency oxygen supply, as specified in MIL-O-27335 or MIL-S-81018, or an equivalent emergency oxygen supply, shall have such system completely independent of the aircraft oxygen supply system. Any emergency oxygen supply system will normally remain with the crewmember during ejection from the aircraft and subsequent descent via parachute. When the emergency oxygen is attached to the seat, separation from the seat shall not occur above an altitude of 15,000 feet (4,571 meters).

3.4 Oxyqen quantity determination.

3.4.1 Oxygen flow requirements.

3.4.1.1 Respiratory provisions. The oxygen supply requirement shall be based on an inspiratory minute volume (volume of gas per minute) of 15 liters per minute (imp) (250 cu.cm/ s) per crewmember determined at BTPS conditions; i.e., body temperature 98.6 F (37°C), body pressure (cabin altitude), and saturated with water vapor, 47 mm Hg (6.27 kPa). At normal conditions (NTPD) of sea level altitude, 760 mm Hg (101.3 kPa), 70°F (21.1°C), and dry, the baseline minute volume per crewmember is 13.35 lpm (223 cu.cm/s) (NTPD). For oxygen system design, the baseline oxygen requirements given in Table I shall apply to all aircraft containing 6 or more aircrewmembers. For intermediate altitudes not listed in Table I, the oxygen requirements may be calculated from Figure 9. For aircraft which contain less than 6 aircrewmembers, the design oxygen quantity shall be increased by the multipliers given in Table II, which is estimated to cover the 90th percentile of normal aircrew populations.

3.4.1.2 Flight demand provisions. Where aircrew duties impose more than routine flight demands on the crew, the baseline oxygen quantity, after adjustment for aircrew size, shall be increased by applicable percentages extrapolated from those given in Table III. Some of these situations will not exist throughout the design mission and they shall be applied only to the crewmember or members directly affected and only for that period during which the increased demand is anticipated.

3.4.1.3 Oxygen regulator air dilution. The oxygen added to air ratio depicted in Figure 9 as Curve B is typical of the performance achieved with the CRU-73 oxygen regulator. When significantly different dilution performance is provided by the selected oxygen regulator, as established by cyclic test results approved by the acquiring activity, the applicable oxygen added curve shall be substituted for Curve B and appropriate oxygen usage rates calculated for use in lieu of those given in Table I under "Air Dilution."

3.4.1.4 Design oxygen requirement. The oxygen system supply capacity shall be calculated from the requirements given in Table I with applicable adjustments for crew size and the provisional factors given in Tables ll-and III. In passenger aircraft, it shall be assumed that, in the event of loss of cabin pressure, the pilot will descend immediately to an altitude not requiring oxygen for passenger stabilization, and then, if necessary for fuel conservation, climb to a more economic cruise altitude which shall not exceed 25,000 feet (7,620 meters). Determine the oxygen quantity required for passengers by using the design flow rates given in Table IV. The oxygen shall be dispensed from constant flow masks selected for their suitability for use up to the maximum cruise altitude expected to occur in the event of a decompressed cabin. Therapeutic oxygen flow is normally adjustable from two to twelve ambient cabin litres per minute (33 cu.cm/s to 200 cu.cm/s). Unless otherwise specified, use an average design flow of 6 NTPD litres per minute (100 cu.cm/s) from three-fourths of the outlets, but in no case assume less than four outlets will be in use. Passengers designated to be receiving therapeutic oxygen can be excluded from calculations of required passenger oxygen quantity.

* 3.4.1.5 Design oxygen capacity. The maximum oxygen flow rates shall be determined by looking at the highest demand situation that may be expected in any mission increment. In a tactical aircraft, the maximum flow rates would be expected to occur in high g maneuvers in flight or with a pressure-demand type regulator in the emergency or safety pressure breathing mode at lower altitudes. Activity factors shall be determined and used for either case. In a transport aircraft, the highest demand flow rates would be expected to occur when all crewmembers select 100 percent emergency oxygen and the passenger oxygen regulator is at higher altitudes. An activity factor of not less than 1.25 for not less than 15 minutes shall be used for all crewmembers. In either case, the converter shall be installed with a properly sized heat exchanger such that in all expected highest demand mission situations, liquid oxygen is not pulled too far downstream such that the temperature range at the outlet(s) becomes too cold.

* 3.4.2 Size and number of converters. Unless otherwise specified, all converters installed in an aircraft shall be of the same size and operating pressure. However, it is acceptable to provide different size converters for crew and passenger systems. The design quantity given in Table V is the amount of oxygen which can be expected to be available from each converter 24 hours after filling and this shall be used for design calculations. The converter(s) selected shall have the capability to develop the maximum flow rate as determined necessary in any increment of the mission. Table V provides the minimum flow rate a converter must develop and still maintain a supply pressure at its calibration pressure.

3.4.2.1 Maximum number of converters. In the event the aircraft performance is such that the number of converters required becomes excessive so that the installation becomes impractical, the acquiring activity shall specify the maximum number of converters (see 6.2c).

* 3.5 System layout. Typical oxygen systems for various types of pressurized or nonpressurized aircraft are shown on Figures 2 through 8, inclusive. These figures represent the general arrangement of the systems; the actual number, location, and application of these items are determined by the aircraft characteristics and the requirements specified herein.

* 3.5.1 Total quantity indicators. For US Navy application, a totalizing quantity indicator shall be installed at the pilot's or co-pilot's station of the aircraft in which more than one converter is installed. This will permit monitoring of the total aircraft oxygen supply. Repeater indicators shall be provided in all isolated flight compartments within normal vision of one crewmember. Liquid oxygen quantity indicators shall be in accordance with MIL-I-81387 or MIL-I-25645, as applicable. Liquid oxygen quantity indicator repeaters shall be in accordance with MIL-I-81388 or MIL-I-25645, as applicable.

* 3.5.1.1 Separate quantity indication. For USAF application, at least one quanity indication shall be provided for each converter installed on the aircraft. The procuring activity shall determine the most effective means of liquid quantity indication (see 6.2d). This may be accomplished by the use of a separate indicator for each liquid oxygen converter or by the use of one indicator with a switch to select the indication of each converter. The indicator shall be correlated and labeled with the liquid oxygen converter that it applies to such that it may be easily determined which converter the indicator is used with. The quantity indicator(s) shall be installed at the crew station of the crewmember(s) designated as responsible for the oxygen system [i.e., pilot, co-pilot, flight engineer, loadmaster). Repeater indicators may also be provided in isolated flight compartments. If they are provided at other crew stations, they shall be within visual range arid readable by that crewmember while seated. Other crew stations on large transport aircraft may be the flight engineer, loadmaster, the head nurse or the flight steward station. Liquid oxygen quantity indicators shall be in accordance with MIL-I-81387 or MIL-I-25645, as applicable. Liquid oxygen quantity indicator repeaters shall be in accordance with MIL-I-81388 or MIL-I-25645, as applicable.

* 3.5.2 Single converter, single place aircraft. When only one converter is installed in the aircraft and there is only one crewmember, the system shall be connected in accordance with Figures 2 and 3.

* 3.5.3 Single converter with multiple crew stations. When only one converter is installed in the aircraft and there are two or more permanent crew stations, all stations shall be connected to the same distribution line in accordance with Figures 4, 5 and 6.

* 3.5.4 Multiple converters with multiple crew stations. When two or more liquid oxygen converters are installed in an aircraft, all converters shall be of the same size and have the same operating pressure, with the exception of transport aircraft that divide oxygen supply between the flight crew and passengers, then the converters may be different sizes. Multiple converters for the passengers shall still be the same size. Converters shall be manifolded for

distribution. Converters shall be divided between each distribution or supply line such that any one converter will provide oxygen supply to all outlets with the exception of separate crew and passenger oxygen supply, then the crew may have the passenger oxygen supply available but the passengers may not have the crew oxygen supply. On aircraft such as transports where it is desired to provide maximum survivability of the oxygen system, the converters shall be separated and check valves provided such that the loss of one converter does not result in the loss of the complete oxygen supply. Figure 7 shows an installation with two or more liquid oxygen converters that are mounted side-by-side and manifolded to two or more heat exchangers. Figure 8 shows an installation with two or more liquid oxygen converters that when physically separated and provided with separate heat exchangers and distribution plumbing as shown will maximize survivability. To enhance safety and maintenance, a manual shuut-off valve shall be provided on the supply line near each converter such that either converter may be isolated as necessary. If the shut-off valve is not accessible while inflight, it may be desirable to also provide remote activation from the flight deck. Additionally, line valve(s) shall be provided such that each entire distribution line may be isolated from the oxygen outlets, for conditions of nonuse and safety. The line valve(s) shall be readily operable from its/their location(s) while inflight and each shall be clearly labeled near the valve(s) as to its/their proper use. Both the manual shut-off and line valve shall withstand cryogenic liquid oxygen and both shall be operable when subjected to liquid oxygen.

* 3.5.4.1 Manual shut-off and line valve indication. A means of indication shall be provided on any manual shut-off and line valve provided such that it is readily apparent to the flight crew whether the valve(s) is/are in “open” or “closed” position. Whenprovided, the valves shall be located and installed such that the proper markings and labeling are given as to function and type of control. Line valve(s) shall be easily accessible while inflight but not located as to be easily subject to damage. Line valves shall be marked as emergency or safety devices.

* 3.5.5 Single converter, dual regulator. When the performance of the aircraft is such that a pressure suit is required {see 3.3.1.6), the applicable survival kit shall be used. Figure 4 shows an installation with one liquid oxygen converter and the necessary oxygen control panel and regulators for single place aircraft. Figure 5 shows an installation with one liquid oxygen converter and the necessary oxygen control panels and regulators for multiple crew stations.

* 3.5.6 Oxygen system survivability. The oxygen equipment, tubing and fittings shall be located as remotely as practicable from fuel, oil, hydraulic fluid, water injection, storage battery systems, exhaust stacks and manifolds, electrical, radio and insulating materials. Insofar as practicable, boxygen lines shall not be grouped with line carrying flammable fluids. Were necessary, deflector plates shall be used to keep flammable fluids away from oxygen lines, fittings and equipment. Converters shall not be in line with the plane of rotation of a turbine or propeller. Components of the oxygen system shall not be installed where they will be subjected to temperatures in excess of that specified in the individual component specifications, and no part of the system shall be installed in an area which will be subjected to a temperature of 260 F (123.3°C) or greater. In order to minimize loss due to heat, liquid oxygen converters shall not be located near equipment that dissipates a high quantity of heat. Liquid oxygen converters and associated fill and build-up and vent lines shall not be located near aircraft components that give off flammable fluids or gases unless physically

* isolated such that heat and flammable fluids or gases cannot enter the converter area. Other equipment components that may be located nearby, but not physically separated shall be qualified to an explosive atmosphere. Converters, associated plumbing arid heat exchanger(s) shall be located and installed to maximize survivability during survivable crash landings. All components including converters filled with LOX shall be installed to withstand a crash loading, g level and pulse duration, applicable to that component and the aircraft for which it is intended.

3.5.7 Drawings and data.

3.5.7.1 Drawings, Drawings should include the following and shall be in accordance with DOD-STD-100.

3.5.7.2 Pre-engineering information. At least 60 days prior to the preparation of the installation drawings, a schematic diagram of the oxygen system and oxygen duration calculation, for specified mission profiles, shall be submitted to the acquiring activity. The oxygen duration calculations shall include data to show that the number of converters provided is sufficient for the performance of the aircraft. The symbols used on all schematic drawings shall be in accordance with Figure 1.

3.5.7.3 'Installation drawings. All installation drawings for oxygen equipment shall be submitted to the acquiring activity for approval. Installation drawings shall show the position of the equipment in the aircraft and the possible stations in the aircraft. Installation drawings shall also show accessibility of replaceable converters and filler valves.

3.5.7.4 Pilot's flight operating handbook data (for Air Force use). A schematic drawing of the oxygen system and oxygen duration tables shall be provided as required in the Pilot's Flight Operating Instructions Handbook in conformance with Manual, Technical, Organizationl Maintenance Instructions. The drawing shall include a plan view of the aircraft and shall include all items for which there is a symbol in MIL-STD-17, Part 2. The drawing shall include the symbol key listing, where applicable, and the type number of items. The symbols used on all schematic drawings shall be in accordance with Figure 1 (see 6.3).

3.6 Major system components.

3.6.1 Converter selection and installation. The liquid oxygen converter, with appropriate indicators, shall be selected from Table V and be based upon the converter capability to support the specified number of crewmembers and based upon the parameters set forth in 3.5.1 for indicators. Space shall be provided in the aircraft based on the maximum converter specification envelope dimensions. If two or more converters are installed in the aircraft, they should be separated as much as practicable to minimize combat vulnerability. Sufficient space shall be available to replace converters and perform maintenance on all parts. The installation shall also provide for replenishing the liquid oxygen supply by connecting 'an external filling source directly to the filling valve(s). The filling point(s) shall be located such that the time for gaining access for connecting the external filling source shall not exceed one man minute and shall not create a hazard for servicing personnel.

3.6.1.1 Removable converters. Where removable converters are to be installed in any oxygen system, the converters shall be in accordance with MIL-C-19803 or MIL-C- 19328, as applicable. The installation shall provide for simple and rapid replacement. The converter shall be capable of being removed from the aircraft and replaced within five minutes.

3.6,1.2 Permanently installed converters. Where permanently installed converters are to be put in any oxygen system, the converters shall be in accordance with MIL-C-25666.

3.6.1.3 Converter mounting. The converter shall be mounted in such a manner, that it is readily accessible to servicing personnel. The converter shall be mounted so that the converter base is within 5 degrees of horizontal when the aircraft is in the normal cruise attitude.

3.6.1.3.1 Converter mounting bracket configuration (removable converters). The configuration of the bracket necessary to mount each converter in the aircraft shall be provided in accordance with MS90341.

3.6.1.4 Dummy converter. For aircraft utilizing more than one liquid oxygen converter, a dummy converter (an electrical equivalent to the empty converter) shall be permanently installed adjacent to each converter in the aircraft. The dummy converter shall be used whenever a converter is removed from the aircraft to insure proper operation of the gauging system. The dummy converter shall be in accordance with MIL-D-26392 or MIL-D-26393, as applicable.

3.6.2 Liquid oxygen quantity indicator. Quantity indicators shall be installed using the parameters outlined in 3.5.1. The quatity indicator shall indicate the amount of liquid oxygen in the converter or converters.

* 3.6.2.1 Indicator location. The quantity indicator shall be connected into the system as shown in Figures 2 through 8. The indicator shall be located in the pilot's or co-pilot's (or other crewmember's) normal field of vision so that he may readily see the indicator when in normal operating or flight position without turning his head and with minimum interference to his flight duties,

3.6.2.2 Press-to-test. A press-to-test switch in accordance with MIL-S-8805/3 shall be located near each liquid oxygen quantity indicator. This switch shall allow the indicator to be functionally checked in accordance with 4.5.6.1.

* 3.6.2.3 Low pressure, low-level warning system. A low pressure, low-level warning light shall be Incorporated near each quantity indicator and into the "Caution" enunciator panel. The low pressure warning-shall be activated when the converter system pressure drops to 42 + 2 psig (290 + 14 kPa). For each crew station in a 70 psig (483 kPa) oxygen system, the pressure sensor shall be located downstream of the on-off valve. If an oxygen regulator in accordance with MIL-R-25410 is used, the pressure sensor shall be located upstream of the regulator. The momentary drop in supply line pressure upon inhalation shall not activate the low pressure warning. The low-level warning shall be actuated at and below 10 percent of the full scale of the quantity indicator.

* 3.6.2.4 Gauging system. The gauging system, when installed in the aircraft, shall indicate the amount of liquid oxygen in the converter within an accuracy of ± 2 percent of indication plus + 4 percent of full scale indication at any of the major dial divisions on the oxygen quantity indicator. The gauging system shall be capable of satisfactory operation using external wiring in accordance with the applicable requirements of MIL-W-5088. The gauging system shall be designed for the use of cables and connectors which shall have equivalent performance to the requirements of MIL-E-5400. The length of the cables shall not affect the accuracy of the systems. The length of the cables shall be adequate to reach the connections of the converter. Adequate clearance shall be provided for the indicator connectors so that they can be readily disconnected by servicing personnel. Provisions shall be made for the storage of the aircraft connectors when they are disconnected. All electrical components shall be protected from electromagnetic interference (EMI) and aircraft voltage power surges.

3.6.3 Regulators.

3.6.3.1 Panel mounted. An automatic diluter demand-pressure breathing regulator, in accordance with MIL-R-25410 (MS22062) or MIL-R-83178 (MS27599), as applicable, shall be installed at each permanent arid temporary crew station in the aircraft. The pilot’s panel mounted regulator shall be located in accordance with MIL-STD-203. The crewmember's regulator shall be in the crewmember’s field of vision so that they can readily read the regulator without more than turning their head and with minimum interference with their flight duties. The regulators shall be located as close to the stations as is required to reach the regulator by normal extension of the crewmember’s arm. The regulators shall be located so that they cannot be damaged by movement of personnel around them and may be mounted vertically or horizontally. The regulator shall be installed with flexible hose for both inlet and outlet-ports, so-that the regulator may be front serviced for both installation or removal.

3.6.3.2 Non-panel mounted. Non-panel mounted regulators shall be installed as specified by the acquiring activity (see 6.2e). Unless otherwise specified, for installations which utilized regulators without a manual shut-off valve incorporated in the regulator, a manual shut-off valve shall be provided at each crewmember’s station. The valve shall be installed in the line upstream of the individual regulator to prevent loss of oxygen when the regulator is not in use and for stopping flow from a defective quick disconnect or a damaged supply hose. Stowage provisions shall be made for chest mounted regulators to prevent damage or contamination during servicing or ingress-egress actions.

* 3.6.3.2.1 Applicable to the Navy. Non-panel mounted regulators shall be in accordance with MIL-R-81553.

3.6.3.3 Preinstallation tests. All regulators shall receive a leakage and flow test in accordance with the applicable specifications prior to installation in aircraft. The test shall be conducted not more than thirty days before installation of the regulator.

3.6.4 Fill-buildup-vent valve. Each permanently installed liquid oxygen converter shall be filled from a separate combination fill-buildup-vent valve. Combination fill-buildup-vent valves used in 70 psig and 300 psig (483 kPa and 2,068 kPa) liquid oxygen system shall be located approximately 5 feet above the ground, where possible, in order to be readily accessible from the ground. Clearance shall be left around the fill-mating section of the combination fill-buildup-vent valve to allow the insertion of the 2 inch (50.8 mm) diameter female section of the ground servicing valve and to permit the ground crew to manually exert an engagement or disengagement torque.

3.6.4.1 Fill line (permanently installed converters). The distance from the fill section of the combination fill -buildup-vent valve to the liquid oxygen converter shall be kept as short as possible. The fill line shall be not longer than 10 feet (3.048 m). The fill lines shall be insulated to prevent frosting and sweating if they pass over equipment which will be harmed by water dripping from the lines, or drip pans shall be installed under the lines.

3.6.4.2 Vent line. The vent line from the combination fill-buildup-vent valve shall be so located as to drain overboard at the bottom of the aircraft within sight of the filler box and not closer than 24 inches (0.61 m) from it measured along the fuselage. Flow from the overboard vent shall be directed away from the filling valve so as to not create a hazard for servicing personnel and not allow liquid oxygen to impinge on the aircraft. The vent lines shall be insulated to prevent frosting and sweating if they pass over equipment which will be harmed by water dripping from the lines, or drip pans shall be installed under the lines. There shall be no hydrocarbon fills or drains forward or above in proximity to vent outlet.

3.6.4.3 Drain valve (permanently installed converters). For permanently installed converters, a liquid oxygen drain valve, in accordance with MIL-V-25962, shall be connected in the fill line between the combination valve and the converter in order to drain the converter. Plumbing from the outlet of the liquid oxygen drain valve shall terminate in an end fitting conforming to MS33656 and located in the filler box. It shall have a cap in accordance with AN929-5 with a suitable chain permanently attached to the top of the cap.

* 3.6.5 Pressure relief valve. The pressure relief valve or on the liquid oxygen converter shall be vented overboard, using 5/16 inch (7.94 mm) minimum outside diameter tubing. The relief valve overboard vent may be the same as that used for the combination fill-buildup-vent valve. When removal converters are installed, a pressure relief valve in accordance with MIL-V-9050, Type V, shall be connected into the supply line downstream from the MS22068 coupling assembly that also vents overboard (see Figure 2).

* 3.6.6 Check valves. Except where otherwise specified, check valves shall be installed in accordance with Figures 7 and 8 and be incorporated into the quick disconnect equipment as shown in Figure 2. In all multiple converter installations, check valves shall be installed where they are effective in preventing additional loss of oxygen in the event any one converter or line is destroyed. When more than one converter is installed in a multi-place aircraft in accordance with Figures 7 and 8, check valves, in accordance with MIL-V-25513 or MIL-V-7908, depending upon the operating pressure, may be installed in each of the auxiliary distribution lines to each station. Check valves that are designed in accordance with MIL-V-7908 may be installed along the primary distribution lines to each station. All check valves installed shall be cryogenic check valves.

3.6.7 Disconnects. The disconnect for the removable converters shall be in accordance with MS22068-7 and MS22068-8. Where the supply line is required to be uncoupled for maintenance purposes, the quick disconnect shall be in accordance with MS22068-1 or MS22068-2.

3.6.8 Hoses. Flexible hoses shall be used for the aircraft system connections to removable converters and to shock mounted converters where movement relative to the aircraft will occur. The flow capacity of the hoses used in lieu of aluminum tubing shall be essentially equivalent to the aluminum tubing size specified for that connection. The bend radii imposed on the hoses during remove and replace actions shall be greater than the minimum established by that hose specification. Hose layouts shall avoid the imposition of torsional forces when being connected to the converter and also avoid the necessity for a particular rotational orientation when the flare nut is torqued. Hoses shall be of sufficient length to provide unstressed connections and be protected against chaffing on surfaces or objects which may damage the wire covering.

3.6.8.1 Metal hose. This wire braid covered hose shall be in accordance with MIL-H-22343 and the applicable part number of MS90457. This hose is flexible at temperatures down to -297°F (-183 C) but since it contains a metal bellows, it is somewhat vulnerable to fatigue failure if subjected to repeated severe flexing.

3.6.8.2 Tetrafluoroethylene hose. This wire braid covered hose shall be in accordance with MIL-H-26626 and the applicable part number of MS24548. This hose is flexible at temperatures down to -65°F (-54°C); therefore, disconnecting and manipulating the hose should be delayed until a few minutes after the flow of LOX has ceased.

3.6.9 Tubing. The tubing shall be of aluminum alloy conforming to AMS 4071, or corrosion resistant annealed steel (304), conforming to MIL-T-8506. The minimum outside diameter of tubing used for oxygen supply lines shall be 5/16 inch (7.94 mm). Tubing for “FILL” and “VENT” lines shall have minimum outside diameter of 3/8 and 1/2 inch (9.53 and 12.7 mm), respectively. All aluminum tubing shall have a wall thickness of 0.035 inch (0.889 mm), while corrosion resistant steel tubing shall conform to AND10104 and have a wall thickness of 0.020, 0.028 or 0.035 inch (0.508, 0.711 or 0.889 mm) as necessary in the application. All tubing shall be electrically bonded in accordance with MIL-B-5087.

3.6.9.1 Evaporation and warming tubing. Where the converter does not include warming coils or a heat exchanger, the aircraft shall include a heat exchanger or a minimum length of tubing, indicated in Table VI, between converter and first crew station for the indicated flow rate. Table VII indicates the approximate length of supply tubing along which frost and condensation can be expected for the indicated flow rate. Where other equipment might be affected by condensation, the supply tubing shall be provided with drip shields or other suitable means of protection. For flows greater than 100 litres per minute (1,666.6 cu.cm/s), pressure losses in 5/16 inch (7.94 mm) tubing may be excessive and necessitate the provision of more than one supply tube or a tube of larger size. The design flow quantity shall be supplied to the oxygen dispensing regulators at a temperature within +10, -20 F (+5.5, -11 C) of the cabin ambient temperature and at a pressure not less than 55 psig (379.2 kPa).

3.6.9.2 Tubing flaring and bending. Aluminum alloy tubing of 5/16 and 3/8 inch (7.94 and 9.53 mm) outside diameters shall be double flared to conform with MS33583. Aluminum alloy tubing of 1/2 inch [12.7 mm) outside diameter and all sizes of corrosion resistant steel tubing may be single flared to conform with MS33584. As an alternative, corrosion resistant steel tubing may be welded, brazed or swaged using methods and quality controls that produce leakproof joints, providing there is no undue degradation of tubing strength, corrosion resistance, or fatigue life. Tubing systems having these permanent type joints shall be designed for ease of fabrication, inspection and installation in the aircraft. The system layout shall provide for rapid in-service repair and component replacement. Tubing bends shall be uniform, without kinks, and fit the span between fittings without tension. The minimum bend radius to tube center lines shall be in accordance with MS33611.

3.6.9.3 Oxygen coupling sleeve. The oxygen coupling sleeve for flared tubing shall be in accordance with Drawing 44A25450.

3.6.9.4 Tubing routing and mounting. In routing the tubing, the general policy shall be to keep total length to a minimum consistent with Table VI. Allow for expansion, contraction, vibration and component replacement. In all installations of two or more converters where check valves are used, there shall be a minimum of tubing lengths in that portion of the system between the regulator and nearest check valve in the distribution line. To further reduce vulnerability to gunfire, the tubing lengths, between this check valve and the converters, shall be separated as much as possible. The separation between these tubing lengths shall be not less than 12 inches (0.305 m). All tubing shall be mounted to prevent vibration and chaffing. This shall be accomplished by the proper use of rubberized or cushion clips installed at no greater than 20 inch (0.508 m) intervals and as close to the bends as possible. Clips shall also be provided near portable recharger connections. The tubing, where passing through or supported by the aircraft structure, shall have adequate protection against chaffing by the use of flexible grommets or clips. The tubing shall not strike against the aircraft structure during vibration and shock encountered during normal use of the aircraft.

3.6.9.5 Tubing marking. All tubing shall be marked in accordance with MIL-STD-1247.

3.6.10 Fittings. All fittings shall be in accordance with applicable standards. 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.

* 3.6.11 Torque of joints. Tightening of flared tube and pipe connections shall be accomplished in accordance with the best commercial practice and instructions as cited herein. Flared tube connections shall be tightened with torque wrenches, and the torque used shall be within the limits as specified in Table VIII. The torque limits specified in Table VIII also apply to double flared AMS 4071 aluminum tubing or MIL-T-8506 corrosion resistant annealed tubing. Straight thread fittings which seat on an end fitting to prevent leakage shall be finger tightened until seated. Tighten until firmly seated, and leak test. If leakage persists, tighten slightly more until leakage is stopped. On pipe threads wrap MIL-T-27730 antiseize tape on the threads leaving the end 1 1/2 to 2 threads exposed, tighten the coupling nut by finger until tight, tighten by wrench another

1/4 to 1/2 turns and leak test. If a leak persists, tighten another 1/4 to 1/2 turns and leak test again. If leakage persists, the part may be defective and should be replaced or try tightening very carefully until leakage is stopped.

3.6.12 Breathing hose. Unless otherwise specified the breathing hose shall be in accordance with MIL-H-81581/5 and the applicable part number of MS22055.

3.6.12.1 Applicable to the Air Force. The breathing hose shall be in accordance with MIL-H-81581/5 and the applicable part number of MS22055, or MIL-H-87961, (see 6.2f)

3.6.13 Personal services. Crewman’s personal services connecting him to the aircraft shall be separated from the aircraft upon ejection by an automatic disconnection system. The disconnection force shall not applied to the crewman. For disconnection forces, refer to applicable component specification. The installation of the personal services and the lengths chosen shall be such that the user’s movements will not be restricted during his normal duties at his station. However, excessive lengths, with resultant bulkiness and resistance to breathing, shall be avoided. Suitable stowage provisions shall be provided in the aircraft for protection of personnel services when not in use.

3.6.13.1 Flow requirement. For panel mounted oxygen regulator installation, the combination of breathing hose, fittings and disconnects between the regulator and the mask connector at the end of the breathing hose shall not exhibit a flow resistance in excess of 2 inches of water (497.6 Pa) with a flow of 80 litres per minute (1,333 cu.cm/s) of oxygen at NTP conditions.

3.6.14 Portable oxygen system.

3.6.14.1 Portable oxygen system (1800 psi) (12.41 MPa). when a portable oxygen breathing system is required but refilling during use is not contemplated, the oxygen assembly shall be selected in accordance with MS22059, MS22061 or Drawing 60D3570. A commercial product may be utilized if the above assemblies are unsuitable for the application, subject to approval of the acquiring activity (see 6.2g).

* 3.6.14.2 Portable oxygen system (300 psi) (2,068 kPa). When a portable oxygen breathing system is required along with refilling during flight, the oxygen assembly shall be in accordance with Drawing 53C3794 for crew use with their pressure breathing oxygen masks, or in accordance with Drawing 53D3970 if the full face pressure breathing smoke mask is to be included. Each assembly shall be secured in a bracket in accordance with Drawing 44B24627 which will retain the assembly under flight conditions and provide for rapid removal for use. The secured assembly shall be convenient to the crew duty stations and to each toilet. Recharging hoses in accordance with MS22032 shall be accessible from crew duty stations and toilets and have the filler valve and secured by a clip conforming to Drawing 46A16236 in a vertical, valve down position.

3.6.15 Emergency oxygen. An emergency oxygen system shall be provided. Provisions shall be made for the automatic opening of the oxygen bail-out supply during ejection seat operation. Position of the emergency oxygen system shall be determined by the type of seat configuration.

3.7 Performance.

3.7.1 Leakage. The oxygen system, when tested as specified in 4.5.2, shall not show any evidence of system leaks.

3.7.2 Pressure decay. The oxygen system, when tested as specified in 4.5.3, shall not exhibit a pressure decay greater than that specified in Table IX.

3.7.3 Functional tests.

3.7.3.1 Panel mounted regulator.

3.7.3.1.1 Flow indicator. The oxygen system, when tested as specified in 4.5.4.1.1, shall permit a free flow of oxygen and the flow indicator of the panel mounted regulator shall function freely with each breath.

3.7.3.1.2 Emergency switch. The oxygen system, when tested as specified in 4.5.4.1.2, shall permit a free continuous flow of oxygen through the mask.

3.7.3.2 Non-panel mounted regulator. The oxygen system, when tested as specified in 4.5.4.2, shall permit a flow of oxygen through the mask without any appreciable resistance to breathing.

3.7.4 Evaporation loss. The oxygen system, when tested as specified in 4.5.5, shall not have liquid oxygen loss greater than that specified in Table X.

3.7.5 Electrical continuity. The liquid oxygen quantity indicator, when tested as specified in 4.5.6, shall have capacitance inputs within the limits specified in Table XI.

3.7.5.1 Low-level warning. The press-to-test button, when tested as specified in 4.5.6.1, shall actuate the low-level light when the indicator is within the lowest 10 percent of the indicator scale and shall remain actuated until the indicator exceeds 10 percent of full scale indication. When the indicator is moving upscale, the low-level light may remain actuated past 10 percent but not to exceed 20 percent of full scale indication.

3.7.6 Flight test. When specified, flight tests on the oxygen systems shall be conducted to determine the proper functioning of all the oxygen equipment in the aircraft by actual crew use and functional measurements. In addition, a determination may be made of the suitability of the arrangement of the items from the standpoint of accessibility and convenience to all crewmembers during their flight duties.

3.8 Antiseize tape. Antiseize tape shall be used on all male pipe thread fittings. Antiseize tape shall conform to and shall be avoided as specified in MIL-T-27730. Antiseize tape shall not be used on flare tube fitting<, straight threads, coupling sleeves, or on the outer side of tube flares None of the tape shall be allowed to enter the inside of a fitting.

* 3.9 System cleanliness. The completed installation shall be cleaned to a specified level by the removal of contaminants such as oil, grease, fuel, water, dust, dirt, objectionable odors, or any other foreign matters, both internally and externally, prior to introducing oxygen in the system. The internal surface of the system shall not exceed a maximum of non-volatile residue of 3.0 milligrams

pet-square foot of surface area. MIL-STD-1359 can be used as a guide for system cleaning.

* 3.9.1 Filter. A replaceable filter shall be provided in the oxygen system where it will effective in minimizing the accumulation of contaminants in critical components. The filter shall permit bypass of the element should the flow through the element drop below safe levels. Type, size, and location of the filter shall be determined by the manufacture.

3.9.2 Closures. If the location of the converter within the aircraft is such that lines are required to be disconnected during aircraft maintenance checks or overhaul, suitable closures shall be provided for each exposed connection to prevent materials which are incompatible with oxygen from entering the system. Caps which introduce moisture and tapes that leave adhesive deposits shall not be used for thesse purposes. The closures shall remain with the aircraft at all times and shall be stored, when not in use, in close proximity to the connections and in such a manner as not to become contaminated. All openings of lines, fittings, valves, and regulators shall be kept securely capped until closed within the installation.

* 3.9.3 Decreasing. The oxygen distribution system or parts of the oxygen system not covered by cleaning procedures shall be degreased in accordance with MIL-STD-1359. After cleanliness verification and when assembled, a halide testing apparatus having a sensitivity of at least 3 x 10 standard cc/see shall be used to determine the absence of the cleaning compound.

* 3.9.4 Purging. The oxygen system shall be capable of being purged to remove any contaminants. The purging procedure shall be as specified in MIL-STD-1359 with a final purge using oxygen conforming to MIL-O-27210, Type 1.

3.9.4.1 Converter. Table XII is applicable only when the converter is purged through the vent outlet. Quick change style converters shall be removed from the aircraft and purged away from the flight line.

3.9.4.2 Oxygen distribution system. Purge the aircraft oxygen distribution system separate from the liquid oxygen converter, by establishing a flow from each oxygen station of at least 5 litres per minute (83.5 cu.cm/s) for a period of not less than 30 minutes. In large aircraft, it may be necessary to divide the system, as determined by feeder lines, and purge each separately.

* 3.9.5 Lubricants. Lubricants in accordance with MIL-G-27617 may be used sparingly on seals. When approved lubricants are used sparingly on seals and straight threads when assembly difficulty is encountered, the specified torque limits may no longer apply. Threads may strip at the recommended torque limits.

3.10 Maintenance and replacement. All parts of the oxygen system shall be installed to permit ready removal and replacement without the use of special tools. All tubing connections, fittings, regulators, converters and other items shall be readily accessible for leak testing with leak test compound and for tightening of fittings without removal of surrounding parts. Flexible hoses shall be used to connect indicating instruments mounted on shock mounted panels to permit easy maintenance.

3.11 Clearance requirements. Oxygen lines, fittings and equipment shall be installed above and at least six inches away from fuel, oil and hydraulic systems to avoid contamination. Deflector plates shall be used, where necessary, to keep hydraulic fluids away from oxygen lines, fittings and equipment. Open ends of cleaned and dried tubing shall be plugged with impermeable caps at all times, except during attachment or detachment of parts. There shall be at least 2 inches (50.8 mm) of clearance between the oxygen system and flexible moving parts of the aircraft. There shall be at least 1/2 inch (12.7 mm) clearance between the oxygen system and rigid parts of the aircraft, except at clamp areas. The oxygen system tubing, fittings and equipment shall be separated at least 6 inches {152.3 mm) from all electrical wiring, heat conduits and heat emitting equipment in the aircraft. Insulation shall be provided on the hot ducts, conduits or equipment to prevent heating of the oxygen system. To assure adequate glove clearance around valves and disconnects, the following clearances shall be provided. The minimum clearance shall be a 3 inch (76.2 mm) diameter circle around the vent and supply disconnects and a 5 inch (127 mm) diameter circle around the filler valve for permanent installations. The centers of the circular clearance areas coincide with the longitudinal axes of the valves.

3.11.1 Deviations from clearances requirements. When barriers such as ribs, webs, frames, channels, extrusions and strangers exist between oxygen lines and electrical wires in such a manner that there is no danger of such lines contacting each other, the above requirements for separation, mounting and covering shall not be applicable. Shields shall be acceptable to the acquiring activity. Where electrical wires lead into oxygen equipment due to an electrical item being a component of the oxygen equipment, the requirements for separation, mounting and covering are not applicable, except that they shall be secured against chaffing. Deviations other than specified herein must be approved by the acquiring activity.

3.12 Aircraft marking requirements: The aircraft shall be permanently and legibly marked in the locatlons and with the information specified below, using a minimum letter height of 1/4 inch (6.35 mm). Color of the-lettrs are to be black on a white background.

a. Adjacent to the overboard vent opening:

CAUTION
LIQUID OXYGEN VENT

b. On outside surface of filler box cover plate:

LIQUID OXYGEN (BREATHING) ACCESS

c. On underside surface of filler box cover plate

CAUTION
KEEP CLEAN, DRY AND FREE FROM OILS

d. Adjacent to liquid oxygen drain valve location:

DO NOT OPEN DRAIN VALVE UNTIL DRAIN HOSE AND
DRAIN TANK ARE CONNECTED

e. Adjacent to recharger location:

PORTABLE OXYGEN RECHARGER

f. Adjacent to filling station:

Aircraft shall be marked in accordance with MS33739

3.13 Workmanship. The oxygen system 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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in 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 shall meet all requirements of sections 3 and he 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 inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, not does it commit the Government to acceptance of defective material.

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

a. 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 (see 4.3).

4.3 Quality conformance inspection. All the examinations and tests of this specification shall be conducted on each liquid oxygen system.

4.4 Test conditions.

4.4.1 Oxygen. Unless otherwise specified, the oxygen used in testing the oxygen system all conform to MIL-O-27210, Type I and the oxygen employed in filling the oxygen system shall conform to MIL-O-27210, Type II.

* 4.4.1.1 Transfer equipment. A liquid oxygen storage tank, conforming to MIL-T-38170, or any suitable liquid oxygen servicing trailer, shall be used to service liquid oxygen systems. When gaseous servicing is needed for test purposses, a

gaseous oxygen trailer, conforming to MIL-T-26069, shall be used. Transfer equipment shall mate with fittings provided for filling.

4.4.2 Leak test compound. The leak test compound employed in testing the system shall conform to MIL-L-25567.

4.4.3 Temperature and pressure. Unless otherwise specified, tests shall be conducted at local ambient temperature and barometric pressure. Test instruments shall be calibrated or adjusted according to their required usage in conductin individual tests. Temperature and pressure shall be recorded at the time of inspection and shall be available, when required, for correction of test results to normal temperature and pressure (NTP) conditions. NTP conditions are 29.92 inches of mercury (101.2 kPa) and 70°F (21.1°C).

4.5 Inspection methods.

4.5.1 Visual examination. The oxygen system shall be examined visually to determine conformance to this specification and applicable drawings with respect to all the requirements not covered by tests.

4.5.2 Leakage test. The complete oxygen system, excluding the converter, personal mounted regulator, seat pan, mask and hard line relief valve, shall be subjected to a gaseous oxygen pressure equal to its operating pressure. While this test pressure is maintained, all fittings and connections shall be examined for leaks by application of leak test compound conforming to MIL-L-25567. The oxygen system shall pass the requirements specified in 3.7.1. Care shall be taken to remove all traces of leak test compound from the system after this test is performed.

4.5.3 Pressure decay. The complete system shall be charged with gaseous oxygen to the system operating pressure. Removable converters may be removed for this test. After system pressure has been stabilized for five (5) minutes, record oxygen pressure, time and distribution line temperature. The oxygen pressure and distribution line temperature shall again be recorded after one-half hour and shall pass the requirements specified in 3.7.2.

4.5.4 Functional test. The following functional tests shall be performed for each station of each aircraft, where applicable, after filling the system with liquid oxygen, and permitting the system to buildup to the designed operating pressure.

4.5.4.1 Panel mounted regulator.

4.5.4.1.1 Flow indicator. Connect a pressure breathing oxygen mask and hose assembly to the oxygen system. Move the diluter lever on the regulator to the "100 - percent oxygen" position. Breathe oxygen normally through the mask for a period of one minute and observe the flow indicator of the regulator. The oxygen system shall pass the requirements specified in 3.7.3.1.1.

4.5.4.1.2 Emergency switch. Connect a pressure breathing oxygen mask and hose assembly to the oxygen system. Move the diluter lever to the "normal" position. Set the regulator emergency switch to the emergency position for a period of 10 to 20 seconds. The oxygen system shall pass the requirements specified in 3.7.3.1.2. After the test, the emergency switch shall be returned to the normal position.

4.5.4.2 Non-panel mounted regulator. Connect an oxygen mask assembly incorporating a pressure breathing regulator and regulator-to-aircraft hose to the oxygen system. Move the oxygen supply valve to the "ON" position. Breathe deeply through the mask several times. The oxygen system shall pass the requirements specified in 3.7.3.2.

4.5.5 Evaporation loss test. The completed aircraft system shall be filled with liquid oxygen, and the mating assembly shall be disconnected from the combination fill-buildup-vent valve. One hour after filling the system, a wax pencil shall be used to mark positions of pointers on glass faces of liquid oxygen quantity-indicators. Twenty-four hours after marking indicators, readings shall be taken on indicators and the evaporation loss shall be within the range specified in 3.7.4.

4.5.6 Electrical continuity test. The liquid oxygen quantity indicator leads shall be disconnected from the converter. A precision variable capacitor, capable of providing stable and precise electrical capacitance equivalents of empty and full liquid oxygen converters, shall be connected to the leads disconnected from the converter. With the capacitor set to provide zero quantity indication, power shall be applied to the indicator, and the capacitance input shall be recorded. The capacitor shall then be set to provide full scale quantity indication, and the capacitance input shall be recorded. The capacitance inputs shall be within the limits specified in 3.7.5. Where two or more converters are installed in an aircraft, the above test shall be conducted at each converter with the capacitor connected to the leads disconnected from one converter, as described above, and all other oxygen quantity indicator leads in the system disconnected from the converters and connected to the dummy converters specified in 3.6.1.4.

4.5.6.1 Low-level warning. The test of the press-to-test button and low-level warning light shall be conducted as specified in 4.5.6, except the variable capacitor shall be set so that the indicator pointer indicates a quantity between 1/2 full and full. The press-to-test button shall then be actuated and the low-level light shall pass the requirements specified in 3.7.5.1.

4.5.7 Flight test. When specified (see 6.2h), flight tests shall be conducted and the oxygen system shall pass the requirements specified in 3.7.6. Upon completion of the flight test, the oxygen system shall then be subjected to and pass the tests specified in 4.5.2 and 4.5.4.

5. PACKAGING

5.1 Not applicable.

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 design and installation requirements specified herein are intended for use in designing and installing liquid oxygen systems in aircraft using liquid to gaseous oxygen converters.

* 6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).

c. Maximum number of converters required (see 3.4.2.1).

d. Type of liquid quantity indication system for Air Force acquisitions (see 3.5.1.1).

e. Installation of non-panel mounted regulators (see 3.6.3.2].

f. Type of breathing hose of Air Force acquisitions (see 3.6.12.1).

g. Whether commercial portable oxygen system is required (see 3.6.14.1).

h. Whether flight tests are required (see 4.5.7].

* 6.3 Data requirements. The following Data Item Descriptions [DID's) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this specification is applied on a contract, in order to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD) Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.5.7.1 thru 3.5.7.3	DI-E-7031	Drawings, Engineering and Associated Lists	
3.5.7.4	DI-E-3135	Characteristics and Performance Data	

The above DID's were those cleared as of the date of this specification, The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current. cleared DID's are cited on the DD Form 1423.

* 6.4 Subject term (key word) listing.

Adapters
Check valve
Cylinders
Decreasing
Emergency oxygen
Filler valve
Fittings
Gages

Indicating instruments
Leakage
Line valve
Liquid oxygen
Liquid oxygen converters
Mask to regulator hoses
Portable units
Pressure decay
Purging
Regulator
Relief valve
Shutoff valve
Tubing

* 6.5 International system of units (SI). The ASTM E 380-74, Metric Practice Guide - A Guide to the Use of SI, the International System of Units. was used for the conversion to the SI units in this document. The-following conversion factors are applicable to this specification.

Foot X 0.3048	= Metre (m)
Litre per hour x 2.77 x 10-7	= Cubic metre per sec (m^3/s)
Litre per minute X 16.7 X 10-6	= Cubic metre per sec (m^3/s)
Pounds per square inch (psi) X 6.894	= Kilopascals (kPa)
Degrees Fahrenheit (°F)	= Degrees Celcius (oC) X 1.8 + 32
Inches X 25.4	= Millimetres (mm)
Inch-pounds X 0.1130	= Newton-metre (N-m)
Litres per minute X 16.667	= Cubic centrimetre per sec (cu. cm/s)
Millimetres of mercury X 0.1333	= Kilopascals (kPa)
Inches of water X 248.18	= Pascals (Pa)

* 6.6 International standardization. Certain provisions of this specification are the subject of International standardization agreement (ASCC 11/1, ASCC 25/27, ASCC 25/30 and STANAG 3499). When amendment, revision, or cancellation of this specification is proposed which will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change the agreement or make other appropriate accommodations.

* 6.7 Streamlining. For MIL-D-19326H acquisitions, the required portions of all MIL-D-19326H tier reference documents shall be limited to the portions described in the "Applicability" column of Table I in Appendix A.

* 6.8 Tailoring. When MIL-D-19326H is tailored in an acquisition, Appendix A must be tailored accordingly. In particular, when Appendix A is tailored specific attention must be given to the chain of referencing. For example, if a first tier reference document in MIL--D-19326H is tailored out, all of the reference documents which are tiered to that first tier reference document must be tailored out.

6.9 Marginal notations. The margins of this specification are marked with asterisks 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 past previous issue.

Custodians:
Army-AV
Navy-AS
Air Force-n

Preparing activity:
Navy - AS
(Project 1660-0599)

TABLE I. Baseline oxygen for each crewmember. 1/

Cabin altitude		Flow rate at 14.7 psia and 70°F (101.3 kPa and 21.1°C)			
		100 Percent oxygen		Air dilution 2/	
X1000 feet	Metres	Litres/hour	cm^3/s	Litres/hour	cm^3/s
0	0	801	222.5	240	66.7
5	1,524	658	182.5	172	47.8
8	2,438	581	161.4	151	41.9
10	3,048	535	148.6	143	39.7
15	4,572	429	119.2	140	38.9
20	6,096	340	94.4	159	44.2
25	7,620	265	73.6	194	53.9
28 and above	8,534 and above	225	62.5	225	62.5

1/ Oxygen values calculated on the basis of 15 lpm (250 cu.cm/s) requirement BTPS.

2/ Based on dilution performance of typical CRU-73 oxygen regulator.

TABLE II. Oxygen requirement adjustment for number in aircrew.

Aircrew number	Multiplier
1	1.20
2	1.10
3	1.06
4	1.03
5	1.02

TABLE III. Oxygen requirement multiplier for specific flight activities.

Specific Flight activity	Multiplier
Breathing safety pressure	1.10
Wearing pressure suit	1.20
Terrain following	1.25
Take off and landing	1.35
Carrier launch and landing	1.50
Aerial combat and threat	1.75

TABLE IV. Oxygen supply requirement for each passenger continuous flow mask.

Cabin altitude		Flow rate at 14.7 psia and 70°F (101.3 kPa and 21.1°C)	
X1000 feet	Metres	Litres/hour	cm^3/s
10	3,048	42	11.7
15	4,572	42	11.7
20	6,096	120	33.3
25	7,620	174	48.3
30	9,144	216	60.0
35	10,668	255	70.8
40	12,192	282	78.3

* TABLE V. Liquid oxygen converter characteristics.

Size of converter (Calibration pressure)	Minimum flow rate **		Theoretical litres of free gas (sea level and 70°F) (21.1°C) immediately after servicing		Design quantity at 70 F, 14.7 psig or 21.1 C, 101.3 kPa***	
Litres	Litres/hr	Cu.m/hr	Litres	Cu.m	Litres	Cu.m
5 (70 psig)	4,380	4.380	4,300	4.300	3,273	3.273
10 (70 psig)	4,800	4.800	8,600	8.600	7,316	7.316
10 (300 psig)*	6,000	6.000	8,600	8.600	7,573	7.573
20 (300 psig)	7,200	7.200	17,200	17.200	15,831	15.831
25 (300 psig)	8,000	8.000	21,500	21.500	20,131	20.131
75 (300 psig)	24,000	24.000	64,500	64.500	61,420	61.420

* The exception is the 10 litre converter defined by MIL-C-25974 which has a minimum flow rate of 4,800 litres/hr.

** To determine the flow rate capabilities that may be provided that exceeds this minimum flow versus supply pressure, the converter manufacture should be contacted.

*** Minimum amount of LOX converter supply available 24 hrs. after filling due to loss from evaporation and referenced to sea level ambient conditions.

TABLE VI. Minimum length of tubing between converter and first station.

Flow rate		Length of 5/16 inch (7.94 mm) tubing, plain		Length of 1/2 inch (12.70 mm) tubing, plain	
Litres/min.	cm^3/s	Feet	Metres	Feet	Metres
20	333.3	20	6.10	11	3.35
40	666.6	40	12.19	22	6.71
60	1,000.0	60	18.29	34	10.36
100	1,666.6	100	30.48	57	17.39
150	2,500.0	150	45.72	85	25.91
200	3,333.3			113	34.44
300	5,000.0			170	51.82
400	6,666.6			227	69.19

TABLE VII. Approximate length of supply tubing to frost line.

Flow rate		Length of 5/16 inch (7.97 m) tubing, plain		Length of 1/2 inch (1.70 mm) tubing, plain	
Litres/min.	cm^3/s	Feet	Metres	Feet	Metres
20	333.3	12	3.66	6	1.83
40	666.6	24	7.31	12	3.66
60	1,000.0	36	10.97	18	5.49
100	1,666.6	60	18.29	29	8.84
150	2,500.0	90	27.43	43	13.11
200	3,333.0			58	17.68
300	5,000.0			87	26.52
400	6,666.6			116	35.36

TABLE VIII. Torque requirements for flared tube connections. 1/

Tubing O. D.		Torque			
		Aluminum		Steel	
Inch	mm	In.-lbs.	N-m	In.-lbs.	N-m
5/16	7.94	100-125	11.30-14.12	170-200	19.21-22.60
3/8	9.53	200-250	22.60-28.25	270-300	30.50-33.90
1/2	12.70	300-400	33.90-45.19	450-500	50.84-56.49

1/ Torque to specified minimum value and check for leakage. If additional torque is required to stop leakage, torque may be applied up to specified maximum value.

TABLE IX. Liquid oxygen system pressure decay.

Converters capacity (litres)	Maximum allowable pressure decay	
	Psig	kPa
5	12	82.74
10	6	41.37
25	3	20.68
75	2.5	17.24

TABLE X. Stand-by liquid oxygen loss-buildup condition.

Converters capacity	Maximum allowable loss of liquid oxygen after 24 hours (litres)
5	1.3
10	1.6
25	2.00
75	3.00

TABLE XI. Indicator system capacitance.

Converters capacity (litres)	Converter capacitance (pf)	
	Empty	Full
5	63.5 ± 0.4	92.5 ± 0.4
10	123.5 ± 0.7	181.5 ± 0.7
20	247.5 ± 1.4	363.0 ± 1.4
25	303.5 ± 1.8	448.4 ± 1.8
75	910.5 ± 5.4	1,345.5 ± 5.4

TABLE XII. Liquid oxygen converter purging requirements.

Converters capacity (liters)	Container at ambient temperature	Within 6 hours after draining
	Purging period (minutes)	Purging period (minutes)
5 and 10	70	120
25 and 75	90	120

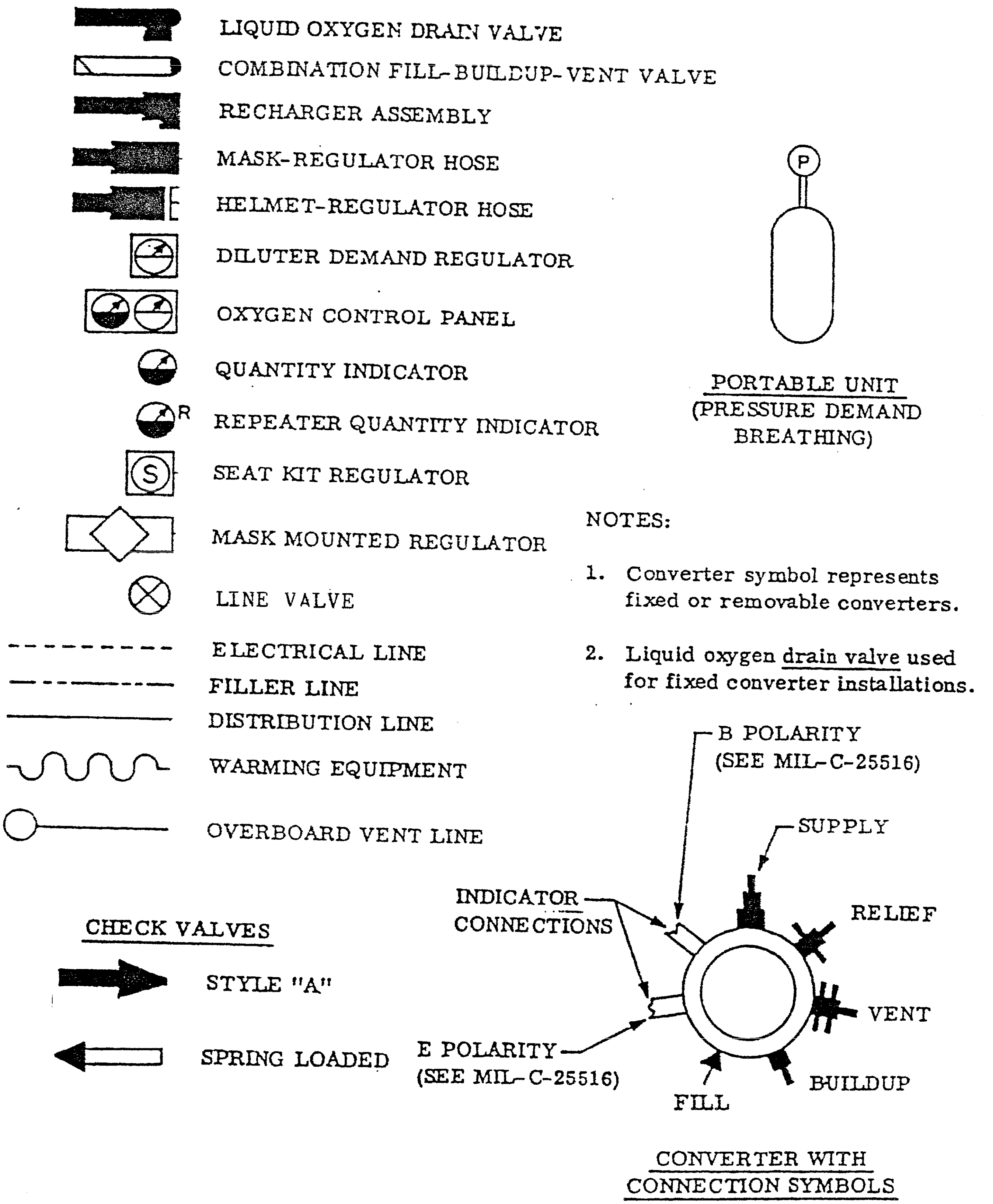


FIGURE 1. Symbols.

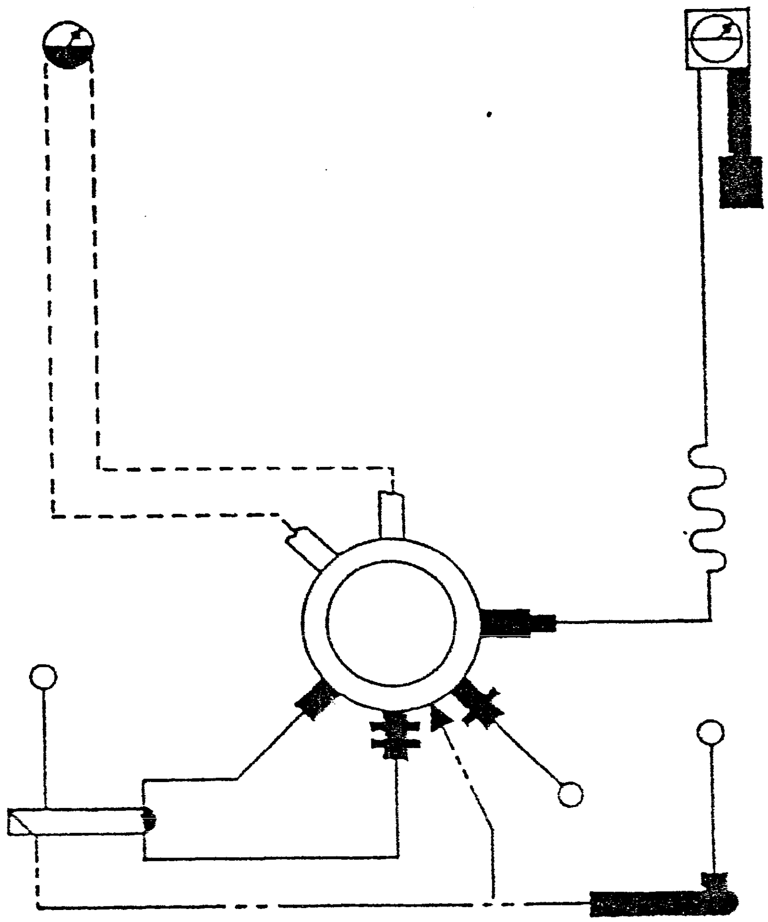
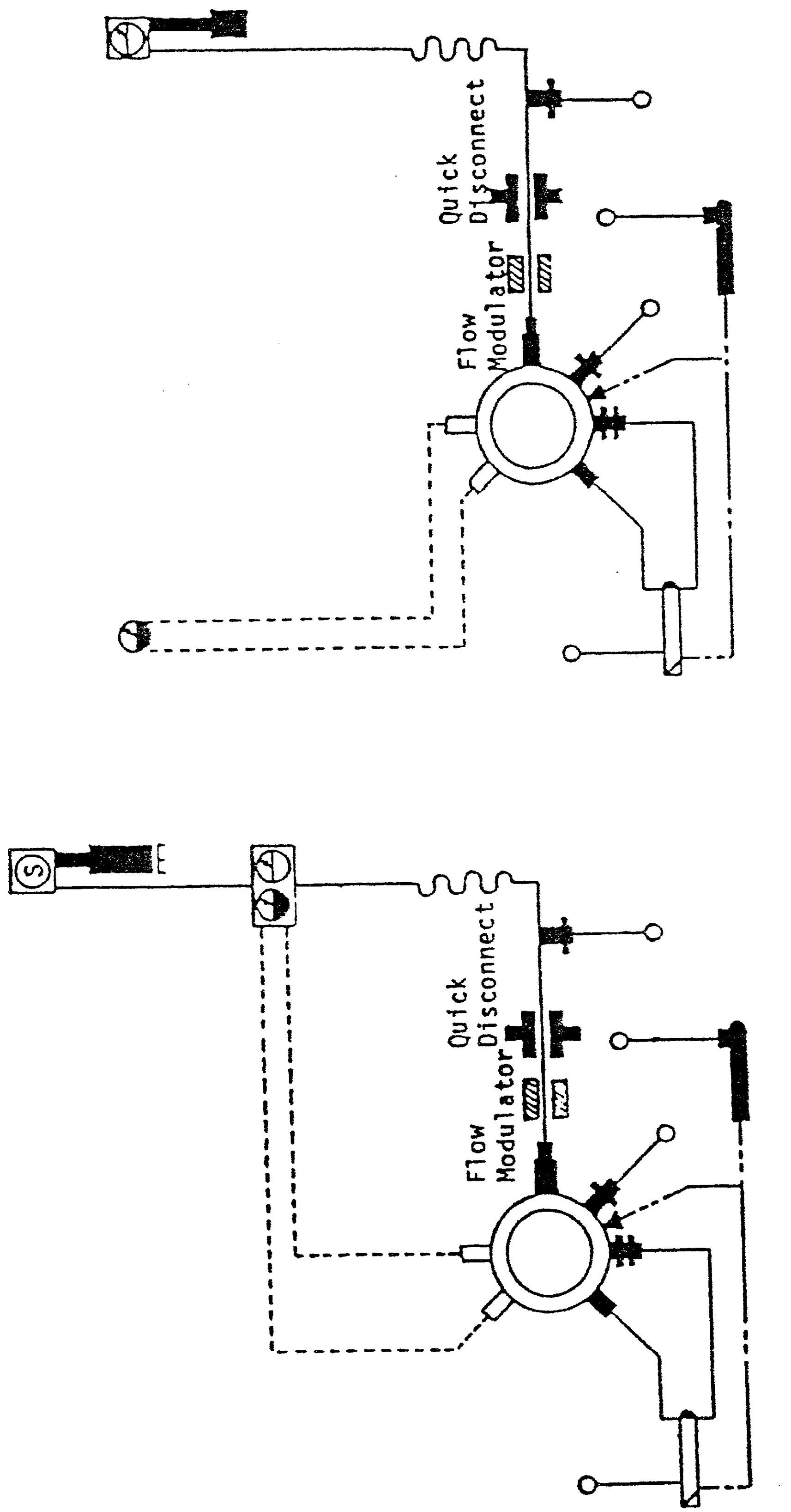


FIGURE 2. Typical installation single converter sinqle place aircraft (fixed converter installation)



FIRURE 3. Single Removable Converter - One or more regulator outlets with seat kit regulator or diluter demand regulator.

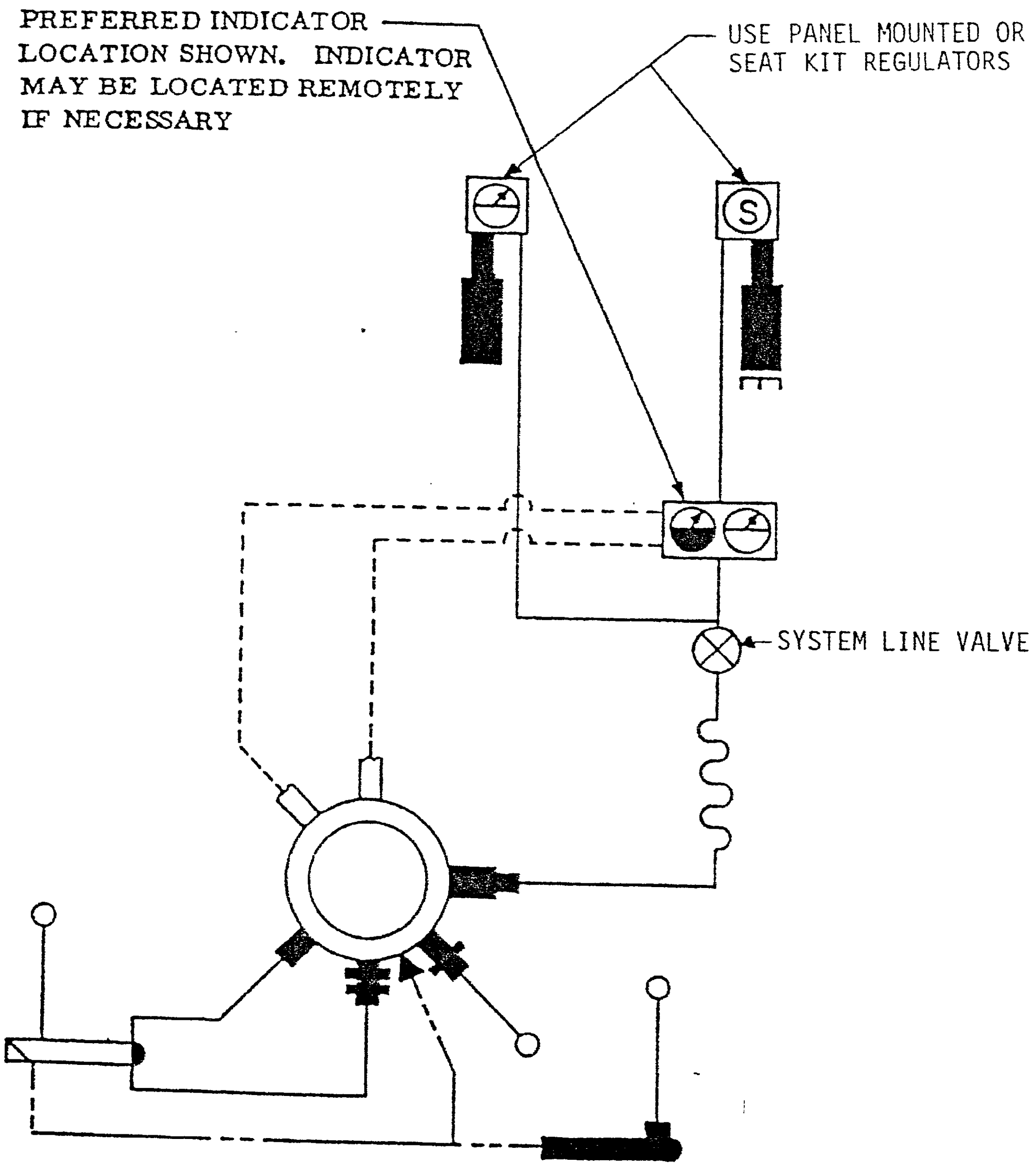


FIGURE 4. Single converter - dual regulator
(fixed converter installation)

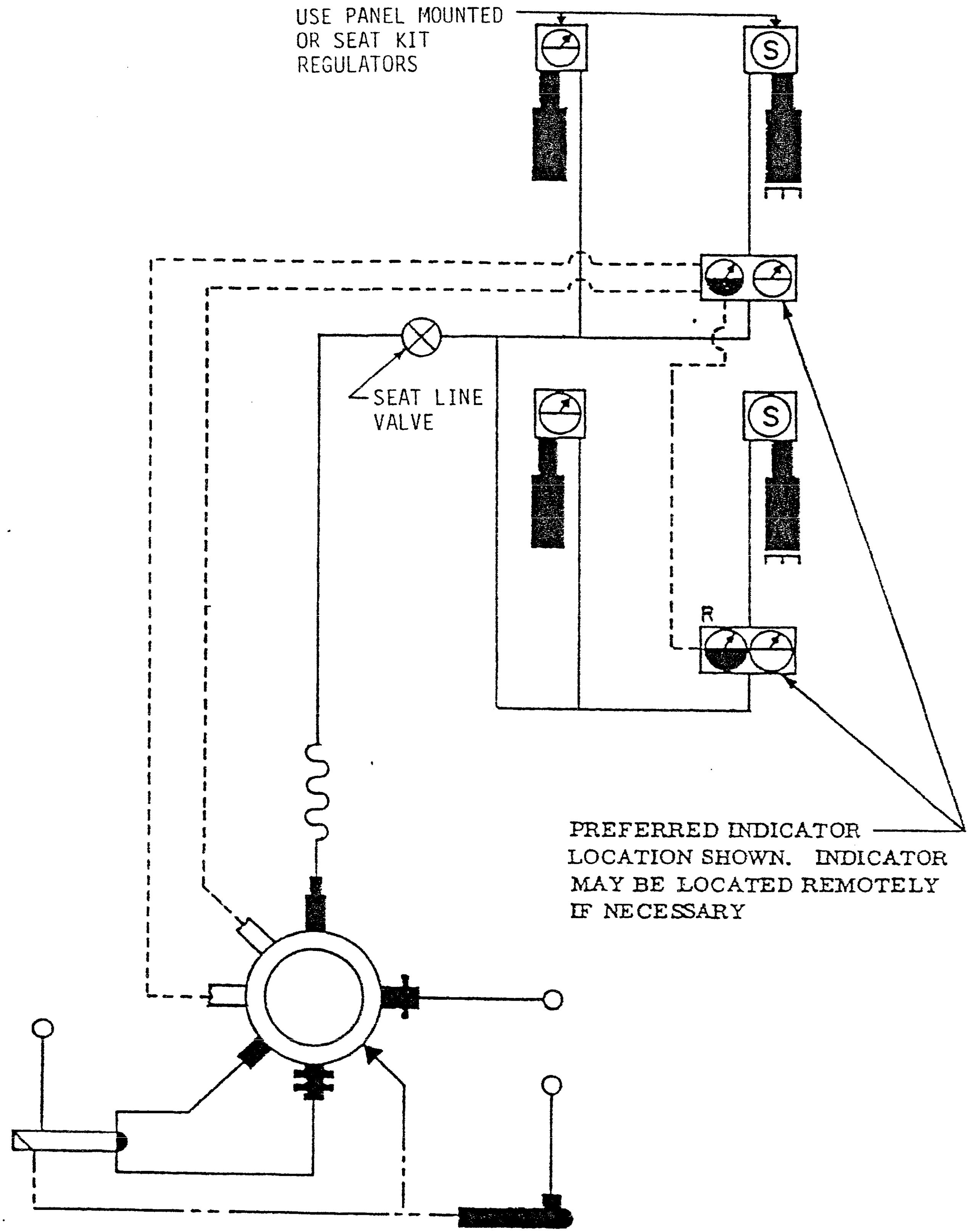


FIGURE 5. Single converter - dual regulator mulitiple crew station
(fixed converter installation)

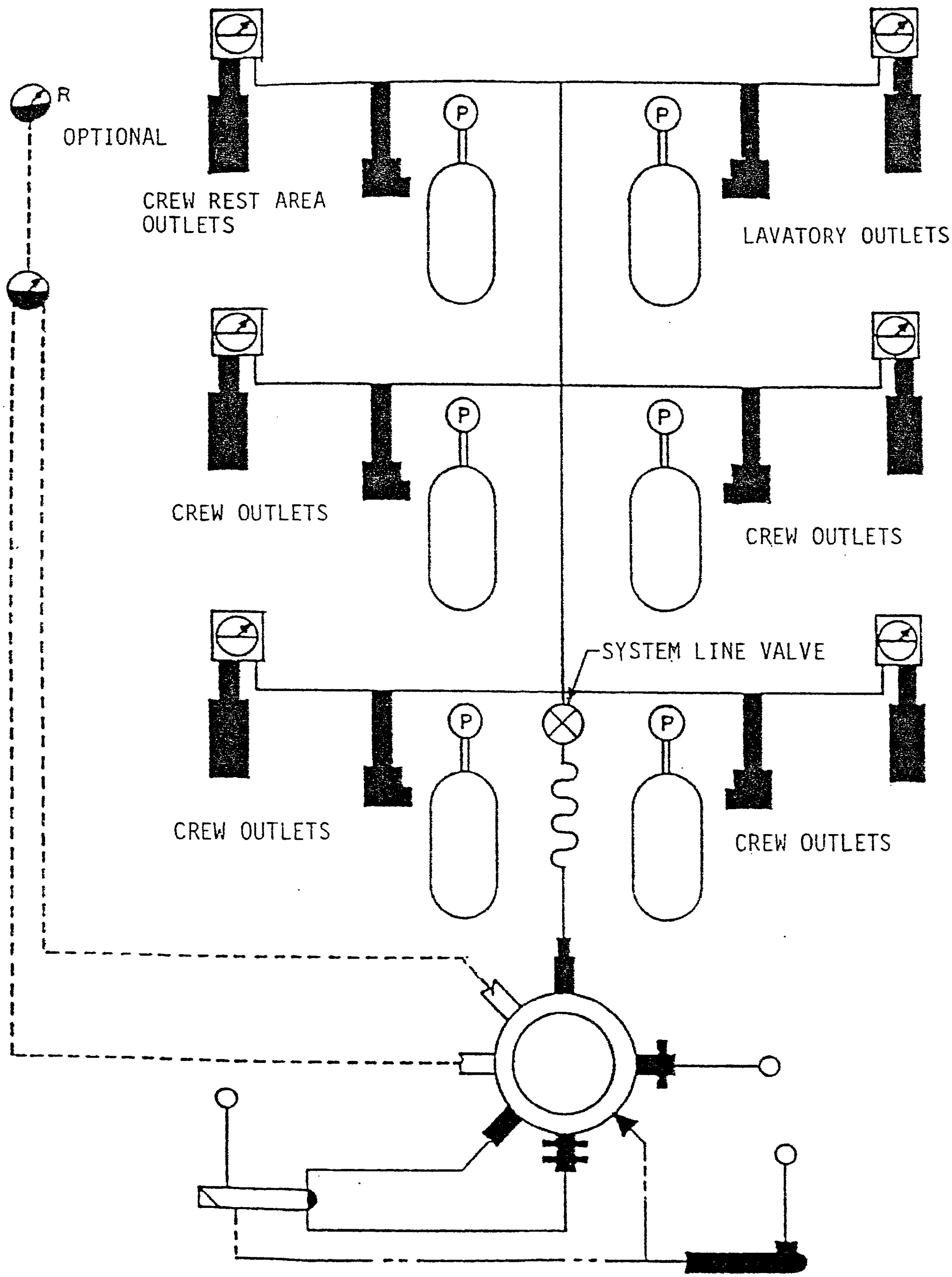


FIGURE 6. Typical installation single converter - multiple crew station (fixed converter installation)

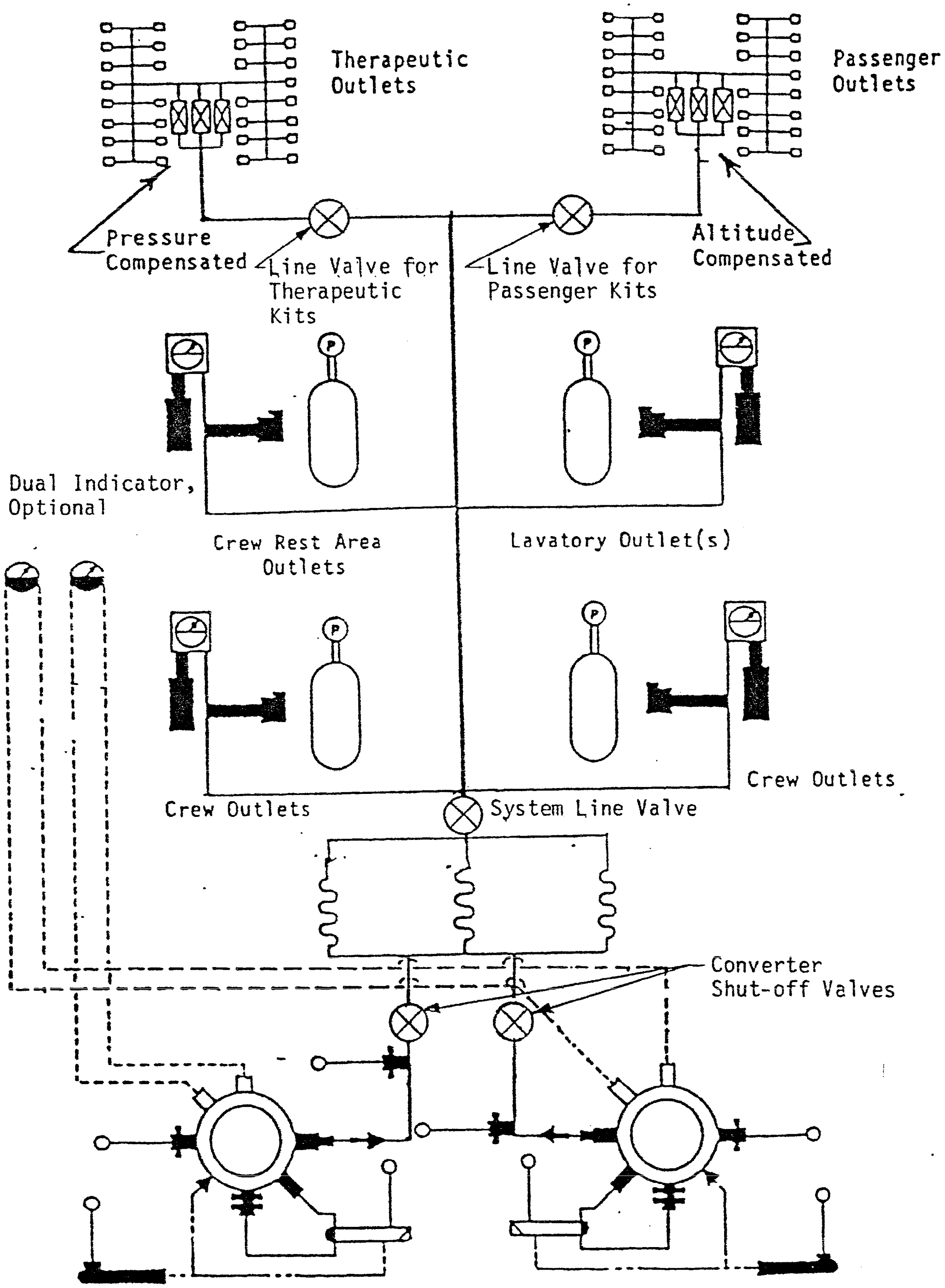


FIGURE 7. Typical installation multiple converters - multiple crew stations.
Converters mounted together - Manifolded heat exchangers

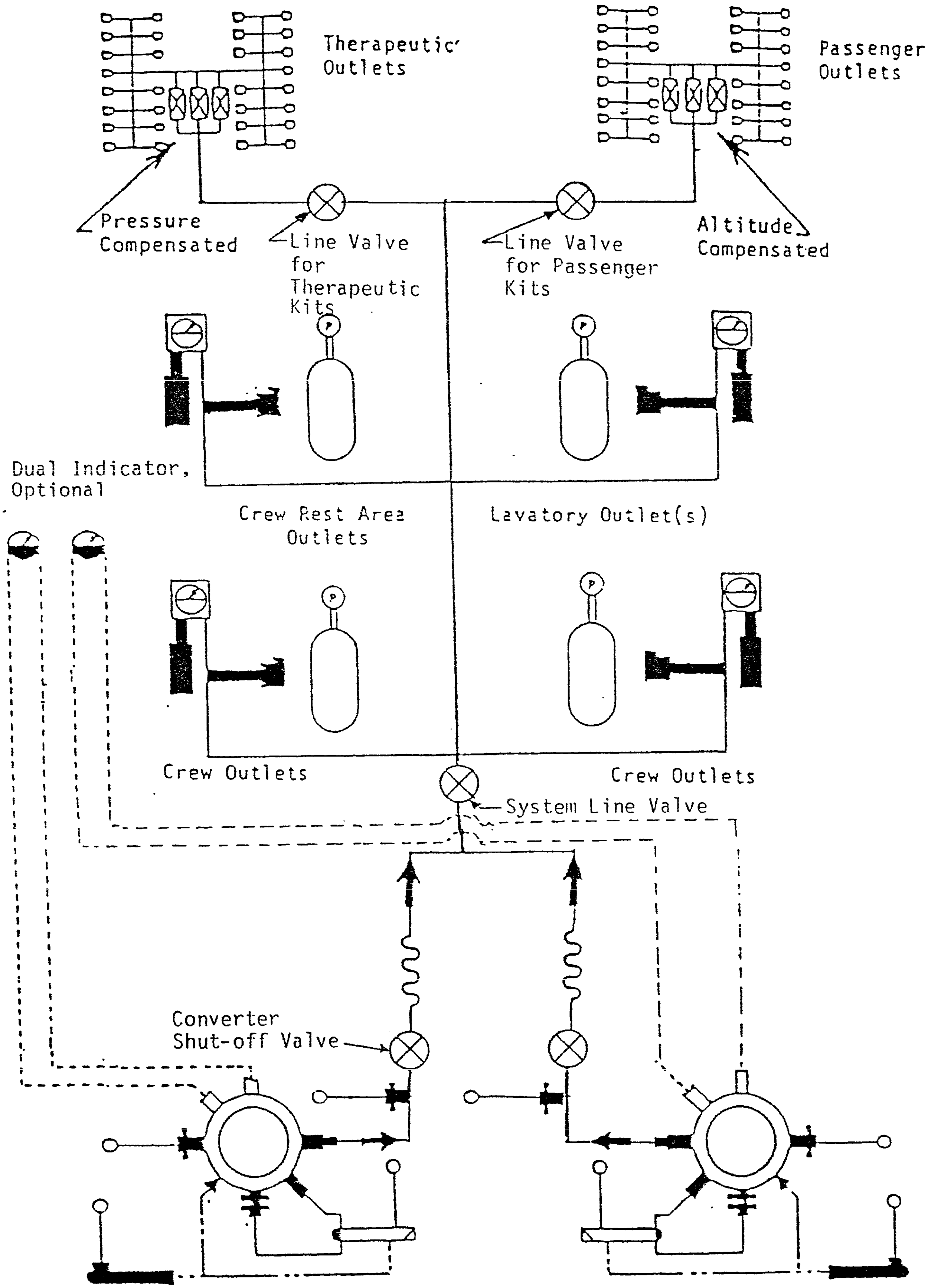


FIGURE 8. Typical installation multiple converters-multiple crew stations.

Converters remotely located-each with own heat exchanger

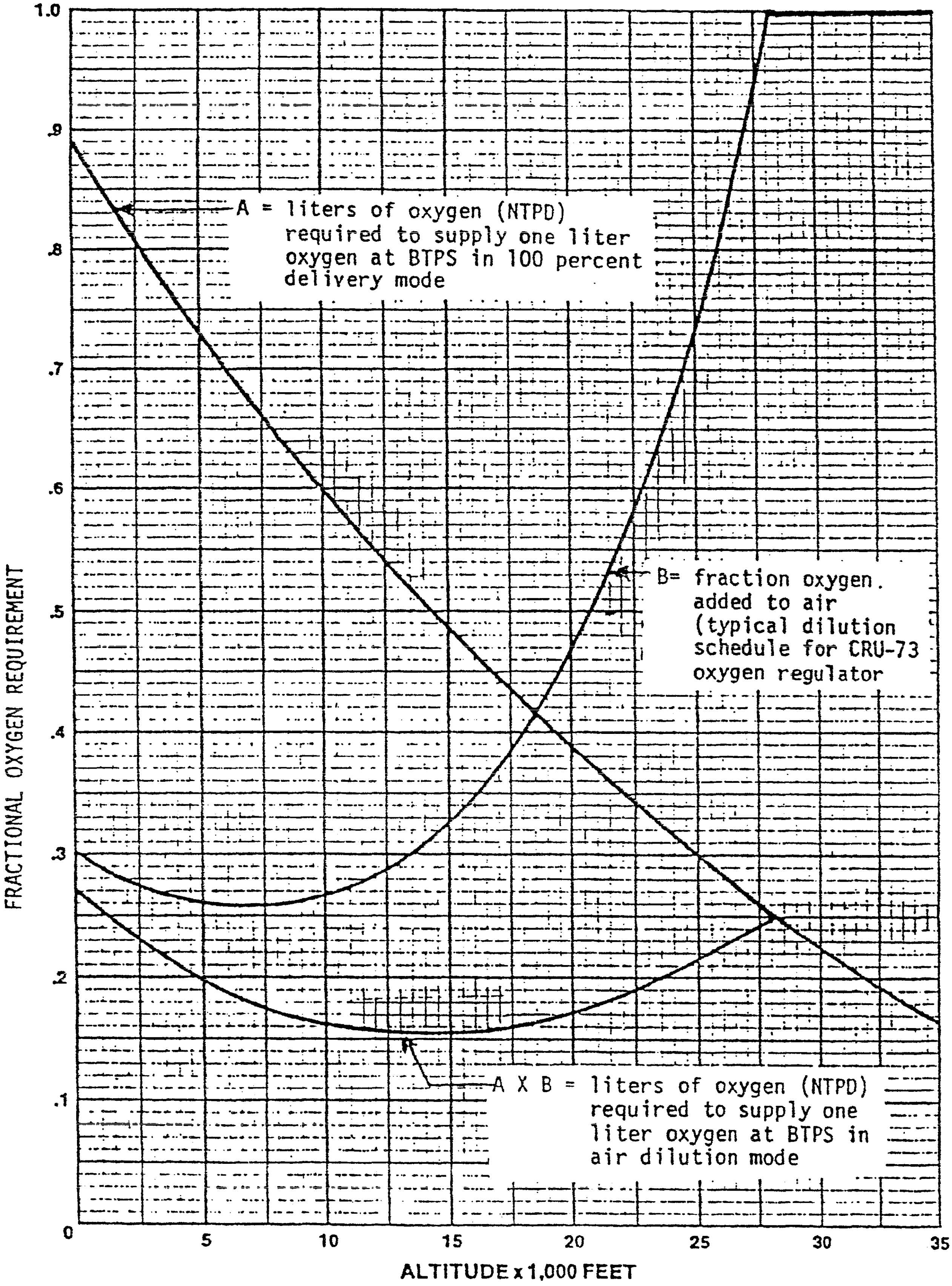


FIGURE 9. Fractional oxygen requirement versus cabin altitude.

APPENDIX A

STREAMLINING INFORMATION

10. SCOPE

10.1 Scope. This appendix is a list of documents referenced in MIL-D-19326H or tiered to documents referenced to MIL-D-19326H that are essential to acquisition. This appendix is not a mandatory port of this specification. The information contained herein is intended only for guidance.

10.2 Application. This appendix identifies the applicability of the documents referenced in MIL-D-19326H or tiered to documents referenced in MIL-D-19326H through the third tier. Only that portion(s) of a document listed in Table 1 of this appendix and described in the "Applicability" column, is pertinent in the use of MIL-D-19326H. If MIL-D-19326H is tailored in acquisition, this appendix must also be tailored.

20. Documents. The documents listed herein, and corresponding applicability data have been identified as required.

30. Definitions.

a. Applicability. The applicability is the pertinent portion or portions of a reference document that pertain to the zero tier document.. The applicability reflects the tier-to-tier relationships between reference documents.

b. QPL item. When a referenced document contains a qualification requirement, the applicability of the document is the qualified item. Applicability will be any item on the Qualified Products List (QPL).

Referenced documents. Those documents cited in secton 3, 4 or 5 of a document listed in Section 2).

d. Requirements and quality assurance. Requirements and quality assurance in the applicability column refers to sections three and four of the referenced document as the applicable portion of that document.

e. Streamlining. The process of improving standardization documentation through improved definition of product/process requirements, elimination of unnecessary requirements and reference document review, and identification of the contractual applicability of reference documents which are cited in, and tiered to, standardization documents utilized in NAVAIR acquisitions.

f. Tier of referenced documents. For documentation streamlining purposes, specifications and standards which are streamlined are denoted as "zero tier" documents. Reference documents cited in a zero tier document are denoted as "first tier" references.Reference documents cited in a first tier document are denoted as "second tier" references, etc.

g. Zero tier. Zero tier is the document undergoing streamlining, MIL-D-19326H.

TABLE I. Required Documents and Corresponding Applicability Data.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (1 of 65 documents)			
MIL-B-5087	Bonding, Electrical, and Lighting Protection, for Aerospace Systems	Preparation of bonding surfaces; classes of application, design, methods, and quality assurance provisions	MIL-D-19326
First Tier (2 of 65 documents)			
MIL-W-5088	Wiring, Aerospace Vehicle	See applicable portions in requirements	MIL-D-19326
First Tier (3 of 65 documents)			
MIL-B-5400	Electronic Equipment, Airborne, General Specification For	Electrical connectors, multi-conductor cable, safety requirements	MIL-D-19326
First Tier (4 of 65 documents)			
MIL-V-7908 1/	Valve, Aircraft Low Pressure Oxygen Systems	Check valves requirements and quality assurance provisions	MIL-D-19326
Second Tier			
DOD-STD-100	Engineering Drawing Practices	Drawing number requirements	MIL-V-7908
MIL-A-8625	Anodic Coating, for Aluminum and Aluminum Alloys	Requirements and quality assurance provisions	MIL-V-7908

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
Second tier			
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas	Type 1 Requirements and quality assurance provisions	MIL-V-7908
MIL-T-27730	Tape, Antiseize, Tetraflouroethylene, With Dispenser	Requirements and quality assurance provisions	MIL-V-7908
MIL-C-45662	Calibrating System Requirements	Requirements and quality assurance provisions	MIL-V-7908
MIL-C-81302 2/	Cleaning Compound, Solvent, Trichlorotri fluoroetthane	Requirements and quality assurance provisions	MIL-V-7908
MIL-T-81533 2/	1,1,1 Trichloroethane (Methyl Chlorform), Inhibited, Vapor Degreasing	Requirements and quality assurance provisions	MIL-V-7908
MIL-STD-130	Identification Marking of U.S. Military Property	General and detailed requirements	MIL-V-7908
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-V-7908
MIL-STD-970 Replaces MIL-STD-143	Standards and Specifications, Order of	General and detailed requirements	MIL-V-7908
MS21211	Valve, Check, Aircraft Low Pressure	Entire document	MIL-V-7908
FED-STD-H28 Replaces H28	Screw-Thread Standards for Federal Services	Entire document	MIL-V-7908

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (5 of 65 documents)			
MIL-T-8506 3/	Tubing, Steel, Corrosion-Resistant, (304), Annealed, Seamless and Welded	Requirements and quality assurance provisions	MIL-D-19326
Second Tier			
MIL-H-6875	Heat Treatment of Steel (Aircraft Practice), Process for	Equipment and thermal treatment requirement	MIL-T-8506
MIL-STD-151	Metals; Test Methods	Composition: chemical and spectro-chemical analysis	MIL-T-8506
First Tier (6 of 65 documents)			
AMS 4071 3/	Aluminum Alloy Tubing, Hydraulic, Seamless, Drawn, Round, 2.5Mg-0.25Cr (5052-0) Annealed	Entire document	MIL-D-19326
First Tier (7 of 65 documents)			
MIL-S-8805/3	Switch, Push, 10 Amperes and Low Level, Dusttight	Entire document	MIL-D-19326
First Tier (8 of 65 documents)			
MIL-V-9050	Valves, Oxygen, Pressure Relief, Aircraft	QPL item	MIL-D-19326
First Tier (9 of 65 documents)			
MIL-C-19328 5/	Converter, Liquid Oxygen, 5 Liter, MBA-5A	QPL item	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (10 of 65 documents)			
MIL-C-19803 4/	Converter, Liquid Oxygen, 10 Liter, GCU-24/A	QPL item	MIL-D-19326
First Tier (11 of 65 documents)			
MIL-H-22343	Hose Assemblies, Metal, Liquid Oxygen	Requirements and quality assurance provisions	MIL-D-19326
First Tier (12 of 65 documents)			
MIL-A-23121 5/	Aircrew Environmental, Escape and Survival Cockpit Capsule System, General Specification for	Normal and emergency environmental subsystems; cabin air contamination	MIL-D-19326
Second Tier			
MIL-E-18927	Environmental Control Systems, Aircraft General Requirement for	Oxygen contamination	MIL-A-23121
Third Tier			
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas	Type II liquid oxygen requirements and quality assurance	MIL-E-18927
First Tier (13 of 65 documents)			
AFGS-87235 5/ Replaces MIL-C-25969	Emergency Escape, Aircraft (CONTROLLED DISTRIBUTION AIR FORCE)	Capsule pressurization and and quality assurance	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (14 of 65 documents)			
MIL-R-25410 6/	Regulators, Oxygen, Diluter-Demand, Automatic Pressure-Breathing	Requirements and quality assurance provision	MIL-D-19326
Second Tier			
MIL-P-7788	Panels, Information, Integrally Illuminated	QPL item	MIL-R-25410
First Tier (15 of 65 documents)			
MIL-R-83178 6/	Regulator, Oxygen, Diluter-demand Automatic-pressure-breathing, General Specification for	QPL item	MIL-D-19326
First Tier (16 of 65 documents)			
MIL-C-25516	Connector, Electrical, Miniature, Environment Resistant Type, General Specification for	QPL item	MIL-D-19326
First Tier (17 of 65 documents)			
MIL-D-25567	Leak Detection Compound, Oxygen Systems	Requirement and quality assurance provisions	MIL-D-19326
Second Tier			
MIL-T-43703	Drum, Molded Polyethlene	Requirement and quality assurance provision	MIL-L-25567

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (18 of 65 documents)			
MIL-I-25645 7/	Indicator, Liquid Oxygen Quantity, Capacitance Type, General Specifications for	Requirements and quality assurance provision	MIL-D-19326
Second Tier			
QQ-Z-325 8/	Zinc Coating, Electrodeposited Reqirements for	Type II and III requirements and quality assurance provisions	MIL-I-25645
QQ-P-416 8/	Plating, Cadmium (Electrodeposited)	Type II and III requirements and quality assurance provisions	MIL-I-25645
MIL-5400	Electronic Equipment, Airborne, General Specifications for	Requirement and quality assurance provisions	MIL-I-25645
MIL-S-7742	Screw Threads, Standard Optimum Selected Series: General Requirements for	Requirements and quality assurance provisions	MIL-I-25645
MIL-A-8625	Anodic Coating, for Aluminum and Aluminum Alloys	Requirements and quality assurance provisions	MIL-I-25645
Second Tier			
MIL-STD-130	Identification Marking of U.S. Military Property	Requirements and quality assurance provisions	MIL-I-25645

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
MIL-STD-721	Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety	Definitions: Corrective action	MIL-I-25645
MIL-STD-970 Replaces MIL-STD-143	Standards and Specifications, Order of	General and detailed requirements	MIL-I-25645
MS33639	Case, Instrument, Clamp-Mounted, Aircraft	Entire document	MIL-I-25645
MS33515	Pointer, Dial, Standard Design of Aircraft Instrument	Entire document	MIL-I-25645
Third Tier			
TT-C-490	Cleaning Methods and Pretreatment of Ferrous Surface of Organic Compound	Requirements and quality assurance for type I	QQ-P-416
MIL-S-5002	Surface Treatment and Inorganic Coating for Metal Surfaces of Weapon Systems	Cleaning requirements	QQ-P-416
MIL-STD-151	Metals; Test Methods	Method 520	QQ-P-416
MIL-STD-1312	Fastener Test Methods	Test 12	QQ-P-416
First Tier (19 of 65 documents)			
MIL-I-81387 7/	Indicator, Liquid Oxygen Quantity	QPL item	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (20 of 65 documents)			
MIL-V-25513 1/	Valve, Check, For 300 PSI Liquid Oxygen Converter System, Type MH-1	Requirements and quality assurance provisions	MIL-D-19326
Second Tier			
QQ-P-416	Plating, Cadmium (Electrodeposited)	Type II, class 2 requirements quality assurance	MIL-V-25513
DOD-STD-100	Engineering Drawing Practices	Drawing number requirements	MIL-V-25513
MIL-P-7105	Pipe Threads, Taper, Aeronautical National Form, Symnol ANPT, General Specification for	Requirement and quality assurance provision	MIL-V-25513
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series, General Specification for	Requirement and quality assurance provision	MIL-V-25513
MIL-A-8625	Anodic Coatings, For Aluminum and Aluminum Alloys	Requirement and quality assurance provision	MIL-V-25513
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas	Type I classification requirements	MIL-V-25513
MIL-T-27730	Tape, Antiseize, Tetrafluoroethylene, With Dispenser	Requirement and quality assurance provision	MIL-V-25513
MIL-STD-130	Identification Marking of U.S. Military Property	Requirement and quality assurance provision	MIL-V-25513

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-V-25513
MS33656	Fitting End, Standard Dimensions for Flard Tube Connection and Gasket Seal	Entire Document	MIL-V-25513
First Tier (21 of 65 documents)			
MIL-V-25962	Valve, Liquid Oxygen Drain	QPL item	MIL-D-19326
First Tier (22 of 65 documents)			
MIL-C-25666	Converter, Liquid Oxygen Capacitance Type Gauging, General Specification For	Requirements and quality assurance provisions	MIL-D-19326
Second Tier			
BB-N-411	Nitrogen, Technical	Requirements and quality assurance provisions	MIL-C-25666
QQ-S-766 9/	Steel Plates, Sheets, and Strip, Corrosion Resisting	Requirements and quality assurance provisions	MIL-C-25666
DOD-STD-100	Engineer Drawing Practices	Identification marking requirements	MIL-C-25666
MIL-S-4043 9/	Steel, Corrosion Resistanting (Extra Carbon Type 304) Plate, Sheet and Strip	Requirements and quality assurance provisions	MIL-C-25666
MIL-P-7105	Pipe Threads, Taper, Aeronautical National Form, Symbol ANPT, General Specification for	Requirements and quality assurance provision	MIL-C-25666

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
MIL-S-7742	Screw Threads, Standard Optimum Selected Series: General Requirements for	Requirements and quality assurance provisions	MIL-C-25666
MIL-V-9050	Valves, Oxygen, Pressure Relief, Aircraft	QPL item	MIL-C-25666
MIL-C-25516	Connectors, Electrical, Miniature, Coaxial, Environment Resistant Leak, General Specification for	QPL item	MIL-C-25666
MIL-D-25567	Leak Detection Compound, Oxygen Systems	Requirement and quality assurance provision	MIL-C-25666
MIL-I-25645	Indicator, Liquid Oxygen Quantity, Capacitance Type, General Specification for	Requirements and quality assurance provision	MIL-C-25666
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas	Requirements and quality assurance provision	MIL-C-25666
MIL-T-27730	Tape, Antiseize, Tetrafluorethylene, With Dispenser	Requirements and quality assurance provision	MIL-C-25666
MIL-V-38201	Valve, Filler, Liquid Oxygen, Female CRU-59/E	QPL item	MIL-C-25666
MIL-C-81302[10/]	Cleaning Compound, Solvent, Trichlorotrifluorethane	Requirements and quality assurance provision	MIL-C-25666
MIL-T-81533[10/]	1,1,1 Trichloroethane (Methyl Chloroform), Inhibited, Vapor Degreasing	Requirements and quality assurance provision	MIL-C-25666

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
FED-STD-595	Colors	Requirements for 14187	MIL-C-25666
MIL-STD-130	Identification Marking of U.S. Military Property	Requirements and quality assurance provision	MIL-C-25666
MIL-STD-721	Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety	Definitions: maintenance, corrective	MIL-C-25666
MIL-STD-781	Reliability Test, Exponential Distribution	Reliability qualification test	MIL-C-25666
MIL-STD-810	Environmental Test Methods	Methods 509, 513, 514, and 516	MIL-C-25666
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-C-25666
MIL-STD-970 Replaces MIL-STD-143	Standards and Specifications, Ordre of	General and detailed requirements	MIL-C-25666
MS33583	Tubing End, Double Flare, Standards Dimensions for	Entire document	MIL-C-25666
MS33584	Tubing End, Standard Dimensions for Flare	Entire document	MIL-C-25666
ASTM D2512	Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold Technique)	Entire document	MIL-C-25666
First Tier (23 of 65 documents)			
MIL-T-26069	Trailer, Oxygen Cylinder, AF-M32R-3, High and Low Pressure, 2 Wheel 8 Cylinder Capacity	Requirements and quality assurance provision	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (24 of 65 documents)			
MIL-D-26392 [11/]	Dummy Converter, Liquid Oxygen Indicator System, 10 Liter, CRU-23/A	Requirements and quality assurance provision	MIL-D-19326
Second Tier			
DOD-STD-100	Engineer Drawing Practices	Drawing number requirements	MIL-D-26392
MIL-STD-130	Identification Marking of U.S. Military Property	Requirements and quality assurance provision	MIL-D-26392
MIL-STD-721	Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety	Definitions: Corrective action	MIL-D-26392
MIL-STD-781	Reliability Tests Exponential Distribution	Reliability accounting test	MIL-D-26392
MIL-STD-810	Environmental Test Methods	Method 512.2	MIL-D-26392
MIL-STD-831	Test Reports, Preparation of	General and detail requirements	MIL-D-26392
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-D-26392
MIL-STD-970 Replaces MIL-STD-143	Standards and Specifications, Order of	General and detailed requirements	MIL-D-26392
First Tier (25 of 65 documents)			
MIL-D-26393 [11/]	Dummy Converter, Liquid Oxygen Indicator System, 25 Liter, CRU-24/A	Requirements and quality assurance provisions	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
Second Tier			
DOD-STD-100	Engineer Drawing Practices	Drawing number requirements	MIL-D-26393
MIL-STD-130	Identification Marking of U.S. Military Property	Requirements and quality assurance provisions	MIL-D-26393
MIL-STD-721	Definitions of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety	Definitions: Corrective action	MIL-D-26393
MIL-STD-781	Reliability Tests Exponential Distribution	Reliability accounting test	MIL-D-26393
MIL-STD-810	Environmental Test Methods	Method 512.2	MIL-D-26393
MIL-STD-831	Test Reports, Preparation of	General and detail requirements	MIL-D-26393
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-D-26393
First Tier (26 of 65 documents)			
MIL-H-26626	Hose Assembly, Non-metallic Tetrafluoroethylene, Oxygen	QPL item	MIL-D-19326
First Tier (27 of 65 documents)			
MIL-O-27210	Oxygen, Aviator's Breathing, Liquid and Gas	Types I and II liquid oxygen requirements and quality assurance provisions	MIL-D019326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (28 of 65 documents)			
MIL-O-27335 12/	Oxygen System, Survival Container and Oxygen Kit, General Specification for	Requirements and quality assurance provisions	MIL-D-19326
First Tier (29 of 65 documents)			
MIL-S-81018 12/	Survival Kit Container, Aircraft Seat, With Oxygen, General Specification for	Requirements and quality assurance provisions	MIL-D-19326
First Tier (30 of 65 documents)			
MIL-G-27617	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant	QPL item	MIL-D-19326
First Tier (31 of 65 documents)			
MIL-T-27730	Tape, Antiseize, Tetrafluoroethylene, With Dispenser	Requirements and quality assurance provisions	MIL-D-19326
First Tier (32 of 65 documents)			
MIL-T-38170	Tank, Mobile Storage Liquid Oxygen, TMU-27/M	Requirements and quality assurance provisions	MIL-D-19326
First Tier (33 of 65 documents)			
MIL-I-81388	Indicator Repeaters, Liquid Oxygen Quantity	QPL item	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (34 of 65 documents)			
MIL-R-81553	Regulator, Chest Mounted, 100 Percent Oxygen, Positive Pressure, CRU-79/P	QPL item	MIL-D-19326
First Tier (35 of 65 documents)			
MIL-H-81581/5	Hose Assemblies, Breathing Oxygen, Low Pressure, Connector to Regulator	QPL item	MIL-D-19326
First Tier (36 of 65 documents)			
MIL-H-87961	Hose and Hose Assemblies, Air Duct, Air Breathing, Oxygen Systems, General Specification for	QPL item	MIL-D-19326
First Tier (37 of 65 documents)			
MIL-STD-17	Mechanical Symbols for Aeronautical and Spacecraft use	Entire document	MIL-D-19326
First Tier (38 of 65 documents)			
MIL-STD-100	Engineering Drawing Practices	Oxygen systems controls and display	MIL-D-19326
First Tier (39 of 65 documents)			
MIL-STD-203	Aircrew Station Controls and Displays for Fixed Wing Aircraft	Oxygen systems controls and display	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabililty:	Referenced by:
First Tier (40 of 65 documents)			
MIL-STD-889	Dissimilar Metals	Definition of dissimilar metals	MIL-D-19326
First Tier (41 of 65 documents)			
MIL-STD-970 Replaces MIL-STD-143	Standards and Specifications, Order of	General and detailed requirements	MIL-D-19326
First Tier (42 of 65 documents)			
MIL-STD-1359	Cleaning Methods and Procedures for Breathing Oxygen Equipment	General requirements and detail requirements	MIL-D-19326
Second Tier			
P-S-1792	Soap, Laundry (Neutral and Built)	Type II, neutral soap requirements	MIL-STD-1359
BB-A-1034	Compressed Air, Breathing	Grade A, high purity, very low water content requirements	MIL-STD-1359
BB-N-411	Nitrogen, Technical	Type I, Grade A, Class I requirements	MIL-STD-1359
MIL-C-5501	Caps and Plugs, Protective, Dust and Moisture Seal	See applicable portions in Supplement I	MIL-STD-1359

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
MIL-D-16791	Detergents, General Purpose (Liquid, Nonionic)	Type I, water-soluable detergent requirements	MIL-STD-1359
MIL-O-27210	Oxygen Aviator's Breathing, Liquid and Gas	Type I requirements and quality assurance provisions	MIL-STD-1359
MIL-T-81533	Trichloroethane 1,1,1 (Methyl Chloroform) Inhibited, Vapor Degreasing	Requirements and quality assurance provisions	MIL-STD-1359
FED-STD-209	Clean Room and Work Station Requirements, Controlled Environment	Air cleanliness requirements	MIL-STD-1359
NAVAIR 13-1-6.4	Oxygen Equipment	For guidance only	MIL-STD-1359
USAFT.O. 15X-1-1	Oxygen Equipment	For guidance only	MIL-STD-1359
TM 55-1660-245-12	Oxygen Equipment	For guidance only	MIL-STD-1359
First Tier (43 of 65 documents)			
MIL-STD-1247	Marking, Functions and Hazard Designations of Hose, Pipe, and Tube Lines for Aircraft, Missile and Space Systems	Detail, colors, and flex hoses requirements	MIL-D-19326
First Tier (44 of 65 documents)			
MS22032	Recharger Assembly, Portable Oxygen	Entire document	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (45 of 65 documents)			
MS22055	Hose Assemblies, Oxygen-Breathing Connector to Regulator	Entire document	MIL-D-19326
First Tier (46 of 65 documents)			
MS27599	Regulator, Oxygen, Diluter Demand	Entire document	MIL-D-19326
Second Tier			
MIL-R-83178	Regulator, Oxygen, Diluter Demand Automatic-Pressure-Breathing, General Specification For	Requirements and quality assurance provisions	MS27599
MS25010	Light, Panel-Plastic Plate Lighting	Entire document	MS27599
First Tier (47 of 65 documents)			
MS33656	Fitting End, Standard Dimensions For Flared Tube Connection and Gasket Seal	Entire document	MIL-D-19326
First Tier (48 of 65 documents)			
MS33739	Aircraft Markings, Servicing, and Precautioning	Entire document	MIL-D-19326
First Tier (49 of 65 documents)			
MS90341	Mounting Bracket, Mating Portion for 5 and 10 Liter Liquid Oxygen Converter	Entire document	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (50 of 65 documents)			
MS90457	Hose Assembly, Metal, Liquid Oxygen	Applicable hose size dimensions	MIL-D-19326
First Tier (51 of 65 documents)			
MS22059[13/]	Oxygen System, Portable, 295 Cu In	Entire document	MIL-D-19326
Second Tier			
MIL-O-23678	Oxygen System, Portable, High Pressure, Aircraft	Requirements and quality assurance provisions	MS22059
First Tier (52 of 65 documents)			
MS22061[13/]	Oxygen System, Portable, 96 Cu In	Entire document	MIL-D-19326
Second Tier			
MIL-O-23678	Oxygen System, Portable, High Pressure, Aircraft	Requirements and quality assurance provisions	MS22061
First Tier (53 of 65 documents)			
Drawing[13/] 60D3570	Cylinder-Regulator, Oxygen, Portable Aircraft, Firefighters	Entire document	MIL-D-19326
First Tier (54 of 65 documents)			
MS22068	Coupling Assemblies, Quick Disconnect, Aircraft Liquid Oxygen Systems	QPL item	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicability:	Referenced by:
First Tier (55 of 65 documents)			
MS24548	Hose Assembly, Tetrafluoroethylene, Oxygen	Entire document	MIL-D-19326
First Tier (56 of 65 documents)			
MS33583	Tubing End, Double Flare, Standard Dimensions For	Entire document	MIL-D-19326
First Tier (57 of 65 documents)			
MS33584	Tubing End, Standard Dimensions for Flared	Entire document	MIL-D-19326
First Tier (58 of 65 documents)			
MS33611	Tube, Bend Radii	Entire document	MIL-D-19326
First Tier (59 of 65 documents)			
AN929	Cap Assembly, Tube, Pressure Seal	Entire document	MIL-D-19326
First Tier (60 of 65 documents)			
AND10104	Tubing, Steel, Corrosion-Resistant, Round, Standard Dimensions For	Entire document	MIL-D-19326
First Tier (61 of 65 documents)			
Drawing 44A25450	Sleeve, Oxygen Coupling	Entire document	MIL-D-19326

TABLE I. Required Documents and Corresponding Applicability Data - Continued.

Document no:	Document title:	Applicabilility:	Referenced by:
First Tier (62 of 65 documents)			
Drawing 44B24627	Bracket Assembly, Portable Oxygen Cylinder	Entire document	MIL-D-19326
First Tier (63 of 65 documents)			
Drawing 46A16236	Clip, Recharger Low Pressure Oxygen System	Entire document	MIL-D-19326
First Tier (64 of 65 documents)			
Drawing 53C3794	Cylinder and Regulator Breathing Oxygen, Portable	Entire document	MIL-D-19326
First Tier (65 of 65 documents)			
Drawing 53D3970	Mask-Cylinder-Regulator, Oxygen, Portable, Aircraft, Firefighters	Entire document	MIL-D-19326

NOTES FOR APPENDIX A

1/ The applicable portion of either MIL-V-7908 or MIL-V-25513 maybe used

2/ The applicable portion of either MIL-C-81302 or MIL-T-81533 maybe used

3/ The applicable portion of either MIL-T-8506 or AMS 4071 maybe used

4/ The applicable portion of either MIL-C-19328 or MIL-C-19803 maybe used

5/ The applicable portion of either MIL-A-23121 or AFGS-87235 maybe used

6/ The applicable portion of either MIL-E-25410 or MIL-R-83178 maybe used

7/ The applicable portion of either MIL-I-25645 or MIL-I-81378 maybe used

8/ The applicable portion of either QQ-Z-324 or QQ-P-416 maybe used

9/ The applicable portion of either QQ-S-766 or MIL-S-4043 maybe used

10/ The applicable portion of either MIL-C-81302 or MIL-T-81533 maybe used

11/ The applicable portion of either MIL-D-26392 or MIL-D-26393 maybe used

12/ The applicable portion of either MIL-O-27335 or MIL-S-81018 maybe used

13/ The applicable portion of either MS22059, MS22061, or Drawing 6003570 maybe used

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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.
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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE *(YYMMDD)*
	MIL-D-19326H	31 August 1990

3. DOCUMENT TITLE

DESIGN AND INSTALLATION OF LIQUID OXYGEN SYSTEMS IN AIRCRAFT, GEN SPEC FOR

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)*
Commanding Officer NAEC, SESD Code 53	(1) Commercial (908) 323-7457 (2) AUTOVON 624-7457
c. ADDRESS *(Include Zip Code)* Lakehurst, NJ 08733-5100	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340