

**BY ORDER OF THE COMMANDER  
59TH MEDICAL WING**

**59TH MEDICAL WING  
INSTRUCTION 91-204**



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***Safety***

***OXYGEN SAFETY AND OXYGEN  
ENRICHED ATMOSPHERE (OEA) AREAS***

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This instruction implements Air Force Policy Directive 91-2, *Safety Programs*. This instruction establishes performance and maintenance criteria for oxygen-enriched atmosphere areas, and storage of compressed gas cylinders. It addresses the equipment and facilities used for safeguarding patients and health care personnel from fire, explosion, electrical and related hazards associated with an Oxygen Enriched Atmosphere (OEA), compressed gases, compressed gas cylinders, and anoxia from erroneous gas connections and similar hazards. It is consistent with Air Force Occupational Safety & Health (AFOSH) Standards. This instruction applies to all military, civilian, and volunteer personnel assigned, attached or under contract to the 59 Medical Wing. This instruction does not apply to the Air National Guard or Air Force Reserve. Refer recommended changes and questions about this publication to the Office of Primary Responsibility using the AF Form 847, *Recommendation for Change of Publication*. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with Air Force Records Information Management System Records Disposition Schedule located at <https://www.my.af.mil/afrims/afrims/afrims/rims.cfm>

***SUMMARY OF CHANGES***

Updated references throughout text.

## 1. Fire Hazards.

1.1. Oxygen is a strong oxidizing gas. Individually, or as a mixture, it will readily support combustion. Materials that are potentially flammable and combustible in air will ignite more easily and burn more vigorously in an OEA.

1.2. Isolate or remove combustible materials that could be hazardous in an OEA area, particularly those found in patient care linens. These include hair oils, oil-based lubricants, skin lotions, rubbing alcohol, and acetone.

1.3. Leakage or venting of oxygen from any storage or dispensing equipment can create an OEA. The potential for an OEA also exists whenever oxygen is transported, stored, or used.

## 2. Training Requirements.

2.1. Each patient care section and OEA will develop written oxygen shut-off procedures, and include oxygen shut-off familiarization to their job safety training outline (JSTO). As a minimum the written procedures will include the training actions to be taken in case of an emergency such as fire and how to close the wall oxygen valves. Also the written procedures will identify the nurse shift leader, nurse manager, element leader, or equivalent individual responsible for directing or closing the wall oxygen valves. All personnel that work in or have the possibility to be exposed to an OEA will be trained. The training consists of both the JSTO and the flights written oxygen shut-off procedures. The JSTO cannot be a standalone oxygen training product. The appropriate flight chief will approve the oxygen shut-off procedures.

## 3. Electrical Hazards.

3.1. All electrical patient care equipment will be tested by Biomedical Equipment Maintenance prior to initial use, and in accordance with AFI 41-203, *Electrical Safety in Medical Treatment Facilities*. Defective equipment will be turned in to the appropriate agency for repair or disposition.

3.2. Piping systems such as water pipes, gas pipes, and electrical conduits will not be used as grounding points. All grounds will be properly installed and checked prior to use.

3.3. All spark producing and non-approved electrical devices will be prohibited in OEA areas.

## 4. Storage.

4.1. Gates to gas supply storage systems will be secured to prevent unauthorized entry. Storage areas for oxygen will not contain combustible materials or flammable gases. Empty oxygen cylinders may be stored in the same enclosure, but they must be marked and segregated.

4.2. All oxygen cylinders will have a Department of Defense (DD) Form 1191, *Warning Tag for Oxygen Equipment*. A capacity tag indicating whether the cylinder is full, partially full, or empty, will also be affixed to each cylinder.

4.3. All cylinders not in use will be capped and secured by wall mounted chains or similar devices, and stored in approved locations. Cylinders connected to a manifold and tubing connections will be secured by chains, wall mounted chains, or similar devices.

4.4. Smoking will be prohibited within 50 feet of gas storage areas and a sign reading: "OXYGEN, NO SMOKING, NO OPEN FLAMES, WITHIN 50 FEET" will be posted. Oxygen cylinders stored outdoors will be shaded from the sun. Oxidizing gases must never be stored within 50 feet of flammable gases (red label) or flammable liquids.

4.5. Gas system pipelines will be readily identifiable by appropriate labeling as to their contents.

4.6. For patient wards, treatment areas, and clinics there are three categories of oxygen use and storage: In order to simplify compliance, definitions are provided and quantity limits are based on B4550 fire zones.

4.6.1. In Use. This category consists of oxygen bottles in use by patient or in use on medical equipment.

4.6.1.1. Quantity Limits. National Fire Protection Association (NFPA) 99 does not directly address the quantities that are used in a fire zone at any given time. However, medical staff should maximize use of wall supplied oxygen if available and quickly return empty oxygen bottles to approved storage rooms.

4.6.2. Ready for Immediate Use. This category consists of oxygen bottles staged for immediate use within an area. For B4550 an "area" will be defined as a fire zone. "Immediate Use" is defined as staged on a crash cart, staged in a patient/treatment room, under a patient bed, or located on a piece of medical equipment.

4.6.2.1. Quantity Limits. New NFPA 99 and the Joint Commission (JC) guidance allows for up to a total volume of 300 cubic feet of oxygen in an area. Recognize that 300 cubic feet of oxygen equates to only 12 "E" sized cylinders or an equivalent mix of H and E size cylinders. One "H" sized cylinder equates to 250 cubic feet, one "E" sized cylinder equates to 24 cubic feet. Empty cylinders do count in the total cubic feet volume for the area so medical staff must expedite return of empties to approved storage rooms.

4.6.3. In Storage. This category consists of oxygen bottles stored in a dedicated oxygen storage room that meets the minimum NFPA 99 construction requirements of 1 hour construction or a sprinkler located in the room.

4.6.3.1. Quantity Limits. There is only one dedicated oxygen storage room to be located in any fire zone designated as healthcare occupancy. The specific locations are determined by Wing Safety, Facilities Management, and Lackland Air Force Base Fire Department. NFPA 99 and JC guidance allows for up to a total volume of 3000 cubic feet of oxygen to be stored in an approved storage room. Empty cylinders in storage do not count in the total cubic feet volume limits.

4.7. Staff must ensure that cylinders staged for "Immediate Use" and cylinders that are in storage include the proper use of safety chains/securing, full/empty labeling, and bottle segregation.

## 5. Special Precautions For Oxygen Cylinders and Manifolds.

5.1. Oxygen cylinders or apparatus will not be handled with oily hands, greasy gloves or rags. Oil, grease, lubricants, rubber or other organic materials will not be allowed to come in contact with oxygen cylinders, valves, regulators, gauges or fittings.

5.2. Particles of dust and dirt will be cleared from cylinder valve openings by slightly opening and closing the valve before applying any fitting to the cylinder.

5.3. The high pressure valve on the oxygen cylinder will be opened before use to ensure the regulator is functioning properly.

## **6. Regulators and Valves.**

6.1. Oxygen fittings, valves, regulators or gauges will only be used to service oxygen, and will be equipped with Diameter Index Safety System, or Pin Index System.

6.2. Defective oxygen cylinder regulators, valves, gauges, and related equipment will not be used. Defective equipment will be turned into Medical Engineering flight and defective cylinders will be turned in to Logistics for proper disposal.

## **7. Adopted Forms.**

AF Form 847, *Recommendation for Change of Publication*

DD Form 1191, *Warning Tag for Oxygen Equipment*

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Administrator

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFPD 91-2, *Safety Programs*, 28 September 1993

AFI 41-203, *Electrical Safety in Medical Treatment Facilities*, 19 June 2002

59MDWI 91-203, *Medical Wing Safety Program*, 9 February 2009

National Fire Protection Association (NFPA), 99, 2005 Edition

Health Care Facilities; Compressed Gas Association Inc, 2008 Standards

***Abbreviations and Acronyms***

**AFI**—Air Force Instruction

**AFOSH**—Air Force Occupational Safety and Health

**DD**—Department of Defense

**JC**—Joint Commission

**JSTO**—Job Safety Training Outline

**NFPA**—National Fire Protection Association

**OEA**—Oxygen Enriched Atmosphere

**OPR**—Office of Primary Responsibility

***Terms***

**Oxygen Enriched Atmosphere**—An atmosphere in which the oxygen content exceeds 23.5 percent by volume.

**Oxygen Administration Site**—All points within one foot of oxygen administration equipment (including oxygen-powered aspirators); except when the equipment contains, or is intended to contain, an OEA greater than (>) two (2) liters in volume (measured at atmospheric pressure), then the oxygen administration site shall include all points within five (5) feet of the equipment.

**Enriched Areas (EA)**—Locations in which oxygen is being administered and in which oxygen levels meet the definition of an OEA.