COMPRESSED GAS ASSOCIATION, INC.

SAFETY ALERT

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HAZARDS OF OXYGEN IN THE HEALTH CARE ENVIRONMENT

For many applications in the medical field, oxygen and oxygen-rich atmospheres are used for treatment in equipment such as oxygen tents, incubators, and hyperbaric chambers. Recently, there have been a number of accidents involving oxygen and oxygen-rich atmospheres in the health care industry.

Always use extreme caution when using oxygen. Although oxygen itself does not burn, it does support and enhance combustion. A material that will normally not burn in air, such as the metal in oxygen regulators or plastic tubing used to supply oxygen in an operating room, may burn in pure oxygen or in an atmosphere with a greater than 21% oxygen concentration. **Advances in material science have introduced more polymers (endotracheal tubes) and fabrics (drapes and gowns) that are flammable in the oxygen-rich atmosphere.**

Similarly, materials that can be ignited in air require less energy in an oxygen-rich atmosphere. Many of these materials can be ignited by the friction of a valve seat when it is opened or by heat produced from adiabatic compression when oxygen at high pressure is rapidly introduced into a system initially at low pressure. Likewise, the reduction in the use of flammable anesthetics in operating rooms has allowed for the increased use of potential ignition sources such as electrosurgical units, lasers, etc.

In general, there is a need for increased awareness in the health community of the hazards of oxygen-rich atmospheres. Some general guidelines when using oxygen and oxygen-rich atmospheres are provided below:

- Do not allow valves, regulators, gauges, or fittings to come into contact with oils including skin oils, make-up, greases, organic lubricants, rubber, or any other combustible substance.
- Open the oxygen valves slowly and completely to lessen the heat produced and achieve the desired flow conditions within the equipment.
- Make sure that any cleaning or repair of oxygen equipment is performed by qualified, properly trained staff.
- Use plugs, caps, and plastic bags to protect “off-duty” equipment from dust and dirt.
- Make sure that personnel using oxygen equipment are adequately trained in its operation and in oxygen safety and have knowledge of the manufacturers’ instructions for using the equipment.

This alert is intended to give a broad overview of a potentially dangerous situation. For more detailed discussion of the hazards and methods of dealing with oxygen-rich atmospheres, please see CGA P-14, *Accident Prevention in Oxygen-Rich and Oxygen-Deficient Atmospheres,* or NFPA 53, *Recommended Practice on Materials, Equipment, and Systems Used in Oxygen-Enriched Atmospheres*, 1999 Edition [1, 2].

References

[1] CGA P-14, *Accident Prevention in Oxygen-Rich and Oxygen-Deficient Atmospheres*, Compressed Gas Association, Inc., 4221 Walney Road, 5th floor, Chantilly, VA 20151.

[2] NFPA 53, *Recommended Practice on Materials, Equipment, and Systems Used in Oxygen-Enriched Atmospheres*, 1999 Edition, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

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