

Oxygen-fuel Gas Welding and Cutting: OSHA Standard 1910.253¹

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This document, a condensation of Standard 1910.253 of the Occupational Safety and Health Act, is not intended to be totally inclusive but rather to highlight the information and requirements in the complete OSHA standard that owners and managers of agricultural businesses should understand.

GENERAL REQUIREMENTS

Mixtures of fuel gases and air or oxygen may be explosive and must be guarded against. No device or attachment facilitating or permitting mixtures of air or oxygen with flammable gases prior to consumption may be allowed, except at the burner or in a standard torch, or unless approved for the purpose.

Workers in charge of the oxygen or fuel-gas supply equipment (including generators) and distribution piping systems must be instructed and judged competent for this important work before being left in charge. Rules and instructions covering operation and maintenance must be readily available.

CYLINDERS AND CONTAINERS

All portable cylinders used for the storage and shipment of compressed gases must be constructed and maintained in accordance with the regulations of the U.S. Department of Transportation, 49 CFR Parts 171 - 179. Containers must be so labeled.

Compressed gas cylinders must be legibly marked with either the chemical or the trade name of the gas. The marking must be stenciled, stamped or labeled, and must not be readily removable. Whenever practical, it must be located on the shoulder of the cylinder.

Storage of Cylinders

Cylinders must be kept away from radiators and other sources of heat. Inside of buildings, cylinders must be stored in a well-protected, well-ventilated, dry location, at least 20 feet from highly combustible materials such as oil or excelsior. Cylinders should be stored in definitely assigned places away from elevators, stairs or gangways. Assigned storage spaces must be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering by unauthorized persons. Cylinders should be chained to a fixed object (e.g., wall) to prevent inadvertent tipping. Cylinders must not be kept in unventilated enclosures such as lockers and cupboards.

Empty cylinders must have their valves closed. Valve protection caps must always be in place, hand-tight, except when cylinders are in use or connected for use.

Oxygen cylinders must *not* be stored:

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- near highly combustible material, especially oil and grease,
- near reserve stocks of carbide and acetylene or other fuel-gas cylinders,
- near any other substance likely to cause or accelerate fire, or
- in an acetylene generator compartment.

Oxygen cylinders in storage must be separated a minimum distance of 20 feet from fuel-gas cylinders or combustible materials (especially oil or grease), or by a noncombustible barrier at least five feet high having a fire-resistance rating of at least one-half hour.

Operating Procedures

Cylinders, cylinder valves, couplings, regulators, hose and apparatus must be kept free from oily or greasy substances. Oxygen cylinders or apparatus must not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike an oily surface or greasy clothes, or enter a fuel oil or other storage tank.

When transporting cylinders, valve-protection caps must always be in place. Unless cylinders are secured on a special truck, regulators must be removed and valve-protection caps must be put in place before cylinders are moved.

Cylinders not having fixed hand wheels must have keys, handles or nonadjustable wrenches on valve stems while these cylinders are in service. In multiple cylinder installations only one key or handle is required for each manifold.

Cylinder valves must be closed before moving cylinders and when work is finished. Valves of empty cylinders must also be closed. If cylinders are found to have leaky valves or fittings which cannot be stopped by closing of the valve, the cylinders must be taken outdoors away from sources of ignition and slowly emptied.

A warning should be placed near cylinders having leaking fuse plugs or other leaking safety devices which instructs persons not to approach them with a lighted cigarette or other source of ignition. Such cylinders should be plainly tagged; the supplier should

be promptly notified and his or her instructions followed as to their return.

Cylinders must be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. Otherwise, fire-resistant shields must be provided. Cylinders must not be placed where they might become part of an electric circuit. Cylinders must be kept away from radiators, piping systems, layout tables, etc., that may be used for grounding electric circuits such as for arc welding machines. Any practice such as tapping of an electrode against a cylinder to strike an arc must be prohibited.

Cylinders must not be dropped or otherwise roughly handled, nor be permitted to strike each other violently. Cylinders may never be used as rollers or supports, whether full or empty. Rough handling, knocks or falls are liable to damage the cylinder, valve or safety devices and cause leakage.

The numbers and markings stamped into cylinders must not be tampered with. Nor may anyone tamper with safety devices in cylinders or valves. Cylinder valves must not be tampered with, nor should any attempt be made to repair them. If trouble is experienced, the supplier should be promptly sent a report indicating the character of the trouble and the cylinder's serial number. The supplier's instructions must then be followed.

No person, other than the gas supplier, may attempt to mix gases in a cylinder. No one, except the owner of the cylinder or person authorized by him or her, may refill a cylinder.

Unless connected to a manifold, oxygen from a cylinder may not be used without first attaching an oxygen regulator to the cylinder valve. Before connecting the regulator to the cylinder valve, the valve must be opened slightly for an instant and then closed. Always stand to one side of the outlet when opening the cylinder valve. Never crack a fuel-gas cylinder valve near other welding work or near sparks, flame, or other possible sources of ignition. Before a regulator is removed from a cylinder valve, the cylinder valve must be closed and the gas released from the regulator.

A hammer or wrench may not be used to open cylinder valves. If valves cannot be opened by hand, the supplier must be notified. Where a special wrench is required it must be left in position on the stem of

the valve while the cylinder is in use, so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders at least one such wrench must always be available for immediate use.

Complete removal of the stem from a diaphragm-type cylinder valve must be avoided. Fuel-gas cylinders must be placed with valve end up whenever they are in use. Liquefied gases must be stored and shipped with the valve end up.

Nothing may be placed on top of an acetylene cylinder when in use which may damage the safety device or interfere with the quick closing of the valve.

Fuel-gas must never be used from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

The cylinder valve must always be opened slowly. An acetylene cylinder valve must not be opened more than one and one-half turns of the spindle, and preferably no more than three-fourths of a turn.

PROTECTIVE EQUIPMENT, HOSE AND REGULATORS

Hose showing leaks, burns, worn places or other defects rendering it unfit for service must be repaired or replaced.

Pressure-reducing regulators must be used only for the gas and pressures for which they are intended. When regulators or parts of regulators, including gages, need repair, the work must be performed by skilled mechanics who have been properly instructed.

Gages on oxygen regulators must be marked "USE NO OIL."

Union nuts and connections on regulators must be inspected before use to detect faulty seats which may cause leakage of gas when the regulators are attached to the cylinder valves.