

Great Western Painting

Welding, Cutting, Hot Work

WELDING, CUTTING, HOT WORK

Definitions. – 1910.251

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Welding, cutting, and heating in way of preservative coatings. - 1926.354

Table Z-1. – Limits for Air Contaminants

Chromium (VI). – 1926-1026

Employees assigned to operate both arc welding and cutting and oxygen-fuel welding and/or brazing equipment, **and their supervisors**, must be suitably trained and instructed in the safe operation of welding equipment and safe welding procedures. Proper PPE will be worn by all welders.

Before welding or cutting, the supervisor or competent person will inspect the area with emphasis on fire prevention and authorizing welding or cutting operations using our written Hot Work Permit noting special precautions that must be taken.

An appropriate fire extinguisher and first aid equipment will be readily available for immediate use.

Compressed Gas Cylinders Use:

Compressed gas cylinders are used on many job sites -- the most common being oxygen and acetylene for welding.

Failure to follow basic safety procedures could result in serious injuries such as:

- a. flash burn - due to explosion.
- b. fragment impalement - due to explosion.
- c. compression of the foot - due to mishandling of tanks.
- d. inhalation of hazardous gases - due to leakage.

Basic safety procedures for gas cylinder use:

- a. Cylinders must remain upright and chained to a substantial support or cart when in use.
- b. Wear appropriate personal protective equipment for the job -- such as steel toed shoes, apron, goggles, gloves, helmet, etc..
- c. Read and understand the MSDS for the gas being used and know the location of the MSDS in case of an emergency.

- d. Have appropriate fire extinguisher readily available.
- e. To release the gas, open the cylinder valve slowly -- standing away from the face and back of the gage -- and leave the opening tools in place (on the valve stem) for quick shut-off in the event of an emergency.
- f. Ensure cylinder valves, regulators, couplings, and hoses are free of oil and grease and ensure all connections are tight.
- g. When using oxygen-fuel systems, use flashback arrestors and reverse-flow check valves to prevent flashback.
- h. Keep cylinders away from open flames and sources of heat.
- i. **Cylinders are never allowed in confined spaces.**
 - 1. When welding or cutting in a confined space, the tanks must remain outside the confined space.
 - 2. Appropriate ventilation must be assured, portable equipment must be secured to prevent movement, if appropriate, a rescue plan should be prepared.
 - 3. If the rescue plan involves pulling the person out, attachment of the lifelines should be so the person's body does not jam in the exit and prevent his extraction.
 - 4. If arc welding is suspended for a substantial period of time, the electrodes must be removed to prevent accidental contact and the machine must be disconnected from the power source.
 - 5. If gas cylinder work is suspended, the torch valves must be closed and the fuel-gas and oxygen supply must be positively shut off or disconnected outside the confined space.
 - 6. After welding operations are completed, the welder must mark the hot metal or provide some other means of warning other workers.
- j. Do not alter or attempt to repair safety devices or valves.
- k. Remove the regulators when: a) moving cylinders; b) work is completed, and/or c) cylinders are empty.

Compressed gas cylinders will:

- a. have valve protectors in place when not in use or connected for use.
- b. be legibly marked to identify the gas contained therein.
- c. have the valves closed before the cylinder is moved, when the cylinder is empty, and at the completion of each job.
- d. be stored in areas away from intense heat, electric arcs, and high temperature lines.

- e. be secured upright (chained in portable dolly), in storage or transportation, to prevent tipping, falling, rolling, and damage from passing or falling objects. Oxygen cylinders must be kept 20 feet from any flammable gases or petroleum products.
- f. be marked "EMPTY" when appropriate.
- g. be removed from service if the regulators or gauges are defective.
- h. be used only for the purpose for which they are designed -- for example, cylinders will not be used as rollers or supports.
- i. be kept away from stairs.
- j. Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent for such work.

Regulators and gauges will be inspected daily.

All cylinders, cylinder valves, couplings, regulators, hoses and apparatus will be kept free of oily or greasy substances.

Operators of welding equipment will report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs will be made only by qualified personnel.

Persons performing arc welding and cutting must be properly instructed and qualified to operate such equipment and, if performing gas shielded arc welding, must be familiar with *Recommended Safe Practices for Gas-Shielded Arc Welding*, A6.1-1966, American Welding Society as well as 29 CFR 1910.254 and paragraphs (a)(b) & (c) or 29 CFR 1910.252.

Electric welders will be inspected daily before use with emphasis on the cables. All splicing of cables must maintain the insulated protection with no exposed metal parts. Cables in need of repair will not be used.

The competent person will ensure that ventilation within a confined space is adequate to negate the possibility of a respiratory or explosion hazard.

A fire watch will be assigned when there is potential a fire might develop. Of course, any person assigned to fire watch must have received training in the specific fire extinguishing equipment being used. When welding, cutting, or brazing an object near a fire hazard that is not readily movable, the fire hazard will be removed. If any fire hazards remain, shields will be used to confine the sparks, heat, and slag the immovable fire hazards. If the provisions of this paragraph cannot be met, welding and/or cutting **may not** take place. In fact, as a company policy, if welding cannot be conducted safely, it may not be conducted.

Assigned fire watchers must be familiar with the facilities in which, and for which, they are working and follow their procedures for sounding an alarm in the event of a fire.

Fire watchers, who must have fire extinguishers ready for immediate use, are required in all locations where other than a minor fire might develop and any of the below conditions exist:

- a. appreciable amounts of combustible materials closer than 35 feet to point of operation.
- b. appreciable combustibles are 35 feet or more away but are easily ignited by sparks.
- c. wall or floor openings within a 35 foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors..
- e. Combustible materials are adjacent to the opposite side of metal partitions, ceilings, or roofs that are likely to be ignited by conduction or radiation.

The fire watch must be maintained at least one half hour after welding or cutting operations have ceased to detect, and extinguish, possible smoldering fires.

When performing operations capable of producing heat at chemical plants, refineries, or other facilities which have a higher degree of hazard than normal work sites, a hot work permit is generally required. Included in these types of operations are burning, cutting, heating, and welding.

On the back of the Hot Work Permit is found fire safety instructions [(29 CFR 1910 252(a)] which must be read and understood by the persons identified on the permit

Welding, cutting, heating of metals of toxic significance (lead, zinc, cadmium, mercury, beryllium, or exotic metals or paints) in enclosed spaces will require either general mechanical ventilation of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits or local exhaust ventilation consisting of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work or appropriate respiratory protection. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

This would include inert-gas metal-arc welding performed on stainless steel to protect against dangerous concentrations of nitrogen dioxide.

When performing welding operations on stainless steel and there is exposure to airborne chromium (VI) above its action level of 2.5 micrograms per cubic meter of air ($2.5 \mu\text{g}/\text{m}^3$) calculated as an 8-hour time-weighted average (TWA), the provisions of 29 CFR 1926.1026 must be adhered to. The PEL is $5 \mu\text{g}/\text{m}^3$. If air monitoring, as described in 29 CFR 1926.1026 is below $.5 \mu\text{g}/\text{m}^3$, the provisions of this standard do not apply.

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Hot Work Permit

This form provides written authorization for the below listed individual(s) to perform operations capable of providing a source of ignition.

Object on which hot work is to be performed: _____

Date(s) hot work is to be performed: _____
(From) (To)

Hot work is applicable to the below listed type of operation:

(Check appropriate box)

- Burning
- Cutting
- Heating
- Riveting
- Welding
- Other: _____

Persons performing hot work operations:

_____ (Name)	_____ (SSN or Employee ID No.)
_____	_____
_____	_____
_____	_____
_____	_____

The above persons have been provided with a copy of **29 CFR 1910.252(a)** and will ensure that its provisions are complied with.

Special Precautions: _____

A copy of this Hot Work Permit will remain on file until the completion of the hot work operation listed above.

(Facility) (Date)

(Signature of Person Authorized to Issue Hot Work Permit) (Title)