

Midland Engineering Co., Inc. Safety Management System			Doc No:	WELDHOT
			Initial Issue Date	12/14/15
Chapter 37-Welding, Cutting & Hot Work			Revision Date:	Initial Version
			Revision No.	0
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PURPOSE

To provide guidelines for the safe operation of welding, cutting and hot work of equipment, and to itemize some of the fundamental hazards inherent with the use of this equipment.

SCOPE

This procedure applies to all operations involving Midland Engineering Co., Inc.

REFERENCES

29 CFR 1926.350, .354, .556, .153, .406, and .102

DEFINITIONS

Fuel Gasses - Acetylene is an unstable gas when compressed above 15 psig. Acetylene cylinders are filled with a porous material and saturated with liquid acetone. Acetylene, when pumped into the cylinder, dissolves in the acetone and is held in a stable condition. If the acetylene cylinder is stored or used in the horizontal position, the acetone may leak out, leaving an explosive mixture of acetylene. It is for this reason, that all acetylene cylinders be stored and used in the upright or vertical position.

Hot Work- OSHA definition means riveting, welding, flame cutting or other fire or spark-producing operation.

Industrial Gases - Oxygen - Oxygen itself is not flammable, but the presence of pure oxygen accelerates the combustion reaction. In the presence of oxygen, oil and grease become highly explosive.

MAPP Gas- is a stabilized mixture of methylacetylene, and has considerably fewer tendencies to backfire than acetylene. Maximum allowable use pressure is 94 psi versus 15 psi for acetylene.

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GENERAL SAFE WORK PRACTICE

- Equipment must be industrial rated, in good condition and always be inspected before each use.
- Never use oil or grease on any fittings or apparatus in contact with oxygen.
- Blow out the cylinder valves before attaching the regulators to the cylinders.
- Release the adjusting screw prior to opening the cylinder valves.
- Never stand directly in front of or in back of a regulator when opening the cylinder valve; stand so that the cylinder valve is between you and the regulator.
- Always open the cylinder valves slowly. If a wrench is used, keep it on the valve.
- An acetylene cylinder should never be opened more than one full turn.
- Always purge the oxygen and fuel passages separately before lighting the torch.
- Light the fuel gas first before opening the oxygen valve on the torch.
- Do not take short cuts or use defective equipment.
- Defective equipment shall be reported and removed from service until repaired.
- Never begin any welding or cutting without the proper permits.
- Always check to see that you have appropriate fire protection equipment immediately available before doing any welding or cutting.
- Welders must not wear any flammable or disposable type clothing.
- Welders must wear head and eye protection that is required in the area in which they are working.
- Heli-arc and MIG welding operations emit intense ultra-violet radiation that can result in third degree burns to exposed skin areas as well as painful flash burns to the eyes. Welding hoods must be checked periodically to insure that they are light tight.
- Arc gouging generally produces a great deal of slag and hot metal sparks. Additional personal protective equipment such as boots, nomex suits and mini-goggles may be appropriate.
- Electrodes should never be changed with bare hands, wet gloves, or when standing on a wet floor or grounded surface.
- Cables that become worn enough to present a hazard must be replaced immediately.
- Confined space and ventilation procedures and protocols will be implemented if welding or cutting operations are to be performed in a confined space.
- First aid supplies and kits are maintained in gang boxes and the site trailer.
- Grounding cables, splices and connectors will be inspected before each use.
- Flashback arrestors are required at all times.

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TRAINING & INFORMATION

Cutters, welders, hot workers and supervisors will be properly trained in the operations, equipment, PPE, and safe work practices in the tasks performed. All operators of welding, cutting and/or hot work equipment must be trained to operate the equipment that they will use. Appropriate safety procedures must be reviewed and understood prior to the use of this equipment. Employees in charge of oxygen or fuel gas supply equipment will be properly trained and instructed in the potential hazards and proper procedures for that job.

All fire watch personnel will receive fire protection and extinguisher training. Fire watch personnel must know how to sound the alarm to warn of fire. All fire watches will attend additional training, as appropriate.

All company employees will be familiar with these procedures and safe work practices related to welding and cutting.

FIRE PROTECTION & FIRE WATCHES

Fire protection will be maintained in all immediate work areas. Fire extinguishers shall be readily available. The company will gain an understanding of the site-specific fire protection and emergency action plan and communicate these procedures to all employees. Before work is performed the supervisor will complete an inspection of the area using a hot work permit to identify precautions and fire protection requirements.

If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed. If fire hazards can't be removed from immediate work areas additional fire protection measures will be implemented that include, but are not limited to, fire blankets, fire watches and other site specific procedures to protect immovable fire hazards from ignition sources. If fire protection measures can't be implemented or followed welding and cutting may not be performed in that work area.

A fire watch will be required when locations where more than a minor fire might develop, combustible materials are closer than 35ft. to point of operation, and wall or floor openings within 35 feet radius of the work area. Fire watch must be continued for at least thirty minutes after welding, cutting and/or hot work was performed.

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STORAGE OF COMPRESSED GAS CYLINDERS

Cylinders shall be kept away from radiators and other sources of heat. Inside buildings, cylinders shall be stored in a dry, well-ventilated, well-protected location. Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects, or be subject to tampering by unauthorized persons.

Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards. Empty cylinders shall have their valves closed. Storage of empty cylinders shall be separated from charged cylinders. Storage racks shall be identified as to compressed gas cylinder content and condition. Valve protection caps, where cylinder is designed to accept a cap, shall always be in place and hand tight (except when cylinders are in use or connected for use). Protection from solar radiant heat shall be provided where cylinders are directly exposed to sunlight. Compressed gas cylinders shall be secured in an upright position at all times, including when being hoisted or transported. Retention chains or straps will be provided on storage racks and carts so that compressed gas cylinders will be secured against falling.

Compressed gas cylinder storage area must have a 20-pound ABC rated fire extinguisher (minimum) placed no closer than 25 feet, but not further than 75 feet to fuel gas storage areas. Compressed gas cylinder storage areas must have warning signs that shall be conspicuously placed and shall read, "Danger-No Smoking, Matches, Open Lights or Flames" or other equivalent wording. Compressed gas cylinder storage area inside buildings (except those in use or attached for use) shall be limited to total gas capacity of 2000 cubic feet or 300 pounds of liquefied petroleum gas. Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials (especially oil or grease) by a minimum of 20 feet, or by a non-combustible barrier at least five feet high having a fire resistant rating of at least one-half (1/2) hour.

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EYE AND FACE PROTECTION

To prevent possible eye and face injuries, suitable eye protection must be worn. Potential eye and face injuries occur from flying objects, liquid chemicals, acids or caustic liquids, molten metal, chemical gases or vapors, and light radiation. Eye protection must provide adequate protection, be reasonably comfortable, fit snugly, be durable, capable of being disinfected and cleaned, kept sanitary and in good repair. When selecting eye and face protection consider what kind and degree of hazard is present. This will assist in deciding the proper protection. Employees who use corrective spectacles and are required to wear eye protection must wear face shields or goggles over the spectacles or safety glasses with protective optical corrective lenses. It is important to use the proper shade lenses when working with injurious light energy.

In general, start with a shade that is too dark to see the weld zone. Then use a lighter shade that gives sufficient view of the weld zone without going below the minimum protection. Oxy-fuel gas welding or cutting produces a yellow light, it is suggested to use a filter lens that absorbs the yellow or sodium line in the visible light of the operation.

Eye and face protection shall be appropriate for the task. When a hazard assessment determines that eye and face protection is necessary, protection shall be worn at all times without exception. Eye and face protection purchased prior to July 5, 1994 must be in accordance with ANSI Z-87. 1-1968 and any eye or face protection purchased after July 5, 1994 must comply with ANSI Z87.1 -1989. If you have question about eye protection ask your supervisor/manager or refer to the manufacturer's instructions.

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VENTILATION AND RESPIRATORY PROTECTION

When hazardous fumes, gases, and/or dusts are possible necessary ventilation and respiratory protection are required. Potential hazardous fumes, gases and/or dusts can potentially come from welding, cutting or burning of lead base metals, zinc, cadmium, mercury, beryllium or exotic metals or paints and other materials not listed here. Reference the Respiratory Protection Program for proper protocol.

RECORDS

Before welding/cutting is permitted the area shall be inspected and a written permit shall be used to authorize welding and cutting operations. A Burning (Hot Work) Permit shall be required prior to the start of any form of hot work.

A copy of the Hot Work Permit will be kept on file for a 24 Hour period and will then be discarded.

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HOT WORK PERMIT

Work Location: _____ Time & Date: _____

Person Requesting Permit: _____

Duration of Work in Area: _____ (days/hours)

Type of Work: _____

Number of Persons Covered Under this Permit: _____

Fire Watch Required: Yes No If Yes, Name of Fire Watch: _____

Type of Fire Protection Used: Extinguisher Fire Hose Other: _____

Potential Fire Hazards	Measure Used to Prevent Fires	Other Information
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Signature of Person Authorizing Permit: _____

Signature of Person Requesting Permit: _____