Hot Work Safety

PURPOSE

The purpose of this Hot Work Safety Program is to educate employees on procedures to prevent fires or injury resulting from temporary operations involving open flame or that produce heat, sparks, or hot slag.

PROCEDURE

An effective Hot Work training will be provided by Supervisory personnel prior to operation of equipment or tools that involve hot work. This includes, but is not limited to, brazing, cutting, grinding, soldering, using torches, and welding. Mandatory refresher training is required of employees due to lack of use, improper use, insufficient skill or understanding, and or change in conditions that renders the earlier training obsolete.

Below is a list of safety rules for Hot Work that will be addressed in the training program conducted by supervisory personnel:

1. Always follow the manufacturer's recommendations for setting up and operating equipment, selection of tip size, and gas cylinder operating pressures. Cutters, welders, and their supervisors must be suitably trained in the safe operations of their equipment and the safe use of the process. Before cutting or welding is permitted the area shall be inspected by the supervisor responsible for inspection and granting authorized welding and cutting operations.
2. Always use a regulator to reduce gas cylinder pressure to the operating pressures recommended by the equipment manufacturer. All piping and equipment must meet the standards of the Compressed Gas Association.
3. Always ensure that all connections are leak tight. Each time connections are loosened and retightened each connection should be checked with a soap and water solution (oil free soap). Do not check with a flame.
4. Before "lighting up" clear out each line by letting a small amount gas flow (separately) to remove any mixed gases that might be in the lines.
5. Never use defective, worn, or leaky equipment. Operators of equipment should report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs shall be made only by qualified personnel.
6. Never use acetylene more than 15 psi pressure. Higher pressures with acetylene are dangerous. If the cylinder is not fitted with a hand wheel valve control, any special wrench required must be placed on the cylinder while the cylinder is in service. On manifolds, one wrench for each manifold will suffice.
7. Always have an assigned fire watcher who is trained in the use of fire extinguishing equipment and familiar with the facilities for sounding an alarm when welding, cutting,

brazing and/or soldering is performed near combustible materials and/or in locations where fire may develop.

8. Always have an appropriate fire extinguisher in good operating condition readily available when operating welding or cutting equipment.
9. Never perform welding, cutting, brazing, or heating operations in a confined space or poorly ventilated areas without ventilation equipment, secured cylinders, lifelines, electrode removal, gas cylinder shutoffs and warning signs.
10. Avoid breathing fumes from these welding and cutting operations at all times, particularly when zinc, cadmium, mercury, beryllium, exotic metals, paints, or lead coated metals are involved. Respiratory protection and proper ventilation must be used at all times when performing these operations.
11. Never perform welding or cutting operations near combustible materials (gasoline cans, paints, paper, rags, etc.).
12. Always protect yourself, others present, welding hoses, gas cylinders, and flammable materials in the area from hot slag and sparks from the welding and cutting operations.
13. The welder and spectators must always wear goggles to protect the eyes from injurious light rays, sparks, and hot molten metal during welding, cutting and heating operations. Eye protection must comply with the established ANSI Standards.
14. Always wear clean, oil free clothing during welding and cutting operations. Protect the hands with leather welding gloves to avoid burns from radiation and hot molten slag. Low cut shoes and trousers with cuffs or open pockets should not be worn.
15. Never use a match or cigarette lighter to light a cutting or welding torch. Always use a spark igniter. Fingers are easily burned by the igniting gas when a match or cigarette lighter is used.
16. Ensure that the material being welded, or cut is secure and will not move or fall on anyone.
17. Never use a welding, cutting, or heating torch on a container that has held a flammable liquid. Explosive vapors can accumulate and linger in closed containers for extended periods of time.
18. Never use a regulator for gases other than those for which it was designed for by the manufacturer since the diaphragm and seat materials may not be compatible with other gases.
19. Never attempt to adapt and use a fuel gas or inert gas regulator on an oxygen cylinder. A special protective device is incorporated on the oxygen regulator to harmlessly dissipate the heat caused by the recompression when the cylinder valve is quickly opened. Such a protective device is not furnished on fuel gas and inert gas regulators.
20. Never tamper with the safety devices on cylinders, fuse plugs, safety discs, etc. and do not permit torch flames or sparks to strike the cylinder.

21. Always refer to the various gases by their proper names. (Do not refer to oxygen as “air” or acetylene as “gas”).
22. All cylinders, particularly acetylene, should be retained securely in an upright position to prevent accidents. A non-vertical position for an acetylene cylinder in use would allow the discharge of acetone through the regulator and into the cutting torch, clogging the mixer passages and creating a fire hazard. It would reduce the efficiency of the flame and contaminate the weld area. It also can cause voids I the porous material inside the cylinder, which can lead to acetylene explosions.
23. Store all gas cylinders not in use away from excessive heat sources, such as stoves, furnaces, radiators, the direct rays of the sun, and the presence of open flames. Cylinders in storage should always be secured in an upright position.
24. Keep all burning or flammable substances away from the oxygen or fuel gas storage area (at least 20 feet) and post “No Smoking” signs.
25. Upon completion of a welding, heating, or cutting operation, immediately inspect the surrounding areas for smoldering embers. Allow at least one-half hour to elapse before leaving the area and conduct another thorough inspection just before leaving. Also alert other personnel of fire possibilities.
26. Always have the properly fitted wrench to fasten a regulator to a cylinder. Never tighten the regulator by hand.
27. Always leave the fuel gas cylinder valve wrench in place when the cylinder valve is open so that it can be closed quickly in an emergency. Do not open acetylene valves more than one-quarter (1/4) turn.
28. Before connecting a regulator to a gas cylinder, open the cylinder valve for a moment. Called cracking the cylinder valve, this will blow out any foreign material that may have lodged in the valve during transit. Do not stand in front of the valve when “cracking”.
29. After attaching a regulator to a gas cylinder, be sure that the regulator adjusting screw is fully released (backed off in a counterclockwise direction so that it swivels freely) before the cylinder valve is opened. Never stand in front of a regulator when you are opening a cylinder valve.
30. Always open the cylinder valve slowly so that gas pressure will build up slowly in the regulator (particularly in the oxygen cylinder). Quick opening of the cylinder valve causes a build up of heat due to recompression of the gas. When combined with combustible materials, ignition and explosion may result.
31. If a leak develops in a fuel gas cylinder that cannot be stopped by closing the valve. Immediately place the cylinder outside of the building away from possible fire or ignition sources in a location that is free from wind currents that might carry the gas to an ignition source.

32. Never attempt to mix gases in a cylinder or fill an empty one from another (particularly oxygen cylinders). The mixture of incompatible gases and/or heat caused by recompression of the gas or gases may result in ignition and fire. Only the owner of a cylinder may mix gases in it.
33. When a gas cylinder is ready for return to the supplier, be certain the cylinder valve is closed to prevent internal contamination and the shipping cap is in place to protect the cylinder valve. Identify empty cylinders.
34. Never use oxygen or other gases as a substitute for compressed air in operations of air-operated tools, blowing off parts, or for ventilation purposes. The only exception to this rule is where oxygen is used to blow out port passages and talcum powder or dust from welding hoses when setting up new or old “dusty” equipment.
35. Do not attempt to do your own repair on welding equipment. Equipment that is improperly repaired can cause leaks and other hazardous conditions. Repairs must be performed by qualified repair personnel.
36. Never repair welding hose with tape. Use of tape and many hose splicers can reduce the pressure to the torch and can cause hazardous conditions. Welding hose must meet the specifications of the Compressed Gas Association.
37. Use the shortest length of hose possible. Longer hoses require higher gas pressures and can be hard to handle.
38. Never use oil or grease on any part of welding or cutting equipment and never let it come into contact with oil or grease. This includes gas cylinders, work benches, regulators, torches, tips, threads on bottles, and clothes that are worn, such as jackets, gloves, aprons, and coveralls. Oxygen and oil or grease can cause explosions and fire.
39. Never use a hammer on the valve cover caps to loosen them. Use a piece of wood to soften the impact and prevent sparks and damage to the cap.
40. When moving gas cylinders always roll them on their bottom edges or in a cart designed for their movement. Sliding, dragging, or rolling them on their sides causes excessive wear and may weaken their walls by metal erosion. Slings and electromagnets are not authorized when transporting cylinders.
41. Never use cylinders as rollers to move material. Do not let them bump into each other or let them fall.
42. Fuel gas and liquefied fuels must be stored and shipped valve end up.
43. Do not hammer on any cylinder. Do not tamper with the relief valves. If you have trouble, contact the supplier for assistance.
44. Suitable eye protection must be worn for all welding and cutting operations.
45. Cylinders must be secured. Valves must be closed when unattended and caps must be on the cylinders when the regulators are not on the cylinders.
46. Cylinders must be upright when they are transported in powered vehicles.

47. All cylinders with a water weight of over 30 ibs. Must have caps or other protection.
48. All fuel gases must be used through a regulator on a cylinder or manifold.
49. Compressed gas cylinders must be upright except for short periods for transportation.
50. Repair work on gauges and regulators must be done by qualified personnel.
51. Only 4 inches of hose per foot may be covered with tape. Defective hoses must be removed from service.
52. Oxygen must not be used for ventilation.
53. Oxygen regulators must be marked “Use No Oil”. Regulators and fittings must meet the specifications of the Compressed Gas Association.
54. Union nuts on regulators must be checked for damage.
55. Before removing a regulator, shut off the cylinder valve and release gas from the regulator. Equipment must be used only as approved by the manufacturer.
56. Caps must be on cylinders unless they are transported on a special carrier.
57. Hot warnings on materials are required.
58. Fire is the biggest hazard in welding. If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed. The area should be cleared for a radius of 35 feet. Fire shields should be used if the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the hear, sparks and slag and to protect the immovable fire hazards. The area should be monitored for 30 minutes or more after the end of work to ensure there is no delayed ignition. If fire hazards cannot be taken to a safe place or guards cannot be used to confine heat, sparks, slag and protect the immovable fire hazards, the welding and cutting shall not be performed.
59. Proper personal protective equipment must be worn by all welders and assisting personnel.
60. All welding personnel should be advised of the hazards from heating zinc, lead, cadmium, and any other substances that could cause health problems from the welding activity.
61. First aid equipment shall be available at all times.

The following apply to arc welding:

62. Workers assigned to operate arc welding equipment must be properly instructed and qualified to operate such equipment.
63. Chains, wire ropes, hoists, and elevators must not be used to carry welding current.
64. Leather capes should be used for overhead welding.
65. The neck and ears must be protected from the arc.

66. Conduits with electrical conductors in them must not be used to complete a welding circuit.
67. Welding shields must be used to protect other workers from injurious light rays.
68. Welding leads must be inspected regularly for damage to insulation. Only proper splicing will be authorized. There should be no splices in stinger lead within 10 feet of the stinger and the leads should never be wrapped around the body.
69. Workers in charge of oxygen of fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent for such work.
70. Workers assigned to operate or maintain equipment must be familiar with eCFR section 1910.254 and with 1910.252(a), (b) and (c).