Fermilab

TECHNICAL SUPPORT - MACHINE SHOP'S
GENERAL SAFETY FOR WELDING AND CUTTING
MARCH 23, 1992

This document is not intended to include all particular hazards inherent when welding, cutting, or brazing at Fermilab. Additional information may be found in ANSI/AWS standard Z49.1 - (latest edition), Safety in Welding and Cutting or within the latest version of the Fermilab E,S & H Manual.

I). EYE PROTECTION

a). Safety glasses, goggles, or welding lenses of a shade number 3 or darker shall be used when oxy-acetylene welding, cutting or brazing, to protect from the intense yellow light.

b). During ARC Welding a shade number 8 to number 14 lense shall be used to prevent harm from ultraviolet and infrared rays.

c). Safety glasses are required in addition to a welding helmet to prevent injury from reflected rays and sparks.

d). Barriers or colored screens are required to provide protection from injurious rays or flying objects from adjacent work.

II). PROTECTIVE CLOTHING

a). The welding helmet is required to protect the face, neck, and ears from the heat and intense rays. A cap may be necessary to prevent sparks from burning the head and hair, and to prevent sunburn from reflected rays.

b). Fire proof gloves are required to prevent burns and exposure to UV rays. The type and weight of gloves depends on the type of welding being performed.

c). It is preferable that clothing be cotton, and should be relatively free of frays, pockets, and cuffs. During ARC welding, clothing should protect <u>all skin</u> from the UV rays.

d). When welding or cutting overhead, or with a process that produces sparks and spatter, a leather cap, bib, and sleeves are recommended.

e). High-top boots with a one-piece tongue prevent sparks form burning the feet. Steel toes are required, if heavy items are being handled metatarsal guards are recommended

III). EAR PROTECTION

a). Processes such as ARC-AIR gouging and plasma cutting produce high decibel noise; ear plugs are recommended for anyone in the vicinity.

b). Ear plugs are also recommended when welding or cutting overhead. or when there is danger of sparks entering the ears.

IV). FIRE PREVENTION

a). Not all welding and cutting processes and procedures pose the same fire hazard potential. Low amperage GTAW (TIG) welding poses almost no fire hazard, while oxy-acetylene cutting is very hazardous.

b). Designated welding or cutting work areas, should be kept free of all flammable material.

c). When welding in areas where flammables cannot be removed, guards, screens, and fire blankets must be used to confine the sparks, heat, slag, or stubs.

d). "Fire Watchers" are required whenever welding or cutting in locations where a major fire might develop (i.e. welding outside where there is a lot of dry grass).

e). Fire watchers are also required when there is:

1). Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.

2). Appreciable combustible material more than 35 feet away, but easily ignited by sparks.

3). Wall or floor openings within a 35 foot radius which expose combustible material in adjacent areas including concealed spaces in walls or floors.

V). FIRE PROTECTION

a). Before welding or cutting in an area not designated as a welding area, the Building Manager or area Supervisor must be notified, and a welding permit must be obtained from the Fire Department.

b). Fire watchers shall have proper fire extinguisher equipment readily available, the proper training in the use of this equipment, and shall be familiar with the location of fire alarm pull boxes.

c). For fire emergencies dial 3131, and for non-emergencies the Fire Department may be contacted at ext. 3428.

VI). ELECTRICAL SAFETY

a). Primary power for welding equipment is usually 240V or 480V. The welding equipment shall not be used if any part of the input circuit is damaged. This includes breakers, fuse boxes, plugs, and conductors.

b). Repairs or changes to the input circuit shall only be performed by qualified electricians or servicemen.

c). The output power for welding is usually limited to 80V, however this is sufficient to be lethal in certain conditions. Even mild shocks may cause involuntary muscular contraction,which could cause a fall or other serious injury.

d). At no time should live metal parts of the output circuit be allowed to touch bare skin or any wet covering of the body. When using AC welding current with a high frequency arc stabilizer particular caution is required.

e). Water cooled welding torches shall not be used if they leak water.

f). Welding leads with damaged insulation and exposed conductors shall not be used.

g). Ground connections should always be placed as close as possible to the arc.

h). Welding current shall never be allowed to travel through chains, wire ropes, cranes, hoists, elevators, bearings, bolts or electrical conduits.

VII). COMPRESSED GASES

a). Cylinder valves should always be "cracked" open before installing regulators, to prevent dirt from entering the regulator. Valves of empty cylinders shall be closed.

b). Cylinders shall not be allowed to conduct electricity, and shall never be welded on.

c). Rigging cylinders with slings, electric magnets, or by the valve cap is not permissible.

d). Acetylene cylinder valves should be opened only a half turn so they may be shut off quickly.

e). Acetylene cylinders should be stored and used only in the upright position.

f). Oxygen cylinder valves should always be opened slowly, and opened fully when in use.

g). Oxygen and fuel gas cylinders must be stored 20 feet apart.

h). All oxy-acetylene welding or cutting torches shall have flashback arrestors installed between the torch and hose.

i). When moving a welding machine by vehicle or crane, compressed gas cylinders must be removed, safety cap replaced, and regulators secured.

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