## Cal/OSHA Electric Welding

1. **Purpose**

To be able to weld using safe practices and to know what personal protective equipment should be used.

1. **Requirements**

Arc welding includes shielded metal-arc, gas shielded and resistance welding. Since arc welding equipment varies in size and type, it is important to read and follow the manufacturer's recommendations.

General Arc Welding Safety:

* Before starting any arc welding operation, a complete inspection of the welder should be made.
* Read all warning labels and instructions manuals.
* Remove all potential fire hazards from the welding area.
* Always have a fire extinguisher ready for immediate use.
* Equip welding machines with power disconnect switches which can be shut off quickly.
* The power to the machine should be disconnected before making repairs.
* Proper grounding of welding machines is essential and must be adequate to carry the electrical current produced.
* Electrode holders should not be used if they have loose cable connections, defective jaws, or poor insulation.
* An arc should not be struck if someone without proper eye protection is nearby.
* Welding machines will always be positioned outside of a confined space at a distance of no less than 15 feet from the confined space opening.
* Defective arc welding equipment must not be used. Defective equipment must be reported to the immediate supervisor. The supervisor must lock out and tag out all defective equipment in such a manner that it cannot be used until it is inspected or repaired by a qualified person. If the equipment is beyond repair, it must be made inoperable and removed from service.
* The power supply must be in the off position when a welding machine is moved or if the welding machine is not in use.
* All work that is to be left unattended and is in excess of 100 degrees Fahrenheit must be identified with a metal red tag that reads “Hot Surface – Do Not Touch.” This marker must be identifiable from all sides of the hot surface or metal part.
* Where the work permits;
  + the welder shall be enclosed in an individual booth enclosed with noncombustible screens having a low reflectivity finish.
  + Booths and screens shall permit the adequate circulation of air at the level where welding is being performed. Workers or other persons adjacent to the welding areas shall be protected from the rays or sparks produced by welding with noncombustible or flameproof screens or adequate shielding.

1. **Personal Protective Equipment**

Personal Protective Equipment:

* Infrared radiation is a cause of retinal burning and cataracts. Protect your eyes and face with a welding helmet properly fitted and with the proper grade of filter plate.
* Protect your body from welding spatter and arc flash with protective clothing. Such as:
  + Woolen clothing
  + Flame-proof apron
  + Gloves
  + Properly fitted clothing that is not frayed or worn.
  + Shirts should have long sleeves.
  + Trousers should be straight-legged and covering shoes when arc welding.
  + Fire resistant cape or shoulder covers are needed for overhead work.
  + Check protective clothing equipment before each use to make sure it is in good condition.
  + Keep clothes free of grease and oil.
* When arc welding is performed in wet or humid conditions, the following procedures must be followed.
  + GFCI outlets must be used for all electrical equipment to include the welding machine.
  + Rubber mats of at least 1” in thickness, for standing, must be used by all welders.

1. **Proper Ventilation**

Be sure there is adequate ventilation available when welding in confined areas or where there are barriers to air movement. Natural drafts, fans and positioning of the head can help keep fumes away from the welder's face.

Ventilation is sufficient if:

* The room or welding area contains at least 10,000 cubic feet for each welder.
* The ceiling height is not less than 16 feet.
* Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
* Welding is not done in a confined space.

If these space requirements are not met then the area needs to be equipped with mechanical

ventilating equipment that exhausts at least 2000 cfm of air for each welder, except where local

exhaust hoods or booths, or air-line respirators are used.

1. **Avoiding Electrical Shock**

Electrical shock can kill. To prevent electrical shock:

* Use well insulated electrode holders and cables.
* Make sure welding cables are dry and free of grease and oil.
* Keep welding cables away from power supply cables.
* Wear dry hole-free gloves.
* Clothing should also be dry.
* Insulate the welder from the ground by using dry insulation, such as a rubber mat or dry wood.
* Ground frames of welding units.
* Never change electrodes with bare hands or wet gloves.