



Company Name: _____ Job Site Location: _____

Date: _____ Start Time: _____ Finish Time: _____ Foreman/Supervisor: _____

Topic 133: Safe Arc Welding Practices

Introduction: The electric arc welder is one of the most useful and timesaving pieces of equipment used in metalworking, fabrication, or repair. Most welders are typically AC/DC 240 volt transformer types that use standard electrical current as the energy source. Portable welders are powered by diesel/gasoline engines and derive their power from built-in AC/DC generators. If properly installed and used the arc welder is very safe, but if used improperly, the operator can be exposed to a number of hazards including toxic fumes, dusts, burns, fires, explosions, electric shock, radiation, and heat stress. Any of these hazards are serious and can cause injury or death. The most common injuries associated with electric arc welding are retinal burns to the eyes and burns to the skin.

Welders must wear flame retardant clothing and protective equipment for the eyes, ears, head, and lungs. Necessary protective gear includes:



- **Aprons** — flame resistant leather or other material that protects against heat and sparks.
- **Leggings** — leather chaps, high boots, or similar protection are recommended when doing heavy work.
- **Safety shoes/boots** — sturdy, steel-toed, high-top boots are best; ankle length low-cut shoes may catch hot slag.
- **Protection during overhead work** — shoulder cape or cover, skull cap made of leather or other protective material worn under the helmet.
- **Ear protection** — ear plugs, and during very noisy operations such as high velocity plasma torches, ear muffs.
- **Head protection** — safety helmet or other head gear to protect against sharp or falling objects.
- **Eye protection** — operators, welders, and helpers should wear goggles, or a helmet and shield to provide maximum protection for the particular welding or cutting process used. All filter lenses and plates must meet the test for transmission of radiant energy.
- **Respiratory protection** — If gases, dusts, and fumes cannot be maintained below permissible exposure levels (PELs), welders should wear respiratory protective equipment designated by the National Institute of Occupational Safety and Health (NIOSH).
- **Clothing preferences** — Inert-gas shielded arc welders should cover all parts of their bodies to protect against ultraviolet and infrared ray flash burn. Dark clothing works best to reduce reflection under the face shield. Woolen clothing is preferred for arc welders, as it resists deterioration better than cotton. Welders should wear pants without cuffs or front pockets that catch sparks.



Employers shall instruct employees in the safe means of arc welding as follows:

- **Ensure that welders** know and understand company welding best practices, and OSHA's safety requirements for welding.
- **Mechanical ventilation** shall consist of either general mechanical ventilation systems, or local exhaust systems, and shall be of sufficient capacity as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.
- **Lifelines** — Where a welder must enter a confined space through a manhole or other small opening, means shall be provided for quick removal in case of emergency.
- **When sufficient ventilation** cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators. Welding reduces oxygen levels as well as producing harmful fumes.
- **Pipelines containing gases** or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return.
- **The frames of all arc welding and cutting machines** shall be grounded, and all connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.
- **Shielding** — Whenever practical, all arc welding operations shall be shielded by non-combustible or flameproof screens.
- **Suitable fire extinguishing** equipment shall be immediately available in the work area and be maintained in a state of readiness.
- **Fire watch** — When required, fire-watchers will have fire-extinguishing equipment readily available and be trained in its use. Fire-watchers will keep welding areas free of combustibles and watch for fires in all exposed areas.



Conclusion: There are numerous health hazards associated with exposure to fumes, gases, and ionizing radiation formed or released during welding including heavy metal poisoning, lung cancer, metal fume fever, flash burns, etc. These risks vary depending upon the type of welding materials and welding surfaces. Whenever welding operations are in progress, everyone involved in the operations must take precautions to prevent fires, explosions, or personal injuries from welding hazards. Follow these guidelines for safe arc welding operations.

Work Site Review

Work-Site Hazards and Safety Suggestions: _____

Personnel Safety Violations: _____

Employee Signatures: _____
(My signature attests and verifies my understanding of and agreement to comply with, all company safety policies and regulations, and that I have not suffered, experienced, or sustained any recent job-related injury or illness.)

Foreman/Supervisor's Signature: _____

These guidelines do not supercede local, state, or federal regulations and must not be construed as a substitute for, or legal interpretation of, any OSHA regulations.