

ELKHART PRODUCTS CORPORATION

“TOOLBOX SAFETY TALK”

Welding, Cutting, & Burning



WELCOME

GENERAL HAZARDS

- **General hazards of welding include:**
 - Impact
 - Penetration
 - Harmful dust
 - Smoke
 - Fumes
 - Heat
 - Light radiation
- **Proper personal protective equipment can protect you from these hazards.**

TYPES OF WELDING

- **Gas – Slower and easier to control than electric arc. Uses gas flame over metals until molten puddle is formed. Most popular fuels used with oxygen include acetylene, Mapp gas, and hydrogen.**
- **Arc – Two metals are joined by generating an electric arc between a covered metal electrode and the base metal.**
- **Oxygen and Arc Cutting – Metal cutting in welding is the severing or removal of metal by a flame or arc. The most common processes**

OXYGEN & ARC CUTTING

- **Metal cutting in welding is the severing or removal of metal by a flame or arc. The most common cutting processes are:**
 - **Oxygen Cutting:** Metal is heated by gas flame and an oxygen jet does the cutting.
 - **Arc Cutting:** Intense heat of electric arc melts away the metal.

PERSONAL PROTECTIVE EQUIPMENT

- **Eye and Face Protection – Proper eye and face protection varies depending on the particular task being performed. Helmet, hand shield, goggles and safety glasses or combination of these are acceptable protection in various applications.**
- **Welding helmets with filter plates are intended to protect users from arc rays and from weld sparks and spatters.**

FILTER SHADE SELECTION

<u>Operation</u>	<u>Arc Current</u>	<u>Minimum Shade</u>	<u>Suggested Shade</u>
Shielded Metal	<60	7	9
Arc Welding	60-160	8	10
	160-250	10	12
	250-550	11	14
Gas Metal & Flux	<60	7	9
Cored Arc Welding	60-160	10	11
	160-250	10	12
	250-500	10	14
Gag Tungsten	<50	8	8
	50-150	8	12

FILTER SHADE SELECTION

<u>Operation</u>	<u>Arc Current</u>	<u>Minimum Shade</u>	<u>Suggested Shade</u>
Air Carbon Arc	150-500	10	14
	500-1000	11	14
Torch Brazing			3 or 4
Torch Soldering			2
Carbon Arc Welding			14
Gas Welding, light			4 or 5
medium			5 or 6
heavy			6 or 8
Oxygen Cutting, light			3 or 4
medium			4 or 5
heavy			5 or 6

PROTECTIVE CLOTHING

- **Appropriate protective clothing will vary with the size, nature and location of the work to be performed.**
- **Clothing shall provide sufficient coverage and be made of suitable materials to minimize skin burns caused by sparks, spatter or radiation. Covering all parts of the body is recommended to protect against ultraviolet and infrared ray flash burn.**
- **Materials that can melt or can cause severe burn due to sparks that may lodge in rolled-up sleeves, pockets of clothing or pants cuffs are not recommended**

PROTECTIVE CLOTHING

Continued

- **Flame-resistant gloves, such as leather welder's gloves, are needed to provide heat resistance. A gauntlet cuff offers additional arm protection.**
- **Other protective clothing would include durable, flame-resistant aprons to provide protection to the front of the body when additional protection is needed.**

VENTILATION

- **Adequate ventilation depends on the following factors:**
 - **Volume and configuration of the space where the welding operations occur.**
 - **Number and type of operations that are generating contaminants.**
 - **Natural air flow rate where operations are taking place.**
 - **Locations of the welder's and other workers' breathing zones in relation to the contaminants or sources.**

VENTILATION

Continued

- Proper ventilation can be obtained either *naturally* or *mechanically*.
- *Natural ventilation* is considered sufficient for welding and brazing operations if the present work area meets these requirements:
 - Space of more than 10,000 sq. ft. is provided per welder.
 - A ceiling height of more than 16 ft.
 - Welding is not done in a confined space.
 - Welding space does not contain partitions, balconies or structured barriers that obstruct cross ventilation.

VENTILATION

Continued

- ***Mechanical ventilation*** options generally fall into two basic categories, ***low vacuum*** and ***high vacuum systems***.
- ***Low vacuum systems*** take large volumes of air at low velocities and consists of a hood positioned at a distance from the work area that exhausts the fumes outdoors.
- ***High vacuum systems*** are close-range extractors that are aimed at capturing and extracting fumes as near to the work as possible. These systems are often equipped with a fan that pulls the contaminants into a filtration system and then recirculates the clean air back into the work area.

HOT WORK PERMIT

- **A *Hot Work Permit* is required whenever welding, cutting or burning is done outside an area designated for that purpose.**
- **This permit serves as a checklist to ensure precautions are taken to prevent the ignition of flammable or combustible materials in a 35 foot area surrounding the work.**
- **This permit must be posted in a visible location at the worksite.**
- **A fire watch must be in place to ensure a safe condition is maintained by keeping a constant vigil for stray sparks, ignition, or other fire hazards.**

HOT WORK PERMIT

Continued

- **A *Hot Work Permit* will not be issued if any of the following exists:**
 - **Sprinkler protection is impaired.**
 - **Appropriate fire extinguisher is not readily available.**
 - **Combustible or flammable materials are within 35 feet and cannot be moved or protected.**
 - **Floor and wall openings cannot be covered.**
 - **Flammable gases or vapors are present.**
 - **Cutting or welding on pipes or other metals can conduct enough heat to ignite nearby combustible materials.**
 - **Partitions, walls, ceilings or roofs having combustible coverings (i.e. expanded plastic insulation).**
 - **Partitions made of combustible sandwich-type construction.**
 - **Any condition that could result in undue hazards by performing the work.**