SAFETY DURING WELDING PROCESS AND PROTECTION EQUIPMENTS

Types of Welding Hazards (continued)

Electric shock

- Two kinds of electric shock: primary voltage shock and secondary voltage shock

- Primary voltage shock involves 230 or 460 volts and is caused by touching both the lead inside the welding equipment and the welding equipment case or other grounded metal while the equipment is powered ON

Types of Welding Hazards (continued)

Electric shock **(continued)**

- Secondary voltage shock involves 60 to 100 watts and is caused by touching a part of the electrode circuit and the side of the welding circuit.

Types of Welding Hazards (continued)

Electric shock **(continued)**

- Do the following to avoid electric shock:

> Keep dry and wear dry gloves.
>Stand or lie on plywood, rubber mats or other insulation.
>Do not rest any part of the body on the workpiece.
>Keep electrodes and electrode holders in good condition.
>Do not touch electrodes or metal parts with either the skin or wet clothing.

Types of Welding Hazards (continued)

Fires and explosions

- The welding process can produce extreme heat; however, fire hazards are not caused by the heat but by the effect of the heat on the workpiece, such as sparks and molten metal.
- Keep the work area and all surrounding areas free of combustible items.
- Be cautious when working in dusty areas where sparks and dust particles can easily oxidize without warning, which can result in a flash fire or an explosion.

Types of Welding Hazards (continued)

Fires and explosions (continued)

- Do the following to protect from fire and explosions:
  - >Always know where the fire exits and fire extinguishers are located.
  - >If welding within 35 feet of a combustible object, utilize a fire watcher, who can watch for landing sparks.

Types of Welding Hazards (continued)

Fumes and gases

- Fumes contain particles from base metal and base metal coating
- Effects from fumes are normally temporary
- Symptoms caused by short-term exposure to fumes can include burning eyes, burning skin, dizziness, nausea, and fever.
- Long-term exposure to fumes can cause siderosis (which are iron deposits in the lungs) and can affect pulmonary function.

Types of Welding Hazards (continued)

Fumes and gases (continued)

- Zinc fumes can cause metal fume fever, which is a temporary illness similar to the flu.
- Cadmium fumes can cause symptoms similar to metal fume fever; however, it can be fatal, even under brief exposure
- When shielding gases are released into the air, they can cause dizziness, unconsciousness, and even death if clean oxygen is withheld for a long enough period.

Types of Welding Hazards (continued)

Fumes and gases (continued)

- UV radiation forms gases when it hits the air, which can cause headaches, chest pains, eye irritation, and itchiness in the nose and throat.

Types of Welding Hazards (continued)

Fumes and gases (continued)

- Do the following to protect from fume and gas exposure:
  - > Ensure adequate ventilation in the work area.
  - > Wear appropriate personal protective equipment, such as a respirator.
  - > Read material safety data sheets before beginning work to learn what fumes can be potentially released.
  - > Familiarize yourself with the metals that are being used to determine if a paint or coating can cause toxic fumes or gases.

Types of Welding Hazards (continued)

Fumes and gases (continued)

- Do the following to protect from fume and gas exposure:
  - >If symptoms of dizziness, headache, or nausea occur, turn off the welding equipment, notify supervisors and coworkers, and get fresh air immediately.

Types of Welding Hazards (continued)

Confined spaces

- Examples of confined spaces include a boiler, tank, or hold of a ship where all the welding hazards are amplified, such as insufficient ventilation, fume and gas exposure, and chances of fire or explosion.

Types of Welding Hazards (continued)

Confined spaces (continued)

•Do the following to protect yourself when working in confined spaces:

>Make sure your body is insulated from the workpiece and ground.

> Wear dry gloves.

> Use only a well-insulated electrode holder.

> Verify that there is sufficient ventilation.

>Always make sure there is a trained person outside the confined space at all times to disconnect power and pull the welder out if a dangerous situation occurs.

Types of Welding Hazards (continued)

Loud noise

- Can cause temporary or permanent hearing loss

- Do the following to protect against noise:
  - Reduce the sound level when possible.
  - Wear ear muffs or ear plugs.

General Shop Safety Rules

- Follow the rules.
- Stay alert.
- Properly use all tools and other materials
- Respond immediately and appropriately to all safety-related incidents.
- Wear appropriate clothing.

Appropriate Clothing and Personal Protective Equipment

Clothing

•Shirts—Wear heavy, long-sleeved shirts with pocket flaps; remove pockets or tape them
shut if they do not have pocket flaps; keep collar and sleeves buttoned to keep out sparks.

Appropriate Clothing and Personal Protective Equipment (continued)

- Pants—Wear pants that have no cuffs and are long enough to cover the top of your shoes or boots.
- Welding cap—Wear a cap with a flexible bill that can be slipped around to cover either ear to keep sparks and metal splatter out of the ear opening.

Appropriate Clothing and Personal Protective Equipment (continued)

•Boots—Wear steel-toed boots made of heavy leather with uppers that reach above the ankle.

•Gloves—Wear heavy leather gloves with gauntlets; gauntlets may be short or extend to the shoulder.

Appropriate Clothing and Personal Protective Equipment (continued)

- Jackets and aprons—Wear leather jackets and aprons for additional protection, especially when welding in confined areas.

Appropriate Clothing and Personal Protective Equipment (continued)

Eye protection

- Safety glasses—Wear at all times in the welding area; include side protection when flying objects are possible.

Appropriate Clothing and Personal Protective Equipment (continued)

•Face shield—Wear a face shield, along with safety glasses, when grinding, chipping, cutting, or shaping metal with any type of power tool.

Appropriate Clothing and Personal Protective Equipment (continued)

- If you wear contact lenses, check with your doctor to see if the type of lens you wear requires any special precautions in the work area.
- If your wear prescription lenses, either wear eye protection that incorporates that prescription into the lens or appropriate eye protection that can be worn over your existing lenses.
- Select the appropriate lens shade when wearing safety glasses, goggles, or a welding hood.

Appropriate Clothing and Personal Protective Equipment (continued)

Welding hoods

- Stationary filter lens—Contains a fixed lens housing with the shaded lens held in by a spring retainer from where a lens can be slipped out and replaced as welding requires.

Appropriate Clothing and Personal Protective Equipment (continued)

Welding hoods

- Flip-front filter lens—Contains a lens housing with a front side that can be flipped up so that it leaves a clear-glass lens that permits the hood to be worn while chipping.

Appropriate Clothing and Personal Protective Equipment (continued)

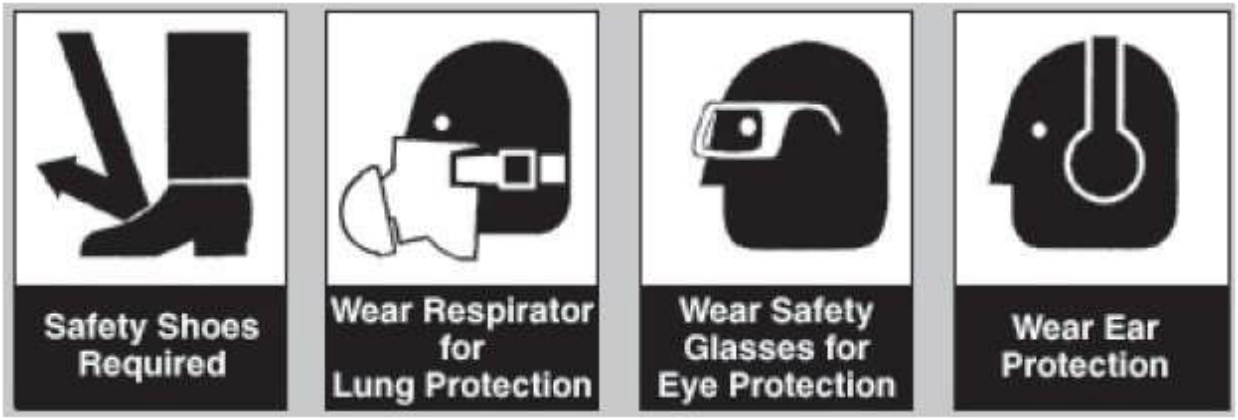
Welding hoods

- Auto darkening lens—Used in helmets specifically designed for auto darkening lenses; contains sensors that automatically change the shade from clear to dark in a fraction of a second when you start to weld and gradually changes back to clear when you stop welding; can be manually adjusted for a variety of shades.

Common Safety Signs

	**DANGER:** Uses a red background with white lettering to indicate an imminently hazardous situation, which if not avoided, will result in death or serious injury.
	**WARNING:** Uses an orange background with black lettering to indicate a potentially hazardous situation that could result in death or serious injury.
	**CAUTION:** Uses a yellow background with black lettering to indicate a potentially hazardous situation that may result in minor or moderate injury.
	**EMERGENCY:** Uses a green background with white lettering to identify safety equipment, first aid, or emergency exits.
	**NOTICE:** Uses a blue background with white lettering to indicate safety information on signs and bulletin boards.

Common Safety Signs (continued)



THANK YOU