

## **MAJOR PROGRAM POINTS**

# **"WELDING SAFETY IN THE WORKPLACE"**

**Part of the "GENERAL SAFETY SERIES"**

**Quality Safety and Health Products, for Today...and Tomorrow**

# Outline of Major Points Covered in the "Welding Safety" Course

The following outline summarizes the major points of information presented in the Course on Welding Safety. The outline can be used to survey the Course before taking it on a computer, as well as to review the Course when a computer is not available.

- **People have been welding in one form or another for over 2,000 years.**
  - They developed different ways to manipulate intense heat.
  - They bonded pieces of metal together, or cut them apart.
  
- **But like other industrial processes, welding can be very dangerous. Hazards include:**
  - Gases in an "Oxyacetylene" unit.
  - The high voltage involved in "Stick" welding.
  - The combination of gas and electricity that powers "MIG" and "TIG" operations.
  
- **Some of the other things that can make welding a dangerous proposition include:**
  - Flying sparks.
  - Toxic fumes.
  - Electric shock.
  - High temperatures.
  
- **When you "strike an arc", or "spark a torch", safety must be your number one priority.**
  - No matter what type of welding you are doing, there are general safety procedures that apply.
  
- **Before you begin welding, you must first have "authorization". Welding may be prohibited in certain areas of your facility, including:**
  - Locations with broken sprinkler systems.
  - Places with explosive atmospheres.
  - Areas with exposed or easily ignitable materials.

- **Remember that sparks are a by-product of just about every type of welding.**
  - Preventing sparks from starting fires requires a concentrated effort.
- **To reduce the risk of fire, remove anything from the work area that can burn.**
  - Especially combustible materials like wood and fuel.
  - These can ignite quickly if exposed to sparks or high temperatures.
  - Also remove aerosol cans from the welding bench.
  - Heat can cause these cans to expand and explode.
- **Sweep up any paper clippings, wood shavings or textile fibers.**
  - Clear a 35 foot radius, centered from where welding will occur.
- **Set up guards or protective barriers to shield combustible objects that can't easily be removed.**
  - If there is still a chance of fire, have someone stand ready with a fire extinguisher.
- **The intense heat generated by welding can often cause metals to release hazardous fumes.**
  - Without proper ventilation, these fumes can contaminate the surrounding air.
  - The degree of danger from fumes is based on three factors.
- **The first factor is the dimension of the work space, especially the height of the ceiling.**
  - The smaller the work space, the quicker hazardous fumes will build up.
  - With lower ceilings, fumes cannot rise out of the breathing zone.
- **The number of welders working in the same "breathing zone" is another factor.**
  - The more welding that takes place, the greater the danger of fumes.
  - More "breathers" require more breathable air.

- **The third factor is the type of substances that are involved in the welding process.**
  - The more hazardous the substance, the more dangerous the breathing zone.
- **Any exposure to contaminated air can be dangerous.**
  - Short-term exposure can lead to irritation of the eyes, nose, and throat, or even "Metal Fume Fever".
  - Long-term exposure can cause severe damage to the nervous system, and even lung cancer.
- **Maintain a healthy breathing zone by ensuring that plenty of air flows around the welding operation.**
  - When working with screens or other barriers, be sure there is space underneath the barrier for adequate ventilation.
- **Some fumes are especially hazardous. Mechanical ventilation devices should be used when welding with:**
  - Stainless Steel.
  - Lead.
  - Mercury.
  - Fluorine Compounds.
  - Zinc.
  - Cadmium.
  - Beryllium
  - Chemically-based cleaning compounds.
- **Mechanical ventilation is also called for in the following situations:**
  - In rooms with less than 10,000 cubic feet of space per welder.
  - Where ceilings are less than 16 feet high.
  - In confined spaces where natural ventilation is blocked.
- **When mechanical ventilation devices aren't enough to protect you, it is time to use respirators.**
  - Always fit-test a respirator before you wear it on the job.
  - A good seal between your face and the respirator is essential for protection.

- **You also have to safeguard your eyesight when welding.**
  - The intense light emitted during welding can cause severe damage.
- **Specially tinted goggles should be worn during Oxy-Fuel cutting, welding and brazing operations. They:**
  - Shield the eyes from hazardous ultraviolet and infrared light.
  - Protect the eyes from sparks and molten spatter.
  - Should be ventilated to prevent fogging.
- **Special helmets and hand shields must be used during Arc Welding.**
  - These protect the face, neck and ears from direct radiant energy and hazardous light.
  - They should have removable filter and cover plates so that the eyepieces can be easily cleaned and replaced.
- **Safety glasses should be worn under both hand shields and helmets.**
  - Inspect lenses for cracks and other defects (they could shatter when exposed to intense heat).
  - If you spot any imperfections, get a new pair.
- **Even if you are not welding, you should wear specially tinted safety glasses in areas where welding is taking place.**
  - These lenses protect against hazardous light from welding processes.
  - Check the shade number to make sure it is the right one for the specific type of welding in your area.

- **Chipping off slag and handling pieces of metal can generate a lot of noise and damage hearing.**
  - Short-term exposure to hazardous noise can lead to fatigue and irritability.
  - Long-term exposure can cause partial or total hearing loss.
  - Wearing earplugs, canal caps or earmuffs can protect you.
  - Talk to your supervisor to determine the protection that is right for the noise levels in your work area.
  
- **Leather welding gloves can protect your hands from the intense heat created during welding.**
  - For additional protection, welding gloves are fitted with "welting".
  - This extra piece of leather is sewn into the finger and the palm of the glove.
  - Welting protects the threads of the glove from exposure to intense heat.
  
- **Don't rely on gloves to hold hot objects. Extremely hot materials can burn your hand through the leather.**
  - Instead use a specially designed holder or clamp.
  
- **The rest of your "wardrobe" is also important.**
  - Clothing should be made from natural fibers like cotton or wool, which are less likely to burn than synthetic ones.
  - Long-sleeve shirts with closable collars help protect against burns.
  - Leather aprons and sleeves can keep sparks from burning through clothes.
  - High-top shoes keep sparks and molten metal away from ankles and feet.
  
- **Another hazard to watch out for is "Heat Stress."**
  - The combination of heavy clothing and intense heat can cause real problems.
  - Drink plenty of fluids to replace liquid that is lost from sweating.
  - Take a break if the heat becomes too much to bear.

- **There are also specific safeguards that should be in place with each of the major welding methods.**
  - Electrical Arcs.
  - Fuel-Gas and Oxygen.
  
- **Arc Welding encompasses several forms of electrical welding.**
  - All of them use large amounts of electricity to generate the heat necessary for welding.
  - Electricity can be extremely dangerous.
  - Whenever you are operating an Arc Welding unit, be especially cautious.
  
- **Before starting, make sure the "Work Lead" and the "Electrode Lead" are properly connected.**
  - These leads conduct electricity from the power source to the electrode holder.
  - A poor connection could produce a shock or other accident.
  
- **Inspect the condition of all cables. Look for damaged insulation or bare conductors.**
  - Defective cables can cause electric shock.
  - Repair or replace any damaged cables.
  
- **Sometimes, to customize or repair a welding cable, it is necessary to splice it.**
  - To reduce the risk of shock, leave at least 10 feet between the splice and the electrode holder.
  
- **Remember to inspect the frame of the welding generator for proper grounding.**
  - A secure ground connection will protect against stray electricity.
  
- **Some equipment can contain "shielding gas", cooling water and/or welding fuel.**
  - Inspect these units for leaks and other problems.
  - Report defective equipment to your supervisor immediately.
  - Do not make repairs unless you are qualified and authorized.

- **Once you are sure that it is safe to start, lower your helmet and strike the arc.**
  - Never look directly into the arc without proper eye protection.
- **Oxy-Fuel operations have their own hazards.**
  - The major problem is the potentially dangerous combination of oxygen and fuel-gas.
  - Safely controlling these two gases is a primary concern.
- **Before you start work, read the instructions for the torch you are going to use.**
  - Be sure that you have the correct fittings and the right tip for the job.
  - Ensure that the gas cylinders are secure. (don't let them bang into each other or fall over).
- **Before sparking your torch, make sure it can control the flow of gas.**
  - First release some fuel, then some oxygen.
  - When the gases flow freely, the torch will operate properly.
  - If you have trouble, the torch may be partially blocked.
  - See your supervisor and get a new torch.
- **When you are ready to start cutting or welding, hold the striker at a right angle to the torch.**
  - Holding the striker straight will cause the torch to flood, and could lead to an explosion.
  - Adjust the flame and begin work.
- **No matter what type of welding you are doing, you are also responsible for the safety of others while you are working.**
  - When cutting, always direct sparks away from other workers in the area.
  - Using protective screens can help keep coworkers safe from sparks and harmful light.
  - Remind people in the area to wear eye protection.

- **Always warn anyone in the area whenever you strike an arc.**
  - This can prevent someone from accidentally looking at the arc once you begin welding.
  
- **A review of the most important points of the program:**
  - Welding is an essential process in many industries, and can be dangerous.
  - But by taking proper precautions, we can minimize the "built-in" hazards.
  - Know and follow safe work practices when welding.
  - Guard against fire by removing or shielding anything in the welding zone that could burn.
  - Use proper ventilation and maximize the air flow around your work area to keep the air safe and clean.
  - Always use the protective equipment and clothing that's called for, and inspect it thoroughly before each use.
  - Pay special attention to electrical hazards when Arc Welding.
  - Exercise particular caution around the hazardous gases that power Oxy-Fuel welding units.
  
- **Despite the potential hazards, you can make welding safe and easy when you follow proper safety practices.**