Welding and Cutting

Often called "Hot Work", proper operation of all welding and cutting tools is essential to ensure the safety of the workers using the equipment. Safe operation will also assist in providing a quality job / finished product.

Anyone who engages in Welding, or Cutting operations must receive the appropriate CSA safety training.

Pause for Safety

Hazards

- → Electric shock
- → Fumes and gasses
- → Burns
- → Eyesight (retina) damage
- → Ultraviolet radiation
- → Fires and explosions

PPE

Additional PPE

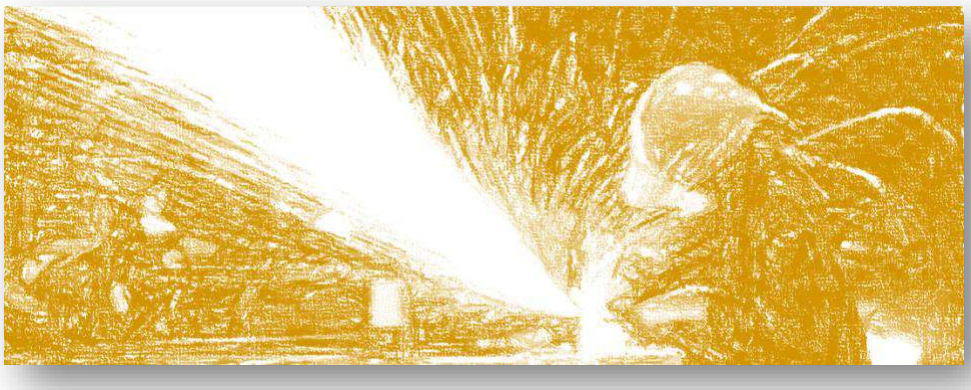
Equipment

- → Oxygen / Acetylene torch
- → MIG welder
- → Arc welder
- → Air Arc

Strategies and Procedures

You may be required to obtain a "hot work" permit.

If so, you must follow this permitting system in addition to these strategies and procedures prior to the start of the work.



Preparation

- → Ensure that there is adequate ventilation since hazardous fumes can be created during welding, cutting or burning.
- → Alert other workers who may be exposed to the hazards created by your activity.
  - Protect co-workers by using welding screens.
- → Examine your equipment. Check:
  - the flash back arrestors between the torch and regulator
  - for leaks on the connections between the cylinder, hose, and regulator
  - cables and hoses for previous damage from slag or sparks.
- → Have fire suppression and/or prevention equipment nearby.
- → Check the work area for combustible material, compressed gas pipes or containers, and possible flammable vapors before starting work.
  - Do not perform welding or cutting work in an environment with any of these items nearby.
  - Either remove the items from the area or relocate your work space.
- → A welder should never work alone.
  - A fire watch should be maintained.
- → All persons in the work area should wear personal protective clothing and utilize proper PPE:
  - flame retardant work clothing
  - welding helmet
  - knee pads
  - cutting goggles or face shield
  - leather gauntlet-style gloves with arm protection
  - leather apron
  - Ear protection must be used when grinding.
  - Do not wear jewelry on the job.
- → When welding or cutting Trimay metal or other metals that give off toxic fumes:
  - Use a Powered Air Purifying Respirator (PAPR) with Speedglas Helmet 9000HWR and Auto-Darkening Filter
  - Such specialized equipment requires special operating considerations. Obtain instruction on how to use the PAPR before using.
  - The filter must be checked for its level of efficiency using the 3M TM Adflo TM Flow Indicator.
- → Never enter, weld or cut in a confined space without proper gas tests and a required safety lookout.
- → Acetylene cylinders should be upright 30 minutes before using.

Working

- → Protect cable, hoses and cylinders from slag and sparks.
- → Open all cylinder valves slowly.
    - Leave the wrench used for opening the cylinder valve on the valve spindle when the cylinder is in use.
- → Never weld or cut lines, drum tanks, etc. that have been in service without making sure that all precautions have been carried out and permits obtained.
- → When working overhead of other workers, use fire resistant materials (blankets, tarps) to control or contain slag and sparks.
    - Do not perform cutting or welding where sparks and slag might fall on cylinders. Relocate such cylinders away to one side.
- → Do not use the cutting torch as a hammer.
- → Never heat an object that is lying flat on the concrete floor.
- → Check the work area for combustible material and possible flammable vapors during work and 30 minutes after work has ceased.

The facts

Work involving welding, cutting and burning can increase the fire hazard and the breathing hazard on any job.

You will be provided training on "Hot Work" procedures.

All welding processes produce hazardous gases.

- → Gases are invisible to the eye, and may or may not have an odour.
- → The heat in both the flame and the arc, and the ultraviolet radiation from the arc, produce gases such as carbon monoxide, carbon dioxide, oxides of nitrogen and ozone.
- → Other gases and vapors may be produced as by-products from the breakdown of solvents or coatings on the metal.
- → Gases used for arc shielding, or as a fuel, are also given off during welding.

Welding produces fumes.

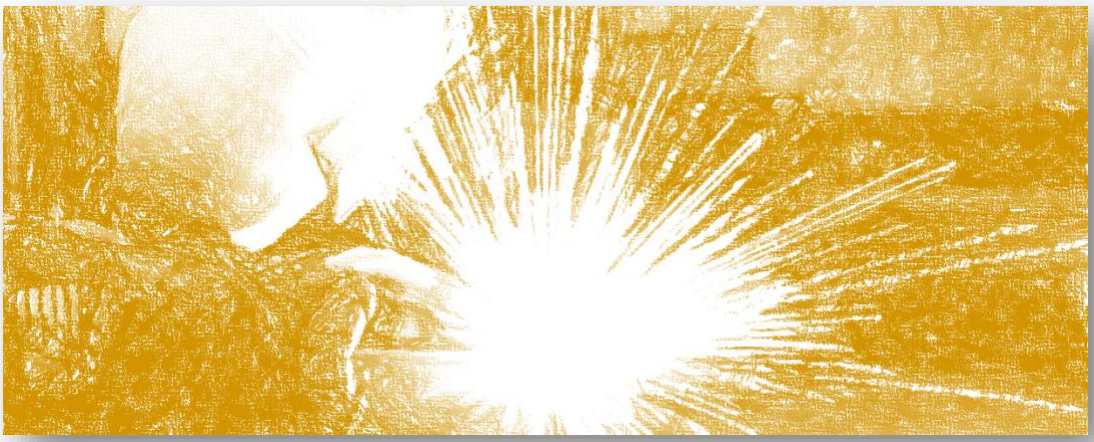
- → Fumes are formed when hot metal vapors cool and condense into very small particles that stay suspended in the vapors or the gas.
- → The particles may be metal or metal compounds, and are often smaller than one micrometer (one-fiftieths) the width of a human hair).
- → Fumes may be visible or not.
- → Welding "smoke" is an example of a visible fume but even if the fume can't be seen, its particles are still present.

The early symptoms of harmful exposure to most substances produced during welding are similar.

- → These may consist of irritation of the eyes, nose, respiratory system and sometimes the skin (such as "nickel itch," caused by exposure to nickel fumes).
- → Coughing, a tight chest or chest pains, headaches, nausea, vomiting and fatigue may also be some persistent symptoms.
- → Since these symptoms are common to many other illnesses, it is important to determine whether or not they are related to work.

The health risks and effects associated with welding gases and fumes are determined by:

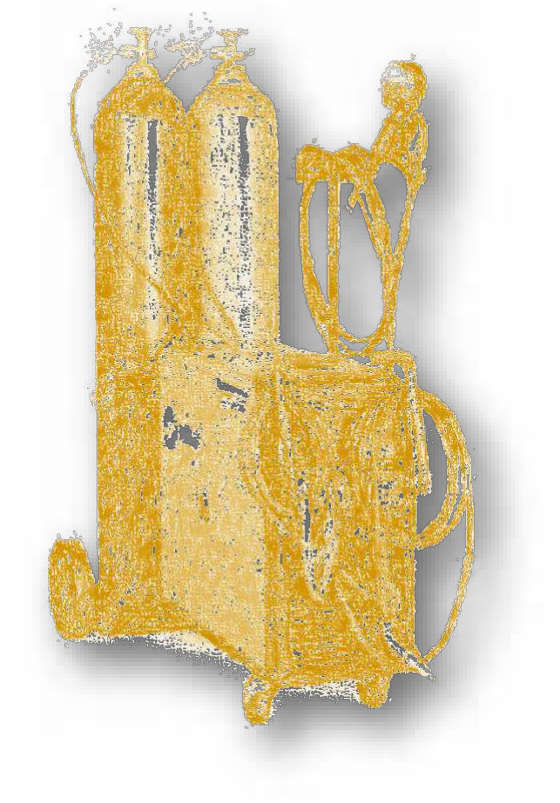
- → the length of time that you are exposed to them
- → the type of welding you do
- → the work environment
- → the protection you use.



Compressed Cylinder Storage

Compressed or liquefied gas containers used, handled, stored, and transported in accordance with the manufacturer's specifications and these basic rules:

- → A cylinder of compressed flammable gas is not stored in the same room as a cylinder of compressed oxygen, unless the storage arrangements are in accordance with Part 3 of the Alberta Fire Code (1997).
- → Compressed or liquefied gas cylinders, piping, and fittings are protected from damage during handling, filling, transportation, and storage.
- → Compressed or liquefied gas cylinders are equipped with a valve protection cap if manufactured with a means of attachment.
- → Oxygen cylinders or valves, regulators, or other fittings of the oxygen using apparatus or oxygen distributing system are kept free of oil and grease.



Respiratory Safeguards

- → Review SDS for all materials used.
- → Whenever possible, and reasonably practical to do so, substitute potentially harmful welding materials with safer alternatives.
- → Whenever possible reduce or eliminate the exposure that your activity creates by:
  - Ensuring proper ventilation exists,
  - Ensuring all exposed workers are using a half face respirator fitted with a P100 cartridge.

General Safeguards

- → All workers that have to perform work in the area near a welding and or cutting operation must be aware of the hazards and included on the JHA for the specific job.
  - All PPE requirements must be followed by these workers as well.
- → PPE for workers in vicinity
  - A half face respirator fitted with a P100 cartridge.
  - Eye protection
    - Must meet requirements of specific task and must be CSA approved for use in the specific job.
  - Hearing Protection
    - Must meet CSA standards and be worn were the hazard assessment shows that the noise levels exceed allowable levels.
- → Ensure proper PPE is used and maintained in proper working order according to the manufacturer's specifications.
  - Proper cleaning, care and storage of the respiratory masks as per the manufacturer's specifications must be maintained.
- → Operate all welding & cutting equipment according to manufacturer's specifications.
- → Take administrative steps to minimize exposure.
  - Rope off, barricade, and post signs of "No Entry" to restrict access to the exposure zone.