SAFE WORK PRACTICE – WELDING (GENERAL)

PURPOSE

To provide a reminder of specific hazards involved in general welding and to ensure that, when hot work is performed, it is done so in a manner that minimizes risk of worker injury or damage to equipment and the environment.

PREREQUISITES

- Only authorized personnel - adequately qualified, trained and with sufficient experience - shall be permitted to operate welding equipment.
- Welding equipment to be used and maintained in compliance with manufacturer guidelines and meet CSA standards.

POTENTIAL HAZARD	PRECAUTION
Burning skin	Keep the flame directed away from the body; do not touch hot metal with bare skin; keep the torch under control to keep the tip away from the body; beware of other people in range of torches, electric arcs, and hot metal.
Burning nearby substances	Clean up the work area to about a 3-metre radius. The radius should be increased when working at a height because the slag and spatter will bounce on the way down.
Burning people, clothing, or materials	Always maintain a controlled grip on the torch. Keep the torch in the line of sight. whenever two hands are needed, turn the torch off and set it down or set the torch down in a supported position.
Damaging equipment or systems due to heat	Identify, isolate, remove, or inert/flush other equipment or vessels.
Poisoning by fumes from heated/melted coatings or residue	Use supplied air respiratory protection or a respirator with filters behind the back that are out of the fume path. Use local exhaust ventilation to capture the fume before it spreads out and reaches the breathing zone. long term, analyze the content of fume from common coatings or contents.
Falling metal striking a person	Ensure cut-outs are supported by the table; ensure body parts are not below a cut piece.
Heat exhaustion in enclosed spaces	Extract heat with ventilation; introduce cool air with ventilation; take frequent breaks from the space.
Electrocution	Maintain proper grounding as close to the weld point as practical; avoid bodily contact between the ground cable and the stinger so the body does not become the ground path; do not handle rods with wet hands/gloves.
Damaging parts or starting fires at points where secondary arcing may occur (ie. at bearings)	Have the grounding cable as close to the work as practical so the current is not travelling through other parts.

BEFORE USE:

- Before starting any hot work make sure that all required permits have been issued, read and understood. Remove or protect flammable/combustible material in the work area and where the spatter, slag, or sparks may go; ensure there are no aerosol cans in the area; know what is on the other side of an object being cut or heated.
- Review hazards in work area and complete a Site-Specific Risk Assessment (2C SSRA)
- Know what the work is, how much heat is needed or how much heat will be generated.
- Determine what additional PPE will be needed and get it.
- Check the area for combustible/flammable, burnable materials; materials, equipment, tools, on the other side that may be damaged. Take steps to isolate or protect the materials (i.e., fire blankets) or move materials out of the area. Have a 20 lb portable fire extinguisher readily available, or a fire hose.
- Determine whether a spark/fire watch is required. Always maintain 100% spark containment.
- Determine whether a hot work permit is required and complete as necessary before starting the work.
- Position work pieces for optimal exposure of the surface to be worked on. Ensure pieces are well supported and alignment will be maintained.
- Ensure screens or other methods are in place to protect others from welding flash.
- Ensure PPE (i.e., gloves) will adequately protect against the heat when pieces are moved.
- If the work is in an enclosed or confined space, use a gas monitor to measure the oxygen level and the LEL. If at any time the monitor alarms, move out to fresh air, determine the cause of the alarm, and remedy the condition before continuing.
- Ensure adequate ventilation is supplied to maintain oxygen level above 19.5% in the breathing space.
- Set up exhaust ventilation to capture the weld fume or burning smoke so it does not contaminate the whole area.
- Set up the work so your body will not be in the line of fire of falling metal, sparks, slag, or spatter.
- Make torch cuts moving away from your body because the molten steel slag tends to blow out in front of the line of travel. Therefore, it is not blowing out toward you.

DIRECTIVES:

Flourine Compounds:

General - In confined spaces, welding or cutting involving fluxes, coverings, or other materials which contain fluorine compounds shall be done in accordance with the safety precautions and work practices delineated on the MSDS. A fluorine compound is one that contains fluorine, as an element in chemical combination, not as a free gas.

Maximum allowable concentration - The need for local exhaust ventilation or airline respirators for welding or cutting in other than confined spaces will depend upon the individual circumstances. However, experience has shown such protection to be desirable for fixed-location production welding and for all production welding on stainless steels. Where air samples taken at the welding location indicate that the fluorides liberated are below the maximum allowable concentration, such protection is not necessary.

Zinc:

Confined Spaces - In confined spaces welding or cutting involving zinc bearing base or filler metals or metals coated with zinc-bearing materials shall be done in accordance with local regulations and the process identified in a project specific job hazard assessment as identified in the group risk assessment.

Indoors- Indoors, welding or cutting involving zinc-bearing base or filler metals coated with zinc-bearing materials shall be done in accordance with local regulations and with a project specific job hazard assessment as identified in the group risk assessment.

Lead:

Confined spaces - In confined spaces, welding involving lead-base metals (erroneously called lead-burning) shall be done in accordance with local regulations and the process identified in a project specific job hazard assessment as identified in the group risk assessment.

Indoors - Indoors, welding involving lead-base metals shall be done in accordance with the local regulations and with a project specific job hazard assessment as identified in the group risk assessment.

Local ventilation - In confined spaces or indoors, welding or cutting involving metals containing lead, other than as an impurity, or involving metals coated with lead-bearing materials, including paint shall be done using local exhaust ventilation or airline respirators. Outdoors such operations shall be done using respiratory protective equipment approved by local regulations. In all cases, workers in the immediate vicinity of the cutting operation shall be protected as necessary by local exhaust ventilation or airline respirators.

Beryllium:

Welding or cutting indoors, outdoors, or in confined spaces involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by local regulations. In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

Cadmium:

General - Welding or cutting indoors or in confined spaces involving cadmium-bearing or cadmium-coated base metals shall be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by local regulations. Outdoor operations shall be done using respiratory protective equipment approved by local regulations.

Confined space - Welding (brazing) involving cadmium-bearing filler metals shall be done using ventilation in accordance local regulations and the process identified in a project specific job hazard assessment as identified in the group risk assessment.

Mercury:

Welding or cutting indoors or in a confined space involving metals coated with mercury-bearing materials including paint, shall be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations defined by local regulations. Outdoors such operations shall be done using respiratory protective equipment approved by local regulations.

Cleaning Compounds:

Manufacturer's instructions - In the use of cleaning materials, because of their possible toxicity or flammability, appropriate precautions such as manufacturers instructions shall be followed.

Degreasing - Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation. In addition, trichloroethylene and perchloroethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

Cutting of Stainless Steels:

Oxygen cutting, using either a chemical flux or iron powder or gas-shielded arc cutting of stainless steel, shall be done using mechanical ventilation adequate to remove the fumes generated.