Hot Work & Welding – Know The Laws of Your Province



Welding, cutting, soldering, and other forms of hot work bring together two highly dangerous things that should normally be kept very far apart:

- Flammable and combustible substances; and
- Heat, sparks, flame, and other things that can cause those substances to ignite.

Too often, the end result of this potentially lethal combination is deadly fire and explosion. OHS laws require employers who perform hot work operations to take measures to prevent this from happening to their own workers. While the rules overlap, there are also significant differences in requirements across jurisdictions. Here's a summary of the OHS rules for hot work in each part of Canada.

Hot Work & Welding Requirements Across Canada

Abbreviations

- **"LEL"** means a substance's lower explosive limit.
- **"OEL"** means a substance's occupational exposure limit.
- **CSA W117.2** means the indicated version of CSA Standard W117.2, *Safety in Welding, Cutting, and Allied Processes.*

FEDERAL

1. Unless a qualified person determines that the work can be performed safely, employer must ensure that no hot work is performed in a hazardous confined space containing: (a) an explosive or flammable hazardous substance above 10% of its LEL; or (b) oxygen in a concentration in excess of 23%;
2. If hot work is performed in a hazardous confined space with the above concentrations: (a) a qualified person must patrol and maintain a fire-protection in the area surrounding the space and until the fire hazard passes; and (b) the employer must ensure that the emergency equipment specified under Section 11.03(2)(c) of the Reg. is provided in the area; and
   3. If an airborne hazardous substance can be produced by hot work in a hazardous confined space, employer must ensure that no person enters or occupies that hazardous confined space unless the ventilation requirements of Section 11.11 are met, or the person uses the required respiratory protection equipment (*COHS Reg*, Sec. 11.1).

ALBERTA

Hot Work:

1. Hot work rules apply if: (a) the work area is a "hazardous location," defined as a place where fire or explosion hazards may exist due to flammable gases or vapours, flammable or combustible liquids, combustible dust or ignitable fibres or flying debris, as described in the *Canadian Electrical Code*; or (b) the work area isn't normally a hazardous location but an explosive atmosphere may exist for a limited time because: (i) a flammable substance is or may be in the atmosphere of the work area, (ii) a flammable substance is or may be stored, handled, processed or used in the location,

(iii) the hot work is on or in an installation or item of equipment that contains a flammable substance or its residue, or (iv) the hot work is on a vessel that contains residue that may release a flammable gas or vapour when exposed to heat;

2. Employer must ensure that hot work doesn't start until: (a) a hot work permit is issued indicating: (i) the nature of the hazard, (ii) the type and frequency of atmospheric testing required, (iii) the safe work procedures and precautionary measures to be taken, and (iv) the protective equipment required, (b) the hot work location is either cleared of or suitably isolated from combustible materials, (c) procedures are implemented to ensure continuous safe performance of the hot work, and (d) testing shows that the atmosphere doesn't contain: (i) a flammable substance, in a mixture with air, in an amount exceeding 20% of that substance's LEL for gas or vapours, or (ii) the minimum ignitable concentration for dust; and
3. Employer must ensure that the above tests are repeated at regular intervals appropriate to the hazard (*OHS Code*, Sec. 169).

Welding:

1. Employer must comply with CSA W117.2 06;
2. Employer must ensure that welding or allied process equipment is erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired and dismantled in accordance with manufacturer's specifications;
3. Employer must ensure that, before a welding or allied process begins, the area surrounding the operation is inspected and either: (a) all combustible, flammable or explosive material, dust, gas or vapour is removed, or (b) alternate methods of rendering the area safe are

implemented;
4. If a welding or allied process is performed above an area where a worker may be present, employer must ensure that adequate means are taken to protect a worker below the operation from sparks, debris and other falling hazards; Operator of an electric welding machine must not leave the machine unattended without removing the electrode; and
5. Employer must ensure that appropriate welding and ground leads are used to fasten the electric supply cable securely (*OHS Code*, Sec. 171.1).

Gas Welding or Allied Process:

1. Employer must ensure that a regulator and its flexible connecting hose are tested immediately after connection to a gas cylinder to ensure there's no leak of the gas supply; and
2. Employer must ensure that if a leak of the gas supply develops during gas welding or an allied process: (a) the supply of gas is immediately shut off by the worker performing the welding or allied process, and (b) the work isn't resumed until the leak is repaired (*OHS Code*, Sec. 171.2).

Welding from Vehicles: Employer must ensure that:

1. Welding services provided from vehicles meet CSA W117.2 01, except for Clause G.2 (Cabinets) of Annex G;
2. Gases don't accumulate and reach their LEL by providing solid walled storage compartments in which compressed gas cylinders are stored with vents that: (a) have a minimum of 0.18 square metres of free area for every 0.42 cubic metres of compartment volume, (b) have the free area split evenly between the top surface and the bottom surface of the storage compartment, and (c) are unobstructed under all conditions;
3. Solid walled storage compartments in which compressed

gas cylinders are stored are built so that gases or vapours can't flow into adjoining compartments;
4. Solid walled compartments in which compressed gas cylinders are stored use: (a) latching and locking hardware made of non-sparking materials, and (b) electrical components appropriate for use in an explosive atmosphere, if electrical components are located within the compartment; and
5. Above requirements apply whether the compressed gas cylinder is stored vertically, horizontally, or at an angle (*OHS Code*, Sec. 172).

BRITISH COLUMBIA

General:

1. Welding, cutting and similar processes must meet CSA W117.2-94;
2. Effective local exhaust ventilation must be used at any fixed work station to minimize worker exposure to harmful air contaminants produced by welding, burning, or soldering;
3. A coating on metal which could emit harmful contaminants (such as lead, chromium, organic materials or toxic combustion products) must be removed from the base metal, whenever practicable, before welding or cutting begins (**Note:** If materials are to be welded and painted, coordination is necessary in accordance with OHS Regs. Sec. 12.129(3) which restricts the application of coatings before welding operations);
4. A container which may have held a combustible substance must be thoroughly cleaned before any welding or burning operation is carried out on it;
5. Burning, welding or other hot work must not be done on any vessel, tank, pipe or structure, or in any place where the presence of a flammable or explosive substance is likely until: (a) tests have been made by a qualified

person to ensure the work may be safely performed, and (b) suitable safe work procedures have been adopted, including additional tests made at intervals that will ensure the continuing safety of the workers;

6. May not use solder containing cadmium and must not be used without WorkSafeBC prior written approval;
7. Welding equipment, including regulators, automatic reducing valves and hoses, must be used only for the gas for which it’s designed;
8. Before using gas welding or burning equipment, the operator must ensure that the equipment is free from defects, leaks, oil and grease;
9. Suitable safety devices to prevent reverse gas flow and to arrest a flashback must be installed on each hose in an oxyfuel system, between the torch and the regulator;
10. Receptacles for electrode stubs must be provided and used;
11. Recently welded or flame cut work must be marked “HOT” or effectively guarded to prevent contact by a worker, if a worker not directly involved in the hot work is likely to enter the work area; and
12. At least one fire extinguisher of a suitable type and capacity must be immediately available at a work location where welding or cutting is done and fire extinguisher locations must be marked and made known to workers (*OHS Reg*, Part 12).

Radiation Protection:

1. Arc welding must not be carried out unless workers who may be exposed to radiation from the arc flash are protected by adequate screens, curtains, or partitions or wear suitable eye protection; and A screen, curtain or partition near an arc welding operation must be made of or be treated with a flame resistant material or coating, and must have a non-reflective surface finish; **Note:** 12 m (40 ft) is the recommended minimum distance

from which an electric welding arc should be seen by the unprotected eye (*OHS Reg*, Sec. 12.122).

Protective Clothing & PPE:

1. A worker involved in welding or burning operations must wear: (a) flame resistant work clothing, (b) gauntlet gloves of leather or other suitable material and arm protection, (c) an apron of leather or other suitable material for heavy work, (d) eye and face protection against harmful radiation, particles of molten metal, and while chipping and grinding welds, and (e) substantial safety footwear made of leather or other suitable material; (**Note:** Unless specifically manufactured as flame resistant, work clothing made of polyester, acetate, nylon, acrylic or polypropylene fibres, or mixtures of these with wool or cotton don't comply with this subsection because those materials aren't flame resistant and will melt while burning, causing deep and extensive burns to the skin. Work clothing made of laminated fabric containing polyurethane sponge shouldn't be worn as it may readily ignite and burn); and
2. A respirator must be provided and worn if an effective means of natural, mechanical or local exhaust ventilation is not practicable: (a) during short duration welding, burning or similar operations, and (b) during emergency work (*OHS Reg*, Secs. 12.123 + 12.124).

MANITOBA

Employer must:

1. Develop, implement, train workers in and ensure they comply with safe work procedures respecting welding and allied processes performed in the workplace;
2. Ensure that all welding and allied processes in the workplace meet CSA W117.2-12;

3. Ensure that when a container, pipe, valve or fitting: (a) holds or may have held an explosive, flammable or otherwise hazardous substance; or (b) may become pressurized to the point of being a hazard to a person at a workplace, any welding or allied process performed by a worker is performed in accordance with the safe work procedures developed in accordance with subsection 1. above;
4. So far as is reasonably practicable, ensure that a worker doesn’t perform electric arc welding if another worker may be exposed to radiation from the arc unless the other worker is using an appropriate eye protector or is protected from the radiation by an appropriate barrier;
5. Ensure that appropriate welding and ground leads are used to fasten the electric supply cable securely so that the inner wires of an electric welding machine aren’t exposed to damage and the cable can’t be separated from the fittings;
6. Ensure that a person performing a gas welding or allied process tests a regulator and its flexible connecting hose immediately after it is connected to a gas cylinder to ensure that there’s no leak of the gas supply; and
7. When gas welding or an allied process is carried out: (a) provide a flashback between the torch and the fuel gas and oxygen supply that prevents the reverse flow of fuel, gas, oxygen or air from the torch to the supply lines, and stops a flame from burning back from a torch into the supply lines; (b) ensure that hose lines or pipelines for conveying the gases to the burner and the couplings are legibly marked or identified to ensure the hoses aren’t interchanged; and (c) ensure that the torch is ignited by a lighting device designed for that purpose (*WSH Reg*, Secs. 17.1 to 17.9).

NEW BRUNSWICK

1. Employer must ensure that an employee is protected from harmful fumes and gases or particles emitted from welding, cutting, burning or soldering operations by: (a) providing a local exhaust system close to the source of the fumes, gases or particles in an indoor welding, cutting, burning or soldering area, (b) monitoring the exposure level of employees to harmful fumes and gases or particles emitted from welding, cutting, burning or soldering operations to ensure that the level of concentration of air contaminants doesn't exceed the OEL, and (c) monitoring the work areas in proximity to the welding, cutting, burning or soldering area to ensure that the level of concentration of air contaminants doesn't exceed the OEL;
2. Employers and employees must comply with CSA W117.2-12 (R2017) or a standard offering equivalent or better protection;
3. If the safety of any person depends on the strength of a weld, employer must ensure that the weld is done by a welder who: (a) holds at least a Class B welder's certificate of qualification issued in accordance with New Brunswick Regulation 84-174 under the *Boiler and Pressure Vessel Act*, or (b) is employed by a company certified to CSA standard W47.1-09 (R2019), or CSA SW47.2-11 (R2020), or a standard offering equivalent or better protection;
4. Employer must not allow an employee to commence a welding, cutting, burning or soldering operation unless the employee has thoroughly inspected the entire area surrounding the area around the operation to ensure that all combustible, flammable or explosive material, dust, gas or vapour has been removed from the area, if possible, or that adequate precautions have been taken to prevent fire or explosion;
5. Employer must ensure that an employee working in the

area and not engaged in a welding, cutting, burning or soldering operation is protected from harmful radiation by providing adequate screening around the operation or by preventing the employee’s entry to the area where the operation is being conducted;

6. Where a container or pipe, or any pipe, valve or fitting connected to the container or pipe, holds or may have held an explosive or flammable substance, employer must ensure that it’s completely drained, cleaned and ventilated before any process involving the application of heat is undertaken; **Note:** To properly drain, clean and ventilate, employer must ensure that: (a) inlet pipes are disconnected and blocked off or moved out of alignment or the inlet valves are locked in the closed position; (b) residual liquid is removed by an employee without going inside the container or pipe; (c) where steam is available, all openings except the vent pipe and steam inlet are closed and the steam is blown into the container or pipe and any pipe, valve or fitting connected to the container or pipe for a period of time suitable for the conditions and the nature of the explosive or flammable substance, with the lids and manhole plates opened during the last one-fifth time of the steaming period; (d) where steam isn’t available, the container or pipe and any pipe, valve or fitting connected to the container or pipe is kept filled with running water for at least 24 hours; (e) after cleaning, the container or pipe and any pipe, valve or fitting connected to the container or pipe is thoroughly ventilated with forced or induced draft air for a minimum of 2 hours; (f) after ventilation, a competent person examines the interior of the container or pipe and any pipe, valve or fitting connected to the container or pipe to see that it’s free from residue and tests air samples to ascertain that all explosive or flammable vapours have been removed; (g) a record is made of the procedures and the tests required by

paragraph (f) and is dated and signed by the person taking the tests; (h) the person who takes the tests certifies that work involving the application of heat can be safely undertaken on the container or pipe and any pipe, valve or fitting connected to the container or pipe; and (i) where the tests required by paragraph (f) indicate the presence of explosive or flammable substances, the steaming or flooding, ventilating and testing operations are repeated;

7. Employer must ensure that a welding, cutting, burning or soldering operation isn't done: (a) on a closed container, (b) on a container or pipe, or any pipe, valve or fitting connected to the container or pipe, containing any amount of an explosive or flammable substance, or (c) on a container or pipe filled with exhaust from an internal combustion engine;
8. Employer must ensure that equipment and materials to be welded, cut, burned or soldered are free of hazardous substances;
9. Employer must ensure that: (a) tables, jigs or work benches used for support during welding, cutting, burning or soldering operations are made of fire resistive materials, and (b) all surfaces in welding, cutting, burning or soldering areas are made of non-reflective materials;
10. Where in a welding, cutting, burning or soldering operation a compressed gas hose or welding cable is placed over a sharp edge or may be struck by falling objects, employer must ensure that suitable protection for the hose or cable is provided;
11. Employer and employee must each ensure that welding and cutting torches and their fittings and regulators are inspected before use to ensure they're in safe working condition and that if a defect is found, the employer ensures that the equipment is repaired by a competent person and that replacement parts or fittings meet the manufacturer's specifications;

12. Employer and employee must each ensure that the supply of gas is cut off to any part of the welding, cutting, burning or soldering operation when a leak of the supply of gas being used develops and that work doesn't resume until the leak is repaired;
13. Employer must ensure that an electric welding machine is moved only by the means provided for that purpose, that an electric welding machine isn't pulled by its electric cables, that the machine is located in a dry area in accordance with CSA C22.1-18, *Canadian Electrical Code, Part* 1, as amended from time to time, and that appropriate fittings are used to fasten the electric supply cable securely so that the inner wires of an electric welding machine aren't exposed to damage and the cable can't be separated from the fittings; and
14. Employee must ensure that a welding or cutting torch: (a) isn't left unattended until the gases have been completely shut off, and (b) isn't hung from a regulator or other equipment so as to come into contact with a cylinder (*OHS General Reg*, Part XVIII).

PPE: Employer must ensure that an employee engaged in a welding, cutting, burning, or soldering operation wears the leather gauntlet type gloves with arm protection, and flame retardant work clothing and an apron of leather or of other material offering equivalent protection.

NEWFOUNDLAND

Gas Welding:

1. Welding, cutting, and similar processes must meet: (a) CSA W117.2 or another standard acceptable to the minister; (b) the manufacturer's instructions and recommendations for the equipment being used; and (c) the applicable requirements of these regulations;
2. Cylinders, piping and fittings of compressed and

liquefied-gas systems shall be located or protected so as to prevent damage to them;
3. Workers must prevent a spark or flame from coming into contact with a cylinder, regulator or hose of a compressed-gas system and charged gas cylinders must be protected from a source of heat above 54.44° C;
4. Before gas-welding or burning equipment is used, a worker must ensure that parts are free from defects, leaks or oil and grease and only standard fittings, designed and manufactured for the specific compressed gas service must be used;
5. A regulator or automatic reducing valve of welding equipment may only be used for the gas for which it was designed (*OHS Regs*, Sec. 449).

Arc Welding:

1. Arc welding may not be carried out unless a worker who may be exposed to radiation from the arc flash is protected by an adequate screen, curtain or partition or wears suitable eye protection; and
2. A screen, curtain or partition near an arc welding operation must be made of or treated with a flame-resistant material or coating, and have a non-reflective surface finish (*OHS Regs*, Sec. 452).

Burning & Welding:

1. Burning, welding, or other hot work may not be done in an area where there's a likelihood of the presence of flammable substances until: (a) tests are done to ensure that work may be safely performed; and (b) suitable procedures are adopted to ensure that all existing or potential sources of ignition have been eliminated or effectively controlled;
2. Where testing procedures are used, tests must be conducted at intervals to ensure the continuing safety of workers;

3. Burning, welding or cutting may not be done where there's a danger of extreme heat coming into contact with a concrete surface unless that surface is protected from the source of heat; and
4. Suitable safety devices to prevent reverse gas flow and to arrest a flashback must be installed according to the manufacturer's instructions on each hose in an oxygen system between the torch and the regulator (*OHS Regs*, Sec. 453).

General:

1. Effective local exhaust ventilation must be used at a fixed work station to minimize worker exposure to harmful air contaminants produced by welding, burning or soldering;
2. A coating on metal which could emit harmful contaminants, including lead, chromium, organic materials, or toxic combustion products must be removed from the base metal, whenever practicable, before welding or cutting; and
3. Receptacles for electrode stubs must be provided and used (*OHS Regs*, Secs. 454 to 456).

PPE: Respiratory protective equipment must be provided and worn where an effective means of natural, mechanical, or local exhaust ventilation isn't practicable (*OHS Regs*, Sec. 457).

NOVA SCOTIA

Key Definition: "welding or allied process" means any specific type of electric or oxy fuel gas welding or cutting process including the processes listed in Appendix A of the latest version of CSA W117.2, including: (a) arc welding, brazing, solid-state welding, soldering, resistance welding, and other welding; and (b) allied processes such as arc cutting, oxygen cutting, thermal spraying, thermal adhesive bonding, and other cutting (*Occ Safety Gen Regs*, Sec. 109(1)).

General: Employer must: 1. Where reasonably practicable, comply with t the latest version of CSA-W 117.2; 2. Ensure that welding or allied process equipment is erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired, and dismantled in accordance with manufacturer's specifications; 3. Ensure that a welding or allied process is performed by a competent person; 4. Ensure that, before a welding or allied process is commenced, the person who is to operate the equipment has inspected the area surrounding the operation to ensure that adequate precautions have been taken: (a) to remove from the area all hazardous material or processes that produce combustible, flammable or explosive material, dust, gas or vapour; and (b) to prevent fire or explosion; 5. Ensure that where a welding or allied process is performed above an area where a person may be present, adequate means of protection are taken to protect a person below the operation from sparks, debris and other falling hazards; 6. Provide adequate screens or prevent a person from entering the work area, unless the employer has demonstrated that a person at or near a welding or allied process isn't excessively exposed to radiation or reflection; 7. Ensure that where screening is used, it's adequate to prevent radiation and reflection from affecting a person at or near the workplace; and 8. Ensure that a compressed gas hose line or welding cable is adequately protected from damage (*Occ Safety Gen Regs*, Secs. 109 to 112, 114).

Work on Containers: 1. Employer must ensure that no person performs a welding or allied process on a container, pipe, valve, or fitting that (a) holds or may have held an explosive, flammable or otherwise hazardous substance; or (b) may become pressurized to the point of being a hazard to a person at the workplace, unless the welding or allied process is performed in accordance with a written work procedure established by the employer; 2. If a welding or allied process

is performed on a natural gas pipeline or a liquids pipeline associated with a natural gas pipeline, employer must ensure that an engineer certifies that the written work procedure required under subsection (1) meets American Petroleum Institute standard API Recommended Practice 2201, "*Procedures for Welding or Hot Tapping on Equipment in Service*", Fourth Edition, September 1995; 3. If a container, pipe, valve or fitting holds or may have held an explosive, flammable or other hazardous substance, and subsection (2) doesn't apply, an employer must include in the required written work procedure provision: (a) for disconnecting and blanking off or moving out of alignment pipes or locking out valves in the closed position; and (b) that after ventilation, a competent person must: (i) where reasonably practicable, examine the area to be welded or processed to ensure it's free from residue, (ii) test air samples to ensure that explosive, flammable or hazardous amounts of gases or vapours have been reduced to less than 1% of the LEL in areas to be welded or processed, and (iii) certify, in writing, that work involving the application of heat can be safely undertaken and that the conditions tested in the area to be heated are likely to be maintained within a predicted and recorded range for the entire time the certification is valid; 4. The above must include: (a) the signature of the competent person; (b) the date and time the tests were performed; (c) the type of work that can be performed and is explicitly banned in the area to be heated; (d) the means by which the work is to be performed; (e) the expiry date and time of the certificate (which can't be longer than 24 hours after the time of the examination and test required to be performed); and (f) a record of any tests performed and of any test results; and 5. Employer must ensure that no person uses the exhaust of an internal combustion engine as a means of decreasing the concentration of flammable and explosive gases and vapours in the area to be welded or processed (*Occ Safety Gen Regs*, Secs. 113 + 114).

Electric Welding: 1. No operator of an electric welding

machine may leave the machine unattended without removing the electrode; and 2. Employer must ensure that appropriate welding and ground leads are used to fasten the electric supply cable securely so that the inner wires of an electric welding machine aren’t exposed to damage and the cable can’t be separated from the fittings (*Occ Safety Gen Regs*, Sec. 115).

Gas Welding:

1. Employer must ensure that a person performing a gas welding or allied process tests a regulator and its flexible connecting hose immediately after it’s connected to a gas cylinder, to ensure that there’s no leak of the gas supply;
2. No person may perform a test required in subsection (1) with a substance that’s oil, fat, or grease-based;
3. Where a leak of the gas supply develops during the performance of a gas welding or allied process: (a) the person performing the welding or allied process must cut off the supply of gas; and (b) the employer must ensure that work doesn’t resume until the leak is repaired; and
4. Where a gas welding or allied process is carried on, the employer must: (a) provide a flashback arrestor between the torch and fuel gas and oxygen supply that (i) prevents the reverse flow of fuel, gas, oxygen or air from the torch to the supply lines, and (ii) stops a flame from burning back from a torch into the supply lines; (b) ensure that hose lines or pipelines for conveying the gases to the burner and the couplings are legibly marked or identified to ensure the hoses aren’t interchanged; and (c) ensure the torch is ignited by a lighting device designed for that purpose (*Occ Safety Gen Regs*, Secs. 116 – 117).

ONTARIO

Industrial Establishments: A process that's likely to produce a gas, vapour, dust or fume, to such an extent as to be capable of forming an explosive mixture with air must be carried out in an area which has provision for safe disposal by burning under controlled conditions or in an area which, (a) is isolated from other operations; (b) has a system of ventilation adequate to ensure that the gas, vapour, dust or fume doesn't reach a hazardous concentration; (c) has no potential sources of ignition; (d) has provision for explosion venting; and (e) has, where applicable, baffles, chokes or dampers to reduce the effects of any explosion (*Ind. Ests. Regs*., Sec. 63).

Construction:

1. Cylinders, piping, and fittings used in welding and cutting must be protected against damage;
2. No cylinder of compressed gas used in welding and cutting may be dropped, hoisted by slings or magnets, or transported or stored in a horizontal position;
3. The valve of a cylinder must be closed when the cylinder is spent or is not being used (*Const. Project Regs*., Sec. 122);
4. Precautions to prevent a fire must be taken when using a blow torch or welding or cutting equipment or similar piece equipment (*Const. Project Regs*., Sec. 123);
5. No arc welding electrode or ground lead may be hung over a compressed gas cylinder;
6. An area where electric welding is carried on must be kept free of electrode stubs and metal scrap;
7. Receptacles for electrode stubs must be provided and used (*Const. Project Regs*., Sec. 124);
8. Before a flame-cutting, gas-welding or similar source of ignition is introduced into a work chamber in the vicinity of a combustible material: (a) a Fire watch must be established and maintained; (b) a fire hose must

be prepared for use; (c) the fire hose must be tested to ensure there's an adequate supply of water and water pressure to extinguish a fire; and (d) a fire extinguisher suitable for the hazard must be provided nearby (*Const. Project Regs*., Sec. 343).

Oil & Gas: Where welding or flame-cutting is planned, the worker must, before starting work: (a) inspect the working area for fire hazards; (b) test for the presence of combustible gases; (c) notify other workers that may be affected by the work; and (d) ensure that firefighting equipment is readily available (*Oil and Gas – Offshore Regs,* Sec. 63).

PRINCE EDWARD ISLAND

1. Where welding, cutting, or soldering operations emit harmful fumes and gases, employer must ensure that ventilation is provided to remove the fumes at the source as required to maintain the airborne contaminants at or below their respective OELs;
2. Employer must ensure that a welding and cutting operation is prohibited in an area containing combustible materials, or in the close proximity of explosive or flammable dusts, gases or vapours, unless adequate precautions are taken to prevent fires or explosions;
3. Employer must provide tables, jigs, or work benches made of non-flammable material when needed for support during welding and cutting operations;
4. Overhead welding and cutting operations must be carried out so as to prevent slag and sparks from falling on persons or combustible materials below a work area;
5. Fire retardant blankets must be placed over open gratings to contain slag and sparks;
6. There must be screens in places where welding and cutting operations are normally carried out, and where

persons other than the welders are working or passing, suitable stationary or portable screens at least 1 800 mm (6 ft.) high must be used;

7. Walls and screens of both permanent and temporary enclosures for welding and cutting operations must be painted with black or dark grey flat paint to absorb the harmful bright rays and prevent reflection;
8. Employer must ensure that adequate fire extinguishing equipment in good working order is readily available where any welding, soldering or flame-cutting or heating operations or any other process which uses heat application are performed;
9. Employer must ensure that all workers engaged in welding or cutting operations wear: (a) adequate fire retardant work clothing; (b) fire retardant gauntlet type gloves and arm protection; (c) an apron of fire retardant or other adequate material; (d) adequate eye and face protection against harmful radiation, or particles of molten metal, or while chipping and grinding welds; and (e) compliant safety boots;
10. Approved respirator equipment must be worn if tests of air samples indicate it’s necessary;
11. Employer and worker must ensure that welding and cutting torches, their fittings and regulators are inspected before use and if faults are found, the employer must ensure that the equipment is repaired or replaced with approved fittings in accordance with the manufacturer’s specifications by a competent person;
12. Employer and worker must ensure that the supply of gas is cut off to any part of the welding or cutting operation when a leak develops and that work doesn’t resume until the leak is repaired;
13. Employer and worker must ensure that a welding or cutting operation isn’t done on a totally enclosed container or on a container or pipe that has contained an explosive or flammable substance or gas;
14. If a container or pipe held an explosive or flammable

substance or gas or if the previous contents are unknown, the employer must ensure that welding, soldering, or cutting operations or any other process which uses heat application are only undertaken when the employer is able to certify in writing that the container or pipe is free from combustible gases or vapours;

15. If the employer is unable so to certify in writing to the officer, welding, or cutting operations on any container or pipe that has held explosive or flammable substances may only be undertaken after the container has been thoroughly cleansed by steam or other effective means; found, by air tests, to be completely free from combustible gases or vapours, or the air in the container has been replaced by inert gas;
16. To drain, clean and ventilate the container or pipe, employer must ensure that (a) inlet pipes are disconnected and blocked off or moved out of alignment, or the inlet valves are locked in the closed position; (b) where residual liquid remains, it’s removed by workers located outside the container or pipe; (c) where steam is available all openings, except the vent pipe and steam inlet, are closed and the steam is blown into the tank for a period of time suitable for the conditions and the nature of the liquid, with the lids and manhole plates open during the last one-fifth time of the steaming period; (d) where steam isn’t available, the container or pipe is kept filled with running water for a period of at least 24 hours; (e) after cleaning, the container or pipe is thoroughly ventilated with forced or induced draft air, for a minimum period of 2 hours; (f) the air in the container or pipe is replaced by a non-flammable gas other than exhaust from an internal combustion engine; (g) after ventilation, a competent person must examine the interior of the container or pipe to see that it is free from residue and take air samples to ascertain that hazardous vapours

have been removed; (h) where the foregoing tests indicate the presence of hazardous vapours, the steaming or flooding and ventilating operations are repeated; and

17. Worker must ensure that a welding or cutting torch is not laid down until the gases have been completely shut off and that a welding or cutting torch isn't hung from a regulator or other equipment so as to come in contact with a gas cylinder (*OHS Gen Regs,* Sec. 37).

QUÉBEC

1. Welding and cutting operations not allowed close to combustible substances or in places containing flammable gases, vapours, or combustible dusts presenting a fire or explosion hazard, unless special precautions are taken to prevent risk of fire or explosion;
2. Tasks involving arc welding or cutting, as well as the installation, handling and maintenance of equipment required for doing so, must meet Chapter 5 of CSA W117.2-M94;
3. Tasks involving resistance welding, as well as the installation, handling, and maintenance of equipment required for doing so, must meet Chapter 6 of CSA W117.2-M94;
4. Tasks involving gas welding, brazing, or cutting, as well as the installation, handling, and maintenance of equipment required for doing so, must meet Chapter 8 of CSA W117.2-M94;
5. Permanent or movable protective screens must be installed in places where welding or cutting operations are ordinarily performed and where people, other than welders, work, or circulate;
6. Before performing welding, cutting or heating operations on a recipient, such as a reservoir, it must be established that the recipient didn't previously contain materials that are combustible or likely to discharge

toxic or inflammable vapours when heated;

7. If the recipient has already contained such materials, no work involving welding, cutting or heating may be undertaken on the recipient until it has been properly cleaned to eliminate any material that’s combustible or likely to discharge toxic or inflammable vapours when heated;
8. If after having cleaned the recipient and made a reading of the concentration of inflammable vapours and gases, there remains a risk of explosion, the work involving welding, cutting, or heating may only be performed if one of the following conditions is met: (a) the recipient is filled with water to within a few centimetres of the point of welding, cutting or heating and the remaining space is ventilated to ensure the evacuation of hot air; (b) the recipient has been purged with inert gases;
9. Conduits and connections must be disconnected, then closed to eliminate the spilling of any material that’s combustible or likely to discharge toxic or inflammable vapours when heated;
10. The oxygen lead hose and the combustible gas lead hose to a torch must be equipped with at least one anti-back-up gas arrester and one anti-back-up flame arrester and the arresters must be installed in compliance with the manufacturer’s instructions;
11. A portable welding machine powered by an internal combustion engine must be grounded if it’s equipped with auxiliary 120 V or 240 V plugs and if these plugs are used at the same time as the welding process; **Exception:** Grounding not required if the tools, appliances or accessories connected to the auxiliary plugs are equipped with double insulation or a third conductor ensuring the continuity of the grounding, or if the branch circuits are protected by Class A ground fault circuit interrupters; and
12. Use of electric conductors or conduits containing gases

or inflammable liquids as a welding or cutting current return circuit is prohibited (*OHS Reg*, Div. XXVII).

SASKATCHEWAN

General:

1. If a flammable substance is or may be present, employer or contractor must ensure that no hot work is performed until: (a) suitable tests have been conducted that: (i) indicate whether the atmosphere contains a flammable substance in a quantity sufficient to create an explosive atmosphere; and (ii) confirm that the work may be safely performed; and (b) appropriate work procedures are implemented to ensure continuous safe performance of the work and that the workers who perform the hot work are trained in and actually carry out those procedures;
2. While hot work is performed, employer or contractor must conduct the above required tests at intervals appropriate to the work being performed and record the results;
3. Employer or contractor may not require or permit any hot work to be performed in the vicinity of a material that may constitute a fire hazard until suitable steps are taken to reduce the risk of fire;
4. Employer or contractor must ensure that a container or piping that contains or has contained a flammable substance is purged using an effective method to remove the flammable substance from the container or piping before any hot work is begun on that container or piping;
5. Employer or contractor must not require or permit any welding or cutting of metal that has been cleaned with a flammable or combustible liquid until the metal has thoroughly dried; and
6. Employer, contractor, or owner must ensure that portable fire extinguishers are placed no more than 9 metres away

from each welding or cutting operation in progress (*OHS Regs*, Sec. 25).

Gas Welding:

1. If gas burning or welding equipment is in use, employer or contractor must ensure that: (a) approved flashback devices are installed on both hoses at the regulator end; and (b) acetylene and liquified gas containers are used and stored in an upright position; and
2. Workers must shut off the container valve and release the pressure in the hose when the they're finished with any gas burning or welding equipment and are unlikely to use it within the next 2 hours (*OHS Regs*, Sec. 25-15).

PPE:

1. Employer or contractor must take all reasonable steps to ensure that a worker doesn't perform electric arc welding if another worker may be exposed to radiation from the arc, unless the other worker is using a suitable industrial eye protector or is protected from the radiation by a suitable screen; and
2. A worker may not perform electric arc welding if another worker may be exposed to radiation from the arc, unless the other worker is using a suitable industrial eye protector or is protected from the radiation by a suitable screen (*OHS Regs*, Sec. 7-8).

NORTHWEST TERRITORIES & NUNAVUT

General:

1. If a flammable substance is or may be present, employer must ensure that no hot work is performed until: (a) suitable tests have been conducted that: (i) indicate whether the atmosphere contains a flammable substance in a quantity sufficient to create an explosive atmosphere; and (ii) confirm that the work may be safely performed;

and (b) appropriate work procedures are implemented to ensure continuous safe performance of the work;
2. While hot work is performed, employer must conduct the above required tests at intervals appropriate to the work being performed and record the results;
3. Employer may not require or permit any hot work to be performed in the vicinity of a material that constitutes a fire hazard until suitable steps are taken to reduce the risk of fire;
4. Employer must ensure that a container or piping that contains or has contained a flammable substance is purged using an effective method to remove the flammable substance from the container or piping before any hot work is begun on that container or piping;
5. Employer must not require or permit any welding or cutting of metal that's been cleaned with a flammable or combustible liquid until the metal has thoroughly dried (*OHS Regs*, Sec. 404); and 6. Employer must ensure that portable fire extinguishers are placed no more than 9 metres away from a welding or cutting operation in progress (*OHS Regs*, Sec. 395(2)).

Gas Welding:

1. If gas burning or welding equipment is in use, employer must ensure that: (a) approved flashback devices are installed on both hoses at the regulator end; and (b) acetylene and liquified gas containers are used and stored in an upright position; and
2. Workers must shut off the container valve and release the pressure in the hose of gas burning or welding equipment if: (i) they're unlikely to use it, or (ii) leave the equipment unattended (*OHS Regs*, Sec. 407).

PPE:

1. Employer must take all reasonable steps to ensure that a worker doesn't and a worker must not perform electric

arc welding if another worker may be exposed to radiation from the arc, unless the other worker is using an approved industrial eye protector or is protected from the radiation by an approved screen; and
2. A worker required to use an industrial eye protector or face protector must not wear contact lenses (*OHS Regs*, Sec. 97).

YUKON

General:

1. Welding, cutting, and similar processes must be carried out in accordance with: (a) CSA Standard W117.2-01 or other similar standard acceptable to the board, or (b) the manufacturer's instructions and recommendations for the equipment used;
2. Welding on a building or structure, equipment, pipeline, or pressure containment system must be carried out according to the standard and code specified by the authority with jurisdiction;
3. Welding equipment, including regulators, reducing valves, and hoses, may be used only for the gas for which they're designed;
4. Suitable devices to prevent reverse gas flow and arrest a flashback must be installed on each hose in an oxy-fuel system between the torch and regulator in accordance with manufacturer's instructions;
5. A screen, curtain, or partition near an arc welding operation must be made of, or treated with, a flame resistant material or coating, and have a non-reflective surface finish;
6. An area where electric welding is carried out must be kept clean and free of electrode stubs and metal scraps;
7. An electric welding machine must be located in a dry area according to CSA Standard C22.1-06, Canadian Electrical Code, Part 1, current edition, or other

similar standard acceptable to the board;
8. Tables, jigs, or any work bench used for support during welding, cutting, burning, or soldering operations must be made of fire resistant materials;
9. All surfaces in welding, cutting, burning, or soldering operations must be made of non-reflective materials; 10. Overhead welding or cutting operations must be carried out so as to prevent slag or sparks from falling on persons or combustible materials below; and
10. A fire watcher must be assigned to monitor the work when welding occurs in an area where combustibles may be affected by sparks and heat (*WSC Regs*, Sec. 13.08).

1. Before gas welding or burning is carried out, the equipment must be free from defects, leaks, oil, and grease;
2. An electrical welding machine may not be pulled by its electrical cable;
3. A recently welded or flame-cut work must be marked “HOT” or effectively guarded to prevent contact by a worker who hasn’t been directly involved with the hot-work and is likely to enter the work area;
4. Arc welding electrodes or ground leads must not be hung over any compressed gas cylinder; and
5. Welding and cutting torches and their fittings and regulators must be inspected before use to ensure they’re in safe working condition (*WSC Regs*, Sec. 13.09).

Hot Work: When welding, cutting, burning or other hot work is conducted on vessels, tanks, pipes, tankers, reservoirs or other containers or their components:

1. Vessels, tanks, pipes, tankers, reservoirs or other containers or their components that hold or have held a combustible, flammable or explosive substance must be thoroughly drained, cleaned, ventilated, and tested before hot work is performed;

2. Where necessary, steam, or an inert gas such as nitrogen must be used to purge explosive or flammable substances that are or may be present;
3. No work may be done where the presence of flammable or explosive substance is likely to be present, until: (a) tests have been carried out by a qualified person to ensure the work can be safely performed, and (b) suitable work procedures have been developed and implemented, including additional tests made at intervals to ensure the continued safety of workers; and
4. If purging has been carried out and tests indicate the absence of flammable or explosive gases or vapours in containers or components, the hot-work must be started without delay (*WSC Regs*, Sec. 13.10).

Contaminants:

1. Silver solder containing cadmium must not be used until a safe work procedure is developed and approved by a professional engineer or other competent person;
2. Any fixed workplace must have effective local exhaust ventilation to minimize worker exposure to harmful air contaminants produced by welding, burning, or soldering;
3. Work areas close to welding, cutting, burning, or soldering must be monitored to ensure that the concentration of the air contaminants are kept within the limits, as established by the *Occupational Health Regulations*;
4. No welding, cutting, burning, or soldering operation may be carried out until the requirements under subsection (3) are met;
5. A coating on metal that could emit harmful contaminants (such as lead, cadmium, and chromium), organic materials, or toxic combustion products, must be effectively removed from the base metal, whenever practicable, before welding or cutting begins;
6. Respiratory protective equipment must be used only: (a)

for short duration welding or burning operations if the use of effective local exhaust ventilation is not practicable, and (b) during emergency work, if the installation of ventilation equipment is not practicable (*WSC Regs*, Sec. 13.11).

Fire Prevention:

1. Welding, cutting, burning, or soldering operations may not be carried out at a workplace unless the surrounding area has been thoroughly inspected to ensure that all the combustible, flammable, or other explosive materials (including dust, gas, or vapour) have been removed, or other equally effective measures have been taken to prevent the possibility of a fire or explosion;
2. Suitable fire extinguishing equipment in good working order must be readily available where any welding, burning, cutting, soldering operation, or any other allied process using heat application is performed; and
3. The location of the fire extinguishing equipment must be marked and made known to workers (*WSC Regs*, Sec. 13.12(1) to (3)).

PPE & Protective Clothing:

1. The following protective clothing and equipment must be used when involved in welding, burning or similar operations: (a) flame resistant work clothing, (b) gauntlet gloves of leather or other suitable material and arm protection, (c) an apron of leather or other suitable material for heavy work, (d) eye and face protection against harmful radiation, particles of molten metal, and while chipping and grinding welds, and (e) substantial safety footwear made of leather or other suitable material;
2. Only clothing made of cotton, wool or leather may be worn when welding, cutting or burning;
3. Ragged or oil-soaked clothing may not be worn by a

worker involved in or near welding or burning activity (*WSC Regs*, Sec. 13.12(4) to (6)); and

4. Arc welding may not be carried out unless workers who may be exposed to radiation from the arc flash wear suitable PPE, including eye protection, or are protected by adequate screens, curtains, or partitions (*WSC Regs*, Sec. 13.08(5)).