

ELECTRICAL SAFETY

1. Task

Working safely around electrical supply and with electrical tools on construction sites.

2. Hazards

Electrocution, burns, fires, arc flash, interruption of service to essential equipment.

3. Controls

Pre-Job Safety Assessment (PSA). CSA/ANSI approved equipment, qualified trained workers, proper lockout procedures, effective grounding of electrical circuits, equipment inspection, identification of live electrical circuits, insulation and containment of connections in junction boxes, locks on panel boxes and equipment rooms.

- ❖ SHORT CUTS AND POOR WORK PERFORMANCE WILL NOT BE TOLERATED.
- ❖ Exposed circuit parts/wires must be capped with insulated connectors and terminated to covered junction boxes -treat all electrical equipment as live until a qualified electrician determines that it has been disconnected.
- ❖ All bare live parts must be guarded against accidental contact by means of approved cabinets or other forms of approved enclosures except where exempted by Code.
- ❖ All work on live circuits must be performed in accordance with Live Wire Safe Work Procedures. At no time are unqualified workers to work on live circuits.
- ❖ Prior to drilling, nailing, cutting, sawing or fastening into walls, ceilings and floors, check for electrical wires or equipment. (Use x-rays, scans, drawings, site drawings). Special precautions must be taken around electrical vaults and horizontal and vertical duct banks. Sole reliance on as-built drawings may not be adequate.
- ❖ In "C" panels, only use supplier-approved components.
- ❖ Adequate PPE must be used when working with electrical wires i.e. insulated blankets, covers, adequate grounding methods, approved barriers, mats and insulated gloves or sleeves.
- ❖ Flame resistant outerwear must be used by workers who may be exposed to the hazard of flash fire or electrical flashover (arc flash hazard). Flame resistant outerwear and other appropriate ARC flash PPE (as required by provincial regulations) must be worn.
- ❖ Warning signs and barricades must be used to limit access to areas with live circuits, i.e. "DANGER DUE TO _____.", "AUTHORIZED PERSONNEL ONLY".
- ❖ All equipment and tools must be in working order and checked for defects before any work can be done.
- ❖ Do not use metal or aluminum ladders when working near exposed, energized circuits.
- ❖ Elevated work close to power lines is only to be done by a fully qualified/competent worker. These workers must know the safe minimum working distance for their work as laid out by provincial regulations.
- ❖ NO ONE is to approach, lean on, or touch vehicles that are working near overhead power lines.
- ❖ If electrical contact is made with vehicle stay in the seat and do not touch metallic surfaces. If you must exit the vehicle, jump to the ground with both feet together, "hop" with both feet together until at least 15 meters (50 feet) away from the vehicle – do not touch the vehicle! Exit only in case of extreme hazard exposure such as fire or imminent explosion-otherwise stay in the vehicle until line is de-energized.
- ❖ When working in an extremely hazardous electrical area, there must be TWO or more people with at least ONE posted as a safety watch in the event of an accident. Safety watch must be trained in CPR and rescue breathing.
- ❖ All electrical rooms and vaults that are energized must be locked with warning signs.



Best Personnel Safe Work Practices & Procedures Manual

- ❖ The spread of fire through electrical installations via fire stopped partitions, floors, hollow spaces, firewalls or fire partitions, vertical shafts, or ventilating or air-conditioning duct must be reduced to a minimum. Where a fire separation is pierced by a raceway or cable, any openings around the raceway or cable shall be properly closed or sealed in compliance with the National Building Code of Canada.
- ❖ Electrical equipment likely to require examination, adjustment, servicing, or maintenance while energized (see also Live Wire Safe Work Procedure), shall be field marked to warn persons of potential electric shock and arc flash hazards. The marking shall be located so that it is clearly visible to persons before work activities proceed.
- ❖ All operating electrical equipment must be kept in safe and proper working condition and conform to CSA Standards. Periodic inspection will determine equipment safety and defective equipment will be repaired or permanently disconnected.
- ❖ Where explosive or flammable materials or gases are present, special precautions shall be observed as follows; repairs or alterations shall not be made on any live equipment fittings or seals in enclosures shall be maintained in their original safe condition.
- ❖ Flammable material shall not be stored or placed in dangerous proximity to the electrical equipment.
- ❖ Arc producing electrical equipment shall not be installed within 1m (3.3ft.) of the discharge of a combustible gas relief device or vent when installed outdoors.
- ❖ All passageways and working space around electrical equipment must always be clear of obstruction to give authorized persons access to maintenance area. A minimum of 1m (3.3ft.) working space with secure footing will be maintained and electrical rooms will have easy access and not be used for the storage of materials.
- ❖ No electrical equipment shall be used in hazardous locations unless it is essential for the process being carried on and is approved for use including the exposure to the specific gas, vapor, mist or dust that will be present. All other electrical equipment such as service equipment, panel boards, switchboards, etc. must be in rooms or areas of the building where hazardous conditions do not exist.
- ❖ Conductors must be insulated or covered throughout their entire length to comply with these groups.
- ❖ Conductors must be manufactured to rated and tested insulated levels.
- ❖ Do not wear rings, watches, jewelry or anything metallic.
- ❖ Wear CSA green triangle work boots that have neoprene or rubber soles. Worn down boots provide no insulation.
- ❖ All power tools must be grounded through a three-prong plug or have a double insulated casing.
- ❖ All portable welding and generating equipment will be effectively grounded.
- ❖ All electrical cords will be connected to a CSA approved GFCI. Protect cords from traffic and sharp edges. Consider running cords through overhead locations. If wires are to be hung, use non-conductive material to hang them.
- ❖ Before working on a circuit, all lockouts must be in place.
- ❖ The following charts outline the safe limit of approach distances from overhead power lines for persons and equipment for Alberta, Ontario, Manitoba, British Columbia and Atlantic Canada.
- ❖ All temporary electrical service panels must be equipped with Ground Fault Circuit Interrupters (GFCI).
- ❖ Keep power cords away from heat, water, oil, and abrasive surfaces-they can damage the insulation and cause electrical shock.

Alberta

Operating voltage between conductors of overhead power line	Safe limit of approach distance for persons and equipment
0 – 750 volts insulated, or polyethylene covered conductors (1)	300 millimeters
0-750 volts Bare, uninsulated	1.0m 3ft 3in
Above 750 volts Insulated conductors (1) (2)	1.0m 3ft 3in
750 volts - 72 kV	3.5m 12ft
72 kV - 144 kV	4.0m 13ft
144 kV - 260 kV	5.0m 16ft
260 kV - 500 kV	7.0m 23ft

Notes: (1) Conductors must be insulated or covered throughout their entire length to comply with this group. (2) Conductors must be manufactured to rated and tested insulated levels.

Ontario

Nominal Phase-to-Phase Voltage Rating	Minimum Distance
750 – 150 000 volts	3.0m 10ft
More than 150 000 - 250 000 volts	4.5m 15ft
More than 250 000 volts	6.0m 20ft

Manitoba

Operating voltage between conductors of overhead power line	Safe limit of approach distance for persons and equipment
750 volts - 75 kV	3.0m 10ft
75 kV - 250 kV	4.5m 15ft
250 kV - 500 kV	6.0m 20ft

British Columbia

Voltage Phase to Phase	Minimum Distance
Over 750 V to 75 kV	3.0m 10ft
Over 75 kV to 250 kV	4.5m 15ft
Over 250 kV to 550 kV	6.0m 20ft

Newfoundland

Voltage Phase to Phase	Minimum Distance
Over 750 V to 75 kV	3.0m 10ft
Over 75 kV to 250 kV	4.5m 15ft
Over 250 kV to 550 kV	6.0m 20ft