

Understanding Workplace Electrical Safety

One of the most common misconceptions in workplaces stems from differences in terminology. Canada's first Workplace Electrical Safety Standard (Canadian Standards Association - CSA Z462) focuses strictly on 'arc flash,' while the new standard also includes a guideline on electrical shock. The CSA standard is more comprehensive and far-reaching, representing a broad cultural shift in workplace electrical safety.

It is important that workplace electrical safety be treated with the same respect as other health and safety hazards, such as fall arrest and confined space entry. From these guidelines, an electrical safety program may be developed and could become a component of the institution's health and safety program. It is not just about issuing personal protective equipment but also providing training or conducting an arc flash hazard assessment. To help review the basics of arc flash safety, we spoke with Len Cicero, the founder of LENCO Training & Technical Services.

Question #1: Can a CSA standard be enforced as legislation by the Ministry of Labour?

Answer: As a tradition, CSA standards such as CSA Z462 have been written to complement and are considered voluntary best practice guidelines. If, however, the provincial or federal government chooses to reference it in regulation, it then becomes a 'Code' used by the workplace parties for compliance or by a Ministry of Labour inspector for enforcement purposes. The first edition of CSA Z462 (January 2009) will be recognized as a voluntary best practice standard for use anywhere in Canada.

Question #2: What is an arc flash and how does it apply to the educational sector?

Answer: Simply put, an electric arc is a short circuit through the air. When insulation or isolation is breached or can no longer withstand the applied voltage, the air between the conductors becomes ionized. Ionized air will conduct electricity and an arcing fault occurs between those conductors. In addition, a flash hazard usually involves a person interacting with the equipment (e.g. testing; dropping of a tool) in a manner that could cause an electric arc. The dangers of an arc flash become a concern when the system nominal voltage is greater than 240 Volts and there is greater than 10,000 Amperes of available fault current.

Question #3: What training is required to reset a breaker on a sealed electrical panel?

Answer: One must realize that closed doors or covers on panels may not provide enough protection from an arc flash event. Workers must be made aware of this; they also need to be made aware of the dangers other than extreme heat and light associated with the flash. The explosive energy includes a broad spectrum of electromagnetic energy, plasma, fragments and a spray of molten materials. The safe operation of a disconnect switch or circuit breaker should be a component of the training.

Question #4: Are employers required to label and identify all incoming power supplies?

Answer: Currently, the only requirement for labelling is an 'Arc Flash and Shock Hazard' warning label, as specified in Rule 2-306 of the Canadian Electrical Code. A detailed warning label, subsequent to an arc flash hazard analysis that has been performed, is not mandatory in Ontario.

Question #5: What personal protective equipment (PPE) is required to protect workers against an arc flash?

Answer: It is referred to Electrical Specific PPE. This is specialized clothing and equipment worn by workers, designed for protection against the electrical hazards of arc flash and electric shock. Ensure that clothing is arc-rated, flame resistant (FR) and has been manufactured in accordance with ASTM F 1506.

Question #6: If an employee is trained on electrical equipment and wears proper arc flash PPE, can he or she work on energized equipment?

Answer: It must be noted that one is trained to work on energized electrical equipment. Working on energized electrical equipment involves testing, troubleshooting, and repair. Practically, testing and troubleshooting is done with the power on or the circuit energized, and is performed wearing electrical specific PPE, as indicated above. It is the repair aspect of working energized that is now becoming discouraged (removing or replacing components, making, or tightening connections).

Question #7: Does a workplace electrical safety program eliminate the requirement for lockout/tagout program?

Answer: Definitely not! Lockout must be paramount in all cases. You will see when reading through Z462 (Establishing an Electrically Safe Work Condition) that lockout is very important. There is a very unique relationship, from both a technical and practical aspect, between lockout and working energized. CSA Z460 (Lockout) and CSA Z462 are referred to as 'sister standards' and will complement each other. The need for a workplace electrical safety standard originated partially from the old technical committee of CSA Z460.

Question #8: How often should an employee inspect his or her personal protective equipment?

Answer: As with any other PPE, electrical specific PPE should be inspected prior to use, every day. Clothing must be inspected for holes, tears, etc. Clothing that has significant spots of grease, oils, etc., should be removed. Face shields also must be checked for cracks or broken parts. A visual and inflatable test should be done prior to the use of rubber and insulating gloves. I recommend that a company follow ASTM F496, for the testing of rubber insulating gloves, which states that the gloves be tested prior to the first issue and every six months thereafter.

If you have any questions regarding your electrical safety, lockouts, or arc flash safety programs, please contact your ESAO field consultant. Click [here](#) for the complete list of ESAO Field Consultants.

Len Cicero is also a certified master and industrial electrician who delivers technical training all over Canada. Len is an active member of the CSA technical committee for CSA Z460 and CSA Z462. More information can be found at Len's website: www.arcflash.ca