# ELECTRICAL Safety Measures

**"Elimination is the first priority! Ensure a risk assessment is completed before energized work tasks are completed."**

## CSA Z462 Clause 4.1.9 Host And Contract Employer's Responsibilities

**By Terry Becker, P.Eng., CESCP, IEEE Senior Member**

When I work with clients to implement an Electrical Safety Program (ESP) as required by CSA Z462, Clause 4.1.7, I advise them that the developed and implemented Electrical Safety Program applies to both employees and third-party contractors. The contractor can be an organization that provides "Qualified Persons" that will complete energized electrical work tasks at the client's facility(ies). In this case OH&S Regulations and responsibility/liability would be applicable to both the client (the "Host" as indicated in CSA Z462, Clause 4.1.9) and the third-party contractors' owners/management/supervisors.

In fact, in recent ESP Roll Out Orientation Training I provided, several questions came up with respect to "does CSA Z462 and all of its requirements apply to third party

contractors working on our property?" My answer was "Yes."

Within an employer's Electrical Safety Program it needs to identify and clarify worker roles, the "Qualified Person" worker role can be an employee or contractor. Inherently, many of the worker roles will not be employees as there is no justification for a full-time employee for the specific worker role, or with respect to specialized electrical equipment testing on high voltage and low voltage electrical equipment this testing would not be completed by an employee.

Typically using recognized trade designations contract workers may be a "Task Qualified Worker" as "HVAC Technicians, Overhead Door/Crane Mechanics, Elevator Mechanics, Cathodic Protection Technicians, or Fire Alarm Technicians." Third-party contractors could also be Journeyperson Electricians or Instrumentation Technicians, or specialized maintenance and testing contractors employing Journeyperson Electricians, Power System Electricians, Power Line Technicians, Certified Electrical Engineering Technologists or Professional Electrical Engineers.

When an independent electrical contractor, specialized electrical equipment maintenance contractor or electrical equipment manufacturers' representative is utilized for construction commissioning, electrical equipment maintenance and specialized electrical equipment testing, the contract employees or sub-contractors they employ shall be qualified and competent to undertake the energized electrical work tasks for which they are contracted.

With respect to the identified contractor workers listed above the client or host as identified in CSA Z462, Clause 4.1.9 Host and Contract Employer's Responsibilities shall ensure that the following information is a component of pre-qualification and confirmed with respect to the contractor hired:

1. The contractor has confirmed that qualified and competent QEWs, TQWs or QIWs will be provided. Where the contract worker is a QEW they shall have appropriate skills, knowledge, experience, and competency to work on low or high voltage electrical power distribution equipment for jobs assigned to them, as outlined in CSA Z462, Clause 4.1.8 Training.

2. The contract employer shall have a documented Electrical Safety Program based on the requirements of the CSA Z462 Workplace electrical safety Standard, Clause 4.1.7.

3. The employees of the contractor document an Energized Electrical Job Safety Plan before completing an energized electrical work task(s) in compliance with CSA Z462 Clause 4.1.7.9.2.

4. The contract employer has provided electrical safety training to their employees that will be exposed to arc flash and shock hazards while performing energized work tasks for the client or host as outlined in CSA Z462, Clause 4.1.8. Training certificates shall be provided when requested. This includes training on emergency release of an electric shock victim.

**Table 1: Two Arc-Rated Level Arc Flash PPE System**

| Arc-Rating Level (ATPV) | Arc Flash PPE Minimum Requirements |
|---|---|
| **Level 1**<br>8.0-12.0 cal/cm$^2$ | **Body:** Everyday/task wear long sleeved shirt/pant or coverall (with storage bag). 100% natural fibre clothing to be worn underneath. "Escape Strap" vest recommended be available for use.<br><br>**Head & Face:** CSA approved eyewear, clear lens. Arc-rated balaclava and arc-rated face shield (with storage bag) with true color grey lens, Class E hard hat and LED lamp.<br><br>**Hearing:** Minimum ear canal insert ear plugs.<br><br>**Hands:** Appropriate Class # of rubber insulating gloves with leather protectors (with storage bag sized to the Class #).<br><br>**Footwear:** CSA approved Ohm rated leather footwear.<br><br>**Note:** Rubber insulating gloves with leather protectors provide arc flash protection for the hands. Where there is no shock hazard exposure heavy duty leather work gloves provide arc flash protection for the hands. |
| **Level 2**<br>Minimum 75, 100 or 140 cal/cm$^2$ | **Body:** Arc flash suit: bib overalls, and jacket (with storage bag). 100% natural fibre clothing to be worn underneath. Arc flash suits with "Escape Strap" recommended.<br><br>**Head & Face:** CSA approved eyewear, clear lens. Arc flash suit hood with true color grey lens, Class E hard hat, hood ventilation system and LED lamp.<br><br>**Hearing:** Minimum ear canal insert ear plugs.<br><br>**Hands:** Appropriate Class # of rubber insulating gloves with leather protectors (with storage bag sized to Class #).<br><br>**Footwear:** CSA approved Ohm rated leather footwear.<br><br>**Notes:** Rubber insulating gloves with leather protectors provide arc flash protection for the hands. Where there is no shock hazard exposure heavy duty leather work gloves provide arc flash protection for the hands. Arc flash suits area available with an ATPV of up to 140 cal/cm$^2$ and can be procured for use. |

5. The contract employer has trained their employees to follow specific policies, and practices for energized electrical work tasks that will be completed based on the contractor's Electrical Safety Program. This may include using a specific electrical safe work procedure.

6. The contract employer has purchased and provided their employees with arc flash & shock PPE, tools and equipment as identified and required (reference Table 1 at left, Two Arc-Rated Level Arc Flash PPE System as required by CSA Z462). The contract employer shall ensure that dielectric testing of rubber insulating gloves is completed every 6 months.

The client or host is responsible to provide the contractor with available electrical hazard information – this would include providing a PDF copy of available arc flash hazard incident energy analysis reports and advising the contractor that arc flash & shock

equipment labels have been installed on electrical equipment.

The client or host will ensure the contractor receives any required overall occupational health & safety orientations and access to related HSE documentation.

The contractor will be monitored or formally audited to ensure they follow their company's specific occupational health and safety management system requirements and specific Electrical Safety Program requirements. In some cases, the contractor's policies and practices may exceed the requirements of the client or host's Electrical Safety Program. Specific review of the contractor's policies related to the requirement for an Energized Electrical Work Permit (EEWP) may be required.

A contractor may have to follow all requirements of the client or host's Electrical Safety Program if the contractor does not have a documented Electrical Safety Program, or an existing Electrical Safety Program is not complete.

The client or host should implement a formal pre-qualification process and hold contractors responsible in order to manage their OH&S regulatory obligations and liability. Table 2 at right is an example of questions that can be used to ensure contractors are held accountable.

It is critically important that the host employer hold the contractor accountable.

If you would like to review the information presented in this article please do not hesitate to contact me.

**Table 2: Electrical Contractor Electrical Safety Pre-Qualification Checklist**

| Item# | Description | Response |
|---|---|---|
| 1 | Overall Occupational Health & Safety Management System (OHSMS) developed, implemented, and audited? | Y / N |
| 2 | Does your company's OHSMS include a requirement for documented hazard identification (e.g. FLHA or equivalent) and risk assessment (e.g. Risk Assessment Matrix/Work Task Risk Register Table)? | Y / N |
| 3 | Does your company's OHSMS have a documented Lockout / Tagout Program developed and implemented? | Y / N |
| 4 | Has your company provided Lockout / Tagout training to Qualified Electrical Workers or Task Qualified Workers and training certificates are available? | Y / N |
| 5 | Does your company's OHSMS include documented Emergency Response Program and separate Incident Investigation and Reporting? | Y / N |
| 6 | Is your company COR Certified? | Y / N |
| 7 | Does your company have a developed, implemented and audited Electrical Safety Program (ESP) as required by CSA Z462, Clause 4.1.7? | Y / N |
| 8 | Does your company's ESP include a policy for the use of an Energized Electrical Work Permit (EEWP) as required by CSA Z462, Clause 4.3.2? | Y / N |
| 9 | Do you have appropriate Qualified Electrical Workers or Task Qualified Workers (e.g. qualification training and specific electrical competencies for work tasks completed on low or high voltage electrical equipment) to complete the scope of energized electrical Jobs and discrete energized electrical work tasks that would be assigned to them? | Y / N |
| 10 | Does your company document an Energized Electrical Job Safety Plan as required by CSA Z462, Clause 4.1.7.9.2? | Y / N |
| 11 | Does your company have Arc Flash & Shock Training Certificates for all Qualified Electrical Workers or Task Qualified Workers that will perform work for Canada Place, valid within the last three (3) years as required by CSA Z462 Clause 4.1.8.14? | Y / N |
| 12 | Does your company have documented Electrical Safe Work Procedures? | Y / N |
| 13 | What arc flash PPE does your Electrical Safety Program specify and what is available to Qualified Electrical Workers or Task Qualified Workers? | Y / N |
| | Everyday Wear/Task Wear Arc Flash PPE (e.g. coverall, true color grey lens arc-rated face shield c/w LED lamp, and arc rated balaclava) lowest ATPV cal/cm$^2$ : | |
| | Oberon Company "Escape Strap Vest" available for use? | Y / N |
| | Arc Flash Suit(s) (e.g. arc flash suit jacket, arc flash suit bib-overalls, arc flash suit hood c/w true color grey lens, hood ventilation system and LED lamp) ATPV cal/cm$^2$ : | |
| 14 | Are you aware that Oberon Company has available "Escape Strap" Arc Flash Suit Jacket available? | Y / N |
| | Class #(s): | |
| 15 | Are the rubber insulating gloves dielectrically tested every 6 months? | Y / N |
| 16 | Do you have approved (e.g. ASTM F1505) insulated hand tools available for your Qualified Electrical Worker or Task Qualified Workers for low voltage energized electrical work if required for use? | Y / N |
| 17 | Do you have approved test instruments for low voltage diagnostics/ troubleshooting Min. CAT III, 600V? | Y / N |

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