



# Safety ELECTRICAL Measures

"All electrical incidents are preventable!  
Keep employees safe with an up to date  
Electrical Safety Program and appropriate training."

## CSA Z462-2015, Clause 4.1.5.7 Risk Assessment Procedure

**By Terry Becker, P.Eng.**

You may not have interpreted the requirements of this NEW Clause in CSA Z462-2015 correctly. Based on training you may have received, the instructor may have avoided this topic altogether or wrongly advised you that completing a Shock Risk Assessment and an Arc Flash Risk Assessment is the Risk Assessment Procedure. You may also have requested that the arc flash incident energy analysis study report you solicited include information on the Risk Assessment Procedure and that the engineer complete the risk

assessment. Unfortunately the P.Eng. that completed the study is most likely not a CSA Z462 Subject Matter Expert or will not have any or limited experience on Occupational Health & Safety Management Systems (OHSMS) and risk assessment. Additionally the engineer is not the Qualified Person that will be performing the energized electrical work task and the engineer is not the employer or supervisor of the Qualified Person who ultimately under OH&S Regulation has the legal responsibility for the Qualified Person's health

and safety in the workplace.

As documented in CSA Z462-2015 the Clause 4.1.5.7 Risk Assessment Procedure requires:

1. That you identify if you (i.e. the Qualified Person) are exposed to arc flash or shock, one or both.
2. Assess the Risk Level of the assigned energized electrical work task.
3. Apply the Hierarchy of Controls as identified in CSA Z1000 and documented in the Note to Clause 4.1.5.7 to mitigate exposure or reduce the Risk Level to as low as reasonable practicable.

Risk assessment is defined as – “an overall process that identifies hazards, estimates the potential severity of injury or damage to health, estimates the likelihood of occurrence of injury or damage to health, and determines if protective measures are required.”

The first requirement is that the Qualified Person completing the energized electrical work task determines if they are exposed to an arc flash or shock hazard related to their assigned work task. This important first step may also be miscommunicated in training that the Qualified Person has received. In order to clarify what may have been communicated let's consider what “working on” means with respect to energized electrical work.

There are four ways to view work tasks on energized electrical equipment and NOT all of them potentially expose workers to arc flash and shock. Operating energized electrical

equipment under “Normal Operating Conditions” doesn’t expose a worker to arc flash or shock hazards, energized maintenance work tasks may expose a Qualified Person to arc flash and/or shock, approved energized repair or alteration may expose a Qualified Person to arc flash and/or shock and isolation (e.g. racking in or out power circuit breakers, or installing temporary protective grounding) related work tasks may expose a Qualified Person to arc flash and/or shock.

If a Qualified Person related to the identified general work task descriptions above is exposed to arc flash and/or shock hazards then as defined in CSA Z462-2015, Clause 4.1.5.7 an employer’s Electrical Safety Program shall provide a documented risk assessment process that must be completed before the energized electrical work task is executed by the Qualified Person. In step 2 above the work task’s Risk Level needs to be assessed.

It is important to note that energized electrical work tasks are allowed to be completed. The question that needs to be answered using the Clause 4.1.5.7 Risk Assessment Procedure is, is the Risk Level of the specific energized electrical work task acceptable. The simple answer to the Risk Assessment Procedure will ultimately be YES or NO to proceed with completing the energized electrical work task, but a formal documented risk assessment must be completed. The Qualified Person needs to receive training on how to complete the Risk Assessment Procedure, but it is recommended that the actual process be implemented using the documented process(es) in the employer’s Electrical Safety Program. It is also recommended that the Risk Assessment Procedure actually be completed by the employer’s Electrical Safety Steering Committee (ESSC). The ESSC as a team would complete and determine the specific Risk Level for typical energized work tasks performed by the Qualified Person(s). In completing a committee based risk assessment the process, the assumptions made, and any debate/discussion, would be documented. The determined Risk Level (Low, Medium or High) will result in the simple decision of Yes or No that the work task could be completed in an energized state. If the Risk Level is determined to be High then an alternate method of completing the work task must be defined or additional controls applied to reduce the Risk Level to an acceptable level (Low or Medium). It is important that you ensure that the assumptions made (Qualified & Competent worker, Human Performance Behaviour is acceptable, Normal Operating Conditions, etc.) are validated in the field by the Qualified Person using a field based document. This field based assessment confirms the committee based determined Risk Level as acceptable before the Qualified Person proceeds to complete the energized electrical work task.

The NEW CSA Z462-2015, Clause 4.1.5.7 Risk Assessment Procedure requires documentation to be created that outlines the process that will be used in the employer’s Electrical Safety Program and should include evidence that the risk assessment was completed for the specific energized electrical work task. In CSA Z462-2015 we can refer to Table 4A for a generic list of work tasks, not all of them are necessarily energized work tasks, some of them are operating related work tasks for energized electrical equipment (e.g. turning motor on or off, opening or closing a circuit breaker or disconnect switch following a procedure).



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## Electrical Hazard Risk Assessment Matrix

Consequence	Severity (SE)	Risk Class (R <sub>c</sub> )					Likelihood of Occurrence Parameter		
		4-5	6-10	11-15	16-20	21-23	Frequency (F <sub>r</sub> )	Probability (P <sub>r</sub> )	Avoidance (A <sub>v</sub> )
Work Task/ Hazard Pairs  Arc Flash, Arc Blast Pressure or Shock	8	Red	Red	Red	Red	Red	Hourly 5	Common 5	
	6	Green	Yellow	Red	Red	Red	Daily 5	Likely 4	
	3	Green	Green	Yellow	Yellow	Yellow	Weekly 4	Likely 3	Impossible 5
	1	Green	Green	Green	Green	Green	Yearly 3	Rare 2	Rarely 3
	0	Green	Green	Green	Green	Green	Less Often 2	Negligible 1	Probable 1

Unfortunately this article cannot provide all of the details you require to complete the Clause 4.1.5.7 Risk Assessment Procedure and I encourage you to review CSA Z462-2015 Annex F Risk Assessment Procedure and reference the CSA Z1002 Standard for additional generic information on risk assessments. If you need clarification you can also contact me and I can clarify the Risk Assessment Procedure and its requirements. Do not blindly trust an instructor providing training that may only have advised you that all that was required was completing a Shock Risk Assessment and Arc Flash Risk Assessment and defining PPE. Managing risk is more than just having the Qualified Person don PPE. Yes PPE is an important requirement to reduce the overall Risk Level, but the Clause 4.1.5.7 Risk Assessment Procedure must consider both Severity or Harm and Likelihood of Occurrence.

Please submit any questions or comments you may have to Kevin Buhr and myself at [kevinb@electricalline.com](mailto:kevinb@electricalline.com) and [terry.becker@esps.ca](mailto:terry.becker@esps.ca).

**Terry Becker, P.Eng., CESCP, IEEE Senior Member** is the first past Vice-Chair of the CSA Z462 Workplace electrical safety Standard and currently a Voting Member and Working Group 8 Leader, Annexes. He is also a Voting Member on the IEEE 1584 Technical Committee and an Associate Member of the CSA Z463 Guideline on maintenance of electrical systems. Terry is a Professional Engineer in the Provinces of BC, AB, SK and ON. Terry is the President & Owner of ESPS Electrical Safety Program Solutions INC., an electrical engineering consulting firm specializing in electrical safety consulting, licensed products and training solutions. [www.esps.ca](http://www.esps.ca)



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