



Safety Measures ^{ELECTRICAL}

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

High Voltage Is Not High Risk

By Terry Becker, P.Eng., CESC, IEEE Senior Member

It is interesting that these two words “High Voltage” have been used throughout the history of our use of electricity to use fear as a tactic to keep people away from electrical equipment located indoors or outdoors and in turn the perception of work performed on high voltage electrical equipment has always been considered as “high risk.” Would you believe me if I told you that actually working on low voltage electrical equipment may be a higher risk level or the same risk level as working on or near high voltage electrical equipment and that the work tasks performed on low and high voltage electrical equipment are not high risk?

Risk Assessment Procedure

In the CSA Z462 Workplace electrical safety Standard it doesn’t use the voltage level of the equipment to define low risk, medium risk, or high risk. CSA Z462 Clause 4.1.6.8 Risk assessment procedure outlines three requirements in completing a risk assessment: identify when electrical hazards exist related to a work task; assess risks; and implement risk control according to the hierarchy of risk control methods to eliminate exposure to the identified electrical hazards or reduce risk of exposure to as low as reasonably practicable. In implementing this process, it is clear that “High Voltage Is Not High Risk.”

In Clause 3 Definitions of the CSA Z462 Standard two definitions are provided to further clarify risk and risk assessment.

“Risk – a combination of the likelihood of occurrence of injury or damage to health and the severity of injury or damage to health that results from a hazard.[1]”

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

Note: As used in this Standard, “arc flash risk assessment” and “shock risk assessment” are types of risk assessments.[1]”

For energized electrical work tasks risk is not defined by the voltage of the electrical equipment.

Work Task Based, Not Voltage

The CSA Z462 Standard is a work task based Standard and the starting point and basis for the implementation of the defined Risk Assessment Procedure is the description of the specific discrete work task(s) that will be performed by a Qualified Electrical Worker. The voltage of the electrical equipment that will be worked on is secondary and is used to define if an arcing fault can be sustained and lead to an arc flash occurring and the voltage also determines if a shock hazard exposure can occur related to inadvertent movement into exposed energized conductors or circuit parts. The third consideration in completing the risk assessment procedure is the actual electrical equipment the work task will be performed on. Specific to that electrical equipment and the likelihood of occurrence is its condition of maintenance. In following this sequence, the risk level is determined based on considering the work task description first.

Shock Risk Assessment & Arc Flash Risk Assessment

As noted above risk assessment takes into consideration the likelihood of occurrence and the potential severity of injury or damage to health. These two elements are considered together to determine a discrete work task’s risk level as low, medium, or high.

There are two independent risk assessments defined in the CSA Z462 Workplace electrical safety Standard that are required to be completed as components of the overall Risk Assessment Procedure, Shock Risk Assessment and Arc Flash Risk Assessment. They require that the maximum voltage level of the electrical equipment that will be worked on is determined by the Qualified Electrical Worker before executing the work task(s) related to a Job that has been assigned to them. In

completing the Arc Flash Risk Assessment, it is noted that CSA Z462 Table 2 Estimate of the likelihood of occurrence of an arc flash incident for AC and DC systems places focus on the work task description, not voltage, and then equipment condition in determining the likelihood of occurrence of an arcing fault and arc flash.

Why Would Low Voltage Work Tasks Be Higher Risk

When completing the risk assessment procedure for a low voltage work task and considering the potential for injury or damage to health and the likelihood of occurrence, low voltage work tasks are performed more frequently, and lower voltages will result in higher available fault currents which can lead to higher incident energy levels depending on the maximum fault clearing times of protective devices associated with the low voltage electrical equipment.

There are less specific discrete work tasks performed on enclosed high voltage electrical equipment and defined industry work practices have always limited the Qualified Electrical Worker’s interaction with the high voltage electrical equipment. Work tasks are performed less frequently on high voltage electrical equipment and high voltage electrical equipment will most likely have more frequent maintenance performed on it having a positive impact on likelihood of occurrence.

Low voltage work tasks performed on low voltage electrical equipment will be the same risk level or a higher risk level that work tasks performed on high voltage electrical equipment.

High Voltage Is Not High Risk!

[1] CSA Z462 Workplace electrical safety Standard, 2018 Edition. CSA Group.

Please submit any questions or comments you may have to Kevin Buhr and Terry Becker at kevinb@electricalline.com and terry.becker@twbesc.ca.

Terry Becker, P.Eng, CEMC, IEEE Senior Member is the first past Vice-Chair of the CSA Z462 Workplace electrical safety Standard Technical Committee and currently a Voting Member and Working Group 8 Leader, Annexes. Terry is also a Voting Member on the CSA Z463 Maintenance of electrical systems Standard and a Voting Member of the IEEE 1584 Guideline for Arc Flash Hazard Calculations. Terry has presented at Conference and Workshops on electrical safety in Canada, the USA, India and Australia. Terry is a Professional Engineer in the Provinces of BC, AB, SK, MN and ON. Terry is an Electrical Safety Specialist, Management Consultant, and can be reached at 1-587-433-3777 or by email terry.becker@twbesc.ca.

CSA Z462-2018 published January 8, 2018 – Now in its fourth edition, CSA Z462 – Workplace electrical safety Standard aims to help workers install, operate and maintain energized electrical equipment safely and provide for the application of defined risk control methods to mitigate or reduce risk to those workers. The Standard provides details on the implementation of an Electrical Safety Program that will document methods to identify electrical hazards related to energized electrical work tasks, and for completing risk assessments. Among other things, it outlines electrical safety training and practices related to de-energizing as a priority, but provides requirements for energized work when it is justified. **Purchase your copy at: <http://shop.csa.ca/en/canada/c221-canadian-electrical-code/z462-18/invt/27029372018>.**