CSA Group

Z462-15

# Workplace electrical safety

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# ***Workplace electrical safety***

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# Contents

**Annexes**

**Tables**



**Figures**

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This edition of CSA Z462 is dedicated to the memory of John Salmon, whose passion towards the harmonization of both this electrical safety Standard and the CSA Z463 Standard on electrical system maintenance with the *Canadian Electrical Code* will remain a valuable contribution to the standards and code community.

# Preface

This is the third edition of CSA Z462, *Workplace electrical safety*. It supersedes the previous editions published in 2012 and 2008.

This Standard is based on NFPA 70E, *Standard for Electrical Safety for the Workplace,* and has been harmonized with Parts I, II, and III of the *Canadian Electrical Code;* CSA Z460, *Control of hazardous energy — Lockout and other methods*; and CSA M421, *Use of electricity in mines*. This revised edition of CSA Z462 has been developed by CSA Group from the original edition as promulgated by the National Fire Protection Association. In addition to its initial source, it includes significant revisions by CSA Group. This Standard is fully the responsibility of CSA Group. The NFPA, holder of the copyright in this edition, takes no responsibility for any portion thereof.

This Standard specifies requirements for and provides guidance on safety management systems, safe work procedures, and selection of personal protective equipment and other safety devices for persons exposed to hazards associated with energized electrical equipment. In addition, this Standard sets out criteria for the identification and training of qualified electrical workers and for determination of hazardous work to be performed only by those qualified individuals.

By permission of the National Fire Protection Association, many of the clauses, tables, and figures in this Standard have been copied from NFPA 70E. CSA Group wishes to thank the NFPA for its support throughout the development of this Standard.

In this 2015 edition, where a major change or addition to the previous edition of this Standard has been made, the clause, table, or figure affected is identified by the symbol delta (Δ) in the margin. Users of this Standard are advised that the change markers in the text are not intended to be all-inclusive and are provided as a convenience only; such markers cannot constitute a comprehensive guide to the revisions made to this Standard. Care must therefore be taken not to rely on the change markers to determine the current requirements of this Standard. As always, users of this Standard must consider the entire Standard.

The following is an overview of the major revisions to the 2015 edition:

(a) The 2015 edition of CSA Z462 reflects a major shift towards risk assessment. In support of this, four new definitions were added to Clause 3: “hazard”, “hazardous”, “risk”, and “risk assessment”. The definitions harmonize with other safety Standards such as CSA Z1000 and CSA Z1002. The content in the Standard was revised to ensure that these terms are used consistently and in accordance with the definitions.

(b) The term “prohibited approach boundary” was deleted throughout the Standard as shock protection requirements apply only at the limited and restricted approach boundaries; the prohibited approach boundary did not trigger any additional requirements.

(c) The requirement to establish an electrical safety program was moved forward to the front of Clause 4.1 to emphasize this key organizational component of electrical safety. Additionally, the electrical safety program must now be implemented as part of the employer’s overall occupational health and safety management system (OHSMS), when one exists. (See Clause 4.1.5.1.)

(d) The electrical safety program must now include elements that consider condition of maintenance. (See Clause 4.1.5.2.)

(e) The hierarchy of risk control found in CSA Z1000 and CSA Z1002 was added to Clause 4.1.5.7 and to the training requirements for qualified persons in Clause 4.1.6.4.1.

(f) Audits of field work to verify compliance with the procedures of the electrical safety program must be performed at intervals not to exceed 1 year. (See Clause 4.1.5.9.2.)

(g) The requirement to use Class A GFCI protection when operating or using cord- and plug-connected tools supplied by 125 V, 15, 20, or 30 A circuits was expanded to include activities related to maintenance and construction activity. (See Clause 4.1.8.3.2.)

(h) The location, sizing, and application of temporary protective grounding equipment is required to be identified as part of the employer’s job planning. (See Clause 4.2.3.1.)

(i) The contents of Clause 4.3.4 were reorganized to provide clarity and ease of use.

(j) The nominal system voltage range in Table 1A was revised . This was done to provide a dimension for the restricted approach boundary for 240 Vac single-phase systems and 208 Vac three-phase systems.

(k) Clarification was added that either the incident energy analysis method or the arc flash PPE category method, but not both, may be used on the same piece of equipment for the selection of arc flash PPE. The Clause prohibits using an incident energy analysis to specify an arc flash PPE category in Table 5. An informational note directs those that perform an incident energy analysis to Tables H.2 and H.3 for the selection of arc flash PPE. (See Clauses 4.3.5.4.1 and 4.3.5.4.2.)

(l) Field-marked equipment labelling requirements were revised to require the label to be updated when the arc flash hazard risk assessment identifies a change that renders the label inaccurate. The owner of the electrical equipment has been made responsible for the documentation, installation, and maintenance of the field-marked label. (See Clause 4.3.5.5.)

(m) The requirement prohibiting the wearing of conductive articles was clarified as applying to the restricted approach boundary or where the articles present an electrical contact hazard. (See Clause 4.3.6.4.)

(n) The hazard/risk category method was revised to become the arc flash PPE category method. Table 4A was split into two tables: Table 4A, Arc-flash hazard identification for alternating current (ac) and direct current (dc) systems, and Table 4B, Arc-flash PPE categories for alternating current (ac) systems. Table 4B became Table 4C, Arc-flash PPE categories for direct current (dc) systems. Table 4A is now used solely to identify when arc flash PPE is likely to be required. When Table 4A indicates that arc flash PPE is required, then Table 4B or Table 4C is used to identify the category of PPE for ac and dc equipment respectively. The PPE categories identified in Table 4A and Table 4B are based on specific listed minimum working distance, maximum fault current, and maximum fault clearing time parameters. Tables 4B and 4C continue to identify an arc flash boundary distance for each type of equipment.

(o) Hazard/risk category 0 has been deleted.

(p) The requirement to use insulated tools or handling equipment has been changed from the limited approach boundary to restricted approach boundary. (See Clause 4.3.7.4.2.)

(q) Barricades cannot be placed closer than the limited approach boundary. When the arc flash boundary is greater than the limited approach boundary, barricades cannot be placed closer than the arc flash boundary. (See Clause 4.3.7.4.2.)

(r) A new requirement was added for an employer to perform a risk assessment before cutting or drilling into equipment, floors, walls, or structural elements where a likelihood of contacting energized electrical lines or parts exists. (See Clause 4.3.10.)

(s) Clarification is provided that the equipment owner or the owner's designated representative is responsible for maintenance of the electrical equipment and documentation. (See Clause 5.2.3.)

(t) A risk assessment must be performed prior to any work on a battery system to identify the chemical, electrical shock, and arc flash hazards and assess the risks associated with the type of tasks to be performed. (See Clause 6.2.4.3.)

This Standard was prepared by the Technical Committee on Workplace Electrical Safety, under the jurisdiction of the Strategic Steering Committee on Occupational Health and Safety, and has been formally approved by the Technical Committee.

**Notes:**

**(1)** *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

**(2)** *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

**(3)** *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

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*(b) provide an explanation of circumstances surrounding the actual field condition; and*
*(c) where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*
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*(b) relevant clause, table, and/or figure number;*
*(c) wording of the proposed change; and*
*(d) rationale for the change.*

# *Z462-15*
# *Workplace electrical safety*

## 1 Scope

### 1.1 General
This Standard specifies requirements for workplace electrical safety necessary for the practical safeguarding of workers during activities such as the installation, inspection, operation, maintenance, and demolition of electric conductors and electric equipment, as well as work in proximity of energized electrical equipment.

### 1.2 Application
While it can be applied by organizations of any type or size, this Standard does not cover
(a) installations in ships, watercraft other than floating buildings, railway rolling stock, aircraft, and automotive vehicles other than mobile homes and recreational vehicles;
(b) installations of railways for the generation, transformation, transmission, or distribution of power used exclusively for operation of rolling stock or installations used exclusively for signalling and communications;
(c) installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations; and
(d) installations under the exclusive control of an electric utility when such installations
    (i) consist of service drops or service laterals, and associated metering;
    (ii) are located in legally established easements or rights-of-way designated or recognized by public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations; or
    (iii) are on property owned or leased by the electric utility for communications or for metering, generation, control, transformation, transmission, or distribution of electric energy.

### 1.3 Suitability
It is the responsibility of the users of this Standard to judge its suitability for their particular purpose (see Note 2 to the Preface).

### 1.4 Use with related standards and regulations
This Standard is intended for use with Parts I, II, and III of the *Canadian Electrical Code* and other related Canadian workplace electrical safety standards (e.g., CSA M421 and CSA Z460) and should be used with such Standards. In addition, users of this Standard should always refer to provincial, territorial, and federal safety regulations that have jurisdiction over their work facility, contract job site, or profession.

### 1.5 Organization of this Standard
The requirements of this Standard are divided into three main clauses, as shown in Figure 1. Annexes A to W do not specify requirements and are included for information only.

### 1.6 Measurements
The values given in SI units are the units of record for the purposes of this Standard. The values given in parentheses are for information and comparison only.