

C22.1HB-18



2018

# CANADIAN ELECTRICAL CODE HANDBOOK

AN EXPLANATION OF THE RULES OF THE CANADIAN  
ELECTRICAL CODE, PART I



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# *C22.1HB-18*

## ***CE Code Handbook***

*An Explanation of the Rules of the  
Canadian Electrical Code, Part I*



- The *Canadian Electrical Code, Part I*, is a voluntary code for adoption and enforcement by regulatory authorities.
- The *Canadian Electrical Code, Part I*, meets the fundamental safety principles of International Standard IEC 60364-1, *Low-voltage electrical installations*.
- Consult with local authorities regarding regulations that adopt and/or amend the Code.

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## Introduction to the *CE Code Handbook*

This Handbook provides background information on the reasons behind the requirements in the *Canadian Electrical Code, Part I*, and gives an explanation of the Rules in plain, easy-to-understand language. The Handbook is intended to provide a clearer understanding of the safety requirements of the Code.

The content of this Handbook is not meant to form a code of mandatory requirements. The mandatory language (“shall”) that is used in the *CE Code, Part I*, has not been used here. Care has been taken to ensure that the intent of the Code Rules is clear to the users of the Handbook. However, users of the Handbook must not under any circumstances rely on it to determine the current requirements of the Code. As always, reference must be made to the Code itself and any local amendments. CSA Group does not assume responsibility for any errors or omissions resulting from the information contained in this Handbook.

The Rules in the *CE Code, Part I*, are divided into two groups. Sections 0 to 16 and 26 are considered general Sections, and the other Sections supplement or amend those general Sections. Therefore a requirement in the supplementary Sections takes precedence over a general requirement. For example:

- Rule 12-1008 requires 3 threads to be engaged when making a threaded connection, whereas Rule 18-102 requires 5 threads to be engaged when making a threaded connection in a Zone 1 area.
- Section 4 permits the use of aluminum conductors, but Rule 32-100 does not allow aluminum conductors to be used in fire alarm systems.

## About the development of the *CE Code Handbook*

The Rationale and Intent for the first edition of this Handbook (1990) were researched and written by technical experts selected for their experience and knowledge of the subject. Their contributions were reviewed by a panel consisting of experienced inspection authorities, manufacturers, and educators responsible for teaching the *CE Code, Part I*. Technical experts developed the figures and schematics for each Section.

In the second edition of the Handbook (1994), changes were made to the Rationale and Intent, based on the deliberations of technical experts, members of the Subcommittees, and members of the Committee on *Canadian Electrical Code, Part I*. In that edition, additional information was provided in some areas under the heading “Field considerations”. Field considerations consisted of nonmandatory information to consider in the field, to ensure safe installation.

In the third edition of the Handbook (1998), changes were made to the Rationale and Intent, based on the deliberations of technical experts, members of the Subcommittees, and members of the Committee on *Canadian Electrical Code, Part I*. Supplementary information was added in some areas under the heading “Field considerations”.

In the fourth edition of the Handbook (2002), similar changes were made to the Rationale and Intent, based on the deliberations of technical experts, members of the Subcommittees, and members of the Committee on *Canadian Electrical Code, Part I*. Many detailed figures were added; the general Sections were rewritten in a simpler format; and other information was added under the heading “Field considerations”.

In the fifth edition of the Handbook (2006), the Rationale, Intent, and Field considerations were consolidated to provide a more user-friendly explanation of the Code Rules. Additional figures were provided, as well as more examples and calculations to help the user put the Code into practice.

In the sixth edition of the Handbook (2009), the content was reviewed to ensure that it was both useful and accessible to the reader. Where the Handbook commentary on a specific Code Rule in previous editions provided little or no information beyond what was given in the Code itself, the Handbook

commentary was deleted. Therefore, the sixth edition of the Handbook, unlike its predecessors, did not contain commentary on every Code Rule.

In the seventh edition of the Handbook (2012), significant revisions were made to address the extensive changes introduced in the 2012 edition of the Code. These changes affected most areas of the electrical industry. They included major updates to Section 50 on solar photovoltaic systems; a new Section 64 on renewable energy systems; several new conductor types and wiring methods; changes in ampacity calculations; revised and clarified grounding and bonding requirements; new requirements for receptacles; and new and revised requirements for electric vehicle charging infrastructure, hazardous locations, and electric heating.

In the eighth edition of the Handbook (2015), significant revisions were made to address extensive changes introduced in the 2015 edition of the Code, including the rewriting of Sections 18, 62, and 64. These revisions included changes in the calculation of ampacities, voltage drops, and conduit and tubing capacities; the use of meter bases and arc-fault and ground fault circuit interrupters; the selection of material for grounding conductors; and disconnecting requirements for generators.

In this, the ninth edition of the Handbook (2018), significant revisions have been made to many Sections, as follows:

- Section 0 clarifies the terms “jacketed”, “insulated”, and “covered”, as applied to conductors, by providing a new definition of the term “jacket” and a revision of the definition of the term “conductor” (as a result of the revision, the term “conductor” has been replaced with “insulated conductor” in many Sections of the Code);
- in many Sections, the redundant use of the term “approved” has been eliminated;
- Section 4 now requires that an identified conductor be provided for all devices controlling permanently installed luminaires;
- Section 8 now formally recognizes energy management systems as a method of reducing the load on building services;
- Section 10 has been updated, reorganized, and significantly reduced in length;
- Section 16 now has requirements for power over ethernet (POE) systems;
- Section 26:
  - now mandates the use of tamper-resistant receptacles in additional areas where children might be present;
  - has been reorganized and renumbered (from Rule 26-400 to Rule 26-726) in order to group related concepts together and provide a more logical flow for the requirements;
  - clarifies requirements for dining area and refrigerator circuits; and
  - clarifies requirements for receptacles exempted from arc-fault circuit interrupter protection;
- Section 32:
  - clarifies requirements for arc-fault circuit interrupter protection for bathrooms, washrooms, existing circuits, and circuits supplying carbon monoxide or smoke alarms; and
  - provides updated requirements for the feeders and circuits supplying fire pumps;
- Section 62 now requires ground fault circuit interrupter protection for heating devices and controls in proximity to tubs, sinks, and shower stalls;
- Section 78 provides substantially updated and reorganized requirements for marinas, wharves, and similar facilities; and
- Section 82 has been deleted as it covered a technology that is no longer in use.

**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 Handbook is stated in its Introduction, it is important to note that it remains the responsibility of the users of this Handbook to judge its suitability for their particular purpose.*

- 3) All enquiries regarding this Handbook should be addressed to CSA Group, 178 Rexdale Blvd., Toronto, Ontario, Canada M9W 1R3.

### Excerpt from the Preface to the *CE Code, Part I*

This twenty-fourth edition of the *Canadian Electrical Code, Part I*, was approved by the Committee on the *Canadian Electrical Code, Part I*, and by the Regulatory Authority Committee at their June 2017 meetings in Halifax, Nova Scotia. This twenty-fourth edition supersedes the previous editions, published in 2015, 2012, 2009, 2006, 2002, 1998, 1994, 1990, 1986, 1982, 1978, 1975, 1972, 1969, 1966, 1962, 1958, 1953, 1947, 1939, 1935, 1930, and 1927.

This edition features important revisions to many Sections. Section 26 now mandates the use of tamper-resistant receptacles in additional areas where children may be present. Section 62 now requires ground fault circuit interrupter protection for heating devices and controls in proximity to tubs, sinks, and shower stalls.

Section 10 has been updated, reorganized, and significantly reduced in length. Requirements for power over ethernet systems have been added to Section 16, and requirements for marine wharves and similar facilities have been substantially updated and reorganized in Section 78.

To address the increasing use of electric vehicles, Section 8 now formally recognizes energy management systems as a method of reducing the load on building services. Because lighting control devices associated with energy management or home automation require power to operate, Section 4 now requires that an identified conductor be provided for all devices controlling permanently installed luminaires.

Other revisions in this edition include the following:

- in Section 26, Rules 26-400 to 26-726 have been reorganized and renumbered in order to group related concepts together and provide a more logical flow for the requirements;
- in many Sections, the redundant use of the term “approved” has been eliminated;
- clarification has been provided on arc-fault circuit interrupter protection for bathrooms, washrooms, existing circuits, and circuits supplying carbon monoxide or smoke alarms;
- requirements for dining area and refrigerator circuits have been clarified;
- the terms “jacketed”, “insulated”, and “covered” as applied to conductors have been clarified through a new definition of the term “jacket” and a revised definition of the term “conductor” in Section 0. As a result, the term “conductor” has been replaced with “insulated conductor” in many Sections of the Code;
- Section 82 has been deleted as it covered a technology that is no longer in use; and
- a new Appendix M containing French translations of markings has been added.

Many of the changes in this edition were developed by cross-functional working groups. Their work is gratefully acknowledged.

### General arrangement

The Code is divided into numbered Sections, each covering some main division of the work. Sections 0 to 16 and 26 are considered general Sections, and the other Sections supplement or amend the general Sections. The Sections are divided into numbered Rules, with captions for easy reference, as follows:

- a) **Numbering system** — With the exception of Section 38, even numbers have been used throughout to identify Sections and Rules. Rule numbers consist of the Section number separated by a hyphen from the 3- or 4-digit figure. The intention in general is that odd numbers may be used for new Rules required by interim revisions. Due to the introduction of some new Rules and the deletion of some existing Rules during the revision of each edition, the Rule numbers for any particular requirement are not always the same in successive editions.

- b) **Subdivision of Rules** — Rules are subdivided in the manner illustrated by Rules 8-204 and 8-206, and the subdivisions are identified as follows:

00-000	Rule
1)	Subrule
a)	Item
i)	Item
A)	Item

- c) **Reference to other Rules, etc.** — Where reference is made to two or more Rules (e.g., Rules 10-200 to 10-206), the first and last Rules mentioned are included in the reference. Where reference is made to a Subrule or Item in the same Rule, only the Subrule number and/or Item letter and the word “Subrule” or “Item” need be mentioned. If the reference is to another Rule or Section, then the Rule number and the word “Rule” shall be stated (e.g., “Rule 10-206 3”) and not “Subrule 3) of Rule 10-206”).

### **The history and operation of the *Canadian Electrical Code, Part I***

The preliminary work in preparing the Canadian Electrical Code began in 1920 when a special committee, appointed by the main Committee of the Canadian Engineering Standards Association, recommended its development. A third meeting of this Committee was held in June 1927 with representatives from Nova Scotia, Québec, Ontario, Manitoba, Saskatchewan, and British Columbia in attendance. At this meeting, the revised draft, which had been discussed at the previous two meetings, was formally approved and it was resolved that it be printed as Part I of the *Canadian Electrical Code*.

The Committee on the *CE Code, Part I*, is composed of 41 members, with representation from inspection authorities, industry, utilities, and allied interests. The main Committee meets once a year and deals with reports that have been submitted by the Section Subcommittees, which work under the jurisdiction of the main Committee. Suggestions for changes to the Code may be made by any member of the Committee or anyone outside the Committee as outlined in Clause C6.

## Metric units

### Symbols and conversion factors for SI units

Recognized symbols for SI units have been used in the *Canadian Electrical Code, Part I*. For the convenience of the user, these symbols and the units they represent have been listed in the following table; the table also gives a multiplying factor that may be used to convert the SI unit to the previously used unit.

Symbol	SI unit	Multiplying factor for conversion to previously used unit	Previously used unit
A	ampere(s)	1	ampere(s)
cm <sup>3</sup>	cubic centimetre(s)	0.061	cubic inch(es)
°(s)	degree(s) (angle)	1	degree(s) (angle)
°C rise	degree(s) Celsius	1.8	degree(s) Fahrenheit
°C temperature	degree(s) Celsius	1.8 plus 32	degree(s) Fahrenheit
h	hour(s)	1	hour(s) (time)
Hz	hertz	1	cycles per second
J	joule(s)	0.7376	foot-pound(s)
kg	kilogram(s)	2.205	pound(s)
kJ	kilojoule(s)	737.6	foot-pound(s)
km	kilometre	0.621	mile(s)
kPa	kilopascal(s)	0.295	inch(es) of mercury
		0.334	feet of water
		0.145	pound(s) per square inch (psi)
kW	kilowatt	3415.179	BTU/h
lx	lux	0.093	foot-candle(s)
L	litre	0.220	gallon(s)
m	metre(s)	3.281	feet
m <sup>2</sup>	square metre(s)	10.764	square feet
m <sup>3</sup>	cubic metre(s)	35.315	cubic feet
MHz	megahertz	1	megacycles per second
min	minute(s)	1	minute(s)
mL	millilitre(s)	0.061	cubic inch(es)
mm	millimetre(s)	0.03937	inch(es)
mm <sup>2</sup>	square millimetre(s)	0.00155	square inch(es)
N•m	newton•metre	8.85	pound-force inches
Ω	ohm(s)	1	ohm(s)

<b>Symbol</b>	<b>SI unit</b>	<b>Multiplying factor for conversion to previously used unit</b>	<b>Previously used unit</b>
Pa	pascal(s)	0.000295	inch(es) of mercury
		0.000334	feet of water
		0.000145	pounds per square inch (psi)
s	second(s)	1	second(s)
V	volt(s)	1	volt(s)
W	watt(s)	1	watt(s)
μF	microfarad(s)	1	microfarad(s)

### Conduit sizes

Starting in the 2006 edition of the Code, the metric trade designator has been used exclusively to identify conduit size. The following table is provided for convenience only.

#### Conduit trade sizes

<b>Inches</b>	<b>Metric designator</b>
3/8	12
1/2	16
3/4	21
1	27
1-1/4	35
1-1/2	41
2	53
2-1/2	63
3	78
3-1/2	91
4	103
5	129
6	155
8	200

## Reference publications

The *Canadian Electrical Code, Part I* refers to the following publications, and the year dates shown indicate the latest editions available at the time the Code was approved:

### CSA Group

6.19-17

*Residential carbon monoxide alarming devices*

ASME A17.1-2013/CSA B44-13

*Safety code for elevators and escalators*

CSA B44.1-14/ASME A17.5-2014

*Elevator and escalator electrical equipment*

B52-13

*Mechanical refrigeration code*

CAN/CSA-B72-M87 (R2013)

*Installation code for lightning protection systems*

B108-14

*Compressed natural gas fuelling stations installation code*

B149.1-15

*Natural gas and propane installation code*

B149.2-15

*Propane storage and handling code*

B355-15

*Lifts for persons with physical disabilities*

CAN/CSA-B613-00 (withdrawn)

*Private residence lifts for persons with physical disabilities*

CAN/CSA-C22.2 No. 0-10 (R2015)

*General requirements — Canadian Electrical Code, Part II*

C22.2 No. 1-04 (withdrawn)

*Audio, video, and similar electronic equipment*

C22.2 No. 3-M1988 (withdrawn)

*Electrical features of fuel-burning equipment*

C22.2 No. 4-16

*Enclosed and dead-front switches*

C22.2 No. 5-16

*Molded-case circuit breakers, molded-case switches, and circuit-breaker enclosures*

C22.2 No. 14-13

*Industrial control equipment*

C22.2 No. 18.1-13

*Metallic outlet boxes*

C22.2 No. 18.2-06 (R2016)

*Nonmetallic outlet boxes*

C22.2 No. 18.3-12 (R2017)

*Conduit, tubing, and cable fittings*

C22.2 No. 18.4-15

*Hardware for the support of conduit, tubing, and cable*

C22.2 No. 29-15

*Panelboards and enclosed panelboards*

C22.2 No. 35-09 (R2014)

*Extra-low-voltage control circuit cable, low-energy control cable, and extra-low-voltage control cable*

C22.2 No. 38-14

*Thermoset-insulated wires and cables*

C22.2 No. 41-13

*Grounding and bonding equipment*

C22.2 No. 42-10 (R2015)

*General use receptacles, attachment plugs, and similar wiring devices*

C22.2 No. 42.1-13

*Cover plates for flush-mounted wiring devices*

C22.2 No. 45.1-07 (R2017)

*Electrical rigid metal conduit — Steel*

C22.2 No. 46-13

*Electric air-heaters*

C22.2 No. 48-15

*Nonmetallic sheathed cable*

C22.2 No. 49-14

*Flexible cords and cables*

C22.2 No. 51-14

*Armoured cables*

C22.2 No. 52-15

*Underground secondary and service-entrance cables*

C22.2 No. 56-17

*Flexible metal conduit and liquid-tight flexible metal conduit*

C22.2 No. 64-10 (R2014)

*Household cooking and liquid-heating appliances*

C22.2 No. 65-13

*Wire connectors*

C22.2 No. 66.3-06 (R2015)

*Low voltage transformers — Part 3: Class 2 and Class 3 transformers*

C22.2 No. 75-17

*Thermoplastic insulated wires and cables*

C22.2 No. 77-14

*Motors with inherent overheating protection*

C22.2 No. 82-1969 (R2013)

*Tubular support members and associated fittings for domestic and commercial service masts*

C22.2 No. 83-M1985 (R2017)

*Electrical metallic tubing*

C22.2 No. 83.1-07 (R2017)

*Electrical metallic tubing — Steel*

C22.2 No. 85-14

*Rigid PVC boxes and fittings*

C22.2 No. 96-17

*Portable power cables*

C22.2 No. 100-14

*Motors and generators*

C22.2 No. 106-05 (R2014)

*HRC-miscellaneous fuses*

C22.2 No. 107.1-16

*Power conversion equipment*

C22.2 No. 111-10 (R2015)

*General-use snap switches*

C22.2 No. 123-16

*Metal sheathed cables*

C22.2 No. 124-16

*Mineral-insulated cable*

C22.2 No. 126.1-17

*Metal cable tray systems*

CAN/CSA-C22.2 No. 126.2-02 (R2017)

*Nonmetallic cable tray systems*

C22.2 No. 127-15

*Equipment and lead wires*

C22.2 No. 129-10 (R2014)

*Neutral-supported cables*

C22.2 No. 130-16

*Requirements for electrical resistance trace heating and heating device sets*

C22.2 No. 131-14

*Type TECK 90 cable*

C22.2 No. 141-15

*Emergency lighting equipment*

CAN/CSA-C22.2 No. 157-92 (R2016)

*Intrinsically safe and non-incendive equipment for use in hazardous locations*

C22.2 No. 174-M1984 (R2017)

*Cables and cable glands for use in hazardous locations*

C22.2 No. 178.1-14

*Transfer switch equipment*

C22.2 No. 179-09 (R2014)

*Airport series lighting cables*

C22.2 No. 208-14

*Fire alarm and signal cable*

C22.2 No. 211.0-03 (R2013)

*General requirements and methods of testing for nonmetallic conduit*

C22.2 No. 211.1-06 (R2016)

*Rigid types EB1 and DB2/ES2 PVC conduit*

C22.2 No. 211.2-06 (R2016)

*Rigid PVC (unplasticized) conduit*

C22.2 No. 211.3-96 (withdrawn)

*Reinforced thermosetting resin conduit (RTRC) and fittings*

C22.2 No. 213-16

*Non-incendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations*

C22.2 No. 214-17

*Communications cables*

C22.2 No. 218.1-13

*Spas, hot tubs, and associated equipment*

C22.2 No. 223-15

*Power supplies with extra-low-voltage Class 2 outputs*

CAN/CSA-C22.2 No. 227.1-06 (R2016)

*Electrical nonmetallic tubing*

C22.2 No. 227.2.1-14

*Liquid-tight flexible non-metallic conduit*

C22.2 No. 239-17

*Control and instrumentation cables*

C22.2 No. 248 series

*Low-voltage fuses*

C22.2 No. 250.0-08 (R2013)

*Luminaires*

CAN/CSA-C22.2 No. 250.13-17

*Light emitting diode (LED) equipment for lighting applications*

CAN/CSA-C22.2 No. 257-06 (R2015)

*Interconnecting inverter-based micro-distributed resources to distribution systems*

C22.2 No. 269.1-17

*Surge protective devices — Type 1 — Permanently connected*

C22.2 No. 269.2-17

*Surge protective devices — Type 2 — Permanently connected*

C22.2 No. 269.3-17

*Surge protective devices — Type 3 — Cord connected, direct plug-in, and receptacle type*

C22.2 No. 269.4-17

*Surge protective devices — Type 4 — Component assemblies*

C22.2 No. 269.5-17

*Surge protective devices — Type 5 — Components*

C22.2 No. 271-11 (R2016)

*Photovoltaic cables*

C22.2 No. 272-14

*Wind turbine electrical systems*

C22.2 No. 273-14

*Cablebus*

C22.2 No. 327-16

*HDPE conduit, conductors-in-conduit, and fittings*

C22.2 No. 330-17

*Photovoltaic rapid shutdown systems*

CAN/CSA-C22.2 No. 60079-0:15

*Explosive atmospheres — Part 0: Equipment — General requirements*

CAN/CSA-C22.2 No. 60079-1:16

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CAN/CSA-C22.2 No. 60079-5:16

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CAN/CSA-C22.2 No. 60079-6:17

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CAN/CSA-C22.2 No. 60079-7:16

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CAN/CSA-C22.2 No. 60079-11:14

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CAN/CSA-C22.2 No. 60079-15:16

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CAN/CSA-C22.2 No. 60079-18:16

*Explosive atmospheres — Part 18: Equipment protection by encapsulation “m”*

CAN/CSA-C22.2 No. 60079-25:14

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CAN/CSA-C22.2 No. 60079-26:16

*Explosive atmospheres — Part 26: Equipment with equipment protection level (EPL) Ga*

CAN/CSA-C22.2 No. 60079-28:16

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CAN/CSA-C22.2 No. 60079-30-1:17

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CAN/CSA-C22.2 No. 60601 series

*Medical electrical equipment*

CAN/CSA-C22.2 No. 60950-1-07 (R2016)

*Information technology equipment — Safety — Part 1: General requirements*

CAN/CSA-C22.2 No. 61730-1:11 (R2016)

*Photovoltaic (PV) module safety qualification — Part 1: Requirements for construction*

CAN/CSA-C22.2 No. 61730-2:11 (R2016)

*Photovoltaic (PV) module safety qualification — Part 2: Requirements for testing*

CAN/CSA-C22.2 No. 62109-1:16

*Safety of power converters for use in photovoltaic power systems — Part 1: General requirements*

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*Cable management systems — Cable ties for electrical installations*

CAN/CSA-C22.2 No. 62368-1-14

*Audio/video, information and communication technology equipment — Part 1: Safety requirements*

C22.3 No. 1-15

*Overhead systems*

C22.3 No. 7-15

*Underground systems*

CAN/CSA-C68.5-13

*Shielded and concentric neutral power cable for distribution utilities*

C68.10-14

*Shielded power cable for commercial and industrial applications, 5–46 kV*

C83-96 (R2016)

*Communication and power line hardware*

CAN3-C235-83 (R2015)

*Preferred voltage levels for ac systems, 0 to 50 000 V*

C282-15

*Emergency electrical power supply for buildings*

CAN/CSA-C50052-99 (R2016)

*Cast aluminium alloy enclosures for gas-filled high-voltage switchgear and controlgear*

CAN/CSA-C50064-99 (R2016)

*Wrought aluminium and aluminium alloy enclosures for gas-filled high-voltage switchgear and controlgear*

CAN/CSA-C50068-99 (R2016)

*Wrought steel enclosures for gas-filled high-voltage switchgear and controlgear*

CAN/CSA-C50069-99 (R2016)

*Welded composite enclosures of cast and wrought aluminium alloys for gas-filled high-voltage switchgear and controlgear*

CAN/CSA-C50089-99 (R2016)

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CAN/CSA-C62155:06 (R2015)

*Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1000 V*

CAN/CSA-IEC 61400-24:12

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IEEE 844.2/CSA C293.2

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M421-16

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PLUS 2203 (withdrawn)

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S413-14

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SPE-1000-13

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Z32-15

*Electrical safety and essential electrical systems in health care facilities*

Z98-14

*Passenger ropeways and passenger conveyors*

CAN/CSA-Z240 MH Series-92 (withdrawn)

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CAN/CSA-Z241 Series-03 (R2013)

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Z462-15

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RP 2216 (2003; R2015)

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EP473.2-2001 (R2015)

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VE 1-2017

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70-2017

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499-2017

*Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*

505-2013

*Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation*

654-2017

*Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids*

655-2017

*Standard for Prevention of Sulfur Fires and Explosions*

664-2017

*Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*

820-2016

*Standard for Fire Protection in Wastewater Treatment and Collection Facilities*

HAZ 10

*Fire Protection Guide to Hazardous Materials, 2010*

**NRCC (National Research Council Canada)**

*National Building Code of Canada, 2015*

*National Farm Building Code of Canada, 1995*

*National Fire Code of Canada, 2015*

**ULC (Underwriters Laboratories of Canada)**

S139-17

*Standard Method of Fire Test for Evaluation of Integrity of Electrical Power, Data, and Optical Fibre Cables*

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**Other publications**

Alberta Municipal Affairs, *Electrical STANDATA*

Canada — *Navigation Protection Act*, R.S.C. 1985, c. N-22

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## Section 0 — Object, scope, and definitions

### Object

The object of the Code is to specify requirements for the installation and maintenance of electrical equipment to help ensure electrical safety. Electrical safety is also ensured through compliance with the objective-based fundamental safety principles of IEC 60364-1 and through the implementation of a quality management or equivalent program acceptable to the authorities having jurisdiction over the adoption and enforcement of the Code.

In the preparation of the Code, consideration has been given to the following four major areas:

- the prevention of fire hazards by
  - using overcurrent protection for
    - ◆ short-circuits; and
    - ◆ excessive current (overload);
  - providing clearances from combustibile materials; and
  - preventing ignition of hazardous and combustibile materials;
- the prevention of shock hazards by
  - grounding and bonding to
    - ◆ establish an equipotential plane so that the possibility of a potential difference between metal parts is minimized;
    - ◆ connect to earth the equipotential plane, thereby minimizing any potential difference to earth; and
    - ◆ provide a low impedance path for fault current to flow back to the source; or
  - using insulation to separate conducting surfaces. Insulation can consist of a dielectric material or an air space that has high enough resistance to prevent the flow of current and/or the discharge of disruptive voltage spikes (e.g., from lightning or transients) from causing damage to the installation and/or endangering personnel (electric shock);
- the installation and maintenance requirements for electrical equipment to ensure essentially safe installation and operation; and
- the proper operation of electrical installations and electrical equipment by ensuring that they are
  - installed to meet the conditions of use/applications; and
  - certified to
    - ◆ a CSA Group Standard
    - ◆ other recognized documents, where such CSA Group Standards do not exist or are not applicable; or
    - ◆ the requirements of the authority having jurisdiction.

Safe installations may also be achieved by alternatives to the Code provided that such alternatives meet the fundamental safety principles of IEC 60364-1 (see Appendix K).

The Code recommends that, when considering new installations, designers and field personnel make provision for wiring changes that might be required as a result of future load growth. If future growth is not taken into consideration, electrical installations can become overloaded, resulting in hazardous conditions.

### Scope

The Code applies to all electrical installations for buildings, structures, and premises and is intended to apply to all voltages. Although low voltages might not pose a shock hazard, various conditions can lead to physical injury and damage to equipment, even at seemingly harmless voltage levels.