CANADIAN ELECTRICAL CODE, PART I

Consolidated Memorandum of Revisions to the 2018 (24th) edition

Notes:

1. *This document contains the first and second memorandum of revisions.*

2. *First memorandum revisions are identified by a **black** number in the right hand margin and second memorandum revisions are identified by a **blue** number.*

3. *Unless specified otherwise, revisions are indicated only by strikeout and underline. Revisions in this memorandum are subject to editing, formatting and renumbering. Revisions are also subject to modification or deletion by subsequent revisions.*

4. *The revisions in this memorandum were approved by the Committee on the Canadian Electrical Code, Part I, and by the Regulatory Authority Committee at or prior to their June 2019 meetings. The revisions are for information only and are not effective until adopted, with or without change, by the authority having jurisdiction, after the twenty-fifth edition is published.*

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September 2019

Revision history

Date	Change	Document
Oct 2018	First Memorandum published	MOR 1.pdf
Sept 2019	Second Memorandum published	MOR 2.pdf
Oct 2 2019	Added missing revisions to Rule 10-612 and Appendix B (SN4278)	MOR 2 R1.pdf
Oct 2 2019	Updated Section 62, Appendix B, and Table 67 with revised definitions (SN4284).	MOR 2 R1.pdf

SECTION 0

Add new definition for Armour to read:

SN4065

Armour — a metallic covering wrapped over one or more insulated conductors that is intended primarily for physical protection against severe installation conditions but is not intended to provide a hermetic seal.

SN4323-0

Note: The following revision was approved by the Committee on the CE Code, Part I. However, the Committee also suspended the revision in accordance with Appendix C, Clause C6.7.

Identified —

a) when applied to a conductor, signifies that the conductor has

i) a white ~~or grey~~ covering; or

ii) a raised longitudinal ridge(s) on the surface of the extruded covering on certain flexible cords, either of which indicates that the conductor is a grounded conductor or a neutral; and

b) when applied to other electrical equipment, signifies that the terminals to which grounded or neutral conductors are to be connected have been distinguished for identification by being tinned, nickel-plated, or otherwise suitably marked.

Add new definition for Sheath to read:

SN4065

Sheath — a continuous covering that is applied over one or more insulated conductors and is intended primarily to provide a hermetic seal and, to a lesser extent, physical protection.

Revise definition for Cablebus to read:

SN3961-0D

Cablebus — an assembly of insulated conductors, cables, or both, with fittings and conductor terminations in a completely enclosed, ventilated, or non-ventilated protective metal housing (see Appendix B).

Revise definition for Voltage to read:

SN3994

~~**Voltage —**~~
~~**Extra-low voltage** — any voltage not exceeding 30 V.~~
~~**High voltage** — any voltage exceeding 750 V.~~
~~**Low voltage** — any voltage exceeding 30 V but not exceeding 750 V.~~

Voltage –

Extra-low voltage —

a) for ac circuits, any voltage not exceeding 30 V ac; or

b) for dc circuits, any voltage not exceeding 42.4 V dc. **Low voltage** — a) for ac circuits, any voltage exceeding 30 V ac but not exceeding 750 V ac; or b) for dc circuits, any voltage exceeding 42.4 V dc but not exceeding 1060 V dc. **High voltage** — a) for ac circuits, any voltage exceeding 750 V ac; or b) for dc circuits, any voltage exceeding 1060 V dc.	
Delete definition for Voltage of a circuit ~~**Voltage of a circuit** — the greatest root-mean-square (effective) voltage between any two conductors of the circuit.~~	**SN3994**
Revise definition for Wireway to read: **Wireway** — a raceway consisting of a completely enclosing arrangement of metal troughing and fittings formed and constructed so that insulated conductors may be readily drawn in and withdrawn, or laid in and removed, after the wireway has been completely installed, without damage either to conductors or to their insulation ~~covering~~.	**SN3961-0D**

# SECTION 2	
Add new Rule 2-317 to read: **2-317 Receptacles required for mobile industrial or commercial structures** (see Appendix B) Where a mobile industrial or commercial structure contains transfer equipment for connection of an alternate power supply, at least one receptacle of CSA configuration 5-15R or 5-20R shall be provided that is supplied by a circuit that is connected to or is capable of being connected to the alternate power supply through the transfer equipment.	SN4371

SECTION 8

Revise Subrule 8-106 3) to read: SN4329

8-106 Use of demand factors (see Appendix B)

3) ~~Where it is known that electric space-heating and air-conditioning loads are installed and will not be used simultaneously, whichever is the greater load shall be used in calculating the demand.~~ Where interlocks are installed to prevent simultaneous operation of electric space heating and air conditioning loads, whichever is the greater load shall be used in calculating the demand.

Revise Rule 8-110 read: SN4353

8-110 Determination of areas

The living area designated in Rules 8-200 and 8-202 shall be determined from inside dimensions and include the sum of

a) 100% of the area on the ground floor;

b) 100% of any areas above the ground floor used for living purposes; and

c) 75% of the area below the ground floor, which consists of areas with finished walls, provided that such areas do not exceed 1.8 m in height between the lowest part of the ceiling assembly and the ground or other surface below it.

Revise Rule 8-304 to read: SN4346

8-304 Maximum number of outlets per circuit

1) ~~There shall be not more than 12 outlets on any 2-wire branch circuit, e~~Except as permitted by other Rules of this Code, the maximum number of outlets on any 2-wire branch circuit shall not exceed

a) 12 - for a 15 A branch circuit where the fused switch or circuit breaker is marked for continuous operation at 80%;

b) 15 - for a 15 A branch circuit where the fused switch or circuit breaker is marked for continuous operation at 100%;

c) 16 - for a 20 A branch circuit where the fused switch or circuit breaker is marked for continuous operation at 80%;

d) 20 - for a 20 A branch circuit where the fused switch or circuit breaker is marked for continuous operation at 100%;

2) ~~Such outlets shall be considered to be rated at not less than 1 A per outlet, e~~Except as permitted by Subrule 3), when a receptacle is used as an outlet for the application of Subrule 1), it shall be considered as

a) 1 outlet per duplex receptacle; b) 1.5 outlets per triplex receptacle; and c) 2 outlets per quad receptacle. 3) Where the connected load is known, the number of outlets shall be permitted to exceed ~~12~~ the maximum number permitted in Subrule 1), provided that the load current does not exceed ~~80% of the rating of~~ the continuous operation marking on the overcurrent device protecting the circuit. 4) Where fixed multi-outlet assemblies are used, each 1.5 m or fraction thereof of each separate and continuous length shall be counted as one outlet, but in locations where a number of electrical appliances are likely to be used simultaneously, each 300 mm or fraction thereof shall be counted as one outlet.	

SECTION 10

SN4379

Note: This revision to Rule 10-302 and the addition of new Table 17 are conditional on approval of related changes to Appendix B under Subject 4484.

Revise Subrule 10-302 to read:

10-302 Use (see Appendix B)

1) Ungrounded conductors of an impedance grounded system shall be insulated to the nominal line to-line voltage of the system.

2) The integrity of an impedance grounded system shall be monitored and controlled, as required by Table 17.~~, and the system shall have an audible or visual alarm that corresponds to the occurrence of~~

~~a) a ground fault on current-carrying conductors, including the neutral conductor where line-to neutral loads are served;~~

~~b) a ground fault on the conductor connecting the impedance grounding device to the source; and~~

~~c) a loss of continuity of the impedance grounding circuit from the system source through the impedance grounding device to the grounded non-current-carrying conductive parts of the electrical system.~~

3) Alarms required by Table 17 ~~The alarm required by Subrule 2), and any extra (i.e., redundant) alarms if installed,~~ shall

a) be clearly labelled as to their purpose;

b) clearly annunciate the status of the system to persons monitoring it; and

c) continue signalling until the condition is corrected.

~~4) On the occurrence of any of the conditions described in Subrule 2), an impedance grounded system shall be automatically and immediately de-energized except as permitted by Subrule 5).~~

~~5) On detection of a ground fault on the ungrounded conductors, an impedance grounded system shall be permitted to remain energized if~~

~~a) the system is operating at 5 kV or less;~~

~~b) the system serves no neutral loads;~~

~~c) the ground fault current is controlled at 10 A or less; and~~

SN4278

Revise Rule 10-612 to read:

10-612 Bonding conductor connection to electrical equipment (see Appendix B)

1) The bonding conductor to conduits, cabinets, equipment, and the like shall be attached by means of lugs, pressure connectors, clamps, or other equally substantial means.

2) Connections that depend on solder shall not be used.

3) A bonding connection shall be made at every metallic and non-metallic outlet box for any fitting or device that requires connection to a bonding conductor.

4) Where the connections between the branch circuit and the internal conductors

of fixed equipment pass through an access cover, the bonding conductor connection shall remain continuous when the cover is removed. ~~5) In the case of metal-enclosed systems where bonding is provided by the metal enclosure, and a device attached to the enclosure has a bonding terminal, a bonding conductor shall be installed to bond the device to the enclosure.~~ ~~6~~5) A bonding conductor connection to the bonding terminal of a device shall be installed such that disconnection or removal of the device will not interfere with, or interrupt, the continuity of the bonding conductor.	

SECTION 12

Add new Rule 12-022 to read: SN4007

12-022 Cables or raceways installed in roof decking systems
Cables or raceways installed in accordance with this Section shall not be installed in locations concealed within a roof decking system.

Revise Subrule 12-106 2)to read: SN4279

12-106 Multi- and single-conductor cables (see Appendix B)

2) Insulated conductors in a cable shall not be used for connection to different power or distribution transformers or other different sources of voltage, except where
a) the conductors are used for the supply and/or control of ~~remote~~ devices and equipment that are interconnected, or dependent upon each other, for proper operation and functionality;

Add new Rule 12-124 to read: SN4148-12

12-124 Temporary Installation of Single Conductor Cables
Except as provided for by other Rules of this Code, single conductor cables terminated into single-pole connectors for single-conductor cables shall only be installed in accordance with Rule 76-100.

Revise Subsection on Open Wiring (Rules 12-200 through 12-224) to read: SN4344

Open wiring

12-200 Open wiring Rules
Rules 12-202 to 12-206 ~~224~~ apply only to single insulated conductors run as open wiring.

~~**12-202 Types of insulated conductors**~~
~~insulated conductors shall be of the types specified in Rules 12-100 and 12-102.~~

12-202 ~~204 Spacing~~ Installation of insulated conductors
~~1) Spacings between insulated conductors and between insulated conductors and adjacent surfaces shall, except as otherwise provided for in this Rule, comply with the following:~~
~~a) for normally dry locations, the spacings shall be not less than those specified in Table 20;~~
~~b) where circuits of different voltages are run parallel to each other, the separation between adjacent insulated conductors of the different circuits shall be not less than that specified in Table 20 for insulated conductors of the circuit having the higher voltage; and~~
~~c) in damp locations, a separation of at least 25 mm shall be maintained between~~

~~insulated conductors and adjacent surfaces.~~

~~2) In all locations, a separation of at least 25 mm shall be maintained between insulated conductors and adjacent metal piping or conducting materials.~~

~~3) Where insulated conductors are run across the open faces of joists, studs, or timber, the separation between insulated conductors shall be as specified in Rule 12-212.~~

~~4) At connections to fittings and devices or in other cases where it is not practical to maintain the spacing specified in Subrules 1), 2), and 3), the~~ Except as permitted by other rules of this Code, insulated conductors shall be installed in raceways. ~~or insulating tubing.~~

~~12-206 Insulated conductor supports~~

~~1) Insulated conductors shall be supported rigidly on non-combustible, absorption-resisting insulators.~~

~~2) Split knobs shall not be used to support insulated conductors larger than No. 8 AWG copper or aluminum.~~

~~3) Conductors supported on solid knobs shall be securely tied to the knobs by tie-wires having insulation of the same type as that on the conductors that they secure.~~

~~4) Where used on metal surfaces, thermoplastic-insulated conductors shall not be mounted in split knobs or cleats.~~

~~12-208 Insulated conductors on flat surfaces~~

~~Where insulated conductors are run on flat surfaces, they shall be supported rigidly at intervals of not more than 1.5 m.~~

~~12-210 Material for attachment of insulated conductor supports~~

~~Knobs and cleats shall be fastened securely with screws~~.

~~12-212 Protection from mechanical damage~~

~~1) Where insulated conductors are supported on or run across the open faces of joists, wall studs, or other timber or on walls where exposed to mechanical damage, they shall be protected by runningboards, guard-strips, wooden boxing, or sleeves of iron pipe.~~

~~2) Where insulated conductors are not exposed to mechanical damage, they shall be permitted to be run directly from timber to timber but shall be~~

~~a) of not less than No. 8 AWG copper or aluminum;~~

~~b) separated from each other by not less than 150 mm; and~~

~~c) supported at each timber.~~

~~3) Open wiring shall not be run across the tops of ceiling joists in unfinished attics or similar places.~~

~~12-214 Material for running-boards, guard-strips, and boxing~~

~~1) Material for running-boards, guard-strips, and boxing shall be at least 19 mm thick and the edges of running-boards shall project at least 12 mm beyond the insulators on both sides.~~

~~2) Guard-strips shall be at least as high as the insulators and placed as close to the insulated conductors as Table 20 permits.~~

~~3) In wooden boxing, there shall be a clear space of at least 25 mm between insulated conductors and adjacent surfaces, and the ends of boxing not abutting on the structure of the building shall be closed~~.

12-204 ~~216~~ Ends of insulated conductors
1) Existing insulated conductors shall not be brought to a dead-end at any fitting distant more than 300 mm from the last supporting insulator.

2) Where existing insulated conductors of No. 8 AWG copper or aluminum or larger are run as open wiring, solid knobs or strain insulators shall be used at the ends of the run.

~~**12-218 Insulated conductors passing through walls or floors**~~
~~Where insulated conductors pass through walls, floors, timbers, or partitions, they shall be installed in raceways or insulating tubing.~~

~~**12-220 Maintaining clearances**~~
~~Sub-bases shall be installed under all surface-mounted switches and receptacles unless adequate clearances are otherwise maintained.~~

12-206 ~~222~~ Where open wiring connects to other systems of wiring
Where existing open wiring is connected to conductors in raceways, armoured cable, or non-metallic-sheathed cable, the junction shall be made in a box, or at, or in, a fitting having a separately bushed hole for each conductor.

~~**12-224 Provision for bonding**~~
~~Where open wiring is used, provision for bonding to ground shall be made in accordance with Section 10.~~

Revise Rule 12-312 to read:

SN4087-12

12-312 Conductors over buildings
Conductors associated with a building shall be permitted to run over the same building.~~shall not be installed over buildings unless a deviation has been allowed in accordance with Rule rule-2-030.~~

Revise Rule 12-516 to read:

SN4241

12-516 Protection for cable in concealed installations (see Appendix G)
1) Where the cable is run through studs, joists, or similar members, the outer surfaces of the cable shall be kept a distance of at least 32 mm from the edges of the members, or the cable shall be protected from mechanical damage by
a) a protector plate covering the width of the member; or
b) a cylindrical bushing sized for the hole through the member, and extending a minimum of 13 mm beyond both sides of the member.

2) Where the cable is run along studs, joists, or similar members, the cable shall be

a) kept a distance of at least 32 mm from the edges of the members that can be covered by drywall or a similar material; or b) protected from mechanical damage by a corrosion resistant ferrous metal of not less than 1.3 mm thick securely fastened in place that extends beyond the face of the member in such a manner that it will cover the width of the cable or group of cables. ~~2)~~ 3) Where the cable is run through ~~or along~~ metal studs, or along metal joists, sheathing, or cladding, it shall be a) located so as to be effectively protected from mechanical damage both during and after installation; and b) protected where it passes through a member by an insert approved for the purpose and adequately secured in place. ~~3)~~ 4) Where the cable is installed immediately behind a baseboard, it shall be effectively protected from mechanical damage from driven nails.	
Revise Item 12-904 2)c) to read: **12-904 Conductors in raceways** (see Appendix B) 2) Except for cable tray, no raceway or compartment of a multiple-channel raceway shall contain conductors that are connected to different power or distribution transformers or other different sources of voltage, except where the conductors c) are used for the supply and/or control of ~~remote~~ devices and equipment that are interconnected, or dependent upon each other, for proper operation and functionality, and are insulated for at least the same voltage as that of the circuit having the highest voltage, and none of the conductors of the circuits of lower voltages is directly connected to a lighting branch circuit.	SN4279
Revise Item 12-910 4)d) to read: **12-910 Conductors and cables in conduit and tubing** (see Appendix B) 4) The maximum number of insulated conductors or multi-conductor cables in one conduit or tubing shall be such that the insulated conductors or cables and their coverings will not result in a greater fill than that specified in Table 8, and in this determination, d) notwithstanding Item c), the dimensions of single conductors shall be permitted to be obtained from Tables 10A to 10D and Table D5 for the constructions identified in those Tables.	SN4351
Revise Item 12-3030 1)b) to read: **12-3030 Insulated conductors in boxes, cabinets, or fittings** (see Appendix B) 1) Insulated conductors that are connected to different power or distribution transformers or other different sources of voltage shall not be installed in the same	SN4279

box, cabinet, or fitting unless

b) the insulated conductors are used for the supply and/or control of ~~remote~~ devices and equipment that are interconnected, or dependent upon each other, for proper operation and functionality, and are insulated for at least the same voltage as that of the circuit having the highest voltage, and none of the insulated conductors of the circuits of lower voltages is directly connected to a lighting branch circuit; or

Revise Subrule 12-3034 2) to read:

SN4264

12-3034 Maximum number of insulated conductors in a box (see Appendix B)

2) Except as specified in Subrule 3) and subject to the details given in Subrule 1), boxes of the nominal dimensions given in Table 23 shall not contain more insulated conductors of a given size than permitted by the Table, and the number of conductors shall be reduced for each of the following conditions as applicable:

a) one insulated conductor ~~if the box contains one or more~~, of the largest size in the box, for each fixture stud~~s~~ or hickey~~s~~ within the box;

b) one insulated conductor, of the largest size terminated under the conductor connector, for every pair of conductor connectors with insulating caps ~~(no deduction for one conductor connector, deduct one insulated conductor for 2 or 3 conductor connectors, two insulated conductors for 4 or 5 conductor connectors, etc.)~~; ~~or~~ and

c) two insulated conductors for each ~~if the box contains one or more~~ flush ~~devices~~ mounted device on a single strap within the box.

SECTION 14

Revise Rule 14-014 to read: SN4237

14-014 Series rated combinations (see Appendix B)
Notwithstanding Rule 14-012 a), a moulded case circuit breaker shall be permitted to be installed in a circuit having an available fault current higher than its rating, provided that

a) the circuit breaker is a recognized component of a series rated combination;

b) it is installed on the load side of an overcurrent device that has an interrupting rating at least equal to the available fault current;

c) the overcurrent device on the line side of the lower rated circuit breaker is as specified on the equipment in which the lower rated circuit breaker is installed;

d) the equipment in which the lower rated circuit breaker is installed is marked with a series combination interrupting rating at least equal to the available fault current; ~~and~~

e) the overcurrent devices installed in a series rated combination are marked at the time of installation in a conspicuous and legible manner to indicate that they must be replaced only with components of the same type and rating~~.~~; and

f) the sum of the rated full load currents of any motors in the system connected directly to the point between the series connected devices does not exceed 1% of the interrupting rating of the lower rated circuit breaker.

Add new Subrule 14-100 2) to read: SN4221

14-100 Overcurrent protection of conductors (see Appendix B)
1) Each ungrounded conductor shall be protected by an overcurrent device at the point where it receives its supply of current and at each point where the size of conductor is decreased, except that such protection shall be permitted to be omitted in each of the following cases:

(Items a) through g) not shown)

2) Notwithstanding Subrule 1), consumer's service conductors shall be permitted to be protected by an overcurrent device at the service equipment.

SECTION 16

Revise Rule 16-012 to read: **SN3961-16**

16-012 Circuits in communication cables

1) Class 1 circuits shall not be run in the same cable with communication circuits.
2) Class 2 remote control and signal circuits or their parts that use conductors in a cable assembly with other insulated conductors forming parts of communication circuits are, for the purposes of this Code, deemed to be communication circuits and shall conform to the applicable Rules of Section 60.
3) Class 2 power and data communication circuits shall comply with Rules 16-300 to 16-350.

Revise Rule 16-102 to read: **SN3961-16**

16-102 Methods of installation for Class 1 circuits

The equipment and insulated conductors of Class 1 circuits shall be installed in accordance with the requirements of other appropriate Sections of this Code, except as provided for in Rules 16-104 to 16-118.

Revise Rule 16-104 to read: **SN3961-16**

16-104 Overcurrent protection of Class 1 circuits

1) Insulated ~~C~~conductors of Class 1 circuits shall be protected against overcurrent in accordance with Section 14 of this Code, except
   a) where other Rules of this Code specifically permit or require other overcurrent protection; or
   b) where the insulated conductors are of No. 18 or No. 16 AWG copper and extend beyond the equipment enclosure, they shall be protected by overcurrent devices rated at a maximum of 5 A and 10 A respectively.
2) Where overcurrent protection is installed at the secondary terminals of the transformer and the transformer is suitably enclosed, overcurrent protection shall not be required on the primary side other than the normal overcurrent protection of the branch circuit supplying the transformer.

Revise Rule 16-110 to read: **SN3961-16**

16-110 Conductor material and sizes

1) ~~Copper~~ Insulated conductors smaller than No. 14 AWG copper shall be permitted to be used in Class 1 circuits if
   a) installed in a raceway;
   b) installed as~~in~~ a cable assembly; or
   c) within a flexible cord in accordance with Rule 12-402.
2) Subject to the conditions specified in Subrule 1), insulated conductors shall be not smaller than

a) No. 16 AWG for individual insulated conductors pulled in raceways; b) No. 18 AWG for individual insulated conductors laid in raceways; and c) No. 18 AWG for an integral assembly of two or more insulated conductors.	
Revise Rule 16-112 to read: **16-112 Insulated conductors for Class 1 wiring** 1) Where insulated conductors larger than No. 16 AWG copper are used in a Class 1 circuit, they shall be of any type selected in accordance with Rule 12-102 3). 2) Where insulated conductors of No. 18 or No. 16 AWG copper are used in a Class 1 circuit, they shall be equipment wire of the type suitable for such use as selected in accordance with Rule 12-122 1).	**SN3961-16**
Revise Rule 16-114 to read: **16-114 ~~Conductors~~ Insulated conductors of different circuits in the same enclosure, cable, or raceway** 1) Different Class 1 circuits shall be permitted to occupy the same enclosure, cable, or raceway without regard to whether the individual circuits are ac or dc, provided that all conductors are insulated for the maximum voltage of any conductor in the enclosure, cable, or raceway. 2) ~~Power supply~~ Insulated power circuits and insulated conductors of~~and~~ Class 1 circuits ~~conductors~~ shall not be permitted in the same enclosure, cable, or raceway except when connected to the same equipment, and all conductors are insulated for the maximum voltage of any conductor in the enclosure, cable, or raceway.	**SN3961-16**
Revise Rule 16-116 to read: **16-116 Mechanical protection of remote control circuits** Where mechanical damage to a remote control circuit would result in a hazardous condition as outlined in Rule 16-010, all insulated conductors of such remote control circuits shall be installed in conduit or electrical metallic tubing or be otherwise suitably protected from mechanical damage or other harmful conditions such as moisture, excessive heat, or corrosive action.	**SN3961-16**
Revise Rule 16-202 to read: **16-202 Methods of installation on the supply side of overcurrent protection, transformers, or devices having Class 2 outputs** 1) In Class 2 circuits, the insulated conductors and equipment on the supply side of overcurrent protection, transformers, or devices having Class 2 outputs shall be installed in accordance with the requirements of other appropriate Sections of this Code. 2) Transformers or other devices having Class 2 outputs shall be protected on the supply side by an overcurrent device with a rating or setting not exceeding 20 A.	**SN3961-16** **SN4331**

Revise Rule 16-208 to read: **16-208 Location of overcurrent devices** Overcurrent devices shall be located at the point where the insulated conductors to be protected receives theirits supply.	**SN3961-16**
Revise Rule 16-210 to read: **16-210 Conductors and cables for Class 2 circuit wiring** (see Appendix B) 1) CInsulated conductors for use in Class 2 circuits shall be of the type suitable for the application as selected in accordance with Rule 12-102 3) except that where insulated conductors smaller than No. 14 AWG are permitted, equipment wire Types REW, SEW-1, SEWF-1, TEW, and TEWN shall be permitted, provided that the equipment wires are installed in raceways. 2) Type ELC cablesconductors shall be limited in use to a) Class 2 circuits operating at 30 V or less; b) dwelling units in buildings of combustible construction; c) dry locations; and d) where concealed or exposed, locations where the conductors are not subject to mechanical damage. 3) Type ELC cablesconductors shall not be permitted for the wiring of heating control circuits or fire safety circuits such as fire alarm or smoke alarm devices. 4) Conductors shall be of copper and shall not be smaller than a) No. 16 AWG for individual insulated conductors pulled into raceways; b) No. 19 AWG for individual insulated conductors laid in raceways; c) No. 19 AWG for an integral assembly of two or more insulated conductors; d) No. 22 AWG for an integral assembly of four or more insulated conductors; e) No. 24 AWG for an integral assembly of six or more insulated conductors; and f) No. 26 AWG for an integral assembly of ten or more insulated conductors. 5) Notwithstanding Subrule 4) d), 4 e) or 4 f), No. 22 AWG Type ELC cablescopper wire shall not be pulled into raceways.be permitted in an integral assembly of two or more conductors where the conductors are not pulled into raceways. 6) The maximum allowable current shall be as listed in Table 57 for sizes No. 16 AWG and smaller, but in no case shall exceed the current limitations of Rule 16-200. 7) Notwithstanding Subrules 4) and 6), eight-conductor cables for Class 2 power and data communication circuits shall be permitted for use in accordance with Table 60.	**SN3961-16**
Revise Rule 16-212 to read: **16-212 Separation of Class 2 circuits conductors from other circuits** 1) Insulated Cconductors and cables of Class 2 circuits shall be separated at least 50 mm from insulated conductors of electric lighting, power, or Class 1	**SN3961-16**

circuits operating at 300 V or less, and shall be separated at least 600 mm from any insulated conductors of electric lighting, power, or Class 1 circuits operating at more than 300 V, unless for both conditions effective separation is afforded by use of

a) metal raceways for the Class 2 circuits or for the electric lighting, power, and Class 1 circuits, subject to the metal raceway being bonded to ground;
b) metal-sheathed or armoured cable for the electric lighting, power, and Class 1 circuits, ~~conductors,~~ subject to the sheath or armour being bonded to ground;
c) non-metallic-sheathed cable for the electric lighting, power, and Class 1 circuits operating at 300 V or less; or
d) non-metallic conduit, electrical non-metallic tubing, insulated tubing, or equivalent, for electric lighting, power, and Class 1 circuits. ~~in addition to the insulation on the Class 2 circuit conductors or the electric lighting, power, and Class 1 circuit conductors.~~

2) Where ~~the~~ electric lighting or power conductors are bare, all Class 2 circuit insulated conductors and cables in the same room or space shall be enclosed in a metal raceway that is bonded to ground, and no opening, such as an outlet box, shall be permitted to be located within 2 m of the bare conductors if up to and including 15 kV or within 3 m of bare conductors above 15 kV.
3) Unless ~~the~~ insulated conductors and cables of the Class 2 circuits are separated from the insulated conductors of electric lighting, power, and Class 1 circuits by an acceptable barrier, the insulated conductors and cables in Class 2 circuits shall not be placed in any raceway, compartment, outlet box, junction box, or similar fitting with the insulated conductors of electric lighting, power, or Class 1 circuits.
4) Subrule 3) shall not apply where ~~the~~ insulated conductors of a power circuit are in the raceway, compartment, outlet box, junction box, or similar fitting for the sole purpose of supplying power to the Class 2 circuits, and all conductors are insulated for the maximum voltage of any insulated conductor in the enclosure, cable, or raceway, except that no Class 2 insulated conductors and cables installed in a raceway, compartment, outlet box, junction box, or similar fitting with such insulated conductors of a power circuit shall show a green-coloured insulation, unless the Class 2 insulated conductor is completely contained within a ~~sheathed or~~ jacketed cable ~~assembly~~ throughout the length that is present in such a raceway or enclosure.
5) Notwithstanding Subrule 3), electric lighting, power, and Class 1 circuit conductors shall be permitted to be used in a cable that contains Class 2 circuit conductors, provided that the cable is marked as being suitable for applications of Class 2 circuit conductors that are
   a) intended for the supply or control, or both, of remote devices associated with the non-Class 2 conductors; and
   b) insulated for the maximum voltage of any conductor in the cable.

Revise Rule 16-214 to read:

SN3961-16

16-214 Insulated ~~C~~conductors of different Class 2 circuits in the same cable, enclosure, or raceway ~~C~~Insulated conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, or raceway,

provided that all insulated conductors in the cable, enclosure, or raceway are insulated for the maximum voltage of any conductor.	
Revise Rule 16-216 to read: **16-216 Penetration of a fire separation** Insulated ~~C~~conductors and cables of a Class 2 circuit extending through a fire separation shall be installed so as to limit fire spread in accordance with Rule 2-128.	**SN3961-16**
Revise Rule 16-218 to read: **16-218 Conductors in vertical shafts and hoistways** Class 2 insulated conductors and cables installed in a vertical shaft or hoistway shall meet the requirements of Rules 2-128 and 2-130.	**SN3961-16**
Revise Rule 16-220 to read: **16-220 Conductors, cables,~~Class 2 conductors~~ and equipment for Class 2 circuits in ducts and plenum chambers** ~~Class 2~~ Insulated conductors, cables, and equipment for Class 2 circuits shall not be placed in ducts or plenum chambers except as permitted by Rules 2-130 and 12-010.	**SN3961-16**
Revise Rule 16-224 to read: **16-224 Class 2 circuits extending beyond a building** Where cables or conductors of Class 2 circuits extend beyond a building and are run in such a manner as to be subject to accidental contact with lighting or power conductors operating at a voltage exceeding 300 V between conductors, the cables or conductors of the Class 2 circuits shall also meet the requirements of Section 60.	**SN3961-16**
Revise Rule 16-226 to read: **16-226 Underground installations** 1) Underground installations of Class 2 circuits shall be installed in accordance with Rule 12-012. 2) Direct buried Class 2 circuits shall maintain a minimum horizontal separation of 300 mm from other underground systems except when installed in accordance with Subrule 3). 3) Direct buried Class 2 circuits shall be permitted to be placed at random separation in a common trench with power circuits that are for the sole purpose of supplying power to the Class 2 circuits, provided that a) the Class 2 circuit is in a metal-sheathed cable, with the sheath bonded to ground; b) the power circuit operates at 750 V or less; and c) all cables~~conductors~~ are insulated for the required maximum voltage of any	**SN3961-16**

cableconductor in the trench.	
Revise Subrule 16-330 8) to read: 8) Notwithstanding Subrules 2) and 3), where communication equipment rated at 60 W or less is powered by a communications cable having a minimum conductor size of No. 24 AWG, such communications cable cables for class 2 power and data communication circuits shall not be required to comply with the cable bundling requirements where a) the rating of each output circuit supplied by power sourcing equipment cannot exceed 0.3 A to any load conductor; and b) the cable has a minimum conductor size of No. 24 AWG.	SN4270

# SECTION 18	
Delete Cable seal from Rule 18-002: ~~**Cable seal** — a seal that is installed at a cable termination to prevent the release of an explosion from an explosion-proof enclosure and that minimizes the passage of gases or vapours at atmospheric pressure.~~	**SN4224**
Delete Conduit seal from Rule 18-002: ~~**Conduit seal** — a seal that is installed in a conduit to prevent the passage of an explosion from one portion of the conduit system to another and that minimizes the passage of gases or vapours at atmospheric pressure.~~	**SN4224**
Delete Primary seal from Rule 18-002: ~~**Primary seal** — a seal that isolates process fluids from an electrical system and that has one side of the seal in contact with the process fluid.~~	**SN4224**
Add new term Seals to Rule 18-002 and relocate existing term Secondary seal with revision as shown: **Seals** **Explosion seal** – a seal that a) when installed at a cable or conduit entry to a flameproof or explosion-proof enclosure, prevents the ignition of an explosive gas atmosphere outside the enclosure; b) when installed in a conduit, prevents the passage of an explosion from one portion of the conduit system to another; and c) minimizes the passage of flammable fluids at atmospheric pressure. **Flammable fluid migration seal** – a cable or conduit seal intended to minimize the transmission of flammable fluids at or near atmospheric pressure. **Primary seal** — a seal that isolates process fluids from an electrical system and that has one side of the seal in contact with the process fluid. **Secondary seal** — a seal that is designed to prevent the passage of process fluids at the pressure it will be subjected to upon failure of a~~the~~ primary seal.	**SN4224**
Add new Subrule 18-050 7) to read: **18-050 Electrical equipment** (see Appendices B and J)	**SN4378**

7) Where equipment is marked for use in Class/Division locations, but will be used in locations classified according to the Zone system as permitted by Table 18, the applicable Group of the Division system shall correspond to the equivalent Group within the Zone system as specified in Table 18A.	
Add new Rule 18-061 to read: **18-061 Optical fiber cable** (see Appendix B) Optical fiber cable types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC shall be permitted to be installed in all hazardous locations, provided that the installation meets applicable sealing requirements of Section 18.	**SN4291**
Revise Subrule 18-064 3) to read: **18-064 Intrinsically safe and non-incendive electrical equipment and wiring** (see Appendices B and F) 3) Except as permitted by Subrule 4), no raceway, cable tray, compartment, enclosure, outlet, junction box, or similar fitting, ~~excluding cable tray,~~ shall contain insulated conductors of intrinsically safe or non-incendive field wiring circuits and insulated conductors of any other circuit unless the conductors are separated by a) not less than 50 mm; b) the metal armour or sheath of cable assemblies; c) a grounded metal barrier not less than 1.34 mm (No. 16 MSG) thick; or d) a non-metallic insulating material not less than 1.5 mm in thickness.	**SN4389**
Revise Rule 18-070 to read: **18-070 ~~Flammable fluid s~~Seals** (see Appendix B) 1) Electrical equipment with a primary seal in contact with flammable fluids shall be a) constructed or installed so as to prevent migration of flammable fluid through the wiring system; and b) used at pressures lower than the marked maximum working pressure (MWP). 2) Where Subrule 1) is met through the installation of secondary seals, the possibility of primary seal failure shall be indicated by a) design features that will make the occurrence of a primary seal failure obvious; or b) ~~acceptable~~ marking means indicating that the enclosure may contain flammable fluid under pressure. 3) Flammable fluid migration seals shall be permanently identified. 4) Where field installed seals are required, they shall conform to the following: a) the seal shall be accessible after installation; b) splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made be filled with compound; and c) where there is a probability that liquid or other condensed vapour may be	**SN4224**

trapped within enclosures for control equipment or at any point in the raceway system, acceptable means shall be provided to prevent accumulation or to permit periodic draining of such liquid or condensed vapour.	
Revise Rule 18-094 to read: **18-094 Sealing, Zone 0** 1) Flammable fluid migration sSeals shall be provided where conduit leaves a Zone 0 location with no box, coupling, or fitting in the conduit run between the seal and the point at which the conduit leaves the location, except that a rigid unbroken conduit that passes completely through a Zone 0 area, with no fittings less than 300 mm beyond each boundary, need not be sealed, provided that the termination points of the unbroken conduit are in non-hazardous areas. 2) Flammable fluid migration sSeals shall be provided on cables at the first point of termination after entry into the Zone 0 location. 3) Seals as specified in Subrule 2) shall not be required to be explosion-proof or flameproof "d" but shall be identified for the purpose of minimizing the passage of gases, vapours, or dusts under normal operating conditions and shall be accessible.	**SN4224**
Revise Rule 18-104 to read: **18-104 Sealing, Zone 1** (see Appendix B) 1) ConduitExplosion seals shall be provided in conduit systems where a) the conduit enters an explosion-proof or flameproof "d" enclosure containing devices that may produce arcs, sparks, or high temperatures, and shall be located as close as practicable to the enclosure, or as marked on the enclosure, but not further than 450 mm from the enclosure; b) the conduit is 53 trade size or larger and enters an explosion-proof or flameproof "d" enclosure housing terminals, splices, or taps, and shall be located no further than 450 mm from the enclosure; or c) the conduit leaves the Zone 1 location with no box, coupling, or fitting in the conduit run between the seal and the point at which the conduit leaves the location, except that a rigid unbroken conduit that passes completely through a Zone 1 area, with no fittings less than 300 mm beyond each boundary, need not be sealed, provided that the termination points of the unbroken conduit are in non-hazardous areas. 2) Only explosion-proof or flameproof "d" unions, couplings, reducers, and elbows that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and an explosion-proof or flameproof "d" enclosure. 3) An explosion Cable seals shall be provided in a cable system where a) the cable enters an enclosure required to be explosion-proof or flameproof "d".; or 4)b) A flammable fluid migration seal shall be provided where a the cable first terminates after entering the Zone 1 area. 4) Where secondary seals, cable seals, or conduit seals are required, they shall conform to the following: a) the seal shall be accessible after installation; b) splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made be filled	**SN4224** **SN4396**

with compound; c) where there is a probability that liquid or other condensed vapour may be trapped within enclosures for control equipment or at any point in the raceway system, acceptable means shall be provided to prevent accumulation or to permit periodic draining of such liquid or condensed vapour; and d) where there is a probability that liquid or condensed vapour may accumulate within motors or generators, joints and conduit systems shall be arranged to minimize entrance of liquid, but if means to prevent accumulation or to permit periodic draining are judged necessary, such means shall be provided at the time of manufacture and shall be deemed an integral part of the machine. 5) Runs of cables, each having a continuous sheath, either metal or non-metal, shall be permitted to pass through a Zone 1 location without seals. 6) Cables that do not have a continuous sheath, either metal or non-metal, shall have a flammable fluid migration seal installed be sealed at the boundary of the Zone 1 location.	
Revise Rule 18-106 to read: **18-106 Motors and generators, Zone 1** (see Appendix B) Increased safety "eb" motor installations shall meet the requirement for thermal protection of cage induction motors given in IEC 60079-14.	SN4407
Revise Rule 18-154 to read: **18-154 Sealing, Zone 2** (see Appendix B) 1) ConduitExplosion seals shall be provided in a conduit system where a) the conduit enters an enclosure that is required to be explosion-proof or flameproof "d", and shall be located as close as practicable to the enclosure, or as marked on the enclosure, but not farther than 450 mm from the enclosure.; 2) Flammable fluid migration seals for conduit shall be installed where a)b) the conduit leaves the Zone 2 location with no box, coupling, or fitting in the conduit run between the seal and the point at which the conduit leaves the location, except that a rigid unbroken conduit that passes completely through a Zone 2 area, with no fittings less than 300 mm beyond each boundary, need not be sealed, provided that the termination points of the unbroken conduit are in non-hazardous areas; or b)c) the conduit leaves a Zone 2 location outdoors, in which case the seal shall be permitted to be located more than 300 mm beyond the Zone 2 boundary, provided that it is located on the conduit before the conduit enters an enclosure or building. 3)2) Only explosion-proof or flameproof "d" unions, couplings, reducers, and elbows that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and an explosion-proof or flameproof "d" enclosure. 4)3) ExplosionCable seals shall be provided in a cable system where a) the cable enters an enclosure required to be explosion-proof or flameproof "d".; or b) Flammable fluid migration seals shall be installed where a the cable enters an enclosure not required to be explosion-proof or flameproof "d", and the other	SN4224 SN4386 SN4396

~~end of the cable terminates in a non-hazardous location in which a negative atmospheric pressure greater than 0.2 kPa exists.~~ 5)~~4)~~ Where a run of conduit enters an enclosure that is required to be explosion-proof or flameproof “d”, every part of the conduit from the explosion seal to that enclosure shall comply with Rule rule-18-102. 6)~~5)~~ Runs of cables, each having a continuous sheath, either metal or non-metal, shall be permitted to pass through a Zone 2 location without seals. 7)~~6) Cables that do not have a continuous sheath, either metal or non-metal, shall~~ have a flammable fluid migration seal installed ~~be sealed at the boundary of the Zone 2 location.~~ ~~7) Where seals are required, Rule rule-18-104 4) shall apply.~~	

SECTION 20

Revise Item 20-000 1)b) to read: SN4289

20-000 Scope (see Appendices G and J)
1) This Section supplements or amends the general requirements of this Code and applies to installations as follows:
a) gasoline dispensing and service stations — Rules 20-002 to 20-014;
b) propane vehicle fuel dispensers ~~dispensing~~, container filling, and storage — Rules 20-030 to 20-042;

Revise Subsection heading for Rules 20-030 to 20-042 as shown: SN4289

Propane vehicle fuel dispensers ~~dispensing~~, container filling, and storage

Revise Rule 20-032 as shown: SN4289

20-032 Special terminology
In this Subsection, the following definitions shall apply:

Container refill centre (propane service station) — ~~a facility such as a propane service station that is open to the public and at which propane is dispensed into containers or the fuel tanks of motor vehicles and that consists of propane storage containers, piping, and pertinent equipment, including pumps and dispensing devices.~~ a facility in which a dispensing system is installed.

Dispensing system — a system, consisting of tank, pump and motor, propane dispenser, and associated piping and supports, for the storage, metering, and dispensing of liquid propane into containers.

Filling plant (bulk plant) — ~~a facility such as a bulk propane plant, the primary purpose of which is the distribution of propane, that receives propane in tank car or truck transport for storage and/or distribution in portable containers or tank trucks, that has bulk storage, and that usually has container filling and truck loading facilities on the premises.~~ a bulk propane storage, distribution and transfer facility.

~~**Propane** — any material that is composed predominantly of the following hydrocarbons either by themselves or as mixtures: propane, propylene, butane (normal butane or iso-butane), and butylene.~~

Vehicle fuel dispenser — a propane dispenser, specifically for dispensing liquid propane by volume into containers.

Revise Rule 20-110 as shown: SN3961-20

20-110 Equipment above hazardous areas

1) Fixed equipment that is less than 3.6 m above floor level and that may produce arcs, sparks, or particles of hot metal, such as cut-outs, switches, charging panels, generators, motors, or other equipment (excluding receptacles and luminaires) having make-and-break or sliding contacts, shall be of the totally enclosed type or constructed to prevent escape of sparks or hot metal particles. 2) Permanently installed luminaires that are located over lanes through which vehicles are commonly driven shall be permitted to be suitable for non-hazardous locations and shall be a) located not less than 3.6 m above floor level; or b) protected from mechanical damage by a guard or by location. 3) Portable luminaires shall a) be of the totally enclosed gasketted type, equipped with a handle, lampholder, hook, and substantial guard attached to the lampholder or handle, and all exterior surfaces that may come in contact with battery terminals, wiring terminals, or other objects shall be of non-conducting materials or shall be effectively protected with an insulating material~~jacket~~; b) be of the unswitched type; and c) not be provided with receptacles for attachment plugs.	

SECTION 24

Revise Rule 24-002 by deleting two entries and adding one new as shown:

SN4235

~~**Emergency power system** — a power system that is supplied from an emergency supply and connected to feed essential systems.~~

~~**Emergency supply** — one or more in-house generators of electricity intended to be available in the event of a failure of all other supplies and capable of supplying all the essential loads.~~

Emergency electrical power supply system — one or more electrical generator sets located on health care facility premises, intended to be available if all other supplies fail, and capable of supplying all loads of essential electrical system

Revise Rule 24-304 to read:

SN4235

24-304 Transfer switches (see Appendix B)

1) All transfer switches shall comply with the requirements of the supply authority.
2) Automatic transfer switches used in essential electrical systems shall conform to the requirements of CSA C22.2 No. 178.1 and, in addition, shall
   a) be electrically operated and mechanically held; and
   b) include means for safe manual operation.
3) Manual transfer switches shall conform to the following:
   a) the switching means shall be mechanically held and the operation shall be by direct manual control or by electrical remote manual control utilizing control power from the supply to which the load is being transferred;
   b) a manual transfer switch that is operated by electrical remote manual control shall include a means for safe manual mechanical operation;
   c) reliable mechanical interlocking (and, in the case of a switch operated by electrical remote manual control, electrical interlocking) to prevent interconnection of the normal and the emergency electrical power supply systems~~supplies of power~~ shall be inherent in the design of a manual transfer switch; and
   d) a manual transfer switch shall include a readily visible mechanical indicator showing the switch position.
4) The vital and delayed vital branches shall be connected to the emergency electrical power supply system by means of one or more automatic transfer switches.
5) The conditional branch shall be connected to the emergency electrical power supply system by either a manual or an automatic transfer switch.

Revise Rule 24-306 to read:

SN4235

24-306 Emergency electrical power supply system

An emergency electrical power supply systemshall be

a) one or more generator sets in accordance with CSA Z32; and b) located on the health care facility premises and installed in a service room or enclosure in accordance with CSA C282.	

SECTION 26

Delete Rule 26-008.

~~**26-008 Sprinklered equipment** (see Appendix B)~~
~~Where electrical equipment vaults or electrical equipment rooms are sprinklered, the electrical equipment contained in such vaults or rooms shall be protected where needed by non-combustible hoods or shields arranged to minimize interference with the sprinkler protection.~~

SN4330

Revise Subrule 26-256 4) to read:

26-256 Conductor size for transformers (see Appendix B)

4) Where the transformer overcurrent protection is more than 125% of the rated primary or secondary current ~~selected~~ in accordance with Rule 26-250 1) or 2) or 26-254 3), the primary and secondary conductors connected to the transformer shall be protected in accordance with Rules 14-100 and 14-104.

SN4354

Move Rules 26-500 to 26-514 to Section 64, renumbered to read:

~~**26-500**~~ **64-1000 Scope**
~~**26-502**~~ **64-1002 Special terminology**
~~**26-504**~~ **64-1004 Location of storage batteries**
~~**26-506**~~ **64-1006 Ventilation of battery rooms or areas (see Appendix B)**
~~**26-508**~~ **64-1008 Battery vents**
~~**26-510**~~ **64-1010 Battery installation**
~~**26-512**~~ **64-1012 Wiring to batteries**
~~**26-514**~~ **64-1014 Wiring methods and installation of equipment in battery rooms**

SN4412-26
SN4412-64

Revise Rule 26-602 to read:

26-602 Panelboards in dwelling units (see Appendix B)

~~A panelboard shall be installed in every dwelling unit except for dwelling units in hotels and motels, and dwelling units that~~
~~a) are not individually metered for electrical power consumption; and~~
~~b) have been created by subdivision of a single dwelling.~~

1) A panelboard shall be installed in every dwelling unit except for:
   (a) dwelling units in hotels and motels, and
   (b) dwelling units that have been created by subdivision of a single dwelling and are not individually metered for electrical power consumption.
2) Every panelboard installed in accordance with Subrule 1) shall have a single supply protected by overcurrent devices, and this supply shall be capable of being disconnected without disconnecting the supply to any other dwelling unit.

SN4255

Revise Rule 26-652 to read:

SN4276

26-652 Branch circuits for residential occupancies

Branch circuits for all residential occupancies (including dwelling units and single dwellings) shall meet the following requirements:

a) receptacles installed for refrigerators in accordance with Rule 26-724 d) i) shall be supplied by at least one branch circuit that does not supply any other outlets, except a recessed clock receptacle intended for use with an electric clock;

b) at least one branch circuit shall be provided solely for receptacles installed in the laundry room or in a space where the complete plumbing is installed to accommodate a washing machine;

c) at least one branch circuit shall be provided solely for receptacles installed in the utility room;

d) each receptacle installed in a cupboard, wall cabinet, or enclosure for the use of a microwave oven in accordance with Rule 26-720 h) shall be supplied by a branch circuit that does not supply any other outlets, and this circuit shall not be considered as forming part of the circuits required under Rule 26-654 b);

e) a separate branch circuit shall be provided solely to supply power to each central vacuum system; and

~~f) the ampere rating of the branch circuit wiring supplying receptacles with CSA configuration 5-20R shall be not less than 20 A; and~~

f)~~g)~~ a separate branch circuit shall be provided solely to supply power to each receptacle described in Rule 26-720 n).

Revise Rule 26-654 to read:

SN4230

26-654 Branch circuits for dwelling units

Branch circuits for dwelling units (including single dwellings) shall meet the following requirements:

a) branch circuits from a panelboard installed in accordance with Rule 26-602 shall not be connected to outlets or electrical equipment in any other dwelling unit;

b) Notwithstanding Item a), where a single panelboard is installed as permitted by Rule 26-602(1)(b), branch circuits from that panelboard shall be permitted to supply outlets or electrical equipment in the dwelling unit created by the subdivision of the single dwelling;

c)~~b)~~ except as may be permitted by Items c) and d), at least two branch circuits shall be provided for receptacles (5-15R split or 5-20R) installed for kitchen counters of dwelling units in accordance with Rule 26-724 d) iii), iv), and v), and

i) no more than two receptacles shall be connected to a branch circuit; and

ii) no other outlets shall be connected to these circuits;

d)~~c)~~ notwithstanding Item c)~~b)~~, where the provisions of Rule 26-724 d) iii) require only one receptacle, only one branch circuit need be provided;

e)~~d)~~ notwithstanding Item c)~~b)~~ i), receptacles identified in Rule 26-720 d) shall be permitted to be connected to those receptacles required by Rule 26-724 d) iii), even though the circuit already supplies two receptacles;

f)~~e)~~ outdoor receptacles readily accessible from ground level and installed in

accordance with Rule 26-726 a) shall be supplied from at least one branch circuit dedicated for those outdoor receptacles; and g)~~f)~~ at least one branch circuit shall be provided solely for the receptacles in a carport or garage of a single dwelling, except that the luminaires and garage door operator for these areas shall be permitted to be connected to this circuit.	
Revise Subrule 26-656 1) to read: **26-656 Arc-fault protection of branch circuits for dwelling units** (see Appendix B) Arc-fault protection of branch circuits for dwelling units shall meet the following requirements: 1) Each branch circuit supplying 125 V receptacles rated 20 A or less shall be ~~protected~~ provided with arc-fault protection by a combination-type arc-fault circuit interrupter, except for branch circuits supplying a) receptacles installed in accordance with i) Rule 26-720 f), provided that no other receptacles are connected to these circuits; or ii) Rule 26-724 d) i), iii), iv), and v); and b) a single receptacle for a sump pump where i) the receptacle is labelled in a conspicuous, legible, and permanent manner identifying it as a sump pump receptacle; and ii) the branch circuit does not supply any other receptacles.	SN4242
Add new Subrule 26-700 8) to read: **26-700 General** (see Appendix B) (8) Receptacles having CSA configuration 5-15R or 5-20R installed within 1.5 m of sinks shall a) not be located on the area of the counter directly in front of the sink; and b) not be located on the area of the wall directly behind the sink except where the distance between the wall and the inside edge of the sink exceeds 450mm.	SN4280
Revise Items 26-742 d), e) and f) to read: **26-724 Receptacles for dwelling units** (see Appendices B and G) d) in dwelling units there shall be installed in each kitchen i) one receptacle for each refrigerator; ii) where a gas supply piping or a gas connection outlet has been provided for a free-standing gas range, one receptacle behind the intended gas range location not more than 130 mm from the floor and as near midpoint as is practicable, measured along the floor line of the wall space intended for the gas range; iii) a sufficient number of receptacles (5-15R split or 5-20R) along the wall at counter work surfaces (excluding sinks, built-in equipment, and isolated work surfaces less than 300 mm long at the wall line) so that no point along the wall	SN4280

line is more than 900 mm from a receptacle measured horizontally along the wall line;

iv) at least one receptacle (5-15R split or 5-20R) installed at each permanently fixed island counter space with a continuous long dimension of 600 mm or greater and a short dimension of 300 mm or greater;

v) at least one receptacle (5-15R split or 5-20R) installed at each peninsular counter space with a continuous long dimension of 600 mm or greater and a short dimension of 300 mm or greater; and
vi) a sufficient number of duplex receptacles installed on the remaining finished walls in accordance with Item a); and

~~e) the receptacles specified in Item d) shall not be located~~
~~i) on the area of the wall directly behind the kitchen sink; or~~
~~ii) on the area of the counter directly in front of the kitchen sink; and~~

e) ~~f)~~ no point in a hallway within a dwelling unit shall be more than 4.5 m from a duplex receptacle as measured by the shortest path that the supply cord of an appliance connected to the receptacle would follow without passing through an opening fitted with a door.

Revise Item 26-954 a) to read:

SN4368

26-954 Deep well submersible pumps installed in wells
Deep well submersible pumps installed in wells shall comply with the following:
a) the power supply cable run from the well head to the pump shall be marked –40 °C and shall be
i) Submersible Pump Cable;
~~i)~~ ii) ~~Types~~ Twisted assemblies of RWU75, RWU90, TWU, or TWU75 ~~single conductor cables or twisted assemblies of these types, suitable for handling at –40 °C~~; or
ii) iii) ~~Type~~ SOW, G, G-GC, W; ~~or the equivalent portable power cable;~~

Revise Title of Rule 26-956 and revise Item 26-956 c) to read:

SN4368

26-956 Submersible pumps installed in bodies of water (see Appendix B)
1) Submersible pumps installed in bodies of water shall comply with the following:

c) the wiring method to the pump shall be marked –40 °C and shall be
i) Type SOW, G, G-GC, W, or Jacketed Submersible Pump Cable; or

ii) Where enclosed in non-metallic rigid or flexible conduit
A) Unjacketed Submersible Pump Cable;
B) Single-conductor cables; or
C) Twisted assemblies of Type RWU75, RWU90, TWU, or TWU75;

~~i) be Type RWU75, RWU90, TWU, or TWU75 or equivalent single-conductor cables or twisted assemblies of these types, suitable for handling at –40 °C and enclosed in a plastic water pipe or in rigid PVC conduit; or~~

~~ii) Type SOW, G, G-GC, W, or the equivalent portable power cable;~~	

SECTION 30

Revise Rule 30-102 to read: SN3936

30-102 Voltage

1) Branch circuit voltage shall not exceed 150 volts-to-ground in dwelling units.
2) Branch circuit voltage shall not exceed a nominal system voltage of 600Y/347 ~~347/600Y~~ in other than dwelling units.

Revise Rule 30-104 to read: SN4350

30-104 Protection (see Appendix B)

~~Luminaires, lampholders, and lighting track shall not be connected to a branch circuit protected by overcurrent devices rated or set at more than~~

~~a) 15 A in dwelling units;~~
~~b) 15 A in other than dwelling units, where the input voltage exceeds 347 V nominal;~~
~~c) 20 A in other than dwelling units, where the input voltage does not exceed 347 V nominal; or~~
~~d) 40 A in other than dwelling units, where the load is from~~
~~i) luminaires with lampholders of the incandescent mogul base type;~~
~~ii) high-intensity discharge (HID) luminaires, with or without auxiliary lighting systems, where the input voltage does not exceed 120 V nominal;~~
~~iii) tungsten halogen luminaires with double-ended lampholders, where the input voltage does not exceed 240 V nominal; or~~
~~iv) luminaires provided with an integral overcurrent device rated at not more than 15 A, where the input voltage does not exceed 120 V nominal.~~

The maximum rating of an overcurrent device protecting a branch circuit containing luminaires, lampholders, or lighting track and installed

a) In a dwelling unit shall be
   i) 15 A; or
b) in other than dwelling units shall be
   i) 15 A where the input voltage is greater than 347 V nominal;
   ii) 20 A where the input voltage is 347 V nominal or less; or
   iii) 40 A where the load is from
      A) luminaires with lampholders of the incandescent mogul base type;
      B) high-intensity discharge (HID) luminaires, with or without auxiliary lighting systems, where the input voltage does not exceed 120 V nominal;
      C) tungsten halogen luminaires with double-ended lampholders, where the input voltage does not exceed 240 V nominal; or
      D) luminaires provided with an integral overcurrent device rated at not more than 15 A, where the input voltage does not exceed 120 V nominal.

Revise Item 30-320 3) b) to read: SN4357

30-320 Lighting equipment in damp locations or near grounded metal

3) Switches (including wall switches) controlling luminaires covered by Subrules 1) and 2) shall a) be located not less than 1 m from a bathtub or shower stall (this distance being measured horizontally between the switch and the bathtub or shower stall, without piercing a wall, partition, or similar obstacle); or b) ~~if the condition in Item a) is not practicable,~~ be located not less than 500 mm from a bathtub or shower stall and be protected by a ground fault circuit interrupter of the Class A type.	
Revise Rule 30-510 to read: **30-510 Garages and carports** (see Appendix G) 1) A luminaire shall be provided for an attached, built-in, or detached garage or carport. 2) Except as provided in Subrule 3), luminaires required in Subrule 1) shall be controlled by a wall switch near the doorway. 3) Where the luminaire required in Subrule 1) is ceiling-mounted above an area not normally occupied by a parked car or is wall-mounted, a luminaire with a built-in switch ~~accessible to an adult of average height~~ shall be permitted to be used~~.~~ provided that, the operating mechanism for the switch is located no more than 1.7 m above the floor or finished grade. 4) Where a carport is lighted by a luminaire at the entrance to a dwelling unit, additional carport lighting shall not be required.	**SN4186**
Revise Subrule 30-1022 3) to read: **30-1022 Grounding of circuits** (see Appendix B) 3) The grounded circuit conductor of the separately derived system referred to in Subrule 1) shall be permitted to be grounded by the system bonding jumper that is connected to the bonding conductor included in the primary supply. ~~interconnected with the grounded circuit conductor originating at the grounded system that is established by connection to the grounding electrode.~~	**SN4301**

SECTION 32

Revise Rule title and Subrules 32-100 1), 3), 4), and 5) to read: SN3961-32

32-100 Insulated ~~C~~conductors and cables

1) Except as provided by Subrule 2), insulated conductors shall be of copper and shall have an ampacity adequate to carry the maximum current that can be provided by the circuit.

“

3) Stranded insulated conductors with more than 7 strands shall be bunch-tinned or terminated in compression connectors.

4) Conductors shall have an insulation rating not less than 300 V and shall be not smaller than
a) No. 16 AWG for individual insulated conductors pulled into raceways;
b) No. 19 AWG for individual insulated conductors laid in raceways;
c) No. 19 AWG for an integral assembly of two or more insulated conductors; and
d) No. 22 AWG for an integral assembly of four or more insulated conductors.

5) Insulated ~~C~~conductors and cables shall be suitable for the purpose and of the type selected in accordance with Rule 12-102 3), except that individual insulated conductors smaller than No. 14 AWG copper installed in a raceway shall be equipment wire of the type selected in accordance with Rule 12-122 1).

Revise Subrules 32-102 1), 2), 3), and 5) to read: SN3961-32

32-102 Wiring method

1) All insulated conductors of a fire alarm system shall be
a) installed in metal raceway of the totally enclosed type;
b) incorporated in a cable having a metal armour or sheath;
c) installed in rigid non-metallic conduit; or
d) installed in electrical non-metallic tubing, where embedded in at least 50 mm of masonry or poured concrete.

2) Notwithstanding Subrule 1), insulated conductors installed in buildings of combustible construction in accordance with the Rules of Section 12 shall be permitted to be
a) non-metallic-sheathed cable;
b) fire alarm and signal cable; or
c) installed in a totally enclosed non-metallic raceway.

3) The insulated conductors shall be installed to be entirely independent of all other wiring and shall not enter a raceway, box, or enclosure occupied by other wiring, except as may be necessary for connection to
a) the point of supply;
b) a signal;
c) an ancillary device; or
d) a communication circuit.

5) All insulated conductors contained in the same raceway or cable shall be insulated for the highest voltage in the raceway or cable.

Revise Rule 32-200 to read:

SN4003
SN3961-32

32-200 Installation of smoke alarms and carbon monoxide alarms in dwelling units (see Appendices B and G)

1) The following requirements shall apply to the installation of permanently connected smoke alarms and carbon monoxide alarms in dwelling units:

a) ~~except as permitted by Item e),~~ smoke alarms and carbon monoxide alarms shall be supplied from a lighting circuit, or from a circuit that supplies a mix of lighting and receptacles;~~, and in any case~~

b) smoke alarms, ~~and~~ carbon monoxide alarms, or a device that is a combination of a smoke alarm and a carbon monoxide alarm shall not be installed where the circuit is protected by a ground fault circuit interrupter or arc-fault circuit interrupter;

c) ~~b)~~ there shall be no disconnecting means between the smoke alarm or the carbon monoxide alarm and the overcurrent device for the branch circuit;

d) ~~c)~~ the wiring method for smoke alarms and carbon monoxide alarms, including any interconnection of units and their associated equipment, shall be in accordance with Rules 32-100 and 32-102; and

2) Notwithstanding Subrule 1)b), where a smoke alarm, carbon monoxide alarm, or a device that is a combination of a smoke alarm and a carbon monoxide alarm has an integral battery as a secondary supply source, such a smoke alarm or combination of a smoke alarm and carbon monoxide alarm shall be permitted to be connected to a circuit protected by a ground fault circuit interrupter or arc-fault circuit interrupter.

3) ~~d)~~ notwithstanding Subrule 1)d) ~~c)~~, where a smoke alarm or carbon monoxide alarm circuit utilizes a Class 2 power supply for the interconnection of the smoke alarms and carbon monoxide alarms and their associated equipment, Class 2 wiring methods shall be permitted in buildings of combustible construction, provided that the conductors and cables are installed in accordance with Rules 12-506 to 12-524.~~;~~ ~~and~~

~~e) where a smoke alarm or a device that is a combination of a smoke alarm and a carbon monoxide alarm has an integral battery as a secondary supply source, such a smoke alarm or combination of a smoke alarm and carbon monoxide alarm shall be permitted to be connected to a circuit protected by a ground fault circuit interrupter or arc-fault circuit interrupter.~~

Revise rule 32-208 to read:

SN3948-32

32-208 Transfer switch (see Appendi~~x~~ces B and G)

1) Where an on-site electrical transfer switch is used to provide emergency

power supply to fire pump equipment, such a transfer switch shall be a) provided solely for the fire pump; b) located in a barriered compartment of the fire pump controller, or in a separate enclosure adjacent to the controller; c) labelled in a conspicuous, legible, and permanent manner identifying it as the fire pump power transfer switch; and d) ~~approved~~ suitable for fire pump service and so marked. 2) Where more than one fire pump is provided with emergency power as described in Subrule (1), a separate transfer switch shall be provided for each fire pump.	
Revise Rule 32-300 to read: **32-300 Insulated ~~C~~conductors** (see Appendices B and G) Insulated ~~C~~conductors from the emergency power source to a fire pump shall a) have an ampacity not less than i) ~~125%~~200% of the full load current rating of the motor, where an individual motor is provided with the fire pump; and ii) ~~125%~~200% of the sum of the full load currents of the fire pump, jockey pump, and the fire pump auxiliary loads, where two or more motors are provided with the fire pump; and b) be protected against fire exposure to provide continued operation in compliance with the *National Building Code of Canada*.	**SN3903** **SN3961-32**
Revise Rule 32-302 to read: **32-302 Wiring method** (see Appendices B and G) All insulated conductors to fire pump equipment shall be a) installed in metal raceways of the totally enclosed type; b) incorporated in a cable, having a metal armour or sheath, of a type selected in accordance with Rule 12-102 3); c) installed in rigid non-metallic conduit where embedded in at least 50 mm of masonry or poured concrete or installed underground; or d) installed in electrical non-metallic tubing where embedded in at least 50 mm of masonry or poured concrete.	**SN3961-32**

SECTION 38

Revise Rule 38-011 4) to read: SN3948-38

38-011 Insulation and types of conductors
(4) Travelling cables used as flexible connections between the car or counterweight and the raceway shall be of the types of elevator cable selected in accordance with Rule 4-040(1) ~~or other types approved for the purpose~~.

Revise Rule 38-021 1)a)iii) to read: SN3948-38

38-021 Wiring methods (see Appendix B)
Elevators
1) …
Hoistways
a) In hoistways the following wiring methods shall also be permitted if not subjected to mechanical damage:
iii) flexible cords and cables that are components of ~~approved~~ equipment and used in extra-low-voltage circuits (30 V or less) shall be permitted in lengths not exceeding 2 m, provided that the cords and cables are supported and protected from physical damage and are of a jacketed and flame-tested type; and

Revise Item 38-021 1)b) to read: SN3948-38

38-021 Wiring methods (see Appendix B)
Elevators
1)...
Cars
b) On cars, the following wiring methods shall also be permitted:
ii) extra-hard-usage cords and hard-usage cords selected in accordance with Rule 12-402 1) shall be permitted as flexible connections between the fixed wiring on the car and devices on the car doors or gates, and extra-hard-usage cords only shall be permitted as flexible connections for the top-of car operating device or the car-top work light
iii) cables with smaller conductors and other types and thickness of insulation and jackets than extra hard usage or hard usage, used as flexible connections between the fixed wiring on the car and devices on the car doors or gates, shall be permitted as flexible connections between the fixed wiring on the car and devices on the car doors or gates, if of ~~approved for~~ extra-hard usage or hard usage types;
iv) flexible cords and cables that are components of ~~approved~~ equipment and used in extra-low-voltage circuits (30 V or less) shall be permitted in lengths not exceeding 2 m, provided that the cords and cables are supported and protected from physical damage and are of a jacketed and

flame-tested type; and	
Revise Item 38-021 1)c)iv) to read: **Within machine rooms, control rooms and machinery spaces, and control spaces** 1)... c) Within machine rooms, control rooms and machinery spaces, and control paces, the following wiring methods shall also be permitted: … iv) flexible cords and cables that are components of ~~approved~~ equipment and used in extra-low-voltage circuits (30 V or less) shall be permitted in lengths not to exceed 2 m, provided that the cords and cables are supported and protected	SN3948-38
Revise Item 38-021 1)d) to read: **Counterweights** 1).... d) Flexible metal conduit, liquid-tight flexible conduit, or flexible cords and cables, or conductors grouped together and taped or corded that are part of ~~approved~~ equipment, a driving machine, or a driving machine brake shall be permitted on the counterweight assembly in lengths that do not exceed 2 m without being installed in a raceway if they are located to be protected from physical damage and are of a flame-tested type.	SN3948-38
Revise Item 38-021 2)b) to read: **38-021 Wiring methods** (see Appendix B) **Escalators** 2) …: a) …; and b) flexible cords and cables that are components of ~~approved~~ equipment and used in extra-low-voltage circuits (30 V or less) shall be permitted in lengths not exceeding 2 m, provided that the cords and cables are supported and protected from physical damage and are of a jacketed and flame-tested type.	SN3948-38
Revise Item 38-021 3)b) to read: **38-021 Wiring methods** (see Appendix B) **Lifts for persons with physical disabilities** 3) …: a) …; and b) flexible cords and cables that are components of ~~approved~~ equipment and used in extra-low-voltage circuits (30 V or less) shall be permitted in lengths not exceeding 2	SN3948-38

m, provided that the cords and cables are supported and protected from physical damage and are of a jacketed and flame-tested type.	

SECTION 40

Revise Rules 40-002 to 40-006 and 40-010 to 40-014 to read:

SN3961-40

40-002 Supply conductor sizes

The size of insulated conductors in raceways or cables supplying main contact conductors or supplying equipment directly shall be determined from Table 58.

40-004 Conductor protection

1) Insulated ~~C~~conductors supplying main contact conductors shall be in rigid conduit, electrical metallic tubing, armoured cable, mineral-insulated cable, aluminum-sheathed cable, or copper-sheathed cable, except as otherwise provided for in Rule 40-018.
2) Insulated ~~C~~conductors supplying the equipment directly shall comply with Subrule 1) unless a flexible connection is required, in which case an armoured or unarmoured cable, festoon cable, or flexible cord, with take-up devices where necessary to prevent damage to the cable or cord and to keep it clear of the operating floor, shall be permitted.

40-006 Overcurrent protection

Insulated ~~C~~conductors supplying main contact conductors or supplying the equipment directly where there are no main contact conductors shall be provided with overcurrent protection in accordance with the requirements of Rule 28-200 for the motor load plus an allowance in accordance with Rule 14-104 for any other loads if the size of conductors has been increased to provide capacity for the other loads.

40-010 Main contact conductors

1) Bare main contact conductors shall have an ampacity not less than that of the conductors supplying them and, if ~~wire~~ conductor is used, in no case shall these conductors be smaller than
   a) No. 4 AWG copper or No. 2 AWG aluminum if the length of contact conductor is 18 m or less; or
   b) No. 2 AWG copper or No. 1/0 AWG aluminum if the length of contact conductor is greater than 18 m, unless the intermediate insulating supports are of a clamp type capable of providing some strain relief.
2) Bare main contact conductors shall be permitted to be of hard drawn copper or aluminum conductor~~wire~~ or shall be permitted to be made of steel or other suitable metal in the form of tees, angles, T-rails, or other rigid shapes.

40-012 Spacing of main contact conductors

1) Bare main contact conductors ~~wires~~ shall be supported so that
   a) they are separated, centre-to-centre, as follows:
      i) not less than 150 mm for other than monorail hoists, if installed in a horizontal plane;
      ii) not less than 75 mm for monorail hoists, if installed in a horizontal plane; or
      iii) not less than 200 mm, if installed in other than a horizontal plane; and
   b) the extreme limit of displacement does not bring them within less than 38 mm of the surface ~~wired over~~.
2) Rigid main contact conductors shall be supported so that there is an air space

of not less than 25 mm between conductors, between conductors and adjacent collectors, and between conductors and the surface wired over. **40-014 Supporting of main contact conductors** 1) Bare main contact conductors ~~wires~~ shall be secured at each end to strain insulators and shall be supported on insulating supports placed at intervals not exceeding 6 m except that, where building conditions make such intervals impossible, the interval between insulating supports shall be permitted to be increased to a maximum of 12 m if the separation between contact conductors is increased proportionately. 2) Rigid main contact conductors shall be secured to insulating supports spaced at intervals of not more than 80 times the vertical dimension of the conductor, but in no case shall the interval be greater than 4.5 m.	

SECTION 42

SN4358

Revise Rules 42-006 and 42-008 to read:

Transformer arc welders and inverter welders

42-006 Supply conductors

1) The insulated supply conductors for an individual transformer arc welder or inverter welder shall have an ampacity of not less than the value obtained by multiplying the rated primary current of that welder in amperes by a factor of

a) 1.00, 0.95, 0.89, 0.84, 0.78, 0.71, 0.63, 0.55, or 0.45 for welders having a duty cycle of 100, 90, 80, 70, 60, 50, 40, 30, and 20% or less respectively; or

b) 0.75 for a welder having a time rating of 1 h.

2) The insulated supply conductors for a group of transformer arc welders or inverter welders shall have an ampacity not less than the sum of the currents determined for each welder in the group in accordance with Subrule 1) multiplied by a demand factor of

a) 100% of the two largest calculated currents of the welders in the group; plus

b) 85% of the third largest calculated current of the welders in the group; plus

c) 70% of the fourth largest calculated current of the welders in the group; plus

d) 60% of the calculated currents of all remaining welders in the group.

3) Lower values than those given in Subrule 2) shall be permitted in cases where the work is such that a high operating duty cycle for individual welders is impossible.

42-008 Overcurrent protection for transformer arc welders and inverter welders

1) Each transformer arc welder and inverter welder shall have overcurrent protection rated or set at not more than 200% of the rated primary current of the welder, unless the overcurrent device protecting the insulated supply conductors meets this requirement.

2) Each ungrounded conductor supplying a transformer arc welder and inverter welder shall have overcurrent protection rated or set at not more than 200% of the allowable ampacity of the insulated conductor as specified in Table 1, 2, 3, or 4, except that the next higher rating or setting shall be permitted to be used where

a) the nearest standard rating of the overcurrent device is less than the rating or setting otherwise required by this Rule; or

b) the rating or setting otherwise required by this Rule results in too frequent opening of the overcurrent device.

3) The maximum rating or setting of an overcurrent device protecting a feeder supplying a group of transformer arc welders and inverter welders shall not exceed a value calculated by determining the maximum rating or setting of overcurrent device permitted by Subrules 1) and 2) for the welder allowed the highest overcurrent protection and adding to this value the sum of ampacities as calculated by Rule 42-006 for all other welders in the group.

SECTION 46

Revise Rule 46-208 to read:

SN4234

46-208 Overcurrent protection (see Appendix B)

1) The overcurrent device for an emergency power supply shall be coordinated with the overcurrent devices of feeders and branch circuits supplying life safety systems and other electrical equipment connected to the emergency power supply in order to provide selective operation of the branch circuit overcurrent device when a fault occurs in that branch circuit.
2) The branch circuit overcurrent devices shall be accessible only to authorized persons.
3) Notwithstanding Subrule 1), where the overcurrent protective devices are permitted to be connected upstream of the main disconnecting means and overcurrent device connecting the generator to the remainder of the emergency electrical power system in accordance with the CSA Standard C282 or in accordance with Rule 32-306 6) of this Code, selective coordination between these overcurrent protective devices shall not be required.

SECTION 54

In Rule 54-002, revise term "Power blocking device" to read:

Power blocking device — a~~n approved~~ unit that is used to prevent power other than radio and television frequency signals from extending to the outgoing coaxial cable.

SN3948-54

Revise Rule 54-010 to read:

54-010 Circuits in communication cables
Community antenna distribution circuits, or their parts, that use insulated conductors in a cable ~~assembly~~ with other conductors forming parts of communication circuits are, for the purposes of this Code, deemed to be communication circuits and shall conform to the applicable Rules of Section 60, except that the requirements for protectors and grounding for the coaxial cables shall meet the requirements of this Section.

SN961-54

Revise Rule 54-100 to read:

54-100 Conductors

1) The conductors used in community antenna distribution shall consist of coaxial cable having a central inner conductor and an outer conductive shield of circular cross-section.
2) ~~Conductors~~ Cables placed within buildings shall be of ~~approved~~ types selected in accordance with Rule 12-102 3).

SN948-54
SN3961-54

Revise Rule 54-102 to read:

54-102 Voltage and current limitations (see Appendix B)

1) Coaxial cable shall be permitted to be used for connection between the cable distribution plant and the customer service enclosure, or between two customer service enclosures, and for providing power to associated community antenna distribution circuits, provided that the following requirements are met:
   a) for a single dwelling, the open-circuit voltage does not exceed 90 V, and the maximum current is limited to 100/V amperes, up to and including the customer service enclosure;
   b) for a building with multiple occupancies, the open-circuit voltage does not exceed 90 V, and the maximum current is limited to 10 A, up to and including the customer service enclosure;
   c) the current supply is from an ~~approved~~ amplifier, transformer, or other ~~approved~~ device having energy-limiting characteristics;
   d) the cable distribution plant complies with the applicable requirements of CSA C22.3 No. 1 and CSA C22.3 No. 7;
   e) the power does not extend beyond the customer service enclosure

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unless extending to another customer service enclosure, and not to the coaxial cable extending to the customer electrical equipment; f) the customer service enclosure is grounded and all coaxial cables entering it are bonded to ground; g) the customer service enclosure is provided with a lock or similar closing device and contains power blocking devices to prevent the coaxial cable to the customer electrical equipment from being energized; and h) all customer distribution circuits fed from a common multitap that is capable of delivering power to the customer distribution circuit are provided with power blocking devices to prevent the coaxial cable to the customer electrical equipment from being energized. 2) Coaxial cable for the connection between the customer service enclosure and a point located at least 1 m from the customer electrical equipment shall be permitted to be energized by ~~an approved~~ a 0 to 30 V Class 2 transformer or power supply within the premises, provided that power blocking devices are installed to prevent the connection at the customer electrical equipment from being energized.	
Revise Rule 54-108 to read: **54-108 Supports** Where ~~conductors~~ cables are attached to, or supported on, buildings, the attachment or supporting equipment shall be acceptable for the purpose.	**SN3961-54**
Revise Rule 54-200 to read: **54-200 Grounding of outer conductive shield of a coaxial cable** (see Appendix B) 1) Where coaxial cable is exposed to lightning or to accidental contact with lightning arrester conductors or insulated power conductors operating at a voltage exceeding 300 volts-to-ground, the outer conductive shield of the coaxial cable shall be grounded at the building as close to the point of cable entry as possible. 2) Where the outer conductive shield of a coaxial cable is grounded, no other protective device shall be required. 3) Grounding of a coaxial cable shield by means of a protective device shall be permitted, provided that the device does not interrupt the grounding system within the building.	**SN3961-54**
Revise Rule 54-202 to read: **54-202 Provision of protector** (see Appendix B) Where a protective device is provided, it shall be ~~a) approved for the purpose;~~ a)~~b)~~ located in or on the building as near as practicable to the point of cable entry; b)~~c)~~ located external to any hazardous location as defined in Sections 18, 20, and 24, and away from the immediate vicinity of flammable or explosive materials; c)~~d)~~ mounted on a flame-retardant, absorption-resisting insulating base; and d)~~e)~~ covered if located outdoors.	**SN3948-54**

Revise Rule 54-304 to read: **54-304 Grounding electrode connection** The grounding conductor shall be attached to a grounding electrode, as required in Rule 10-118 a) directly; or b) to a conductor~~wire~~ lead permanently connected to the ground rod electrode in a manner specified in CSA C83.	**SN3961-54**
Revise Rule 54-400 to read: **54-400 Separation from other conductors** 1) ~~Conductors~~ Cables of community antenna distribution circuits shall be separated at least 50 mm from insulated conductors of electric lighting, power, or Class 1 circuits operating at 300 V or less, and shall be separated at least 600 mm from any insulated conductor of an electric lighting, power, or Class 1 circuit operating at more than 300 V, unless effective separation is afforded by use of the following: a) grounded metal raceways for the community antenna distribution circuits or for the electric lighting, power, and Class 1 circuits; b) grounded metal-sheathed or armoured cable for the electric lighting, power, and insulated Class 1 conductors; or c) raceways of a non-metal-type as permitted in Section 12, in addition to the insulation on the community antenna distribution circuit conductors or on the electric lighting, power, and Class 1 circuit conductors. 2) Where the electric lighting or power conductors are bare, all community antenna distribution cables ~~conductors~~ in the same room or space shall be enclosed in a grounded metal raceway and no opening, such as an outlet box, shall be located within 2 m of bare conductors if up to and including 15 kV or within 3 m of bare conductors above 15 kV. 3) The cables~~conductors~~ of a community antenna distribution circuit shall not be placed in any raceway, compartment, outlet box, junction box, or similar fitting that contains insulated conductors of electric light, power, or Class 1 circuits, unless a) the cables~~conductors~~ of the community antenna distribution circuit are separated from the electric light, power, or insulated Class 1 circuit conductors by a barrier that conforms to Rule 12-904 2) for insulated conductors in raceways or Rule 12-3030 1) for insulated conductors in boxes, cabinets, and fittings; or b) the power or insulated Class 1 conductors are placed solely for the purpose of supplying power to the community antenna distribution circuit.	**SN3961-54**
Revise Rule 54-402 to read: **54-402 Cables~~onductors~~ in a vertical shaft** Cables~~onductors~~ of a community antenna distribution circuit in a vertical shaft shall be in a totally enclosed non-combustible raceway.	**SN3961-54**

Revise Rule 54-404 to read: **54-404 Penetration of a fire separation** Cables~~onductors~~ of a community antenna distribution circuit extending through a fire separation shall be installed so as to limit fire spread in accordance with Rule 2-128.	**SN3961-54**
Revise Rule 54-406 to read: **54-406 Community antenna distribution cablesconductors in ducts and plenum chambers** Community antenna distribution cables ~~conductors~~ shall not be placed in ducts or plenum chambers except as permitted by Rules 2-130 and 12-010.	**SN3961-54**
Revise Rule 54- to read: **54-500 Community antenna distribution amplifiers and other power sources** ~~1) Amplifiers and other devices that supply current to a community antenna distribution circuit from an electric supply circuit shall be approved for the purpose.~~ 1)~~2)~~ Where amplifiers and other power devices are connected to an electric supply circuit and enclosed in a cabinet, the cabinet shall be positioned to be readily accessible and shall be adequately ventilated. 2)~~3)~~ The chassis and cabinets of the community antenna distribution amplifier or other power sources, the outer conductive shield of the coaxial cables, and the metal conduit or the metal cable sheath enclosing the insulated electric supply conductors shall all be connected to the system ground with a minimum No. 6 AWG copper conductor. 3)~~4)~~ Where a cabinet containing an amplifier or other power device is mounted where it is accessible to the public, it shall be provided with a lock or similar closing device.	**SN3948-54** **SN3961-54**
Revise Rule 54-600 to read: **54-600 Overhead cables~~conductors~~ on poles** The installation of overhead community antenna distribution cables~~conductors~~ in proximity to power conductors on poles and in aerial spans between buildings, poles, and other structures shall conform to the provisions of the *Canadian Electrical Code, Part III*.	**SN3961-54**
Revise Rule 54-602 to read: **54-602 Overhead conductors on roofs** 1) Community antenna distribution cables~~conductors~~ passing over buildings shall be kept at least 2.5 m above any roof that can be readily walked upon. 2) Community antenna distribution cables~~conductors~~ shall not be attached to the	**SN3961-54**

upper surfaces of roofs or be run within 2.5 m, measured vertically, of a roof, unless a deviation has been allowed in accordance with Rule 2-030. 3) A deviation in accordance with Rule 2-030 shall not be necessary where the building is a garage or other auxiliary building of one storey.	
Revise Rule 54-604 to read: **54-604 Cables~~onductors~~ on buildings** 1) Community antenna distribution cables~~conductors~~ on buildings shall be separated from insulated light or power conductors not in cable or conduit by at least 300 mm, unless the conductors are permanently separated by a continuous and firmly fixed non-metal-type raceway, as permitted in Section 12, in addition to the insulation on the conductors. 2) Community antenna distribution cables~~conductors~~ subject to accidental contact with light or power conductors operating at voltages exceeding 300 V, and attached exposed to buildings, shall be separated from combustible material by being supported on glass, porcelain, or other insulating material acceptable for the purpose, except that such separation is not required where the outer conductive sheath of the coaxial cable is grounded. 3) Community antenna distribution cables~~conductors~~ attached to buildings shall not conflict with other communication cables~~conductors~~ attached to the same building, and sufficient clearances shall be provided so that there will be no unnecessary interference to maintenance operations, and in no case shall the insulated conductors, strand, or equipment of one system cause abrasion to the insulated conductors, strand, or equipment of the other system.	**SN3961-54**
Revise Rule 54-606 to read: **54-606 Cables~~onductors~~ entering buildings** The community antenna distribution conductors shall enter the building either through a non- combustible, non-absorptive insulating bushing, or through a metal raceway, except that the insulating bushing or raceway shall be permitted to be omitted where the entering conductors pass through masonry or are acceptable for the purpose.	**SN3961-54**
Revise Rule 54-608 to read: **54-608 Lightning conductors** A separation of at least 2 m shall be maintained between cables~~conductors~~ of a community antenna distribution circuit on buildings and lightning conductors.	**SN3961-54**
Revise Rule 54-610 to read: **54-610 Swimming pools** Where cables~~conductors~~ are installed over or adjacent to swimming pools, they shall be placed in accordance with Rules 68-054 and 68-056.	**SN3961-54**

Revise Rule 54-700 to read:

SN3961-54

54-700 Direct buried systems

Where community antenna distribution cables~~conductors~~ are direct buried, the sheath shall be suitable for direct burial and the cables~~conductor~~ shall be

a) installed outside the same vertical plane that contains differing underground cables~~conductors~~ other than communication cables~~conductors~~, except when installed in accordance with Item f);
b) maintained at a minimum horizontal separation of 300 mm from differing underground cables~~conductors~~ other than communication cables~~conductors~~, except when installed in accordance with Item f);
c) placed at a minimum depth of 600 mm, unless rock bottom is encountered at a lesser depth, in which case a minimum depth of 450 mm shall be permitted, except that for service cables~~wires~~ under parkways and lawns the depth shall be permitted to be reduced to 450 mm;
d) placed with a layer of sand 75 mm deep, both above and below the cable, if in rocky or stony ground;
e) placed at a minimum depth of 900 mm under an area that is subject to vehicular traffic, except that the depth shall be permitted to be reduced to 600 mm provided that there is mechanical protection that consists of
   i) treated plank at least 38 mm thick or other suitable material that shall be placed over the ~~conductor or~~ cable after first backfilling with 75 mm of sand or earth containing no rocks or stones; or
   ii) a conduit suitable for earth burial placed to facilitate cable replacement and to minimize traffic vibration damage; and
f) equipped with a metal shield when placed in a common trench involving random separation with power supply cables or wiring operations at 750 V or less, in which case the community antenna distribution conductors shall not cross under the supply cables.

Revise Rule 54-702 to read:

SN3961-54

54-702 Underground raceway

Where community antenna distribution cables~~conductors~~ are placed in underground raceway systems

a) the raceway, including laterals, shall be separated from those used for the electric power system by not less than 50 mm of concrete or 300 mm of well-tamped earth;
b) the raceway shall be located to maintain a minimum depth of 600 mm in areas subject to vehicular traffic and 450 mm in all other areas, except that where rock bottom is encountered at lesser depth the raceway shall be encased in concrete;
c) the raceway shall not terminate in the same maintenance hole, and the ~~conductors or~~ cable assembly shall not be placed in the same maintenance hole, used for an electric power system, unless all requirements of Clause 6 of CSA C22.3 No. 7 are adhered to;
d) the cables~~conductors~~ shall not be placed in the same raceway containing electric lighting, power, or insulated Class 1 circuit conductors;
e) the cable sheath shall be suitable for wet locations; and
f) raceways entering a building and forming part of an underground installation shall be sealed with a suitable compound in such a way that moisture and gas will not enter the building and shall

i) enter the building above ground where practicable; or ii) be suitably drained.	
Revise Rule 54-704 to read: **54-704 Underground block distribution** Where the entire street circuit is run underground and the circuit is placed to prevent contact with electric lighting, power, or Class 1 circuits of more than 300 V, insulating bushings or raceways as specified in Rule 54-606 shall not be required where the circuit cables~~conductors~~ enter a building.	**SN3961-54**
Revise Rule 54-800 to read: **54-800 Lightning arresters for receiving stations** 1) A lightning arrester shall be provided for each lead-in conductor from an outdoor antenna to a receiving station, except where such a lead-in conductor is protected by a continuous grounded metal shield between the antenna and the point of entrance to the building. 2) Lightning arresters for receiving stations shall be located outside the building or inside the building between the point of entrance of the lead-in and the radio set or transformer, and as near as practicable to the entrance of the cables~~conductors~~ to the building. 3) Lightning arresters for receiving stations shall not be located near combustible material nor in a hazardous location.	**SN3961-54**
Revise Rule 54-902 to read: **54-902 Insulation of grounding conductor** ~~The~~ A bare grounding conductor shall be permitted ~~to be uninsulated~~.	**SN3961-54**
Revise Rule 54-920 to read: **54-920 Radio noise suppressors** Radio interference eliminators, interference capacitors, or radio noise suppressors connected to power supply leads ~~shall be of a type approved for the purpose and~~ shall not be exposed to mechanical damage.	**SN3948-54**

SECTION 58

Revise Rule 58-014 to read: SN3961-58

58-014 Voltage limitations

1) Voltages for communication, control, remote control, monitoring, supervision, and signal circuits shall not exceed 48 volts-to-ground (nominal), with the exception of circuits for hand-crank-type telephone signal bells.
2) Voltages for motors, machine brakes, motor-generator sets, floodlighting, and heaters shall not exceed 750 volts-to-ground.
3) Voltages for motor control circuits shall not exceed 120 volts-to-ground.
4) Voltages for aerial conductors or cables carried between towers that support the passenger ropeway shall not exceed 30 volts-to-ground or 42 volts-to-ground peak, with the exception of circuits for hand- crank-type telephone signal bells.
5) Voltages for all other circuits shall not exceed 300 volts-to-ground.

Revise Rule 58-102 to read: SN3961-58

58-102 Minimum size of conductors

1) In travelling cables, the minimum size of insulated conductors for all communication, control, remote control, monitoring, supervision, and signal circuits shall be No. 20 AWG copper.
2) Except as specified in Subrule 1), the minimum size of insulated conductors for all communication, control, remote control, monitoring, supervision, and signal circuits shall be No. 26 AWG copper.

Revise Rule 58-104 to read: SN3961-58

58-104 Grouping of insulated conductors and cables

1) Optical fiber cables, shielded cables, and insulated conductors for operating devices, power, motor, heating, air conditioning, operating, signal, communication, control, safety, fire alarm, and lighting circuits shall be permitted to be run in the same raceway system or travelling cable, provided that the insulation rating for each conductor is not less than the maximum circuit voltage in the cable or raceway system.
2) Optical fiber cables, shielded cables, and insulated conductors for operating devices, operating, signal, communication, control, safety, and fire alarm circuits shall be permitted to be run in the same aerial cable, provided that the insulation rating for each conductor is not less than the maximum circuit voltage.
3) The optical fiber cables referred to in Subrules 1) and 2) shall include conductive, non-conductive, and hybrid types.

Revise Subrule 58-200 1) and Item 58-200 2)i) to read: SN3961-58

58-200 Wiring methods

1) Insulated ~~C~~conductors, cables, and optical fiber~~s~~ cables located in machine rooms, control rooms, machinery spaces, control spaces, and in or on cabins, not including travelling cables connecting the movable drive carriage or movable return carriage, shall be installed in rigid metal conduit, electrical metallic tubing, rigid PVC conduit, or wireways. 2) Notwithstanding Subrule 1), the following wiring methods shall be permitted in machine rooms, control rooms, machinery spaces, control spaces, and in or on cabins: “ “ i) ~~jacketed~~ flexible cords and cables used in extra-low-voltage circuits ~~(30 V or less)~~, provided that the cords and cables are i) not greater than 2 m in length; and ii) supported and provided with mechanical protection.	

SECTION 62

SN4284

In Rule 62-102, revise special terminology for "Heating cable" and "Heating device" and add term "Trace heater" to read:

62-102 Special terminology (see Appendix B)
In this Section, the following definitions shall apply:

Heating cable ~~**Trace heater**~~ — see **Trace heater** ~~**Heating cable**~~.

Heating device — any form of electrical heater, including trace heaters ~~cables~~, fixtures and~~,~~ panels~~, and strip systems~~.

Trace heater ~~**Heating cable**~~ — a device of linear geometry designed for the purpose of producing heat on the principle of electrical resistance ~~parallel~~ trace heater ~~or series~~ trace heater ~~heating cable~~.

Parallel trace heater ~~**heating cable**~~ — a trace heater with its heating element being either continuous or in discrete zones, such that the power per unit length is not substantially affected by any change in circuit length. ~~cable incorporating heating elements connected in parallel either continuously or intermittently such that the watt density along the length of the cable is not altered by changes in the cable length.~~

~~**Parallel heating cable set** — a parallel heating cable assembled with the associated parts necessary to connect it to a source of electrical supply.~~

Series trace heater ~~**heating cable**~~ — a trace heater having a series connected heating element with a single current path and a specific resistance at a given temperature for a given length. ~~a cable using a series resistance conductor(s).~~

Series trace heater ~~**heating cable**~~ **set** — a series trace heater ~~heating cable~~ assembled with the associated parts necessary to connect it to a source of electrical supply.

Trace heater ~~**Heating cable**~~ **set** — a parallel trace heater or series trace heater ~~heating cable~~ assembled with the associated parts necessary to connect it to a source of electrical supply.

SN4305

Revise Subrule 62-104 2) to read:

62-104 Installation of heating devices and bonding (see Appendix B)
1) Electric heating devices shall be assembled and installed in accordance with the manufacturer's instructions and the applicable rules of this Section.

2) Electrically conductive shields, braids, sheaths, and coverings, and all exposed metal surfaces of heating devices shall be bonded ~~to ground~~.

Revise Rule 62-114 to read: SN4284

62-114 Overcurrent protection and grouping (see Appendix B)

1) Every heating fixture, trace heater ~~heating cable~~ set~~,~~ or heating panel set~~, or parallel heating set~~ having an input of more than 30 A shall be supplied by a branch circuit that supplies no other equipment.
2) In buildings for residential occupancy, two or more heating fixtures, trace heater ~~heating cable~~ sets, or heating panel sets shall be permitted to be connected to a branch circuit used for space heating, provided that the branch circuit overcurrent devices are rated or set at not more than 30 A.
3) In other than buildings for residential occupancy,
   a) two or more heating fixtures, trace heater ~~heating cable~~ sets~~,~~ or heating panel sets~~, or parallel heating sets~~ shall be permitted to be grouped on a branch circuit, and the branch circuit overcurrent devices shall not be set or rated in excess of 60 A unless a deviation has been allowed in accordance with Rule 2-030 to use overcurrent devices having a higher setting or rating; and
   b) where three heating fixtures, trace heater ~~heating cable~~ sets~~,~~ or heating panel sets~~, or parallel heating sets~~ are grouped on a branch circuit in a balanced three-phase arrangement, the branch circuit overcurrent devices shall be permitted to be set or rated in excess of 60 A.
4) Where two or more heating fixtures, trace heater ~~heating cable~~ sets~~,~~ or heating panel sets~~, or parallel heating sets~~ are grouped on a single branch circuit, the non-heating leads of trace heater ~~heating cable~~ sets, heating fixtures, and taps to trace heater ~~heating cable~~ sets~~,~~ and heating fixtures~~, and strip systems~~ shall
   a) have an ampacity not less than one-third the rating of the branch circuit overcurrent device; and
   b) be not more than 7.5 m in length.

Revise Rule 62-116 to read: SN4284

62-116 Ground fault protection (see Appendix B)

1) Ground fault protection shall be provided to de-energize all normally ungrounded conductors of electric trace heater ~~heating cable~~ sets, heating panel sets, and fixed infrared radiant heaters of the metal sheath glowing element type, with a ground fault setting sufficient to allow normal operation of the heater.
2) Notwithstanding Subrule 1), in industrial establishments where continued circuit operation is necessary for safe operation of equipment or processes, and conditions of maintenance and supervision ensure that only qualified persons will service the installed systems, ground fault detection shall be permitted in place of the requirements of Subrule 1).
3) Notwithstanding Subrule 1), ground fault protection shall not be required for trace heater ~~heating cable~~ sets and heating panel sets connected to a Class 1 extra-low-voltage power circuit, where
   a) the Class 1 extra-low-voltage power circuit is supplied from the secondary of an isolating transformer having no direct electrical connection between the primary and secondary windings;
   b) the isolating transformer is supplied from a branch circuit operating at

not more than 150 volts-to-ground; and c) the Class 1 extra-low-voltage power circuit is not grounded.	
Revise Rule 62-122 to read: **62-122 Construction of series trace heater ~~heating cable~~ sets** Series trace heater ~~heating cable~~ sets shall be complete assemblies, including both the heating portion and the non-heating end leads, and shall have permanent markings as required located on one or both of the non-heating leads not more than 75 mm from the supply end of a non-heating lead.	SN4284
Revise Rule 62-124 to read: **62-124 Installation of series trace heater ~~heating cable~~ sets** 1) The heating portion of a series trace heater ~~heating cable~~ set shall not be shortened, and any trace heater ~~heating cable~~ set that does not bear its original markings shall be considered to have been shortened unless the installer can demonstrate, by instrument measurements, that the characteristics of the series trace heater ~~heating cable~~ set have not been altered. 2) The entire length of the heating portion, including connections to non-heating leads, shall be installed within the heating area.	SN4284
Revise Rule 62-126 to read: **62-126 Field repair, modification, or assembly of series trace heater ~~heating cable~~ sets** (see Appendix B) Notwithstanding Rule 62-124, at industrial establishments where conditions of maintenance and supervision ensure use by qualified persons, series trace heater ~~heating cable~~ sets shall be permitted to be a) field repaired or spliced with splice kits supplied by the trace heater ~~heating cable~~ manufacturer, provided that the total length of the heating portion of the sets is not changed by more than 3%; and b) field modified or field assembled with splice and termination kits supplied by the trace heater ~~heating cable~~ manufacturer, provided that i) a permanent tag with the new design information is installed; ii) a permanent record of the new design information is retained; iii) tests for insulation resistance and verification of the finished trace heater ~~heating cable~~ set resistance are made; iv) the design, or modifications to the design, are done by a qualified person and reviewed by the trace heater ~~heating cable~~ manufacturer; and v) the electrical rating is permanently marked A) in or on the junction box that is provided as part of the system; B) on the trace heater ~~heating cable~~; or C) on a permanent tag within 75 mm of a power connection or power connection fitting.	SN4284
Revise Rule 62-208 to read:	SN4284

62-208 Location of trace heater ~~heating cable~~ sets and heating panel sets

1) The heating portion of trace heater ~~heating cable~~ sets and heating panel sets shall not penetrate or pass through walls, partitions, floors, or similar structures.
2) Trace heater ~~Heating cable~~ sets and heating panel sets shall be permitted to be in contact with thermal insulation but shall not be run in or through thermal insulation.

Revise Rule 62-212 to read: SN4284

62-212 Installation of trace heater ~~heating cable~~ sets and heating panel sets (see Appendix B)

1) Field-made connections necessary to assemble an individual heating panel set shall be permitted to be inaccessible, provided that they are accessible before the surface finishing materials are applied and the connectors and enclosures are part of the heating panel sets.
2) Cutting, nailing, or stapling of the heating panels and heating panel sets shall be done only through the area(s) provided for this purpose.
3) Branch circuits supplying trace heater ~~heating cable~~ sets and heating panel sets shall be marked with a warning label supplied by the manufacturer and affixed to the panelboard by the installer, stating that the applicable surface and location supplied by the branch circuit contains energized wiring and must not be penetrated by nails, screws, or similar devices.

Revise Rule 62-214 to read: SN4284

62-214 Installation of trace heater ~~heating cable~~ sets in plaster or other cementitious material

1) Trace heater ~~Heating cable~~ sets installed in plaster or other cementitious material shall be secured in place by fastening devices that are suitable for the temperature involved and not likely to damage the trace heater ~~heating cable~~.
2) The entire length of the heating portion, including the connections to the non-heating leads, shall be completely embedded in non-combustible material.

Revise Rule 62-216 to read: SN4284

62-216 Trace heater ~~Heating cable~~ sets and heating panel sets in gypsum board and other cementitious ceiling and wall installations (see Appendix B)

1) Trace heater ~~Heating cable~~ sets and heating panel sets shall be installed parallel to the joists, studs, or nailing strips, with clearance not less than 13 mm on each side of the joist, stud, or nailing strip.
2) After the trace heater ~~heating cable~~ sets and heating panel sets are installed, the entire ceiling below the installed trace heater ~~heating cable~~ set or heating panel set shall be covered with gypsum board or acceptable cementitious materials not exceeding 13 mm in thickness.

Revise Rule 62-218 to read: SN4284

62-218 Installation of trace heater ~~heating cable~~ sets and heating panel sets under floor coverings 1) Heating panel sets and trace heater ~~heating cable~~ sets shall be a) installed on floor surfaces that are smooth and flat; and b) completely covered by floor coverings for which the heating device is intended. 2) Type FCC non-heating leads shall be permitted to be used in dwelling units for connecting underfloor-covering trace heater ~~heating cable~~ sets and heating panel sets to the branch circuit.	
Revise Rule 62-304 to read: **62-304 Trace heaters ~~Heating cables~~ and heating panels installed below the heated surface** (see Appendix B) 1) Trace heaters ~~Heating cable~~ and heating panels installed outdoors under the surface of driveways, sidewalks, and similar locations shall a) be surrounded by non-combustible material throughout their length, including the point of connection to the non-heating leads; and b) be embedded or covered to a depth of 50 mm minimum below the finished surface. 2) Non-metallic trace heaters ~~heating cable~~ or heating panels installed indoors shall be not less than 25 mm from any uninsulated metal bodies located below the surface to be heated.	SN4284
Revise Rule 62-306 to read: **62-306 Trace heater ~~Heating cable~~ sets installed on or wrapped around surfaces** 1) Trace heater ~~Heating cable~~ sets installed on or wrapped around surfaces shall be secured in place by suitable fastening devices that will not damage the heating unit and that are suitable for the temperature involved. 2) Trace heater ~~Heating cable~~ sets wrapped over valves, equipment, or expansion joints in piping systems shall be installed in such a manner as to avoid damage when movement occurs at these areas.	SN4284
Revise Rule 62-308 to read: **62-308 Trace heater ~~Heating cable~~ sets or heating panel sets installed on non-metallic pipes, ducts, or vessels** A trace heater ~~heating cable~~ set or heating panel set installed on a non-metallic pipe, duct, or vessel shall be controlled by a thermostat or other suitable temperature-limiting system so that it does not cause damage to the pipe, duct, or vessel.	SN4284
Revise Rule 62-400 to read: **62-400 Trace heater ~~Heating cable~~ sets and heating panel sets installed within pipes, ducts, or vessels**	SN4284

1)	Trace heater ~~Heating cable~~ sets and heating panel sets installed within pipes, ducts, or vessels shall be suitable for the application.	
2)	Where the trace heater ~~heating cable~~ set or heating panel set passes through the pipe, duct, or vessel, it shall pass through a suitable gland.	
3)	Where a metal raceway is required for the non-heating leads of a trace heater ~~heating cable~~ set installed in a pipe, duct, or vessel, it shall be installed so that it will not become flooded in the event of the failure of the gland required by Subrule 2).	
4)	A trace heater ~~heating cable~~ set or heating panel set installed within a non-metallic pipe, duct, or vessel shall be controlled by a thermostat or other suitable temperature-limiting system so that it does not cause damage to the pipe, duct, or vessel.	

SECTION 64

NOTE: The revision below was conditionally approved subject to development and approval of Rules for energy storage systems. SN4275

Revise the title of Section 64 and Rule 64-000 to read:

Section 64 — Renewable energy, energy production, and energy storage systems

64-000 Scope (see Appendix B)
1) This Section applies to the installation of renewable energy systems, energy production systems, and energy storage systems except where the voltage and current are limited in accordance with Rule 16-200 1) a) and b).
2) This Section supplements or amends the general requirements of this Code.

Revise Subrule 64-062 1) to read: SN4314

64-062 Wiring methods
1) Except as provided for by Rule 64-210, insulated conductors ~~for~~ between dc renewable energy sources ~~or supply circuits of~~ and an ~~interactive~~ inverter, installed inside a building or structure, shall be contained in metallic raceways, metal enclosures, or cables with a metal armour or metal sheath.

Revise Subrule 64-072 1) to read: SN4315

64-072 Marking
(1) All interactive system(s) points of interconnection with other sources shall be marked with the rated ~~maximum~~ ac ~~output~~ operating voltage and current.

Revise Subrule 64-212 1)b)i) to read: SN4323-64

64-212 Insulated conductor marking or colour coding (see Appendix B)
1) Notwithstanding Rule 4-032, dc photovoltaic output circuit insulated conductors, and photovoltaic source circuit insulated conductors installed between a module and the power conditioning unit of the dc system, shall be coloured or coded, or both, as follows:

"

b) for a 3-wire circuit (bipolar circuit)
i) white~~, grey,~~ or white with a coloured stripe for the mid-wire (identified as the centre tap), red for positive, and black for negative; or
ii) black insulated conductors manufactured with permanent surface printing indicating the polarity on the conductor insulation.

Revise Subrule 64-216 to read: SN4292

64-216 Photovoltaic dc arc-fault circuit protection (1) Solar photovoltaic systems with a dc source or ~~circuits,~~ dc output circuit~~s, or both, and operating at a maximum system~~ voltage of 80 V or greater when calculated in accordance with Rules 64-202 1) or 2) shall be protected by: (a) a dc arc-fault circuit interrupter; or (b) other system equipment that provides equivalent protection.	
Add new Rules 64-1000 to 64-1014 to read:* **64-1000 Scope** 1) Rules 64-1002 to 64-1012 apply to the installation of storage batteries. 2) Rule 64-1014 applies to the installation of electrical equipment, other than storage batteries, in a battery room. **64-1002 Special terminology** In this Subsection, the following definitions shall apply: Sealed cell or battery — a storage battery that has no provision for the addition of water or electrolyte or for the external measurement of electrolyte specific gravity. Storage battery — a battery consisting of more than one rechargeable cell of the lead acid, alkaline, or other electrochemical type. **64-1004 Location of storage batteries** Batteries with exposed live parts shall be kept in a room or enclosure accessible only to authorized personnel. **64-1006 Ventilation of battery rooms or areas** (see Appendix B) 1) Storage-battery rooms or areas shall be adequately ventilated. 2) Storage batteries shall not be subjected to ambient temperatures greater than 45 °C or less than the freezing point of the electrolyte. **64-1008 Battery vents** 1) Vented cells shall be equipped with flame arresters. 2) Sealed cells shall be equipped with pressure release vents. **64-1010 Battery installation** 1) Battery trays, racks, and other surfaces on which batteries are mounted shall be a) level; b) protected against corrosion from the battery electrolyte; c) except as permitted in Subrule 5), covered with an insulating material having a dielectric strength of at least 1500 V; d) of sufficient strength to carry the weight of the battery; and e) designed to withstand vibration and sway where appropriate. 2) Battery cells shall be spaced a minimum of 10 mm apart. 3) Battery cells having conductive containers shall be installed on non-conductive surfaces. 4) Sealed cells and multi-compartment sealed batteries having conductive containers shall have an insulating support if a voltage is present between the container and ground.	**SN4412-26** **SN4412-64**

5) Cells and multi-compartment vented storage batteries, with covers sealed to containers of nonconductive, heat-resistant material, shall not require additional insulating support. 6) Batteries having a nominal voltage greater than 150 V and with cells in rubber or composition containers shall be sectionalized into groups of 150 V or less. **64-1012 Wiring to batteries** 1) The wiring between cells and batteries and between the batteries and other electrical equipment shall be a) bare conductors that shall not be taped; b) open wiring; c) a flexible cord; d) mineral-insulated cable, provided that it is adequately protected against corrosion where it may be in direct contact with acid or acid spray; or e) aluminum-sheathed cable or copper-sheathed cable, provided that it has suitable corrosion resistant protection where necessary. 2) Where wiring is installed in rigid conduit or electrical metallic tubing a) the conduit or tubing shall be of corrosion-resistant material or other materials suitably protected from corrosion; b) the end of the raceway shall be tightly sealed with sealing compound, rubber tape, or other material to resist the entrance of electrolyte by spray or creeping; c) the conductor shall issue from the raceway through a substantial glazed insulating bushing; d) at least 300 mm of the conductor shall be free from the raceway where connected to a cell terminal; and e) the raceway exit shall be located at least 300 mm above the highest cell terminal to reduce electrolyte creepage or spillage entering the raceway. **64-1014 Wiring methods and installation of equipment in battery rooms** The installation of wiring and equipment in a battery room shall be in accordance with the requirements for a dry location. **64-1000 is former Rule 26-500 with revisions. Rules 64-1002 to 64-1014 are former Rules 26-502 to 25-514 (no revisions).*	

SECTION 66

Revise Rule 66-100 to read:

SN3961-66

66-100 Supporting of ~~conductors~~cables

1) Only decorative lighting, signal, communication, and control circuits shall be supported on structures that support amusement rides.
2) The decorative lighting and control circuits of one amusement ride shall not be installed on a supporting structure of another ride.
3) Overhead cables~~conductors~~ shall have a vertical clearance to finished grade of not less than the following:
   a) across highways, streets, lanes, and alleys: 5.5 m;
   b) across areas accessible to vehicles: 5 m; and
   c) across areas accessible to pedestrians: 3.5 m.

Revise Rule 66-200 to read:

SN3961-66

66-200 Grounding

1) The service and electrical distribution shall be grounded in accordance with Section 10.
2) Notwithstanding Rule 10-118 1) a), a plug-in, locking-type single-conductor cable connector shall be permitted for connection to a grounding electrode for a mobile generator.~~grounding electrodes for mobile generators shall be permitted to be connected using single-conductor, plug-in, locking-type connectors.~~
3) A mobile generator grounding conductor shall
   a) be dedicated to the mobile generator;
   b) be run directly, by the shortest practicable route;
   c) have no more than two sets of mated, in-line, single-pin connections, excluding the connections at the grounding electrodes and the mobile generator;
   d) not exceed 50 m in total length; and
   e) be not less than No. 4 AWG.

Revise Subrules 66-456 7) and 8) to read:

SN3961-66

66-456 Single-conductor cable connections

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7) No more than one tapping or parallel tee per single-conductor cable shall be used at any one point in a power distribution system.
8) Any distribution splitting or combining devices requiring more than two load connections per single-conductor cable shall use a single multiple-connection device at that point.

SECTION 68

Revise Rule 68-054 to read: **SN3961-68**

68-054 Overhead wiring (see Appendix B)

1) No pool shall be placed under or near overhead wiring, and no overhead wiring shall be placed over or near a pool, unless the installation complies with the requirements of this Rule.
2) There shall not be any overhead wiring above the pool and other elevated surfaces associated with the pool, such as a diving structure, slide, swings, observation stand, tower, or platform, or above the adjacent area extending 5.0 m horizontally from the pool edge, except as permitted by Subrules 3) and 4).
3) ~~Insulated c~~Communication cables~~conductors~~, communication antenna distribution cables~~conductors~~, and neutral supported cables not exceeding 750 V shall be permitted to be located over a pool and other elevated surfaces associated with the pool, or above the adjacent area extending horizontally from the pool edge, provided that there is a clearance of at least 5.0 m measured from the outer edge of the pool or from other elevated surfaces associated with the pool.
4) Conductors other than the cables~~those~~ covered by Subrule 3) and operating at not more than 50 kV phase-to-phase shall be permitted to be located over a pool and other elevated surfaces associated with the pool, or above the adjacent area extending horizontally from the pool edge, provided that there is a clearance of at least 7.5 m measured from the outer edge of the pool or from other elevated surfaces associated with the pool.

Revise Rule 68-056 to read: **SN3961-68**

68-056 Underground wiring

The horizontal separation between the inside walls of a pool and underground cables or insulated conductors in a raceway, except for bonding conductors or cables or insulated conductors in a raceway supplying electrical equipment associated with the pool and protected by a Class A ground fault circuit interrupter, shall be not less than that shown in Table 61.

Revise Subrule 68-058 6) to read: **SN3961-68**

68-058 Bonding (see Appendix B)

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“

6) The bonding conductor from the junction box referred to in Rule 68-060 shall be run to the panelboard supplying pool electrical equipment and, if smaller than No. 6 AWG, shall be installed and mechanically protected in the same manner as the insulated circuit conductors or cable.

Revise Subrules 68-060 2) and 4) to read: **68-060 Junction and deck boxes** (see Appendix B) “ 2) Junction boxes installed on the supply side of conduits extending to forming shells, hereafter referred to as deck boxes, shall be suitable~~specifically approved~~ for the purpose. “ 4) Deck boxes shall not contain the insulated conductors of any circuits other than those used exclusively to supply the underwater equipment.	**SN3948-68** **SN3961-68**
Revise Subrule 68-066 1) to read: **68-066 Luminaires and lighting equipment** 1) Wet-niche or submersible luminaires shall a) be mounted in forming shells that have provision for a suitable connection to the wiring method used; b) unless suitable~~specifically approved~~ and marked for submersion at a greater depth, not be submersed in the pool water at a depth of more than 600 mm, such distance being measured from the centre of the lens face of the luminaire to the normal water level; and c) operate with neither the supply voltage to the luminaire nor its associated ballast or transformer, if applicable, nor the secondary open-circuit voltage of the ballast or transformer exceeding 150 V during either starting or operating conditions.	**SN3948-68**
Revise Subrule 68-100 4) to read: **68-100 Wiring method** “ 4) Insulated ~~C~~conductors on the load side of each Class A ground fault circuit interrupter shall be kept entirely independent of all other wiring that is not protected in that way and shall not enter a luminaire, raceway, box, or cabinet occupied by other wiring except for panelboards that house the interrupters.	**SN3961-68**
Revise Rule 68-200 to read: **68-200 Electrical equipment** No electrical equipment shall be located in the pool water or on the pool wall unless suitable~~specifically approved~~ for the purpose.	**SN3948-68**
Revise Rule 68-202 to read: **68-202 Pumps** 1) Swimming pool pumps shall be a) supplied from a permanently installed receptacle located not less than 1.5 m	**SN3948-68**

nor more than 7.5 m from the pool wall; and b) protected by a Class A ground fault circuit interrupter if located within 3 m of the inside walls of the pool and not suitably separated from the pool area by a fence, wall, or other permanent barrier. 2) Swimming pool pumps located within 3 m of the pool walls shall be marked ~~specifically approved~~ for the purpose.	
Revise Rule 68-304 to read: **68-304 Control** 1) A hydromassage bathtub shall be controlled by an on-off device located in accordance with Subrule 2). 2) Electric controls associated with a hydromassage bathtub shall be located behind a barrier or shall be located not less than 1 m horizontally from the wall of the hydromassage bathtub, unless they are an integral part of a~~n approved~~ factory-built hydromassage bathtub.	**SN3948-68**
Revise Subrule 68-404 1) to read: **68-404 Controls and other electrical equipment** (see Appendix B) 1) Controls for a spa or hot tub shall be located behind a barrier or not less than 1 m horizontally from the spa or hot tub, unless they are an integral part of a~~n approved~~ factory-built spa or hot tub.	**SN3948-68**
Revise Subrule 68-406 5) to read: **68-406 Leakage current collectors** “ “ 5) The bonding conductor for leakage current collectors shall be a) not smaller than that required by Table 16 where the bonding conductors are mechanically protected in the same manner as the insulated circuit conductors or cable; or b) a minimum No. 6 AWG copper conductor.	**SN3961-68**
Revise Rule 68-408 to read: **68-408 Field-assembled units** (see Appendix B) 1) Spas and hot tubs field assembled with individual components shall be installed in accordance with Rules 68-402 to 68-406 and Subrules 2) and 3) of this Rule. 2) Individual components such as pumps, heaters, and blowers shall be ~~specifically approved~~ suitable for use with spas or hot tubs. 3) Air blowers shall be installed above the tub rim, or other means shall be used to prevent water from contacting blower live parts.	**SN3948-68**

SECTION 70

Revise Subrule 70-108 1) to read:

SN3948-70
SN3961-70

70-108 Power supply cord or cord set

1) Where a power supply cord or cord set is used except as provided for in Subrule 4), the cord shall
   a) be provided as part of the mobile structure;
   b) have an ampacity not less than the ampere rating of the attachment plug;
   c) be of the extra-hard-usage type suitable for outdoor use as selected in accordance with Rule 12-402 1) or 12-406 1);
   d) have separate identified and bonding conductors;
   e) be not less than 7.5 m in length, as measured from the attachment plug to the point of entrance to the unit;
   f) if it is a permanently connected power supply cord, terminate at the main disconnecting means in the unit or at a box in or on the unit, suitable space being provided in the unit for storage of the cord when it is not in use to protect it from damage; and
   g) have a suitable grounding-type attachment plug and where used in an application covered by Section 8, the plug shall have ~~with~~ an ampere rating ~~as follows:~~
   ~~i) for applications covered by Section 8,~~ not less than that of the insulated service conductor ampacity required in Section 8.~~; or~~
   ~~ii) for other applications, not less than that for which it is approved.~~

Revise Item 70-110 1)b) to read:

SN3961-70

70-110 Disconnecting means and main overcurrent protection

1) Except as provided for in Subrule 2), each structure shall be provided with
   a) a service box or a combined service and distribution box located within the structure with provision for grounding the neutral;
   b) main overcurrent protection having a current rating at least equal to the minimum ampacity of the consumer's service, as determined in accordance with Section 8, but in no case less than 50 A for mobile homes and not exceeding the ampacity of the insulated supply conductors actually used, except as permitted by Rule 14-104; and

Revise Item 70-112 d) to read:

SN3961-70

70-112 Location of service or distribution equipment

Service or distribution equipment shall be

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"

d) located as close as practicable to the point where the insulated supply conductors enter the structure; and

Revise Rule 70-114 to read: **70-114 Wiring methods — General** 1) The wiring method shall be as specified in Section 12, except where flexible cords are permitted in Rule 70-116 or for Class 2 circuits. 2) Surfaces against which ~~conductors~~ cables are in contact shall be smooth and entirely free from sharp edges and burrs that may cause abrasion of the cable jacket or insulation on the conductors. 3) Where cable is required to be protected from mechanical damage by Rules 12-516, 12-616, and 12-710, plates or tubes of sheet steel of at least No. 16 MSG or the equivalent, secured in place, shall be used to protect the cable from driven nails, screws, or staples. 4) Cable run through holes in joists or studs shall be considered to be secured for the purposes of Rules 12-510 and 12-618. 5) Unless provided with insulation suitable for the highest voltage involved, insulated conductors of low-voltage and extra-low-voltage circuits shall be separated by barriers, or shall be segregated by clamping, routing, or equivalent means that will ensure permanent separation, and shall in any case be separated or segregated from bare live parts of the other circuit. 6) For the purposes of Subrule 5), the outer covering of non-metallic-sheathed cable shall be considered to be a suitable barrier. 7) Bare live parts, including terminals of electrical equipment in extra-low-voltage circuits other than Class 2 circuits, shall be enclosed in accordance with Rule 2-202 1). 8) Insulated ~~C~~conductors for extra-low-voltage Class 2 circuits shall be Type LVT, low-energy safety control cable, or the equivalent, and if protected by fuses in accordance with Rule 16-200, the fuses shall not be interchangeable with those of higher ratings.	**SN3961-70**
Revise Subrule 70-124 1) to read: **70-124 Ventilating fans used in kitchen areas** (see Appendix B) 1) The motor of any fan installed in the kitchen area above or in the vicinity of cooking equipment and located in the air stream shall be of the totally enclosed type unless marked as being suitable for use in a household cooking area.~~specifically approved for this application.~~	**SN3948-70**
Revise Subrule 70-204 1) to read: **70-204 Service and distribution equipment** 1) Provision shall be made at the factory for the installation either at the factory or on the job site of a service box or other service equipment in the structure that shall be a) in a readily accessible location within the building; b) as close as practicable to the point where the insulated service conductors or cable enter the building; and c) within the individual units where multiple occupancy residential	**SN3961-70**

condominium or row-house structures are involved or, in all other cases, in a central location accessible to all tenants.	

SECTION 72

Revise Rule 72-102 to read:

SN4303

72-102 ~~Demand factors~~ Calculated load for service~~s~~ and feeder~~s~~ ~~conductors~~

1) The ~~minimum ampacity of the consumer's~~ calculated load for the service ~~and~~ or feeder ~~conductors for~~ supplying a mobile home park~~s~~ shall be based on the requirements of
   a) Rule 8-200 with respect to the service or feeder ~~conductors~~ supplying an individual mobile home; and
   b) Rule 8-202 with respect to the service or feeder ~~conductors~~ supplying more than one mobile home.
2) The ~~minimum ampacity of the consumer's~~ calculated load for the service ~~and~~ or feeder ~~conductors in the case of~~ supplying a recreational vehicle park~~s~~ shall be ~~calculated on the basis of the ampere rating of the receptacles and by applying the following demand factors~~:
   a) 100% of the sum of the ampere ratings of the first five receptacles having the highest ampere ratings; plus
   b) 75% of the sum of the ampere ratings of the next ten receptacles having the same or next smaller ratings to those specified in Item a); plus
   c) 50% of the sum of the ampere ratings of the next ten receptacles having the same or next smaller ratings to those specified in Item b); plus
   d) 25% of the sum of the ampere ratings of the remainder of the receptacles.
3) For the purpose of Subrule 2),
   a) each duplex receptacle supplied from a multi-wire branch circuit shall be counted as two receptacles; and
   b) ~~For the purpose of Subrule 2),~~ where receptacles of different ratings are installed on one lot, the receptacle having the highest ampere rating shall serve as a basis for calculation.
4) For the purpose of Subrule 2), where receptacles of different ratings are installed on one lot, the receptacle having the highest ampere rating shall serve as a basis for calculation.

Delete Rule 72-104:

SN3961-72
SN4303

~~**72-104 Feeders**~~
~~Feeders between the park consumer's service equipment and the park distribution centres shall be permitted to be installed in accordance with the applicable requirements for service conductors and cables.~~

Revise Rule 72-112 to read:

SN4316

72-112 Power supply cords

1) Power supply cords shall be permitted only for the connection of recreational vehicles where the cords are not subject to mechanical damage ~~severe physical abuse or extended periods of use~~.

SECTION 74

Revise Subrule 74-004 3) to read: **SN3961-74**

74-004 Wiring methods (see Appendix B)

“

3) For installations covered by this Section of the Code, in areas not accessible to the public, ~~single conductors and~~ cable[s] ~~assemblies~~ shall be Type ASLC and shall be installed as follows:
   a) when installed in a raceway, be no less than 450 mm deep;
   b) when direct buried, be no less than 450 mm deep with a layer of sand or screened earth extending at least 75 mm above and below the cables~~conductors~~, if in rocky or stony ground; and
   c) when installed under runways, taxiways, aprons, and roads, be provided with mechanical protection in the form of rigid conduit or a system of concrete-encased underground raceways installed a minimum of 600 mm deep.

Revise Subrule 74-006 2) to read: **SN3961-74**

74-006 Direct burial transformers

“

2) The secondary insulated conductors shall be colour-coded and one conductor shall be identified.

Revise Subrule 74-010 1) to read: **SN3961-74**

74-010 Ground counterpoise

1) Ground counterpoise conductors shall be soft copper ~~wire~~ not smaller than No. 8 AWG and shall be
   a) solid bare conductor~~wire~~ where installed in earth; or
   b) insulated and have a green finish if installed underground in raceways.

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TABLES

Revise Table 1 as shown:

SN4267

Table 1

Allowable ampacities for single copper conductors, bare, covered, or insulated, rated not more than 5000 V and unshielded, in free air

(based on an ambient temperature of 30 °C*)

(See Rules 4-004, 4-006, 8-104, 26-142, 42-008, and 42-016 and Tables 5A, 5B, and 19.)

Size,		Allowable ampacity†					
AWG or	mm²	60 °C‡	75 °C‡	90 °C‡§	110 °C‡ See Note (3)	125 °C‡ See Note (3)	200 °C‡ See Note (3)
14**	2.08	25	30	35	40	40	50
12**	3.31	30	35	40	45	45	55
10**	5.26	40	50	55	65	65	80
8	8.37	60	70	80	90	95	115
6	13.3	80	95	105	120	130	155
4	21.2	105	125	140	160	170	205
3	26.7	120	145	165	185	195	240
2	33.6	140	170	190	215	230	280
1	42.4	165	195	220	245	265	320
0	53.5	195	230	260	290	310	375
00	67.4	220	265	300	335	355	435
000	85.0	260	310	350	390	420	510
0000	107	300	360	405	455	485	590
250	127	340	405	455	510	545	—
300	152	370	445	500	560	600	—
350	177	425	505	570	640	680	—
400	203	455	545	615	690	735	—
500	253	520	620	700	785	835	—
600	304	580	690	780	870	930	—
700	355	630	755	850	955	1020	—
750	380	655	785	885	990	1060	—
800	405	680	815	920	1030	1100	—
900	456	730	870	980	1100	1175	—
1000	507	785	935	1055	1180	1260	—
1250	633	890	1065	1200	1345	—	—
1500	760	985	1175	1325	1485	—	—
1750	887	1070	1280	1445	1620	—	—
2000	1010	1160	1385	1560	1750	—	—
Col. 1		Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7

(Existing notes not shown)

Revise Table 2 as shown:

SN4267

Table 2
Allowable ampacities for not more than three insulated copper conductors, rated not more than 5000 V and unshielded, in raceway or cable (based on an ambient temperature of 30 °C*) (See Rules 4-004, 8-104, 12-3034, 26-142, 42-008, and 42-016 and Tables 5A, 5C, 19, 39, and D3.)

Size,		Allowable ampacity†,††					
AWG or	mm²	60 °C‡	75 °C‡	90 °C‡**	110 °C‡ See Note	125 °C‡ See Note	200 °C‡ See Note
14§	2.08	15	20	25	25	30	35
12§	3.31	20	25	30	30	35	40
10§	5.26	30	35	40	45	45	60
8	8.37	40	50	55	65	65	80
6	13.3	55	65	75	80	90	110
4	21.2	70	85	95	105	115	140
3	26.7	85	100	115	125	135	165
2	33.6	95	115	130	145	155	190
1	42.4	110	130	145	165	175	215
0	53.5	125	150	170	190	200	245
00	67.4	145	175	195	220	235	290
000	85.0	165	200	225	255	270	330
0000	107	195	230	260	290	310	380
250	127	215	255	290	320	345	—
300	152	240	285	320	360	385	—
350	177	260	310	350	390	420	—
400	203	280	335	380	425	450	—
500	253	320	380	430	480	510	—
600	304	350	420	475	530	565	—
700	355	385	460	520	580	620	—
750	380	400	475	535	600	640	—
800	405	410	490	555	620	660	—
900	456	435	520	585	655	700	—
1000	507	455	545	615	690	735	—
1250	633	495	590	665	745	—	—
1500	760	525	625	705	790	—	—
1750	887	545	650	735	820	—	—
2000	1010	555	665	750	840	—	—
Col. 1		Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7

(existing notes not shown)

SN4267

Revise Table 3 as shown:

Table 3
Allowable ampacities for single aluminum conductors, bare, covered, or insulated, rated not more than 5000 V and unshielded, in free air (based on an ambient temperature of 30 °C*)
(See Rules 4-004, 8-104, 26-142, 42-008, and 42-016 and Tables 5A, 5B, and 19.)

Size		Allowable ampacity†					
AWG or kcmil	mm²	60 °C‡	75 °C‡	90 °C‡	110 °C‡ See Note (3)	125 °C‡ See Note (3)	200 ° See Note
12§	3.31	25	30	35	40	40	50
10§	5.26	35	40	45	50	55	65
8	8.37	45	55	60	70	75	90
6	13.3	65	75	85	95	100	125
4	21.2	85	100	115	125	135	165
3	26.7	95	115	130	145	155	190
2	33.6	115	135	150	170	180	220
1	42.4	130	155	175	195	210	255
0	53.5	150	180	205	225	245	295
00	67.4	175	210	235	265	285	345
000	85.0	200	240	270	305	325	395
0000	107	235	280	315	355	375	460
250	127	265	315	355	400	425	—
300	152	295	350	395	440	470	—
350	177	330	395	445	500	535	—
400	203	355	425	480	535	575	—
500	253	405	485	545	615	655	—
600	304	455	545	615	690	735	—
700	355	500	595	670	750	800	—
750	380	520	620	700	785	835	—
800	405	540	645	725	815	870	—
900	456	585	700	790	885	945	—
1000	507	630	750	845	950	1010	—
1250	633	715	855	965	1080	—	—
1500	760	795	950	1070	1200	—	—
1750	887	880	1050	1185	1325	—	—
2000	1010	965	1150	1295	1455	—	—
Col. 1		Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7

(existing notes not shown)

Revise Table 4 as shown:

SN4267

Table 4
Allowable ampacities for not more than three insulated aluminum conductors, rated not more than 5000 V and unshielded, in raceway or cable
(based on an ambient temperature of 30 °C*)
(See Rules 4-004, 8-104, 26-142, 42-008, and 42-016 and Tables 5A and 5C.)

Size,		Allowable ampacity†§					
AWG or	mm²	60 °C‡	75 °C‡	90 °C‡	110 °C‡ See Note	125 °C‡ See Note	200 °C‡ See Note
12**	3.31	15	20	25	25	25	35
10**	5.26	25	30	35	40	40	50
8	8.37	35	40	45	50	55	65
6	13.3	40	50	55	65	70	80
4	21.2	55	65	75	80	90	105
3	26.7	65	75	85	95	100	125
2	33.6	75	90	100	115	120	150
1	42.4	85	100	115	125	135	165
0	53.5	100	120	135	150	160	195
00	67.4	115	135	150	170	180	220
000	85.0	130	155	175	195	210	255
0000	107	150	180	205	225	245	295
250	127	170	205	230	260	275	—
300	152	195	230	260	290	310	—
350	177	210	250	280	315	335	—
400	203	225	270	305	340	365	—
500	253	260	310	350	390	420	—
600	304	285	340	385	430	460	—
700	355	315	375	425	475	505	—
750	380	320	385	435	485	520	—
800	405	330	395	445	500	535	—
900	456	355	425	480	535	575	—
1000	507	375	445	500	560	600	—
1250	633	405	485	545	615	—	—
1500	760	435	520	585	655	—	—
1750	887	455	545	615	690	—	—
2000	1010	470	560	630	710	—	—
Col. 1		Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7

(existing notes not shown)

SN4394-12

Revise Table 11 entry for DLO as shown:

Location	Use	Kind	CSA type designation	Voltage rating, V	Temperature rating, C°	Ref. Notes
Wet (or damp or dry) locations	For extra-hard usage	Portable power cables	DLO	2000	60, 75, 90, 105, 125	

SN4379

Note: New Table 17 and the associated revision to Rule 10-302 are conditional on approval of related changes to Appendix B under Subject 4484.

Add new Table 17 as shown:

(NEW) **Table 17**
Impedance grounded systems – Conditions for initiation of automatic alarm and de-energization of the system
(See Rule 10-302)

Impedance grounded system configuration		Conditions for initiation of automatic alarm and de-energization of the system		
		Ground fault on current-carrying conductors	Ground fault on conductor from source to impedance grounding device	Loss of continuity between source through the impedance grounding device to grounded conductive parts of equipment
Line-to-neutral loads are served (4-wire), all		Alarm and de-energize system immediately	Alarm and de-energize system immediately	Alarm and de-energize system immediately
Line-to-neutral loads are not served (3-wire) System is: • 5kV or less; and • ground fault is limited to 10A or less	Scenario 1 *(see Note 1)*	Alarm and de-energize within the time rating of the impedance grounding device	Alarm and de-energize the system within 48 hours.	Alarm
	Scenario 2 *(see Note 2)*	Alarm and de-energize within the time rating of the impedance grounding device	Alarm and de-energize system within 48 hours	Alarm and de-energize system within 48 hours
Line-to-neutral loads are not served (3-wire) System is: • greater than 5kV; or • ground fault is greater than 10A	Scenario 1 *(see Note 1)*	Alarm and de-energize system in the lesser of 48 hours or the time rating of the impedance grounding device	Alarm and de-energize the system within 48 hours.	Alarm
	Scenario 2 *(see Note 2)*	Alarm and de-energize system in the lesser of 48 hours or the time rating of the impedance grounding device	Alarm and de-energize system within 48 hours.	Alarm and de-energize system within 48 hours.

Notes:

On the occurrence of a loss of continuity of the impedance grounding circuit from the system source through the impedance grounding device to the grounded non-current-carrying conductive parts of the electrical system, the device monitoring the system

1) ***can*** *continue to detect a ground fault on an ungrounded system.*
2) ***cannot*** *continue to detect a ground fault on an ungrounded system.*

Revise Table 18 to read:

SN4325

Table 18
Equipment suitable for explosive atmospheres
(See Rules 18-090, 18-100, 18-150, 18-190, 18-200, 18-250, J18-100, J18-150, J18-200, 18-250, J18-300, and J18-350.)

Area Classification	Type (Level) of Protection	
Zone 0	Intrinsic safety (Group II)	ia
	Encapsulation (Group II)	ma
	Flameproof (Group II)	da*
	Inherently safe optical radiation	op is, *with EPL Ga***
	Optical system with interlock	op sh, *with EPL Ga***
	Intrinsically safe	Intrinsically safe, IS, I.S., Exi, Exia, *for Class I*
	EPL††	Ga
Zone 1	*Equipment suitable for use in Zone 0*	
	Equipment suitable for use in Class I, Division 1	
	Flameproof (Group II)	d, db
	Intrinsic safety (Group II)	ib
	Increased safety (Group II)	e, eb
	Pressurized enclosure (Group II)	p, px, pxb, py, pyb
	Encapsulation (Group II)	m, mb
	Powder filling (Group II)	q, qb
	~~Oil~~Liquid immersion (Group II)	o, ob
	Electrical resistance trace heating	60079-30-1, *with EPL Gb***
	Skin effect trace heating	CSA293.1, *with EPL Gb***
	Inherently safe optical radiation	op is, *with EPL Gb***
	Optical system with interlock	op sh, *with EPL Gb***
	Protected optical radiation	op pr, *with EPL Gb***
	EPL††	Gb

Zone 2	*Equipment suitable for use in Zone 0*	
	Equipment suitable for use in Zone 1	
	Equipment suitable for use in Class I, Division 1	
	Equipment suitable for use in Class I, Division 2	
	Type of Protection "n" (Group II)	nA, nC, nL, nR
	Pressurized enclosure (Group II)	pz, pzc
	Intrinsic safety (Group II)	ic
	Flameproof (Group II)	dc
	Increased safety (Group II)	ec
	~~Oil~~Liquid immersion (Group II)	oc
	Encapsulation (Group II)	mc
	Electrical resistance trace heating	60079-30-1, *with EPL Gc***
	Skin effect trace heating	CSA293.1, *with EPL Gc***
	Impedance heating	CSA293.3, *with EPL Gc***
	Inherently safe optical radiation	op is, *with EPL Gc***
	Optical system with interlock	op sh, *with EPL Gc***
	Protected optical radiation	op pr, *with EPL Gc***
	EPL††	Gc
	Other electrical apparatus‡	
Zone 20	*Equipment suitable for use in Class II, Division 1*	
	Intrinsic safety (Group III)	ia
	Intrinsically safe	Intrinsically safe, IS, I.S., Exi, Exia, *for Class II*
	Protection by enclosure (Group III)	ta
	Encapsulation (Group III)	ma
	Inherently safe optical radiation	op is, *with EPL Da***
	Optical system with interlock	op sh, *with EPL Da***
	EPL††	Da
Group IIIA Only	*Equipment suitable for us in Class III, Division 1*	
Zone 21	*Equipment suitable for use in Zone 20*	
	Equipment suitable for use in Class II, Division 1	
	Intrinsic safety (Group III)	ib
	Protection by enclosure (Group III)	tb
	Pressurized enclosure (Group III)	p, px, pxb, py, pyb
	Encapsulation (Group III)	mb
	Electrical resistance trace heating	60079-30-1, *with EPL Db***
	Skin effect trace heating	CSA293.1, *with EPL Db***
	Inherently safe optical radiation	op is, *with EPL Db***
	Optical system with interlock	op sh, *with EPL Db***
	Protected optical radiation	op pr, *with EPL Db***
	EPL††	Db
Group IIIA Only	*Equipment suitable for us in Class III, Division 1*	

Zone 22	*Equipment suitable for use in Zone 20*	
	Equipment suitable for use in Zone 21	
	Equipment suitable for use in Class II, Division 1	
	Equipment suitable for use in Class II, Division 2	
	Intrinsic safety (Group III)	ic
	Protection by enclosure (Group III)	tc
	Pressurized enclosure (Group III)	pz, pzc
	Encapsulation (Group III)	mc
	Electrical resistance trace heating	60079-30-1, *with EPL Dc***
	Skin effect trace heating	CSA293.1, *with EPL Dc***
	Impedance heating	CSA293.3, *with EPL Dc***
	Inherently safe optical radiation	op is, *with EPL Dc***
	Optical system with interlock	op sh, *with EPL Dc***
	Protected optical radiation	op pr, *with EPL Dc***
	EPL††	Dc
	Other electrical apparatus‡	
Group IIIA Only	*Equipment suitable for us in Class III, Division 2*	
Class I, Division 1	*Equipment marked for use in Class I, Division 1*†	
	Intrinsically safe	Intrinsically safe, IS, I.S., Exi, Exia, *for Class I*
	Purged Equipment to NFPA 496	Type X, *for Class I*
	Purged Equipment to NFPA 496	Type Y, *for Class I*
	Equipment suitable for use in Zone 0	
	Intrinsic safety (Group II)	ia
	Encapsulation (Group II)	ma
	Flameproof (Group II)	da*
	Inherently safe optical radiation	op is, *with EPL Ga***
	Optical system with interlock	op sh, *with EPL Ga***
Class I, Division 2	*Equipment suitable for use in Class I, Division 1*	
	Equipment marked for use in Class I, Division 2†	
	Equipment suitable for use in Zone 0, Zone 1 or Zone 2	
	Type of Protection “n” (Group II)	nA, nC, nL, nR
	Pressurized enclosure (Group II)	px, pxb, py, pyb, pz, pzc
	Intrinsic safety (Group II)	ia, ib, ic
	Flameproof (Group II)	da, db, dc
	Increased safety (Group II)	eb, ec
	~~Oil~~Liquid immersion (Group II)	ob, oc
	Encapsulation (Group II)	ma, mb, mc
	Electrical resistance trace heating	60079-30-1, *with EPL Gb or Gc***
	Skin effect trace heating	CSA293.1, *with EPL Gb or Gc***
	Impedance heating	CSA293.3, *with EPL Gb or Gc***
	Inherently safe optical radiation	op is, *with EPL Ga, Gb or Gc***
	Optical system with interlock	op sh, *with EPL Ga, Gb or Gc***
	Protected optical radiation	op pr, *with EPL Gb or Gc***
	Purged Equipment to NFPA 496	Type Z, *for Class I*
	Other electrical apparatus‡	

Class II, Division 1§	*Equipment marked for use in Class II, Division 1*†
	Intrinsically safe — Intrinsically safe, IS, I.S., Exi, Exia, *for Class II*
	Purged Equipment to NFPA 496 — Type X, *for Class II*
	Purged Equipment to NFPA 496 — Type Y, *for Class II*
	Equipment suitable for use in Zone 20
	Intrinsic safety (Group III) — ia
	Protection by enclosure (Group III) — ta
	Encapsulation (Group III) — ma
	Inherently safe optical radiation — op is, *with EPL Da***
	Optical system with interlock — op sh, *with EPL Da***
Class II, Division 2§	*Equipment suitable for use in Class II, Division 1*
	Equipment marked for use in Class II, Division 2†
	Equipment suitable for use in Zone 20, Zone 21 or Zone 22
	Intrinsic safety (Group III) — ia, ib, ic
	Protection by enclosure (Group III) — ta, tb, tc
	Pressurized enclosure (Group III) — px, pxb, py, pyb, pz, pzc
	Encapsulation (Group III) — ma, mb, mc
	Electrical resistance trace heating — 60079-30-1, *with EPL Db or Dc***
	Skin effect trace heating — CSA293.1, *with EPL Db or Dc***
	Impedance heating — CSA293.3, *with EPL Db or Dc***
	Inherently safe optical radiation — op is, *with EPL Da, Db or Dc***
	Optical system with interlock — op sh, *with EPL Da, Db or Dc***
	Protected optical radiation — op pr, *with EPL Db or Dc***
	Purged Equipment to NFPA 496 — Type Z, *for Class II*
	Other electrical apparatus‡
Class III, Division 1	*Equipment suitable for use in Class II, Division 1*
	Equipment marked for use in Class III, Division 1†
	Intrinsically safe — Intrinsically safe, IS, I.S., Exi, Exia, *for Class II or III*
	Enclosure — Type 5‡‡
	Equipment suitable for use in Zone 20 or Zone 21
	Intrinsic safety (Group III) — ia, ib
	Protection by enclosure (Group III) — ta, tb
	Encapsulation (Group III) — ma, mb
	Inherently safe optical radiation — op is, *with EPL Da or Db***
	Optical system with interlock — op sh, *with EPL Da or Db***

Class III, Division 2	*Equipment suitable for use in Class II, Division 1*	
	Equipment suitable for use in Class II, Division 2	
	Equipment suitable for use in Class III, Division 1	
	Equipment marked for use in Class III, Division 2†	
	Equipment suitable for use in Zone 20, Zone 21 or Zone 22	
	Intrinsic safety (Group III)	ia, ib, ic
	Protection by enclosure (Group III)	ta, tb, tc
	Pressurized enclosure (Group III)	px, pxb, py, pyb, pz, pzc
	Encapsulation (Group III)	ma, mb, mc
	Electrical resistance trace heating	60079-30-1, *with EPL Db or Dc***
	Skin effect trace heating	CSA293.1, *with EPL Db or Dc***
	Impedance heating	CSA293.3, *with EPL Db or Dc***
	Inherently safe optical radiation	op is, *with EPL Da, Db or Dc***
	Optical system with interlock	op sh, *with EPL Da, Db or Dc***
	Protected optical radiation	op pr, *with EPL Db or Dc***
	Other electrical apparatus‡	

Note: *This table is structured to show the ~~zone equipment~~ area classification on the left side and the ~~Class/Division~~ permitted equipment on the right side. Zone equipment is suitable for use in some Class/Division locations and vice versa. This is indicated by the phrase "Equipment suitable for use in .....". For example, in Class I, Division 1 locations, "Equipment suitable for use in Zone 0" means all equipment listed under Zone 0 can be used.*

* *"da" is limited to sensors of portable combustible gas detectors.*

† *With the exception of Intrinsically Safe equipment, equipment for use in a Class XX, Division XX, location is not required to be marked with a Type of Protection, only the location where that equipment is permitted to be installed.*

‡ *"Other electrical apparatus" means electrical apparatus complying with the requirements of a recognized standard for industrial electrical apparatus that does not in normal service*
a) have ignition-capable hot surfaces;
b) produce incendive arcs or sparks.
See 18-150 2), 18-250 2), J18-150 2) and 3), ~~J18-250,~~ J18-252, J18-254, and J18-262. "Other electrical apparatus" also makes reference to equipment or systems currently acceptable as alternative means of protection (see Rules 18-064, 18-068, J18-062 and J18-066).

§ *For use in Class II and Class III, such (Zone acceptable) equipment is subject to the limitation of Rules J18-054 2) or J18-054 3) respectively. Group IIIA equipment is not suitable for use in Class II Locations.*

****** *Equipment marked with these types of protection is available in multiple levels of protection that are not specifically identified within the Ex marking.*

†† *The EPL takes precedence over the Type of Protection, for example "Ex ia Gb" is suitable for Zone 1 (not Zone 0), "Ex op is Db" is suitable for Zone 21 (not Zone 20), and "Ex 60079-30-1 Gc is suitable for Zone 2 (not Zone 1). Selection according to the marked EPL is critical to the safe application of this equipment.*

‡‡ *In Class III, Division 1; switches, controllers, circuit breakers, fuses, control transformers, resistors, utilization equipment (fixed and portable), electric cranes, hoists, and similar equipment may be housed in Enclosure Type 5*

SN4378

Add new Table 18A to read:

Table 18A
Equivalent Zone – Division "GROUP" Classification

	GROUP, for Zones	GROUP, for Divisions
GASES	IIC	A, B, C, D
	(IIB + H_2)*	B, C, D
	IIB	C, D
	IIA	D
DUSTS	IIIC	Class II, Group E
	IIIB	Class II, Group F,G
	IIIA	Class III

Notes:

a) Equipment marked IIC may also be used in Group IIB and IIA classified locations. Equipment marked IIB may also be used in Group IIA classified locations.

b) Equipment marked IIIC may also be used in Group IIIB and IIIA classified locations. Equipment marked IIIB may also be used in Group IIIA classified locations.

** Equipment marked with IIB + H_2 is suitable for atmospheres containing any group IIA gas, IIB gas or Hydrogen. It is not completely equivalent to Group B, C, D.*

SN4291
SN4395

Revise Table 19 entries as shown:

Conditions of use	Trade desig.	CSA type desig.	Max. temp.	Ref. Notes
For use in a) buildings or outdoors; b) in dry or damp locations;~~,~~ c) where exposed, concealed, or used in raceways including cable trays;~~, or~~ d) in plenums; or e) in hazardous locations	Non-conductive optical fiber cable	OFNP, OFNR, OFNG, OFN~~,~~ ~~OFNH~~	—	24
For use in a) buildings or outdoors; b) in dry or damp locations;~~,~~ c) where exposed, concealed, or used in raceways including cable trays;~~, or~~ d) in plenums; or e) in hazardous locations	Conductive optical fiber cable	OFCP, OFCR, OFCG, OFC~~,~~ ~~OFCH~~	—	24
For use in cable trays in Class I, Division 2, ~~and~~ Class II, Division 2, Class III, Division 2, Zone 2 and Zone 22 hazardous locations	Tray Cable	TC	—	23

SN4344

Delete contents of Table 20 as shown:

Table 20
Deleted
~~Spacings for insulated conductors~~
~~(See Rules 12-204 and 12-214.)~~

~~Voltage of circuit, V~~	~~Minimum distance, mm~~	
	~~Between insulated conductors~~	~~From adjacent surfaces~~
~~0 to 300~~	~~65~~	~~13~~
~~301 to 750~~	~~100~~	~~25~~

SN3961-16

Revise Table 57 as shown:

Table 57
Allowable ampacities for insulated copper conductors of Class 2 circuits~~copper conductors~~
(based on an ambient temperature of 30 °C†)
[See Rule 16-210 6) and Table 5A.]

Size, AWG	Single conductors in free air, A	Not more than three ~~copper~~ conductors in raceway or cable*, A
26	3	1
24	4	2
22	5	2.5
20	7	3.5
19	8	4
18	9	5
16	13	10
Col. 1	**Col. 2**	**Col. 3**

** Where more than three insulated conductors are in a raceway or cable, apply the following derating factors to Column 3:*

Conductors in raceway or cable	*Derating factor*
4–6	*0.8*
7–24	*0.7*
25–42	*0.6*
43–50	*0.5*

† For ambient temperatures over 30 °C for Columns 2 and 3, apply the correction factors of Table 5A, Column 2.

Revise Notes beneath Table 58 to read:

SN3961-40

Notes:

1) *Allowable ampacities of insulated copper conductors used with 15 minute motors shall be the 30 minute ratings increased by 12%.*

2) *For five or more simultaneously energized ~~power~~ insulated conductors in raceway or cable, the ampacity of each shall be reduced to 80% of that shown in this Table.*

3) *For insulated conductors subject to ambient temperatures in excess of 30 °C, the correction ~~derating~~ factors in Table 5A shall apply to the ampacities shown in this Table.*

Revise Table 61 as shown:

SN3961-68

Table 61
Minimum buried cable horizontal separations from pools
(See Rule 68-056.)

Type of installation	Minimum horizontal separation, m	
	Direct buried unjacketed cable with bare neutral or cables with a semi-conducting jacket	Cables with a non-conducting jacket or insulated conductors in non-conducting raceways~~ducts~~
Communication conductors	1.5	1.0
Power cables and insulated conductors		
0–750 V	1.5	1.0
751–15 000 V	3.0	1.5
15 001–28 000 V	6.0	2.0

Notes:

1) *Voltages are phase-to-phase.*

2) *This Table is derived from CEA 266 D 991.*

3) *The separation from non-conducting raceways~~ducts~~ is measured from the nearest edge of the raceway ~~duct~~ to the inside wall of the pool.*

SN4289

Revise Parts A, C, D, F, I, K of Table 63 and add new Note as shown:
(Some existing Parts not shown)

Table 63
Hazardous areas for propane dispensing, container filling, and storage
(See Rule 20-034.)

Part	Location	Extent of hazardous locations*	Group IIA hazardous location
A	Storage containers other than ~~TC/CTC/DOT~~ cylinders and ASME vertical containers of less than 454 kg water capacity	Within 4.5 m in all directions from connections, except connections otherwise covered in this Table	Zone 2
C	Gauge vent openings other than those on ~~TC/CTC/DOT~~ cylinders and ASME vertical containers of less than 454 kg water capacity	Within 1.5 m in all directions from point of discharge	Zone 1
		Beyond 1.5 m but within 4.5 m in all directions from point of discharge	Zone 2
D	Relief device discharge other than those on ~~CTC/DOT~~ cylinders and ASME vertical containers of less than 454 kg water capacity	Within direct path of discharge‡	Zone 1
		Within 1.5 m in all directions from point of discharge	Zone 1
		Beyond 1.5 m but within 4.5 m in all directions from point of discharge except within the direct path of discharge	Zone 2
F	Service station vehicle fuel dispenser ~~dispensing~~ units	Entire space within vehicle fuel dispenser enclosure or up to a solid partition within the enclosure at any height above the base. The space within 450 mm horizontally from the vehicle fuel dispenser enclosure up to 1.2 m above the base or to the height of a solid partition within the enclosure. Entire pit or open space beneath the vehicle fuel dispenser	Zone 1
		The space above a solid partition within the vehicle fuel dispenser enclosure. The space up to 450 mm above grade within 6 m horizontally from any edge of the vehicle fuel dispenser enclosure§	Zone 2
I	Pipelines and connections containing operational bleeds, drips, vents, or drains	Within 1.5 m in all directions from point of discharge	Zone 1
		Beyond 1.5 m from point of discharge, same as Part E of this Table	As shown in ~~See~~ Part E, as applicable
K	Outdoor cylinder storage; ~~area~~ aggregate storage of propane ~~for portable cylinders or containers~~	—	—
	~~Aggregate storage~~ up to and including 454 kg water capacity	Within 1.5 m in all directions from connections ¥	Zone 2
	~~Aggregate storage over~~ greater than 454 kg water capacity	Within 4.5 m in all directions from connections	Zone 2

** The classified area shall not extend beyond an unpierced wall, roof, or solid vapour-tight partition.*
† When the extent of a hazardous area is being classified, consideration shall be given to possible variations in the locating of tank cars and tank vehicles at the unloading points and the effect these variations of location may have on the point of connection.
‡ Fixed electrical equipment should not be installed in this space.
§ For pits within this area, see Part G of this Table.
¥ CSA B149.2 limits propane cylinder exchange cabinets to no more than four adjacent cabinets at one retail site and each cabinet is permitted to contain not more than 225 kg of propane.

SN4363
SN4284

Revise Table 67 as shown:

Table 67
Clearance requirements for installed space heating systems
(See Rule 62-200.)

Heating system type and location	Minimum clearance, mm	Obstructions and protrusions
All systems, including heating fixtures; trace heater ~~heating cable~~ sets; heating panel sets; heating device sets	100	From protrusions ~~protruding~~ such as ~~water~~ pipes and ducts ~~fans~~
	200	From electrical outlets to which a luminaire or other heat-producing equipment is liable to be connected From receptacles and switches From other heating devices, unless otherwise rated
Floor systems above sub-floors, for trace heater ~~heating cable~~sets or heating panel sets	50	From walls, partitions, and permanently fixed cabinetry
Floor systems under sub-floors, for trace heater ~~heating cable~~ sets or heating panel sets	50	Minimum air gap between bottom of subfloor and heating device sets, unless otherwise rated
Wall systems for trace heater ~~heating cable~~ sets or panel sets	50	Minimum air gap behind the wall surface to protect installed heating devices, unless the heating device set is protected by design from mechanical damage. From the top and side surfaces of permanently fixed cabinetry
	150	From ceiling, floor, and other wall corners
	150	From partitions, bottom surfaces of permanently fixed cabinetry, door and window frames, or other thermal obstructions, unless otherwise rated
Ceiling systems for trace heater ~~heating cable~~ sets or panel sets	50	From glass walls and window walls
	150	From corners, partitions, and adjacent surfaces, and not overlapping permanently fixed cabinetry or other thermal obstructions, unless otherwise rated

APPENDIX B

Revise Appendix B Note for definition of Approved to read: SN4252

Approved
It is intended by this definition that electrical equipment installed under provisions of this Code is required to be certified to the applicable CSA product Standards as listed in Appendix A. Where such CSA Standards do not exist or are not applicable, it is intended by this definition that such electrical equipment be certified to other applicable Standards, such as ULC Standards. Code users should be aware that fire alarm system equipment is deemed to be approved when it is certified to the applicable product Standards listed in CAN/ULC-S524.

This definition is also intended to reflect the fact that equipment approval could be accomplished via a field evaluation procedure in conformance with CSA Model Code SPE-1000, or for medical electrical equipment - in conformance with CSA Model Code SPE-3000, where special inspection bodies are recognized by participating provincial and territorial authorities having jurisdiction. For new products that are not available at the time this Code is adopted, the authority having jurisdiction may permit the use of products that comply with the requirements set out by that jurisdiction.

Revise Appendix B Note for definition of Ventilated cable tray to read: SN3961-0D

Ventilated cable tray
Ventilated cable tray includes ~~a cable tray of the~~ wire mesh cable tray.~~type.~~

Add new Appendix B Note for definition of Voltage to read: SN3994

Voltage
Unless otherwise specified, ac voltages are expressed throughout this Code as the root-mean-square voltage values in a sinusoidal 60 Hz system, and dc voltages represent steady-state maximum nominal voltage values.

Add new Appendix B Note for Rule 2-317 to read: SN4371

Rule 2-317
The intent of this Rule is to ensure that at least one receptacle is available for portable chargers, tools, lighting, and similar uses when the mobile industrial or commercial structure is supplied from the alternate power supply.

Revise Appendix B Note for Rules 8-104 and 62-114 to read: SN4346

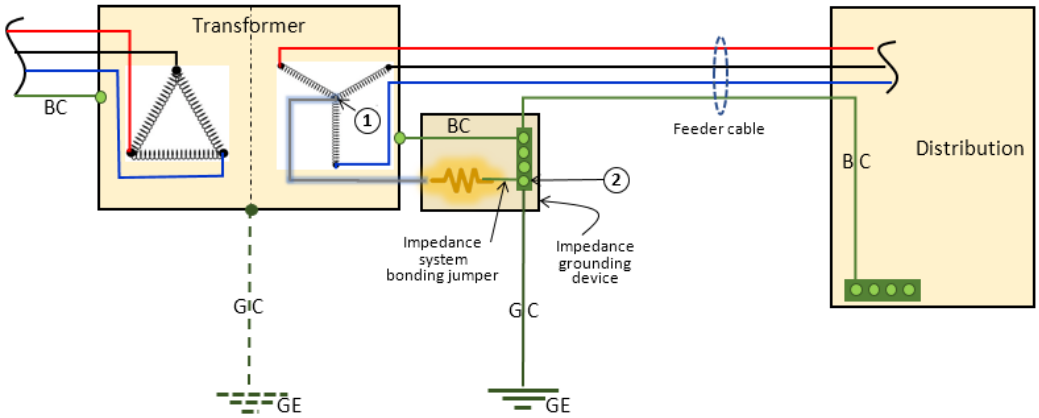
Rules 8-104; 8-304 and 62-114
When an overcurrent device is located in an assembly such as a fused switch or a panelboard, the assembly is required to be marked for continuous operation of its

overcurrent devices in accordance with the requirements of CSA C22.2 No. 4 or CSA C22.2 No. 29.
Fused switches and circuit breakers not marked as suitable for continuous operation at either 80% or 100% of the rating of their overcurrent devices are considered to be suitable for continuous operation at 80%.

Replace Figure B10-12 with the following:

SN4261

Figure B10-12
Impedance grounded system



LEGEND

- Bonding bus bonded to enclosure
- Termination point to conductive enclosure
- BC - Bonding conductor
- GC - Grounding conductor
- GE - Grounding electrode
- ①-② - Points between which continuity of the impedance grounding circuit is monitored [Rule 10-302 2) c)]
- - - - - - The transformer equipment may be required to be grounded (e.g., where high voltage is involved)

Add new Appendix B Note for Rule 10-612 3) to read:

SN4278

Rule 10-612 3)
CSA C22.2 No. 42 *General use receptacles, attachment plugs and similar wiring devices*, requires that receptacles be connected directly to a bonding conductor. For some other devices, such as switches, the bonding connection is permitted to be made via the mounting screws to the device enclosure. CSA C22.2 No. 18.2 *Nonmetallic Outlet Boxes* requires that the mounting screw termination point of a device enclosure be electrically connected to a bonding means within the non-metallic device enclosure. Installers should consult the manufacturers instructions for proper installation of wiring devices.

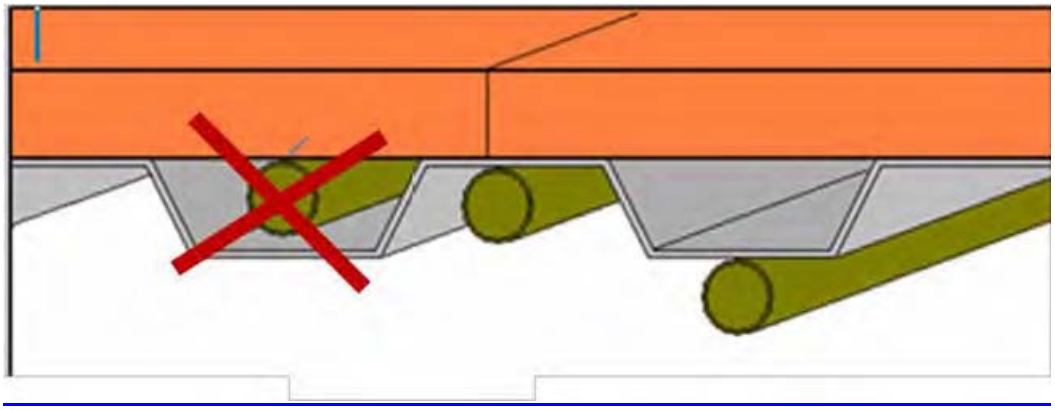
Add new Appendix B Note for Rule 12-022 to read:

SN4007

Rule 12-022
For the application of this rule, an attic space is not considered part of the roof decking system.
Where roof decking systems are mechanically fastened using screws or other penetrating fasteners, exposed cables and raceways should not be installed below

the roof decking system until completion of the roof decking system.

Figure B12-2



It is not the intent of this rule to require relocation of existing cables or raceways when a roof decking system is repaired or replaced.
For additional information on roofing systems, refer to the National Building Code of Canada and CAN/ CSA A123.21 Dynamic Wind Uplift Resistance of Membrane-Roofing Systems.

Revise Appendix B Note for Rules 12-106, 12-904, and 12-3030 to read:

SN4279

Rules 12-106, 12-904, and 12-3030
~~For the application of Rules 12-106, 12-904, and 12-3030, a remote device is considered to be a device that is connected to a control circuit and is used to control or provide indication (e.g., limit switches, push buttons, thermostats, pilot lights, and alarms). Examples of equipment that are not considered remote devices are task and room luminaires, receptacles, unit equipment, heaters, etc.~~
Examples where conductors connected to different sources of voltage are functionally associated include indicating devices such as pilot lights and alarms, and control circuits of standby power systems, industrial control panels and adjustable speed drives, etc.

Add new Appendix B Note for Rule 12-3034 2) to read:

SN4264

Rule 12-3034 2)
When a reduction in the number of insulated conductors is required, this Rule intends that the reduction be made with the largest available insulated conductor size.

Table B12-3
Examples for a 4 x 1-1/2 trade size box with 12 AWG insulated conductors

	Reduced maximum number of insulated conductors
Fixture stud in box	7

One connector	8
Two connectors	7
Three connectors	7
Four connectors	6
Three connectors and fixture stud	6
Four connectors and fixture stud	5

Revised Appendix B Note for Rule 14-014 to read: **SN4237**

Rule 14-014
A series rated system is one in which either a circuit breaker or a fuse is in series with a downstream circuit breaker that has an interrupting rating less than the fault current available at the line terminals of the upstream overcurrent device. The upstream device always has an interrupting rating at least equal to the available fault current.
This series combination is tested and approved at the higher rating in accordance with special requirements for series rated devices in the CSA Standards for the equipment involved (e.g., circuit breakers, panelboards, or metering equipment).
The tests verify that the combination acts together to safely clear a fault up to the maximum rating of the line side overcurrent device.
The downstream equipment is marked, as a part of its electrical rating, with its series rating and with the specific upstream overcurrent device required to achieve the series rating.
Where motors are connected in the system between the series connected devices, any significant motor contribution to the fault current should be considered. It is generally agreed that the contribution of asynchronous motors to the short-circuit current may be neglected if the sum of the rated currents of motors connected directly to the point between the series connected devices is 1% or less of the interrupting rating of the downstream circuit breaker. ~~(See IEC 60781.)~~

Revise Appendix B Note for Rule 14-100 to read: **SN4221**

Rule 14-100 1)
This Rule applies only to conductors and cables interconnecting electrical equipment. It does not apply to overcurrent protection of electrical equipment as required by other Rules of the Code.

Rule 14-100 2)
Consumer's service conductors terminate at service equipment where an overcurrent device is located (see Rule 14-104). This device provides overload protection but not short circuit protection for the conductors on the line side of the service equipment.

Revise Appendix B Note for Rule 16-210 to read: **SN3961-16**

Rule 16-210
Both LVT and ELC are approved cables for Class 2 circuit applications under the conditions outlined in Table 19. Type ELC cables~~conductors~~ do not have an overall protective jacket and are further limited in use under this Rule to certain Class 2 circuits operating at 30 V or less, such as doorbells, intrusion devices,

etc., in dwelling units in buildings of combustible construction. Type ELC is not permitted for the wiring of circuits related to fire safety, such as fire alarms or smoke alarm devices.	
Revise Appendix B Note for Rule 18-002 to read: **Rule 18-002** ~~**Cable seal** — a seal that is designed to prevent the escape of flames from an explosion-proof enclosure. Because cables are not designed to withstand the pressures of an explosion, transmission of an explosion into a cable could result in ignition of gases or vapours in the area outside the enclosure.~~ **Combustible dust** — combustible dust includes dust and grit as defined in ISO 4225. The term "solid particles" is intended to address particles in the solid phase and not the gaseous or liquid phase but does not preclude a hollow particle. See ASTM E1226 or ISO 6184-1 for procedures for determining the explosibility of dusts. Dusts are considered combustible dusts unless it has been confirmed by test in accordance with ASTM E1226 or ISO 6184-1 that they are not combustible dusts. **Combustible flyings** — examples of combustible flyings include rayon, cotton (including cotton linters and cotton waste), sisal, jute, hemp, cocoa fibre, oakum, and baled waste kapok. ~~**Conduit seal** — a seal that is designed to prevent the passage of flames from one portion of the electrical installation to another through the conduit system and to minimize the passage of gases or vapours at atmospheric pressure. Unless specifically designed for the purpose, conduit seals are not intended to prevent the passage of fluids at a continuous pressure differential across the seal. Even at differences in pressure across the seal equivalent to a few centimetres of water, there may be passage of gas or vapour through the seal and/or through the insulated and bare conductors passing through the seal. Where conduit seals are exposed to continuous pressure, there may be a danger of transmission of flammable fluids to "safe areas" resulting in fire or explosions.~~ **Explosion seal** –This seal is intended to prevent hot gases resulting from an ignition of an explosive gas atmosphere on one side of the seal, from igniting an explosive gas atmosphere on the other side of the seal (or external to the cable, for a cable seal). The design of these seals also minimizes the passage of flammable fluids through them under atmospheric pressure. **Flammable fluid migration seal** – A flammable fluid migration seal is only intended to prevent the passage of flammable fluid at atmospheric pressure. It is not intended to prevent the transmission of an explosion or of flammable fluids under pressure. While explosion seals can meet this definition (see note to Rule 18-070), other methods using compounds such as silicone or duct seal will be suitable, providing they are installed in a manner that will prevent migration of flammable fluids at atmospheric pressure. **Hazardous location cables** — cables that are certified to CSA C22.2 No. 174 are marked "HL". Before a cable type can be submitted for testing under CSA	SN4224

C22.2 No. 174, it must first be approved under a CSA cable Standard, for example, CSA C22.2 No. 131. The additional tests in CSA C22.2 No. 174 ensure a more rugged cable suitable for all hazardous locations. While “HL” marked cables are suitable for use in all hazardous locations, they are not required for all hazardous locations. For example, tray cables and instrument and control cables are also suitable for use in Zones 2 and 22.

Primary seal — a seal that is typically a part of electrical devices such as pressure-, temperature-, or flow-measuring devices and devices (such as canned pumps) in which the electrical connections are immersed in the process fluids.

Secondary seal — a seal that is designed to prevent flammable process fluids from entering the electrical wiring system upon failure of a primary seal. These devices typically prevent passage of fluids at process pressure by a combination of sealing and pressure relief.

Revise Appendix B note to Rules 18-004, 18-006, and 18-008, and add new Table B18-2 to read:

SN4378

Rules 18-004, 18-006, and 18-008
Reference material for area classification is listed in Table B18-1.
See also the Note to Rule 18-062.

There is an equivalency in area classifications between the Zone system and the Class/Division system as shown in Table B18-2. For equipment suitable for installation in hazardous locations, refer to Tables 18 and 18A.

Table B18-2
Equivalent ZONE – DIVISION Classification

GASES	Zone 0	Class I, Division I
	Zone 1	
	Zone 2	Class I, Division 2
DUSTS	Zone 20	Class II and Class III, Division 1
	Zone 21	
	Zone 22	Class II and Class III, Division 2

Renumber existing Appendix B Tables B18-2 to B18-5 as B18-3 to B18-6.

SN4378

Add new Appendix B Note for Rule 18-061 to read:

SN4291

Rule 18-061
Optical fiber cable and equipment is being used more due to advancements in technology in hazardous locations as can be seen by the recognition of optical radiation as a potential explosion hazard and the adoption of CAN/CSA-C22.2 No. 60079-28 for optical equipment. It is important that these cables are recognized for installations and that they are installed to minimize the risks of fire, explosions and

transmission of flammable fluids.
Some of these cables contain both wiring and fiber elements within them, and they are considered electrical cables, see Rule 56-204 2). As such they would need to meet the "Wiring Methods" Rules for the applicable Zone.
When optical fiber cables are intermixed with electrical cables there are additional requirements contained in Section 56.

Revise Appendix B Note for Rule 18-070 to read:

SN4224
SN4313

Rule 18-070

ANSI/~~ISA~~ UL 122701 provides construction, performance, and marking requirements for the process seals incorporated into process-connected electrical equipment. Equipment containing a primary seal that complies with this Standard is eligible to include either the “Single Seal” or “Dual Seal” designation in the nameplate markings. These markings indicate that the electrical equipment is designed to prevent the migration of flammable fluid through the equipment into the wiring system when the equipment is operated at or lower than its rated pressure. Devices certified as conforming to ANSI/~~ISA~~ UL 122701 and marked either “Single Seal” or “Dual Seal” meet the intent of Subrule 1) a).

Where devices containing primary seals are not marked to indicate conformance with ANSI/~~ISA~~ UL 122701, other means may be used to prevent fluid migration though the wiring system. This may include the use of suitable barriers located between the primary seal and the wiring system, such as secondary seals or short lengths of mineral-insulated (MI) cable. IEEE 1673, *Standard for Requirements for Conduit and Cable Seals for Field Connected Wiring to Equipment in Petroleum and Chemical Industry Exposed to Pressures above Atmospheric (1.5 kPa, 0.22 psi)*, provides construction, performance, and marking requirements for field installed secondary seals. Where secondary seals are installed, examples of design features that make the occurrence of primary seal failure obvious are vents, drains, visible rupture or leakage, audible whistles, or electronic monitoring. The intent of making the primary seal failure obvious is to prevent continuous pressure on the secondary seal and the possibility of an eventual secondary seal failure, as well as to protect personnel working on the device. Alternatively, where means to relieve pressure on a secondary seal is not provided, a cautionary label should be provided to warn personnel that the enclosure may contain flammable fluid under pressure.

In subsurface applications, for example oil and gas wells, the requirement for process (flammable fluid) sealing still exists. Wiring and fiber optic systems would need to be process sealed as they pass through the surface wellhead to prevent flammable fluids from migrating through the wiring and fiber optic systems on the surface. A field installed secondary seal would be difficult to implement as there is a need to have a primary seal with annunciation of failure, which may be difficult to address on downhole equipment. Sealing at the wellhead should incorporate both primary and secondary seals, which can be certified “dual seals” or “single seals”.

Engineering considerations may lead to the conclusion that the probability of leakage from a specific installation will be negligible. Acceptable factors such as an extensive history of safe operation with similar installations, or the use of a primary seal with a pressure rating well in excess of the maximum process operating pressure, may be considered.

In conduit systems, the function of the primary and secondary seals is to prevent

flammable fluids (liquid, gas or vapour) that may be under pressure from getting into the wiring system. Beyond the primary and secondary seals there is no opportunity for gas under significant pressure to enter the wiring system. However it is important to understand that situations such as where fluids under pressure are located in an enclosed space (such as gas sample tubing situated inside a control panel), conduits and cables entering the enclosure may require sealing (secondary seal) in case there is a leak under pressure within the enclosure from sources of release. Therefore downstream of the secondary seals (or primary seals where there are no secondary seals), any fluids entering the wiring system will be at or near atmospheric pressure. For example, where there is a major release of natural gas into a process building, it is not possible to build up significant pressure in the building as the walls and windows will burst at a relatively low pressure. There is no need to seal conduit against significant pressure in Zone 1, however the conduit itself is required to be an explosion-proof enclosure, so seals at the boundary of Zone 1 locations are required to be explosion-proof to maintain the explosion-proof rating of the conduit. In Zone 2, conduit is not required to be explosion-proof, so boundary seals are not required to be explosion-proof. They need only be flammable fluid migration seals, for fluids that are not under pressure. A flammable fluid migration seal can be made using any suitable fitting that has been filled with a material capable of sufficiently prohibiting the transmission of the flammable fluid at or near atmospheric pressure. Properly installed explosion seals are one possible means of providing a flammable fluid migration seal. Cables with continuous sheaths will only admit fluids at the point they terminate in hazardous areas. Therefore after the primary and secondary seals, the probability of flammable fluids entering cables (except in enclosures containing equipment with fluids under pressure), is low enough that only a flammable fluid migration seal is required. In many situations, filling the end of the cable connector where the conductors exit the connector (or where the conductors exit the cable when the jacket extends beyond the connecter) with silicone or other suitable material will provide an effective flammable fluid migration seal in Zones 0, 1 and 2. Properly installed explosion-proof or flameproof cable glands are one possible means of providing a fluid migration seal. As flammable fluid migration seals are often not obvious where they are installed, they are required to be identified. This can be done with a label or tag located near the seals, identifying them as a “flammable fluid migration seal” and indicating their location if it is not readily apparent.	
Revise Appendix B Note for Rules 18-104 and 18-154 to read: **Rules 18-104 and 18-154** Seals are provided in conduit or cable systems to prevent the passage of gases, vapours, or flames from one portion of the electrical installation to another through the system. Some equipment may include markings such as “FACTORY SEALED” or “SEAL NOT REQUIRED” as permitted by CSA Standard C22.2 No. 30 *Explosion-proof enclosures for use in Class I hazardous locations*. These terms apply to conduit installations only. The markings “FACTORY SEALED” or “SEAL NOT REQUIRED” are used interchangeably and indicate that the termination enclosure for the equipment is	SN4317

isolated from ignition capable components by an internal factory seal or that the equipment incorporates devices that have been assessed as to not produce arcs, sparks, or high temperatures.

Equipment marked “FACTORY SEALED” or “SEAL NOT REQUIRED” in Zone 1 applications

- For conduit installations, an explosion seal is not required.
- For cable installations an explosion seal is required.

Equipment marked “FACTORY SEALED” or “SEAL NOT REQUIRED” in Zone 2 applications

Because equipment that is not ignition capable [see 18-150 2) a)], and terminations housed in non-hazardous location enclosures [see 18-150 2) c)] are permitted in Zone 2 locations an explosion seal for conduit or cable is not required per 18-154 1) and 4) respectively.

Passage of gases, vapours, or flames through mineral-insulated cable is inherently prevented by the construction of the cable, but sealing compound is used in cable glands to exclude moisture and other fluids from the cable insulation and is required to be of a type intended for the conditions of use.

Cables and flexible cords are not tested to determine their ability to resist internal explosions. Therefore, regardless of size, each cable must be sealed at the point of entry into any enclosure that is required to be explosion-proof.
Some designs of cable glands incorporate an integral seal, and these are marked “SL” to indicate that the seal is provided by the cable gland. Cable glands of this type are identified with the class designation. Designs requiring a field- or factory-installed sealing fitting have the group designation marked on this component.

The appropriate sealing characteristics may be achieved by different means; therefore, the manufacturer’s instructions should be followed.

Sealing of insulated and bare conductors in the conduit, or in most cables, requires that the sealing compound completely surround each individual insulated and bare conductor to ensure that the seal performs its intended function. In certain constructions of cables, specifically those containing bundles of shielded pairs, triads, or quads, removal of the shielding or overall covering from the bundles negates the purpose for which the shielding was provided. Testing of this type of cable now includes testing for flame propagation along the length of the individual subassemblies of the cable.

The letters A, B, C, or D, or a combination of them, may be added to signify the group(s) for which the cable has been tested, for example,

a) the marking “HL-CD” indicates that the cable has been tested for flame propagation for gas groups C and D; and
b) the marking “TC-BCD” indicates that the cable has been tested for flame propagation for gas groups B, C, and D.

See also Table B18-2.

SN4395
SN4407

Revise Appendix B Note for Rules 18-106 and 18-150 2) e) to read:

Rule~~s~~ 18-106 ~~and 18-150 2) e)~~

Increased safety motors can only be safely installed and used in Zone 1 hazardous locations when specific protection requirements for their thermal and fault protection are met. This ensures the likelihood of a winding failure resulting in incendive arcing, or overload or fault resulting in high temperatures is unlikely to occur. These protection requirements are outlined in standard IEC 60079-14.

~~Sections 7.2 and 11.3 of~~ IEC 60079-14 ~~(edition 4.0, 2007-12) are included here for the convenience of designers and users.~~ contains the requirements for designers and users to apply when Ex eb motors are used in Zone 1. Requirements include the following areas:

- Protection from overload and short circuits to prevent inadmissible heating
- Application of cage induction motors
- Operation, starting and automatic reclosing (restarting after power failure)
- Use of winding temperature sensors
- Operation of high voltage machines
- Operation of motors from a frequency converter
- Operation of motors using reduced-voltage (soft) starting

For additional information on design and installation requirements of increased safety motors, consult the following:

a) IEC 60079-14, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection*; and
b) CAN/CSA-C22.2 No. 60079-7, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e"*.

~~The following extracts from IEC 60079-14 outline additional requirements for the application of type of protection "e" (increased safety) motors in Class I, Zone 1 hazardous locations.~~

~~*11.3 Cage induction motors*~~

~~11.3.1 Mains-operated~~

~~In order to meet the requirements of item (a) of 7.2~~11.1~~, inverse-time delay overload protective devices shall be such that not only is the motor current monitored, but the stalled motor will also be disconnected within the time t_E stated on the marking plate. The current-time characteristic curves giving the delay time of the overload relay or release as a function of the ratio of the starting current to the rated current shall be held by the user.~~

~~The curves will indicate the value of the delay time from the cold state related to an ambient temperature of 20 °C and for a range of starting current ratios (I_A / I_N) of at least 3 to 8. The tripping time of the protective devices shall be equal to these values of delay ±20 %.~~

~~The properties of delta wound machines in the case of the loss of one phase should be specifically addressed. Unlike star wound machines, the loss of one phase may not be detected, particularly if it occurs during operation. The effect will be current imbalance in the lines feeding the machine and increased heating of the motor. A delta wound motor with a low torque load during start-up might also be able to start under this winding failure condition and therefore the fault may exist undetected for long periods. Therefore, for delta wound machines, phase imbalance protection shall be provided which will detect machine imbalances before they can give rise to~~

~~excessive heating effects.~~

~~In general, motors designed for continuous operation, involving easy and infrequent starts which do not produce appreciable additional heating, are acceptable with inverse-time delay overload protection.~~

~~Motors designed for arduous starting conditions or which are to be started frequently are acceptable only when suitable protective devices ensure that the limiting temperature is not exceeded.~~

~~Arduous starting conditions are considered to exist if an inverse-time delay overload protective device, correctly selected as above, disconnects the motor before it reaches its rated speed. Generally, this will happen if the total starting time exceeds 1.7 t_E.~~

~~NOTE 1 Operation:~~

~~Where the duty of the motor is not S1 (continuous operation at constant load), the user should obtain the appropriate parameters for the determination of suitability given a definition of operation.~~

~~NOTE 2 Starting:~~

~~It is preferred that the direct on-line starting time for the motor is less than the t_E time so that the motor protection device does not trip the motor during start-up. Where the starting time exceeds 80% of the t_E time, the limitations associated with starting whilst maintaining operation within the machine instruction manual should be ascertained from the motor manufacturer.~~

~~As the voltage dips during a direct on-line start, the starting current decreases and the run-up time increases. Although these effects may tend to cancel out for small voltage dips, for voltages less than 85% of U_N during startup, the motor manufacturer should declare the associated limitations on start-up.~~

~~Motors may be limited by the manufacturer to a fixed number of start attempts.~~

~~NOTE 3 Protection relay~~

~~The protection relay for machines in accordance with type of protection 'e' should , in addition to the requirements of Clause 7:~~
~~a) monitor the current in each phase;~~
~~b) provide close overload protection to the fully loaded condition of the motor.~~

~~Inverse-time delay overload protection relays may be acceptable for machines of duty type S1 which have easy and infrequent starts. Where the starting duty is arduous or starting is required frequently, the protection device should be selected so that it ensures limiting temperatures are not exceeded under the declared operational parameters of the machine. Where the starting time exceeds 1.7t_E, an inverse-time relay would be expected to trip the machine during start-up.~~

~~Under some circumstances, e.g., for duty types other than S1, the motor may be certified with the temperature detection and protection. If this is the case, the t_E time may not be identified.~~

~~11.3.2 Winding temperature sensors~~

~~In order to meet the requirements of 7.2(b), winding temperature sensors associated with protective devices shall be adequate for the thermal protection of the machine even when the machine is stalled.~~

~~The use of embedded temperature sensors to control the limiting temperature of the~~

~~machine is only permitted if such use is specified in the machine documentation.~~

~~NOTE The type of built-in temperature sensors and associated protective device will be identified on the machine.~~

~~11.3.3 Machines with rated voltage greater than 1 kV~~

~~Machines with a rated voltage exceeding 1 kV shall be selected taking into account the 'Potential stator winding discharge risk assessment — Ignition risk factors' (see Annex E). If the total sum of the risk factors is greater than 6, then anti-condensation space heaters shall be employed, and special measures shall be applied to ensure that the enclosure does not contain an explosive gas atmosphere at the time of starting.~~

~~NOTE 1 If the machine is intended to operate under 'special measures', the certificate will have the symbol 'X' in accordance with IEC 60079-0.~~

~~NOTE 2 Special measures may include pre-start ventilation, the application of fixed gas detection inside the machine or other methods specified in manufacturer's instructions.~~

~~NOTE 3 In the table in Annex E, the reference to 'Time between detailed inspections' is intended to reflect the interval between cleaning of the stator windings. It should read 'Time between major overhauls (disassembly and cleaning where necessary)' as a detailed inspection in accordance with IEC 60079-17 would not normally require the stator winding to be examined.~~

~~11.3.4 Motors with converter supply~~

~~Motors supplied at varying frequency and voltage by a converter shall have been type tested for this duty as a unit in association with the converter and the protective device.~~

~~11.3.5 Reduced-voltage starting (soft starting)~~

~~Motors with a soft start supply require either:~~

~~a) the motor has been tested as a unit in association with the soft start device specified in the descriptive documents and with the protective device provided; or~~

~~b) the motor has not been tested as a unit in association with the soft start device. In this case, means (or equipment) for direct temperature control by embedded temperature sensors specified in the motor documentation, other effective measures for limiting the temperature of the motor shall be provided or the speed control device ensures that the motor run up is such that the temperature is not exceeded. The effectiveness of the temperature control or proper run up shall be verified and documented. The action of the protective device shall be to cause the motor to be disconnected.~~

~~NOTE 1 It is considered that soft starting is used for a short time period.~~

~~NOTE 2 When using a soft start device with high-frequency pulses in the output, care should be taken to ensure that any overvoltage spikes and higher temperatures which may be produced in the terminal box are taken into consideration.~~

~~*7.2 Rotating electrical machines*~~

~~Rotating electrical machinery shall additionally be protected against overload unless it can withstand continuously the starting current at rated voltage and frequency or, in the case of generators, the short- circuit current, without inadmissible heating. The overload protective device shall be:~~

~~a) a current-dependent, time lag protective device monitoring all three phases, set~~

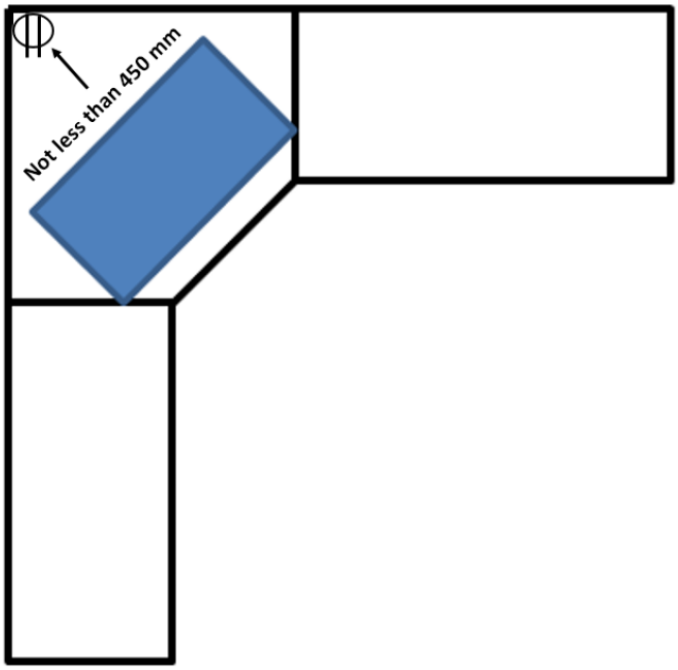
~~at not more than the rated current of the machine, which will operate in 2 h or less at 1.20 times the set current and will not operate within 2 h at 1.05 times the set current; or~~ ~~b) a device for direct temperature control by embedded temperature sensors; or~~ ~~c) another equivalent device.~~	
Revise Appendix B Note for Rule 18-150 2)c)ii) to read: **Rule 18-150 2) c) ii)** The equipment referred to in this Item includes service and branch circuit switches and circuit breakers; motor controllers, including push buttons, pilot switches, relays, and motor-overload protective devices; and switches and circuit breakers for the control of lighting and appliance circuits. Oil-immersed circuit breakers and controllers of the ordinary general-use type may not confine completely the arc produced in the interruption of heavy overloads, and ~~specific approval for locations of this Class and Division is therefore necessary~~ should therefore be marked to indicate suitability for the specific hazardous location.	**SN4395**
Revise Appendix B Note for Rule 20-030 as shown: **Rule 20-030** Information on the non-electrical aspects of propane tank systems, container refill centres, and filling plants may be found in CSA B149.2.	**SN4289**
Revise Appendix B Note for Rule 24-106 5) to read: **Rule 24-106 5)** It is intended by this Subrule to mandate installation of 15 A or 20 A non-locking hospital grade receptacles throughout all locations within a patient care area, including locations of tables, desks, or counters used by the staff who perform care or treatment functions in a patient care area. Nursing stations may also be located within some patient care areas, such as intensive care units, emergency wards, etc. It is not intended by this Subrule to mandate installation of hospital-grade receptacles in bathrooms or washrooms contained within a patient care area.	**SN4243**
Delete Appendix B Note for Rule 26-008. ~~**Rule 26-008**~~ ~~The intent of this Rule is to protect electrical apparatus within ventilated enclosures from the direct spray from sprinkler heads. The intent of the Rule is considered to be met when~~ ~~a) water following a direct line-of-sight path from the sprinkler head cannot strike live parts within the enclosure through ventilation openings in the sides and tops of electrical equipment; and~~ ~~b) water accumulating on the top of the equipment cannot flow into the interior through significant openings. Examples of significant openings are ventilation openings, openings around bus duct, and dry-type armoured cable connectors. Bolts and seams are not considered to be significant openings.~~ ~~The intent of this Rule can also be met through use of weatherproof equipment.~~	**SN4330**

Delete Appendix B Note for Rule 26-506 and associated gas calculation example (moved to Appendix B Note for Rule 64-1006): ~~**Rule 26-506**~~ ~~Sufficient ventilation should be provided to prevent the hydrogen gas from building up to a level of 2% by volume in the room air at any time.~~ ~~When batteries are operated in constant-voltage-float service and the float voltage is maintained at appropriate levels, generation of gas is very slight.~~ ~~The rate of ventilation required to maintain the volume of hydrogen gas below the 2% level in a battery room may be calculated in accordance with IEEE 484.~~ ~~As an example, the volume of hydrogen gas generated daily by a 60 cell, 840 ampere-hour lead calcium grid battery charging at 2.2 V per cell is determined as follows:~~ ~~Total m3/min of hydrogen gas = number of cells × gas generation rate of battery type in m3/min × float current in amperes × minutes/day.~~ $\text{Volume of gas production} = 60 \text{ cells} \times 7.6 \times 10^{-6} \frac{\text{m}^3}{\text{min}} \times \frac{0.006 \text{ A}}{100 \text{ A.H.}} \times 840 \text{ A.H.} \times \frac{60 \text{ min}}{\text{h}} \times \frac{24 \text{ h}}{\text{day}}$ $= \frac{0.03309 \text{ m}^3 \text{ gas}}{\text{day}}$ For a room volume of 30 m³, the total volume of gas that should be allowed to accumulate in this roo is 30 m³ × 2% = 0.6 m³. Therefore, to meet this 2% maximum level, one air change is required for each $\frac{0.6 \text{ m}^3}{0.03309 \text{ m}^3 \frac{\text{gas}}{\text{day}}} = 18 \text{ days}$ ~~However, a minimum of one to four air changes per hour in the battery room is recommended to prevent pockets of hydrogen gas from accumulating and to ensure the comfort of the maintenance personnel.~~ ~~**Rule 26-506 2)**~~ ~~The freezing point of the electrolyte used in a lead-acid battery is −15 °C for a specific gravity of 1.150, −20 °C for a specific gravity of 1.175, and −27 °C for a specific gravity of 1.200. The freezing point will be higher if the battery is completely discharged. Therefore, batteries should not be located in areas where the temperature is likely to fall below −7 °C.~~	SN4412-26 SN4412-64
Revise Appendix B Note for Rule 26-704 and add new Figure to read: **Rules 26-700 8) and 26-704** The term “sink” is intended to include kitchen sinks, bar sinks, laundry sinks, utility room sinks, wash basins, etc., that are connected to a plumbing drain pipe. It is not intended to include portable wash basins. It is not intended that the 1.5 m dimension be extended through a wall opening that is fitted with a door. Where a room combines a wash basin or shower/bathing facilities with an area serving another purpose, such as an ensuite bathroom in a bedroom, requirements for receptacles located in such rooms or areas should be considered similar to the requirements for receptacles located in bathrooms and	SN4280

washrooms.

It is also intended that no receptacle be located directly behind any sink unless the distance between the wall and the inside edge of the sink exceeds 450mm, such as in the case of a diagonal corner sink. See Figure B26-1.5.

Figure B26-1.5



The requirement for Class A GFCI protection is not intended to apply to receptacles supplying specific-use appliances located behind such appliances as washers, dryers, fridges, ranges, built-in microwaves, and other similar appliances, provided that those receptacles, by virtue of their location, are rendered essentially inaccessible for use by other portable appliances.

Revise Appendix B Note for Rule 26-710 to read:

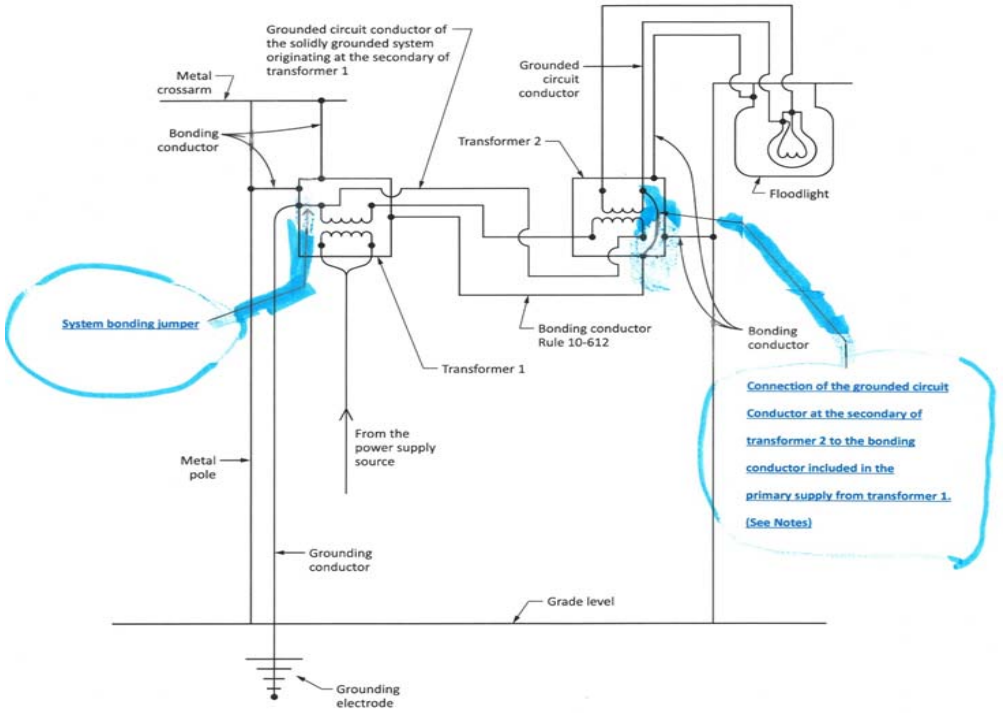
SN4383

Rule 26-710
The ~~minimum~~ maximum distance of 7.5 m is intended to ensure that a standard 10 m long extension cord will reach the rooftop equipment. The minimum 750 mm clearance from the finished roof is intended to ensure that the receptacle remains visible in the event of snow buildup.

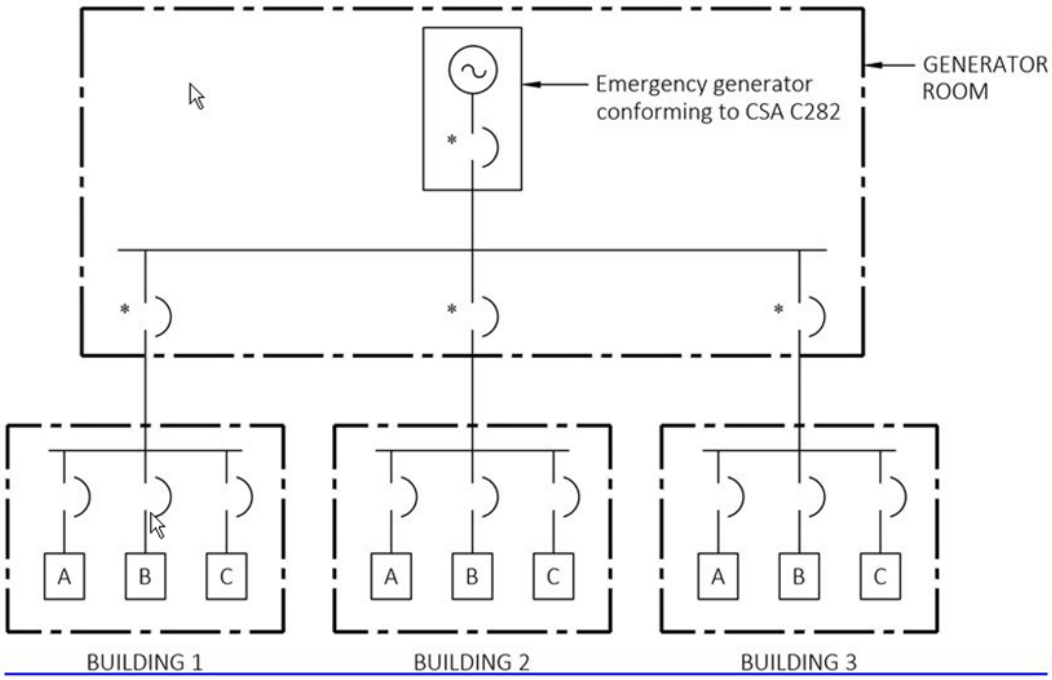
Add new Appendix B Notes for Rule 26-956 to read:

SN4368

Rule 26-956
Polyethylene water pipe is not an approved electrical conduit suitable for this purpose. High-density polyethylene (HDPE) conduit is similar in construction to water piping and approved to CSA C22.2 No. 327 as a non-metallic conduit that would meet the requirements of this rule.

Revise Figure B30-1 as shown: Δ **Figure B30-1** **Bonding and grounding — Permanent outdoor floodlighting installations**  **Notes:** 1) *The primary of transformer 2 is supplied from the solidly grounded system derived at transformer 1.* 2) ~~*The secondary of transformer 2 is a solidly grounded system established by interconnection with the solidly grounded system at transformer 1.*~~ 2) The secondary of transformer 2 is a solidly grounded system established by connection of the grounded circuit conductor to the bonding conductor included in the primary supply from transformer 1 by means of the system bonding jumper.	**SN4301**
Add new Appendix B Note for Rule 32-308 to read: **Rule 32-208** Annex E in CSA C22.2 No. 178.1 requires fire pump power transfer switches to be so marked.	**SN3948-32**
Revise Appendix B Note for Rule 32-300 to read: **Rule 32-300** In light of on the requirement of Subrule 32-206(4) for the setting of the overcurrent protection in the circuit breaker upstream of the fire pump feeder conductors, the feeder conductors between a fire pump and normal and emergency power sources maybe subjected to locked rotor current of the fire pump. The intent of this Rule is to size conductors so that upon temporary subjection to rotor current there will be no compromise in the integrity of their insulation. The intent of this Rule is also to protect the insulated feeder conductors between a fire pump and an emergency power source from fire damage.	**SN3903** **SN3961-32**

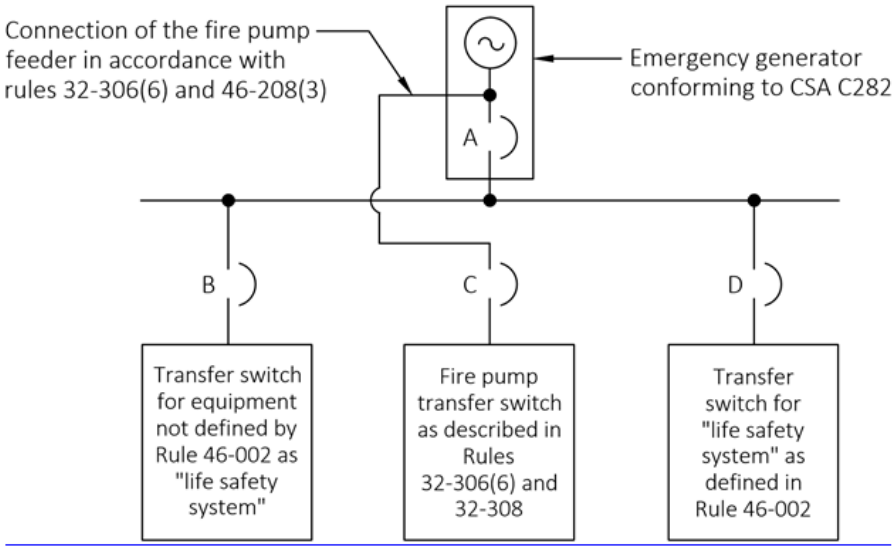
The *National Building Code of Canada* requires that insulated conductors supplying life and fire safety equipment be protected against exposure to fire to ensure continued operation of this equipment for a period not less than 1 h. NFPA 20 also mandates protection of circuits feeding fire pumps against possible damage by fire. Specific requirements pertaining to the protection of conductors against exposure to fire can be found in Article 3.2.7.10 of the *National Building Code of Canada* or in the appropriate provincial/territorial legislation.	
Revise Appendix B Note for Rule 46-108 5) to read: **Rule 46-108 5)** The intent of this Subrule is to keep the wiring between the *National Building Code of Canada* required emergency power supply and life safety systems entirely independent of all wiring to other loads that are connected to the emergency power supply, except where necessary in enclosures for splitters that are provided for connection between the emergency power supply overcurrent device and a) a separate disconnecting means and overcurrent device for a feeder supplying a transfer switch for equipment that does not fall within the definition of "life safety systems" in this Section; b) a separate circuit breaker for a feeder supplying a fire pump transfer switch in conformance with Rules 32-306 4) and 32-308; and c) except for a fire pump circuit breaker, a separate disconnecting means and the overcurrent device for a feeder supplying a transfer switch for equipment that falls within the definition of "life safety systems" in this Section. See Figure B46-1. For installations where, in accordance with C282, a single emergency generator provides an emergency power supply to a site comprising multiple buildings, it is intended by this Rule that a distribution arrangement shown in Figure B46-2 is provided for the loads located in each building at the site supplied by the single emergency generator.	**SN4236**

Add new Figure B46-2 as shown: Figure B46-2 Emergency power supply from one building to the loads located in multiple buildings  A - Transfer switch for loads not defined by Rule 46-002 as "life safety system" B - Fire pump transfer switch, as described in Rule 32-308. Note: For fire pump feeder connection, see also arrangement shown in the Figure B46-2, as permitted by Rules 32-306(6) and 46-208(3). C - Transfer switch for loads of "life safety systems" as defined in Rule 46-002.	SN4236
Add new Appendix B Note for Rule 46-208 1) to read: **Rule 46-208 1)** The feeder or branch circuit overcurrent devices described by this Subrule may also be provided as part of the emergency generator supply, in accordance with Clauses 5.1(f) of C282.	SN4234
Add new Appendix B Note for Rule 46-208 3) to read: **Rule 46-208 3)** It is not intended to provide selective coordination between the overcurrent protective devices when the feeder or branch circuit overcurrent protective devices are permitted to be connected upstream of the generator main overcurrent protective device in accordance with Clause 8.7.2 of C282 (see Rule 32-306(6) and Figure B46-3)	SN4234

Add new Figure B46-3 as shown:

SN4234

Figure B46-3



A - Circuit breaker of the emergency generator
B - Circuit breaker of the feeder supplying equipment other than "Life Safety System"
C - Circuit breaker of the fire pump feeder
D - Circuit breaker of the feeder supplying "Life Safety System"

Notes:
1. Selective coordination between the circuit breaker "A" and circuit breaker "C" is not required, when a connection arrangement permitted by Subrule 46-208(3), is used.
2. Selective coordination between circuit breaker "A" and circuit breakers "B" and "D" is required as per Subrule (1)

Revise Appendix B Note for Rule 46-400 to read:

SN4349

Rule 46-400

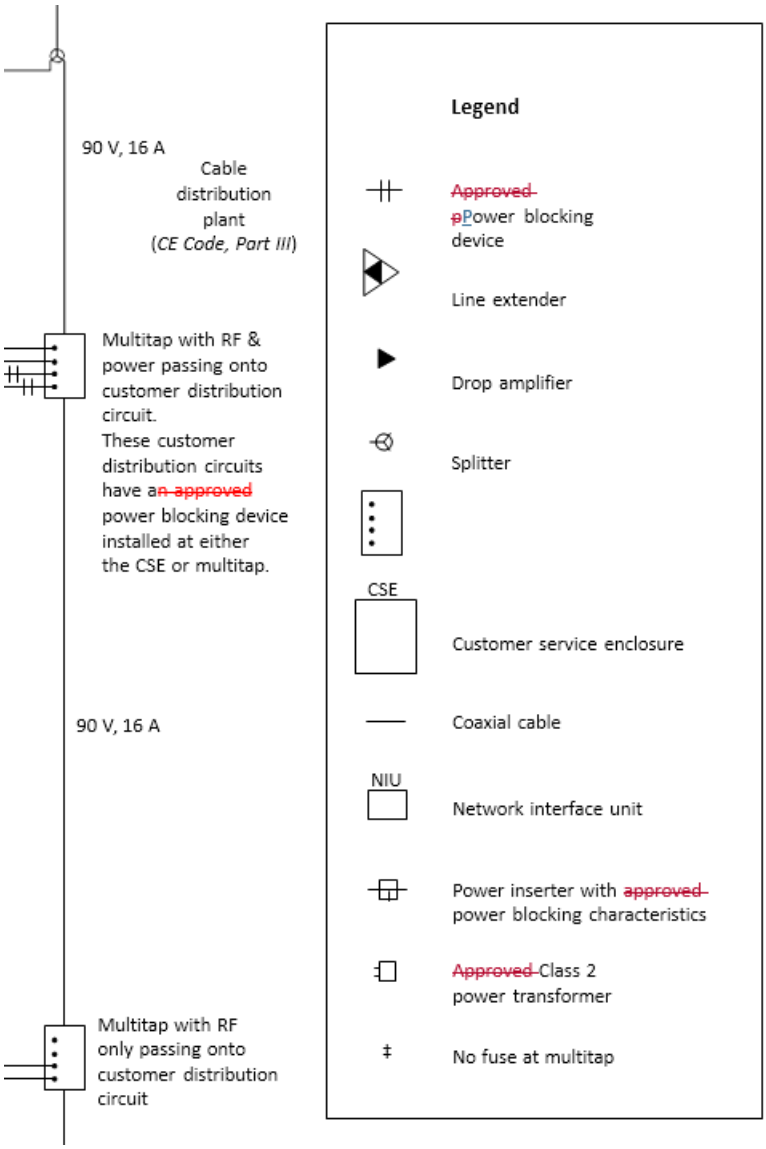
This Rule applies to exit signs containing electrically connected luminaires (internally illuminated exit signs) and to luminaires used to illuminate exit signs not directly connected to an electrical circuit (externally illuminated exit signs). It is intended by this Rule that each electrically connected exit sign represents approved electrical equipment conforming to CSA C22.2 No. 141.

It is also intended by this Rule that where an externally illuminated exit sign is installed in accordance with Article 3.4.5.1 of the *National Building Code of Canada*, circuitry serving lighting used to illuminate such externally illuminated exit signs is installed in compliance with Subrules 1) and 3).

The National Building Code of Canada recognizes externally illuminated exit signs which are constructed in conformance with CAN/ULC-S572, "Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems".

Revise text in Figure B54-1 (complete Figure not shown):

SN3948-54



Revise Appendix B Note for Rule 54-200 1) to read:

SN3961-54

Rule 54-200 1)
The point at which the exposed cables~~conductors~~ enter a building is considered to be the point of emergence through an exterior wall, a concrete floor slab, or from a totally enclosed non-combustible entrance raceway.

Revise Appendix B Note for Rule 62-104 1) to read:

SN4305

Rule 62-104 ~~1)~~
Manufacturers' instructions are incorporated into the *Canadian Electrical Code, Part II* certification process for heating equipment and form an important part of the overall safety of the final installation.

A mineral insulated trace heater can be of similar construction as mineral-insulated power cable but is not considered a power cable. A trace heater is electrical equipment. Consequently, the sheath is not serving as a bonding conductor, but rather as the conductive enclosure part of the electrical equipment. This conductive enclosure is connected to a bonding conductor at the point where it receives its supply. The design of trace heater installations often includes taps to extend a section of trace heater in one or more directions. The tap connections can be made using properly designed cable connectors or by using connections made within conductive or nonconductive enclosures ensuring that the continuity of the trace heater conductive sheath is maintained. When the connections are made in conductive enclosures, the continuity of the trace heater conductive sheath is maintained by their attachment to the conductive enclosure itself. Conductive cable glands and the conductive enclosure containing the tap connections are considered an extension of the mineral-insulated electrical trace heater sheath and therefore an extension of the conductive enclosure part of the electrical equipment.	
Revise Appendix B Note for Rule 62-126 to read: **Rule 62-126** Splicing, modification, or assembly of series heat tracing cables in the field should be done only by trained personnel. Design of series trace heaters ~~heat tracing cables~~ should be done by persons qualified to do so. This Rule recognizes the ability of a qualified person, using the manufacturer's design tools, to do similar design to that normally done by the manufacturer. Owners of industrial establishments are responsible for ensuring that persons undertaking work outlined in this Rule are properly qualified.	SN4284
Revise Appendix B Note for Rule 62-204 to read: **Rule 62-204** Trace heaters ~~Heating cables~~ embedded in concrete or in plaster attached to the concrete have about the same effect on temperatures within the concrete; therefore, Item b) applies in either case.	SN4284
Revise Appendix B Note for Rule 62-304 to read: **Rule 62-304** For the purposes of Item a), mechanical protection of the trace heater ~~cable~~ that exits the medium may include metallic or non-metallic conduit. It is recommended that trace heaters ~~heating cable~~ and heating panels installed outdoors under the surface of driveways, sidewalks, and similar locations a) not have spacing between adjacent trace heater ~~heating cable~~ runs less than 25 mm on centres; b) be installed so that adjacent runs of trace heater ~~heating cable~~ are spaced between 25 mm and 200 mm apart to provide for even heating;	SN4284

c) be secured in place by frames, spreaders, or other means while being embedded or covered, to prevent damage to the trace heaters;
d) be installed on an appropriate substrate to support maximum load without crumbling, settling, or extensive movement to prevent cracking or breaking of the trace heater ~~heating cable~~ or heating panel; and
e) not be installed where they cross expansion joints unless provision is made for expansion and contraction.

It is recommended that when trace heaters ~~heating cables~~ are embedded in asphalt, they be rated at not more than 82 W/m to prevent softening or warping of the asphalt and, where no curbs are provided, that they be installed 300 mm or more from the edge of the driveway.

Add new Appendix B Note for Rules 64-1006 and 64-1006 2) to read:*

SN4412-26
SN4412-64

Rule 64-1006

Sufficient ventilation should be provided to prevent the hydrogen gas from building up to a level of 2% by volume in the room air at any time.
When batteries are operated in constant-voltage-float service and the float voltage is maintained at appropriate levels, generation of gas is very slight.
The rate of ventilation required to maintain the volume of hydrogen gas below the 2% level in a battery room may be calculated in accordance with IEEE 484.
As an example, the volume of hydrogen gas generated daily by a 60 cell, 840 ampere-hour lead calcium grid battery charging at 2.2 V per cell is determined as follows:
Total m3/min of hydrogen gas = number of cells × gas generation rate of battery type in m3/min × float current in amperes × minutes/day.

$$\text{Volume of gas production} = 60 \text{ cells} \times 7.6 \times 10^{-6} \frac{\text{m}^3}{\text{min}} \times \frac{0.006 \text{ A}}{100 \text{ A.H.}} \times 840 \text{ A.H.} \times \frac{60 \text{ min}}{\text{h}} \times \frac{24 \text{ h}}{\text{day}}$$

$$= \frac{0.03309 \text{ m}^3 \text{ gas}}{\text{day}}$$

For a room volume of 30 m³, the total volume of gas that should be allowed to accumulate in this roo is 30 m³ × 2% = 0.6 m³.

Therefore, to meet this 2% maximum level, one air change is required for each

$$\frac{0.6 \text{ m}^3}{0.03309 \text{ m}^3 \frac{\text{gas}}{\text{day}}} = 18 \text{ days}$$

However, a minimum of one to four air changes per hour in the battery room is recommended to prevent pockets of hydrogen gas from accumulating and to ensure the comfort of the maintenance personnel.

Rule 64-1006 2)

The freezing point of the electrolyte used in a lead-acid battery is –15 °C for a specific gravity of 1.150, –20 °C for a specific gravity of 1.175, and –27 °C for a specific gravity of 1.200. The freezing point will be higher if the battery is completely discharged. Therefore, batteries should not be located in areas where the temperature is likely to fall below –7 °C.

**These Appendix B Notes are relocated from the former Appendix B Notes for Rules*

26-506 and 26-506 2) without revision (other than renumbering from 26-506 to 26-1006).	
Add new Appendix B Note for Rule 68-202 to read: **Rule 68-202** CSA Standard C22.2 No 108 Liquid pumps, has additional construction, and testing requirements for pumps designed for swimming pool use. Such pumps are marked "INSULATED WET END PUMP and POMPE À EXTRÉMITÉ IMMERGÉE ISOLÉE."	**SN3948-68**
Add new Appendix B Note for Rule 68-408 to read: **Rule 68-408** CSA Standard C22.2 No. 218.1 Spas, hot tubs, and associated equipment, has specific requirements for pumps, heaters, and blowers used with spas or hot tubs.	**SN3948-68**
Add new Appendix B Note for Rule 70-124 a) to read: **Rule 70-124 a)** CSA Standard C22.2 No. 113 contains construction and testing requirements for ventilating fans in range hoods. Such fans are marked "SUITABLE FOR USE IN A HOUSEHOLD COOKING AREA and CONVIENT A L'EMPLOI DANS UNE ZONE DE CUISSON MENAGERE, or equivalent wording.	**SN3948-70**

APPENDIX C

Revise Appendix C Clause C5.4.3 to read: SN4322

C5.4.3
The Project Manager shall forward public review comments to the Subcommittee for consideration (see Clause ~~C6.4~~ C6.5).

Revise Appendix C Clause C5.4.6 to read: SN4322

C5.4.6
A Subcommittee recommendation should be submitted to the Project Manager of the Committee on Part I within a period not exceeding 12 months from the date that the original proposal was received, in accordance with Clause C5.4.1, and the Subcommittee recommendation shall include deliberations on the public review comments, where such comments are received by the Subcommittee as the result of public review, described in Clause C6.5.

Revise Appendix C Clause C6.3 to read: SN4322

C6.3
If the request for amendment is of a horizontal nature that proposes similar changes to two or more Sections of the Code, it shall be submitted for public review in accordance with Clause C6.4 b) and submitted to the Executive Committee for preparation of a report and recommendation either to proceed with the request or to reject it. The recommendation shall be processed in accordance with Clause C7. If a recommendation to proceed is approved, or a recommendation to reject is not approved, the Project Manager shall assign a subject number to each Section-specific part of the request for amendment and process it in accordance with Clauses C6.4 and C6.5.

Revise Appendix C Clause C6.4 to read: SN4322

C6.4
The Project Manager shall assign the request a subject number and submit it
a) to the Chair of the appropriate Section Subcommittee for the preparation of a report and recommendation by the Subcommittee (see Clause C5.4); and
~~b) for 60 day public review; and~~
b)~~c)~~ to the Technical Committee on the Application of Electricity in Health Care for a 30 day review if the request affects Section 24 or 52.

Insert new Appendix C Clause C6.5 and renumber existing Clauses C6.5 to C6.7 as C6.6 to C6.8: SN4322

C6.5

The Section Subcommittee Chair shall forward the report and recommendation described in Clause C6.4 to the Project Manager. The Project Manager will forward the original proposal, rationale, and Subcommittee recommendation for 60 day public review. **C6.~~5~~6....** **C6.~~6~~7....** **C6.~~7~~8....**	

APPENDIX D

Revise title of Table D5 to read:

SN4351

Table D5
Strandings for building bare and insulated conductors ~~and cables~~
(See ~~Appendix B Note to~~ Rule 12-910.)

APPENDIX E

Delete contents of Appendix E.

SN4347
SN4395

Appendix E (deleted)

~~**— Dust-free rooms**~~

~~(See Rules in Appendix J for Class II and Class III hazardous locations)~~

~~Note: This Appendix is an informative (non-mandatory) part of this Standard.~~

~~**E1 Introduction**~~

~~This Appendix covers recommended practices for the housing of electrical equipment. With respect to actual constructional requirements, it is not practical to cover all materials and methods that are or may become available and, therefore, any specific details mentioned in this Appendix are to be considered examples rather than specific requirements. The National Building Code of Canada or any other building code that may be in force in any particular locality should take precedence over this Appendix and should be consulted in this respect.~~

~~**E2 Scope**~~

~~This Appendix applies to the construction of dust-free rooms built adjacent to or as part of buildings that, by the nature of their use or occupancy, are subject to accumulations of dusts that may create a fire or explosion hazard or that may be detrimental to the proper operation of electrical equipment not provided with dust-tight enclosures.~~

~~**E3 Definition**~~

~~The following definition applies in this Appendix:~~

~~Dust-free room — a room, building, or other area, of a size that permits the entrance of persons for operation and maintenance purposes and constructed so that the quantity of dust that can enter will not create a hazardous condition.~~

~~**E4 Use**~~

~~E4.1~~

~~Dust-free rooms are intended to be used to house electrical equipment except equipment required by this Code to be installed in vaults.~~

~~E4.2~~

~~Dust-free rooms should not be used for any manufacturing, processing, maintenance, storage, or other purposes except those that may be essential for the proper operation and maintenance of the electrical equipment that they house.~~

~~**E5.1**~~

~~Electrical equipment in dust-free rooms need not be of types approved for Zones 20, 21, and 22, or Class II, Division 1 & 2 and Class III, Division 1 & 2 locations.~~

~~E5.2~~

~~Where access to the dust-free room by unauthorized persons is permitted, the electrical equipment should be enclosed, guarded, protected, etc. as required by this Code for ordinary locations.~~

~~E5.3~~

~~Where access is to authorized persons only, enclosures may be omitted as provided for by this Code (e.g., Section 26).~~

~~**E6 Materials and methods of construction**~~

~~Materials used for the construction of dust-free rooms and the method of construction should fulfill the following conditions:~~

~~a) the enclosure of the room should be as impervious to the passage of dust from~~

outside the room as is practicable;
b) the various components, walls, floors, ceilings, etc. should be capable of safely supporting the live and dead loads (including impact) to which they are liable to be subjected;
c) there should be no likelihood that dust passages will be created due to shrinkage, breaking, or cracking;
d) the completed structure should have a fire resistance rating of 1 h or better;
e) in buildings constructed of non-combustible materials, the rooms should also be constructed of non-combustible material, but in other buildings, the rooms may be constructed of combustible materials with non-combustible facing on at least the inner surfaces; and
f) if it is necessary that shafts or other rotating or sliding members be used to connect equipment outside the room with that inside, suitable means such as seals, gaskets, baffles, etc. should be provided to prevent passage of dust through the necessary openings.

E7 Floors

Some acceptable floor constructions are as follows:
a) solid concrete slab of minimum thickness 75 mm and reinforced as necessary; or
b) steel joists with welded plate metal floor or concrete slabs of minimum thickness 50 mm over the joists and 22 mm Portland cement plaster on metal lath under them.
Wherever necessary, floors should be surfaced with insulating material to prevent shock hazard.

E8 Walls

Some acceptable wall constructions are as follows, and it is to be noted that lath and plaster on both sides must have other construction built into the wall to ensure continuance of the dust-free features, and plywood joints must be backed by studding:
a) monolithic concrete of minimum thickness 100 mm reinforced as necessary;
b) built-up masonry consisting of
i) solid bricks of minimum thickness 95 mm;
ii) hollow tile of minimum thickness 75 mm if plastered both sides, and 150 mm if not plastered; or
iii) hollow concrete or cinder concrete block of minimum thickness 125 mm if plastered both sides, and 200 mm if not plastered; or
c) stud construction of 50 mm if of metal or 100 mm if of wood, faced on the outside with metal or perforated gypsum lath with 19 mm gypsum or 22 mm Portland cement plaster, faced on the inside with
i) metal-faced laminated wood;
ii) laminated wood with 19 mm gypsum or 22 mm Portland cement plaster on metal or perforated gypsum lath;
iii) laminated wood with fire-resisting non-metallic facing; or
iv) sheet metal equivalent to 1.69 mm (No. 14 MSG) steel with welded or riveted locked-seam joints secured to metal studs by welding or by self-locking screws.

E9 Ceilings

Ceilings, if load-bearing, should have the same construction as floors, but if non-load-bearing, may be constructed similarly to walls with wood joists, if used, of greater depth in accordance with the span.

E10 Cubicle construction

E10.1

Where the room is constructed as a free-standing cubicle with walls and ceiling not forming a part of and spaced away from the structure of the building proper, the walls and ceiling may be of sheet steel not less than 1.69 mm (No. 14 MSG) thick, suitably joined and reinforced as may be necessary.

~~E10.2~~
~~If the floor is elevated above the floor of the building proper, it may be constructed in accordance with Clause E7 and the plaster may be omitted.~~

~~E11 Doors~~

~~E11.1~~
~~Doors giving access to the room from dusty locations should be~~
~~a) either metal-clad or hollow metal and weatherstripped or otherwise arranged to prevent dust leakage at the edges of frames and sills; and~~
~~b) equipped with self-closers.~~

~~E11.2~~
~~If operation of the electrical equipment requires entry to the room from dusty locations, two hinged doors with a 1.5 m vestibule between them should be provided, but where entry is necessary for maintenance only, single doors may be used.~~

~~E11.3~~
~~Doors giving access to the room from a dust-free atmosphere may be of ordinary types.~~

~~E11.4~~
~~If more than one point of access to a room is provided, all but the principal one should be either securely locked or other adequate means should be used to prevent unauthorized traffic through the room.~~

~~E11.5~~
~~All doors should be provided with means whereby they can be readily unlocked and opened from the inside without the use of a removable key.~~

~~E12 Windows~~

~~E12.1~~
~~Windows facing dusty locations should have a fixed metal sash and wired glass.~~

~~E12.2~~
~~Windows in exterior walls may be arranged for opening if it is reasonably certain that the surrounding exterior area will remain sufficiently dust-free.~~

~~E13 Ventilation~~

~~E13.1~~
~~Ventilation by clean air should be adequate for the dissipation of heat from the electrical apparatus installed.~~

~~E13.2~~
~~If ventilation is by means of forced air circulation, the air should be forced into the room rather than exhausted out of it.~~

~~E13.3~~
~~It is recommended that the air in the room be kept at a pressure slightly above atmospheric, which will tend to blow any dust out of the room rather than have it sucked in.~~

~~E13.4~~
~~The amount of ventilating air required is difficult to specify in an empirical value because it depends on~~
~~a) the size of the room;~~
~~b) the dissipating ability of walls and ceilings;~~
~~c) the amount and nature of the electrical equipment; and~~
~~d) the temperature of the incoming air.~~

~~E13.5~~
~~The cooling effect may be obtained by radiation alone (if the area is sufficient), by ventilation alone, or by a combination of both.~~

APPENDIX I

Add the following entry to Appendix I: **SN4262**

Rule 4-006 1)

Question: In accordance with the new note in Table 5A, "** The insulation temperature rating is the temperature marked on the conductor.", if a circuit breaker rated with a maximum conductor termination of 75 degrees C has Teck 90 connected to it to feed a piece of equipment that is marked with a maximum conductor termination of 75 degrees C, yet part way through the cable run, the Teck 90 goes through an area with an ambient exceeding 30 degrees C, would we use the 90 degree column of Table 5A so long as the high ambient area is more than 1.2 meters away from the equipment in accordance with 4-006 (1) & (4)?

Answer: Yes

Add the following entry to Appendix I: **SN4225A**

Rule 8-304 1)

Question: For the application of Rule 8-304(1) is a duplex receptacle considered as one outlet?

Answer: Yes

Add the following entry to Appendix I: **SN4225B**

Rule 8-304 1)

Question: For the application of Rule 8-304(1) is a quad receptacle considered as one outlet?

Answer: Yes

Add the following entry to Appendix I: **SN4287**

Rule 64-222

Question: If a racking system approved for use in Canada utilizes integrated bonding in its components in conjunction with modules approved for use with that racking system, would this be an acceptable means of bonding to ground?

Answer: Yes

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Add the following entry to Appendix I: **Rule 64-222 4)** **Question:** In Subrule 64-222 4), does the phrase “removal of a photovoltaic module” refer to a singular photovoltaic module only? **Answer:** Yes	SN4286

APPENDIX J

Delete the following entries from Rule J18-002: **SN4224**

~~**Cable seal** — a seal that is installed at a cable termination to prevent the release of an explosion from an explosion-proof enclosure and that minimizes the passage of gases or vapours at atmospheric pressure.~~

~~**Conduit seal** — a seal that is installed in a conduit to prevent the passage of an explosion from one portion of the conduit system to another and that minimizes the passage of gases or vapours at atmospheric pressure.~~

Add new term Seals to Rule J18-002 and relocate existing term Secondary seal with revision as shown: **SN4224**

Seals

Explosion seal – a seal that

a) when installed at a cable or conduit entry to a flameproof or explosion-proof enclosure, prevents the ignition of an explosive gas atmosphere outside the enclosure;

b) when installed in a conduit, prevents the passage of an explosion from one portion of the conduit system to another; and

c) minimizes the passage of flammable fluids at atmospheric pressure.

Flammable fluid migration seal – A cable or conduit seal intended to minimize the transmission of flammable fluids at or near atmospheric pressure.

Primary seal — a seal that isolates process fluids from an electrical system and that has one side of the seal in contact with the process fluid.

Secondary seal — a seal that is designed to prevent the passage of process fluids at the pressure it will be subjected to upon failure of a~~the~~ primary seal.

Add new Subrule J18-050 5) to read: **SN4378-J18**

5) Where equipment is marked for use in Zone locations, but will be used in locations classified according to the Class/Division system as permitted by Table 18, the applicable Group of the Zone system shall correspond to the equivalent Group within the Class/Division system as specified in Table 18A.

Add new Rule J18-061 to read: **SN4290**

J18-061 Optical fiber cable (see Annex JB)

Optical fiber cable types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN and OFC shall be permitted to be installed in all hazardous locations, provided that the installation meets applicable sealing requirements of Annex J18.	
Revise Subrule J18-064 3) to read: **J18-064 Intrinsically safe and non-incendive electrical equipment and wiring** (see Annex JB and Appendix F) 3) Except as permitted by Subrule 4), no raceway, cable tray, compartment, enclosure, outlet, junction box, or similar fitting, ~~excluding cable tray,~~ shall contain insulated conductors of intrinsically safe or non-incendive field wiring circuits and insulated conductors of any other circuit unless the conductors are separated by a) not less than 50 mm; b) the metal armour or sheath of cable assemblies; c) a grounded metal barrier not less than 1.34 mm (No. 16 MSG) thick; or d) a non-metallic insulating material not less than 1.5 mm in thickness.	**SN4389-J18**
Revise Rule J18-068 as shown: **J18-068 ~~Flammable fluid s~~Seals** (see Annex JB) 1) Electrical equipment with a primary seal in contact with flammable fluids shall be a) constructed or installed ~~so as~~ to prevent migration of flammable fluids through ~~the~~ wiring and fibre optic systems; and b) used at pressures lower than the marked maximum working pressure (MWP). 2) Where Subrule 1) is met through the installation of secondary seals, the possibility of primary seal failure shall be indicated by a) design features that will make the occurrence of a primary seal failure obvious; or b) ~~acceptable~~ marking means indicating that the enclosure may contain flammable fluid under pressure. 3) Flammable fluid migration seals shall be permanently identified. 4) Where field installed seals are required, they shall conform to the following: a) the seal shall be accessible after installation; b) splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made be filled with compound; and c) where there is a probability that liquid or other condensed vapour may be trapped within enclosures for control equipment or at any point in the raceway system, acceptable means shall be provided to prevent accumulation or to permit periodic draining of such liquid or condensed vapour.	**SN4224**
Revise Rule J18-108 as shown: **J18-108 Sealing, Class I, Division 1** (see Annex JB) 1) ~~Conduit~~ Explosion seals shall be provided in conduit systems where	**SN4224** **SN4396-J18**

a) the conduit enters an explosion-proof enclosure containing devices that may produce arcs, sparks, or high temperatures, and shall be located as close as practicable to the enclosure, or as marked on the enclosure, but not farther than 450 mm from the enclosure;

b) the conduit is 53 trade size or larger and enters an explosion-proof enclosure housing terminals, splices, or taps, and shall be located no further than 450 mm from the enclosure;

c) the conduit leaves the Class I, Division 1 location with no box, coupling, or fitting in the conduit run between the seal and the point at which the conduit leaves the location, except

that a rigid unbroken conduit that passes completely through a Class I, Division 1 area, with no fittings less than 300 mm beyond each boundary, need not be sealed, provided that the termination points of the unbroken conduit are in non-hazardous areas; or

d) the conduit enters an enclosure that is not required to be explosion-proof, except that a seal is not required where an unbroken and continuous run of conduit connects two enclosures that are not required to be explosion-proof.

2) Only explosion-proof unions, couplings, reducers, and elbows that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and an explosion-proof enclosure.

3) An explosion~~Cable~~ seal~~s~~ shall be provided in a cable system where

~~a)~~ the cable enters an enclosure required to be explosion-proof or flameproof "d".~~; or~~

4)~~b)~~ A flammable fluid migration seal shall be provided where a ~~the~~ cable first terminates after entering the Division 1 area.

~~4) Where secondary seals, cable seals, or conduit seals are required, they shall conform to the following:~~

~~a) the seal shall be made~~

~~i) in a field-installed sealing fitting or cable gland that is accessible and complies with the requirements of Rule J18-100; or~~

~~ii) in a sealing fitting provided as part of an enclosure, and where the seal is factory made, the enclosure shall be marked to indicate that such a seal is provided;~~

~~b) splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made be filled with compound;~~

~~c) where there is a probability that liquid or other condensed vapour may be trapped within enclosures for control equipment or at any point in the raceway system, means shall be provided to prevent accumulation or to permit periodic draining of such liquid or condensed vapour; and~~

~~d) where there is a probability that liquid or condensed vapour may accumulate within motors or generators, joints and conduit systems shall be arranged to minimize entrance of liquid, but if means to prevent accumulation or to permit periodic draining are judged necessary, such means shall be provided at the time of manufacture and shall be deemed an integral part of the machine.~~

5) Runs of cables, each having a continuous sheath, either metal or non-metal, shall be permitted to pass through a Class I, Division 1 location without seals.

~~6) Cables that do not have a continuous sheath, either metal or non-metal, shall have a flammable fluid migration seal installed~~be sealed at the

~~boundary of the Division 1 location.~~

Revise Rule J18-154 as shown:

SN4224
SN4386-J18
SN4396-J18

J18-154 Sealing, Class I, Division 2 (see Annex JB)

1) ~~Conduit~~Explosion seals shall be provided in a conduit system where
   ~~a)~~ the conduit enters an enclosure that is required to be explosion-proof or flameproof and shall be located as close as practicable to the enclosure, or as marked on the enclosure, but not farther than 450 mm from the enclosure.~~;~~

2)~~b)~~ Flammable fluid migration seals for conduit shall be installed where
   a) the conduit leaves the Class I, Division 2 location with no box, coupling, or fitting in the conduit run between the seal and the point at which the conduit leaves the location, except that a rigid unbroken conduit that passes completely through a Class I, Division 2 area, with no fittings less than 300 mm beyond each boundary, need not be sealed, provided that the termination points of the unbroken conduit are in non-hazardous areas; or
   b)~~c)~~ the conduit leaves a Class I, Division 2 location outdoors, in which case the seal shall be permitted to be located more than 300 mm beyond the Class I, Division 2 boundary, provided that it is located on the conduit before the conduit enters an enclosure or building.

3)~~2)~~ Only explosion-proof unions, couplings, reducers, and elbows that are not larger than the trade size of the conduit shall be permitted between the sealing fitting and an explosion-proof or flameproof enclosure.

4)~~3)~~ Explosion~~Cable~~ seals shall be provided in a cable system where
   ~~a)~~ the cable enters an enclosure required to be explosion-proof or flameproof.~~; or~~

~~5)b) Flammable fluid migration seals shall be installed where a the cable enters an enclosure not required to be explosion-proof or flameproof, and the other end of the cable terminates in a non-hazardous location in which a negative atmospheric pressure greater than 0.2 kPa exists.~~

5)~~4)~~ Where a run of conduit enters an enclosure that is required to be explosion-proof or flameproof, every part of the conduit from the explosion seal to that enclosure shall comply with Rule J18-106.

6)~~5)~~ Runs of cables, each having a continuous sheath, either metal or non-metal, shall be permitted to pass through a Class I, Division 2 location without seals.

~~7)6) Cables that do not have a continuous sheath, either metal or non-metal, shall have a flammable fluid migration seal installed be sealed at the boundary of the Division 2 location.~~

~~7) Where seals are required, Rule J18-108 4) shall apply.~~

Revise Rule J20-110 to read:

SN3961-20

J20-110 Equipment above hazardous areas

1) Fixed equipment that is less than 3.6 m above floor level and that may produce arcs, sparks, or particles of hot metal, such as cut-outs, switches, charging panels, generators, motors, or other equipment (excluding

receptacles, lamps, and lampholders) having make-and-break or sliding contacts, shall be of the totally enclosed type or constructed to prevent escape of sparks or hot metal particles. 2) Permanently installed luminaires that are located over lanes through which vehicles are commonly driven shall be permitted to be suitable for non-hazardous locations and shall be a) located not less than 3.6 m above floor level; or b) protected from mechanical damage by a guard or by location. 3) Portable lamps shall comply with the following: a) they shall be of the totally enclosed gasketted type, equipped with a handle, lampholder, hook, and substantial guard attached to the lampholder or handle, and all exterior surfaces that may come in contact with battery terminals, wiring terminals, or other objects shall be of non-conducting materials or shall be effectively protected with an insulating material ~~jacket~~; b) the lampholders shall be of the unswitched type; and c) they shall not be provided with receptacles for attachment plugs.	

ANNEX JB

Revise Annex JB Note for Rule J18-002 to read: SN4224

Rule J18-002

~~**Cable seal** — a seal that is designed to prevent the escape of flames from an explosion-proof enclosure. Because cables are not designed to withstand the pressures of an explosion, transmission of an explosion into a cable could result in ignition of gases or vapours in the area outside the enclosure.~~

~~**Conduit seal** — a seal that is designed to prevent the passage of flames from one portion of the electrical installation to another through the conduit system and to minimize the passage of gases or vapours at atmospheric pressure.~~

~~Unless specifically designed for the purpose, conduit seals are not intended to prevent the passage of fluids at a continuous pressure differential across the seal. Even at differences in pressure across the seal equivalent to a few centimetres of water, there may be passage of gas or vapour through the seal and/or through the conductors passing through the seal. Where conduit seals are exposed to continuous pressure, there may be a danger of transmission of flammable fluids to "safe areas" resulting in fire or explosions.~~

Explosion seal – This seal is intended to prevent hot gases resulting from an ignition of an explosive gas atmosphere on one side of the seal, from igniting an explosive gas atmosphere on the other side of the seal (or external to the cable, for a cable seal). The design of these seals also minimizes the passage of flammable fluids through them under atmospheric pressure.

Flammable fluid migration seal – A flammable fluid migration seal is only intended to prevent the passage of flammable fluid at atmospheric pressure. It is not intended to prevent the transmission of an explosion or of flammable fluids under pressure. While explosion seals can meet this definition (see note to Rule J18-068), other methods using compounds such as silicone or duct seal will be suitable, providing they are installed in a manner that will prevent migration of flammable fluids at atmospheric pressure.

Revise Annex JB Note for Rules J18-004, J18-006 and J18-008 to read: SN4378-J18

Rules J18-004, J18-006, and J18-008

Reference material for area classification is listed in Table B18-1.

See also the Note to Rule J18-062 in this Annex.

There is an equivalency in area classifications between the Zone system and the Class/Division system as shown in Table B18-2. For equipment suitable for installation in hazardous locations, refer to Tables 18 and 18A.

Add new Annex JB Note for Rule J18-061 to read: SN4290

Rule J18-061

Optical fiber cable and equipment is being used more due to advancements in technology in hazardous locations as can be seen by the recognition of optical radiation as a potential explosion hazard and the adoption of CAN/CSA-C22.2 No. 60079-28 for optical equipment. It is important that these cables are recognized for installations and that they are installed to minimize the risks of fire, explosions and transmission of flammable fluids. Some of these cables contain both wiring and fiber elements within them, and they are considered electrical cables, see Rule 56-204 2). As such they would need to meet the "Wiring Methods" Rules for the applicable Class and Division. When optical fiber cables are intermixed with electrical cables there are additional requirements contained in Section 56.	
Revise Annex JB Note for Rule J18-068 to read: **Rule J18-068** ~~ANSI/ISA 12.27.01~~ ANSI/UL 122701 provides construction, performance, and marking requirements for the process seals incorporated into process-connected electrical equipment. Equipment containing a primary seal that complies with this Standard is eligible to include either the “Single Seal” or “Dual Seal” designation in the nameplate markings. These markings indicate that the electrical equipment is designed to prevent the migration of flammable fluid through the equipment into the wiring system when the equipment is operated at or lower than its rated pressure. Devices certified as conforming to ~~ANSI/ISA 12.27.01~~ ANSI/UL 122701 and marked either “Single Seal” or “Dual Seal” meet the intent of Subrule 1) a). Where devices containing primary seals are not marked to indicate conformance with ~~ANSI/ISA 12.27.01~~ ANSI/UL 122701, other means may be used to prevent fluid migration though the wiring system. This may include the use of suitable barriers located between the primary seal and the wiring system, such as secondary seals or short lengths of mineral-insulated (MI) cable. IEEE 1673, *Standard for Requirements for Conduit and Cable Seals for Field Connected Wiring to Equipment in Petroleum and Chemical Industry Exposed to Pressures above Atmospheric (1.5 kPa, 0.22 psi),* provides construction, performance, and marking requirements for field installed secondary seals. Where secondary seals are installed, examples of design features that make the occurrence of primary seal failure obvious are vents, drains, visible rupture or leakage, audible whistles, or electronic monitoring. The intent of making the primary seal failure obvious is to prevent continuous pressure on the secondary seal and the possibility of an eventual secondary seal failure, as well as to protect personnel working on the device. Alternatively, where means to relieve pressure on a secondary seal is not provided, a cautionary label should be provided to warn personnel that the enclosure may contain flammable fluid under pressure. In subsurface applications, for example oil and gas wells, the requirement for process (flammable fluid) sealing still exists. Wiring and fiber optic systems would need to be process sealed as they pass through the surface wellhead to prevent flammable fluids from migrating through the wiring and fiber optic systems on the surface. A field installed secondary process seal would be difficult to implement as there is a need to have a primary process seal with annunciation of failure, which may be difficult to address on downhole equipment. Sealing should incorporate both primary and secondary process seals, which can be certified “dual seals” or “single seals”. Engineering considerations may lead to the conclusion that the probability of	**SN4224** **SN4313-J18**

leakage from a specific installation will be negligible. Acceptable factors such as an extensive history of safe operation with similar installations, or the use of a primary seal with a pressure rating well in excess of the maximum process operating pressure, may be considered. In conduit systems, the function of the primary and secondary seals is to prevent flammable fluids (liquid, gas or vapour) that may be under pressure from getting into the conduit system. Beyond the primary and secondary seals there is no opportunity for gas under significant pressure to enter the conduit. It should be understood that situations such as where fluids under pressure are located in an enclosed space (such as gas sample tubing situated inside a control panel), conduits and cables entering the enclosure may require sealing (secondary seal) in case there is a leak under pressure within the enclosure from sources of release. Therefore downstream of the secondary seals (or primary seals where there are no secondary seals), any fluids entering the conduit will be at or near atmospheric pressure. For example, where there is a major release of natural gas into a process building, the walls will typically burst with a low buildup of pressure from the gas release. While there is no need to seal conduit against significant pressure in Class I, Division 1, the conduit itself is required to be an explosion-proof enclosure, so seals at the boundary of Class I, Division 1 locations are required to be explosion-proof to maintain the explosion-proof rating of the conduit. In Class I, Division 2, conduit is not required to be explosion-proof, so boundary seals are not required to be explosion-proof. They need only be flammable fluid migration seals, for fluids that are not under pressure. A flammable fluid migration seal can be made using any suitable fitting that has been filled with a material capable of sufficiently prohibiting the transmission of the flammable fluid at or near atmospheric pressure. Properly installed explosion seals are one possible means of providing a flammable fluid migration seal. Cables with continuous sheaths will only admit fluids at the point they terminate in hazardous areas. Therefore after the primary and secondary seals, the probability of flammable fluids entering cables (except in enclosures containing equipment with fluids under pressure), is low enough that only a flammable fluid migration seal is required. In many situations, filling the end of the cable connector where the conductors exit the connector (or where the conductors exit the cable when the jacket extends beyond the connecter) with silicone or other suitable material will provide an effective flammable fluid migration seal in Class I, Division 1 and Class I, Division2. Properly installed explosion-proof or flameproof cable glands are one possible means of providing a fluid migration seal. As flammable fluid migration seals are often not obvious where they are installed, they are required to be identified. This can be done with a label or tag located near the seals, identifying them as a “flammable fluid migration seal” and indicating their location if it is not readily apparent.	
Insert the following Annex JB Note for Rules J18-108 and J18-154 between the first and second paragraphs: Some equipment may include markings such as “FACTORY SEALED” or “SEAL NOT REQUIRED” as permitted by CSA Standard C22.2 No. 30 Explosion-proof enclosures for use in Class I hazardous locations. These terms apply to conduit	**SN4317-J18**

installations only. The markings “FACTORY SEALED” or “SEAL NOT REQUIRED” are used interchangeably and indicate that the termination enclosure for the equipment is isolated from ignition capable components by an internal factory seal or that the equipment incorporates devices that have been assessed as to not produce arcs, sparks, or high temperatures. Equipment marked “FACTORY SEALED” or “SEAL NOT REQUIRED” in Class I, Division 1 applications • For conduit installations, an explosion seal is not required. • For cable installations an explosion seal is required. Equipment marked “FACTORY SEALED” or “SEAL NOT REQUIRED” in Class I, Division 2 applications Because equipment that is not ignition capable [see J18-150 2) a)], and terminations housed in non-hazardous location enclosures [see J18-150 2) c)] are permitted in Class I, Division 2 locations, an explosion seal for conduit or cable is not required per J18-154 1) and 4) respectively.	

Subjects incorporated into this Memorandum of Revisions				
MOR #1	MOR #2			
3903	3948-32	4347		
3936	3948-38	4349		
3948-54	3961-32	4350		
3948-68	3994	4351		
3948-70	4003	4353		
3961-0D	4007	4354		
3961-16	4065	4357		
3961-20	4221	4358		
3961-40	4237	4363		
3961-54	4241	4368		
3961-58	4242	4371		
3961-66	4264	4378		
3961-68	4267	4378-J18		
3961-70	4270	4379		
3961-72	4278	4383		
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4087-12	4280	4386-J18		
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