NEXANS WEBINAR

# Key 2021 Electrical Code Changes Impacting Wire and Cable

January 27, 2021

**By: Nexans Canada**

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ATTENTION

# AUDIENCE PARTICIPATION

- **Questions received via email will be answered at the end of the presentation. New questions cannot be asked at this time.**

- **This webinar will not cover all the changes in the Canadian Electrical Code, so we recommend you purchase a copy at https://www.csagroup.org/store/**

- **This presentation, a recording of the webinar and a brief survey will be emailed to all registrants.**

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PRESENTERS

## Alain Blezy, P.Eng

**Director of Engineer, Nexans B&T NAM**

- Started Nexans career with Canada Wire in 1989
- Worked several roles in engineering, production, quality & management over this time period

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- **2019 Nexans in Canada** – click here to watch it
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- Conductor ampacity and temperature calculations
- Post installation product support
- Custom engineered solutions to optimize a project from conception to energization
- Overhead line calculations, including conductor ampacity, temperature, impedance, as well as sag and tension

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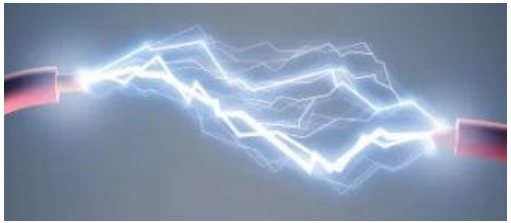
# AGENDA

- Section 0 - Definition Changes
- Section 2 – Revised Rule
- Section 4 – Revisions
- Section 12 – New & Revised Rules
- Revised Tables
- Summary
- Q&A

# SECTION 0 – REVISED DEFINITIONS

**SN 4426: AMPACITY**: ~~the current-carrying capacity of electric conductors expressed in amperes.~~ the maximum current, in amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating or, for insulated conductors, the insulation temperature rating



**What does this mean?**

A clearer definition was required since the original definition used “capacity” and it was not clear that capacity means maximum.

# SECTION 0: NEW DEFINITION

**SN 4065 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.

**What does this mean?**

Definition was added to alleviate concerns regarding the meaning of the terms in the industry.

# SECTION 0: REVISED DEFINITION

**SN 4065 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.

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# SECTION 0 – REVISED DEFINITIONS

**SN 4454 CABLE TRAY**: a ~~raceway~~ supporting means consisting of troughing and fittings formed and constructed so that insulated conductors and cables may be readily installed or removed after the cable tray has been completely installed, without damage either to conductors or their covering.

**SN 4454 RACEWAY:** any channel designed for holding wires, cables, or busbars, and unless otherwise qualified in the Rules of this Code, the term includes conduit, electrical metallic and non-metallic tubing, underfloor raceways, cellular floors, surface raceways, wireways, ~~**cable trays**~~, busways, and auxiliary gutters.

# SECTION 0 – REVISED DEFINITIONS

**SN 4323-0 Revise definition for Identified – (Removed)**

**Indentified**:
a) when applied to a conductor, signifies that the conductor has
i) a white ~~**or grey**~~ covering;

**SN 4323-0 Revise Subrules 4-024 1) and 2) – (Removed)**
**4-024 Identification of insulated neutral conductors up to and including No. 2 AWG copper or aluminum**

**SN 4323-4 Revise Subrules 4-032 3) – (Removed)**

# SECTION 0 – REVISED DEFINITION

**SN 3994 and SN 4390 VOLTAGE:**

- **Extra-low voltage:**
  - AC circuits, any voltage < 30 V AC; or
  - DC circuits, any voltage < 42.4 V DC
- **Low voltage:**
  - AC circuits, any voltage > 30 V AC but < 1000 V AC; or
  - DC circuits, any voltage > 42.4 V DC but < 1060 V DC
- **High voltage:**
  - AC circuits, any voltage > 1000 V AC; or
  - DC circuits, any voltage > 1060 V DC

# SECTION 2 – REVISED RULES

**SN 4453 Rule 2-134: Sunlight resistance requirements**

2) Where the outer covering of a cable assembly marked sunlight resistant has been **removed** for termination of the cable, and the **inner jacket or insulation of the internal conductors is exposed to direct rays of the sun**, the internal insulated conductors shall be:

a) **marked as sunlight resistant**; or

b) **protected by tubing, tape or equivalent that is marked as sunlight resistant.**

**What does this mean?**

Adequate markings are required or adequate protection from direct sunlight exposure must be provided.

# SECTION 4 – REVISED SUBRULE

**SN 4341 Revise Subrule 4-004 7) Ampacity of wire and cables**

7) The correction factors specified in this Rule

a) shall not apply to conductors installed

ii) inside electrical equipment for termination of these conductors at the electrical equipment

**What does this mean?**

Tables 5A to 5D are intended to apply to the cables and conductors between equipment, not within the equipment.

# SECTION 4 – DELETE SUBRULE & TABLE

## SN 4485: Subrule 4-004 (22) and Table 39 (Removed)

~~22) Notwithstanding Rules 4-006 and 8-200 1) b), 3-wire 120/240 V and 120/208 V service conductors for single dwellings and feeder conductors supplying single dwelling units of row housing, apartment, or similar buildings and terminating on equipment having a conductor termination temperature of not less than 75 °C shall be permitted to be sized in accordance with Table 39, and a permanent, legible caution marking shall be field applied adjacent to the fused switch or circuit breaker nameplate on the equipment to indicate the maximum calculated load from Table 39.~~

## What does this mean?

- Inclusion of this Subrule and Table have created confusion
- Inconsistencies between this Subrule and Table, and Rule 8-104 with regards to the maximum calculated load for a cable.

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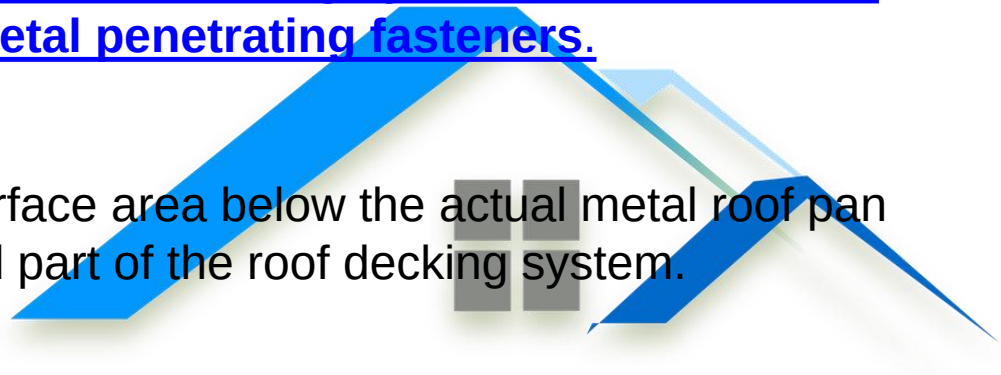
# SECTION 12 – NEW RULES

**SN 4007, 4486: New Rule 12-022: Cables or raceways installed in roof decking systems**

1) Cables or raceways installed in accordance with this Section shall not be installed in locations concealed within a **roof decking system, where the roof systems utilizes screws or other metal penetrating fasteners**.

## What does this mean?

For the application of this rule, the surface area below the actual metal roof pan and an attic space are not considered part of the roof decking system.



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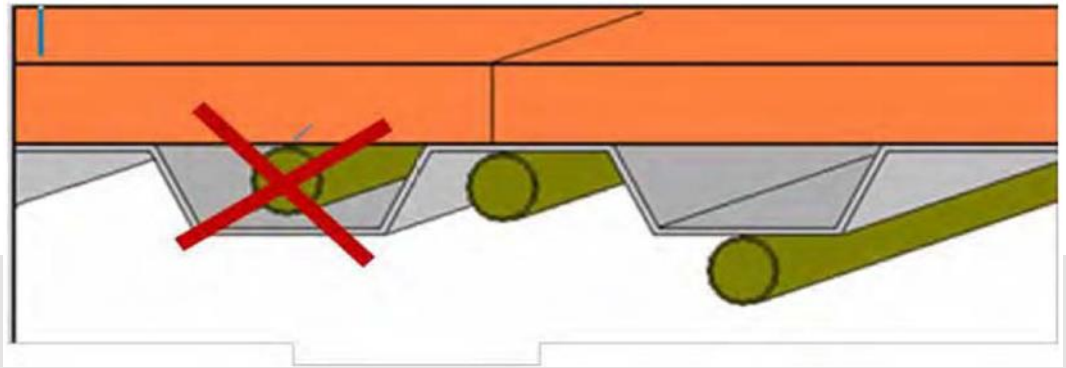
# SECTION 12 – NEW RULES

**SN 4007, 4486: New Rule 12-022: Cables or raceways installed in roof decking systems continued**

2) Notwithstanding Subrule 1) the following circuits shall be permitted for installations in locations concealed within a roof decking system:

a) Class 2 circuits in which the open-circuit voltage does not exceed 30 V; and
b) embedded trace heat.

Figure Source: 2021 CE Code



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# SECTION 12 – NEW RULES

## SN 4007, 4486: New Rule 12-022: Cables or raceways installed in roof decking systems continued

3) Where wiring is concealed within the roof deck system in accordance with Subrule 2 a warning label shall be installed

a) at all permanently installed roof access points where provided; and

b) in a conspicuous location in the roof area where the cabling is installed

**What does this mean?**

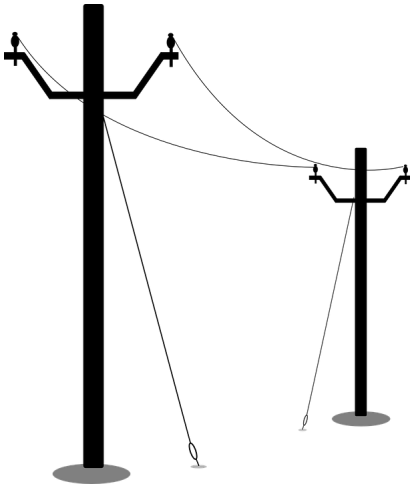
To warn that energized electrical circuits are within the roof deck system and to take precaution.

# SECTION 12 – REVISED RULES

**SN 4385, 4542: Revised Rule 12-308: ~~Minimum size~~ Maximum span of overhead conductors**

1) Spans of single conductors, or cables run aerially between buildings or supports on the same premises in spans exceeding shall not exceed 4.5 m

2) Notwithstanding Subrule 1) conductors and cables run aerially between buildings or supports shall be permitted to have spans exceeding 4.5 m where installed in accordance with Rule 12-318.

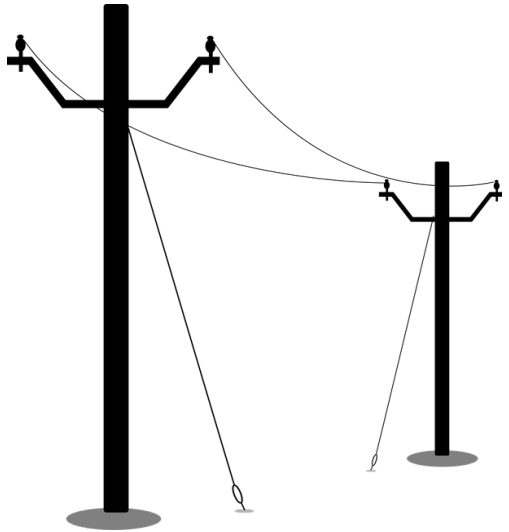


# SECTION 12 – REVISED RULES

**SN 4542: Revised Rule 12-318: Overhead Installations**
~~**Use of neutral supported cables**~~

**Added:**

Subrule 2) Insulated conductors and cables shall be permitted to exceed an overhead span of 4.5 m when lashed to a messenger cable in accordance with Rule 12-320



# SECTION 12 – NEW RULE

## SN 4542 New Rule 12-320: Messenger cables

1) Should be securely attached at each end of the run & bonded in accordance with Section 10.

2) Insulated conductors & cables shall be permanently lashed to the messenger cable.

3) Cable ties not permitted as the sole means to lash conductors & cables to messenger cable.

4) Messenger cables shall be

a) of galvanized steel with coating not less than 45 g/m2, copper-coated steel, or stainless steel; and
b) of stranded construction with not less than seven strands.

5) Effective ultimate strength of a messenger cable shall not be < three times the calculated maximum working load, including loading due to ice loads and wind loads, and the individual strands shall in no case be less than

a) 1.17 mm in diameter in the case of galvanized or copper-coated wire; or
b) 1.11 mm in diameter in the case of stainless steel wire.

# SECTION 12 – REVISED RULE

## SN 4343: Revised Rule 12-514: Protection of cables in non-concealed locations

1) Cables shall be protected from mechanical damage in the form of **running-boards, or guard-strips**

**What does this mean?**

- Running board is piece of wood installed so a cable can be secured to the side of the wood
- Guard strips are 2 pieces of wood installed one on each side of cable
- Both to prevent someone from standing on or kneeling on the cable as shown in Figure B12-X.

**Figure B12-X:**

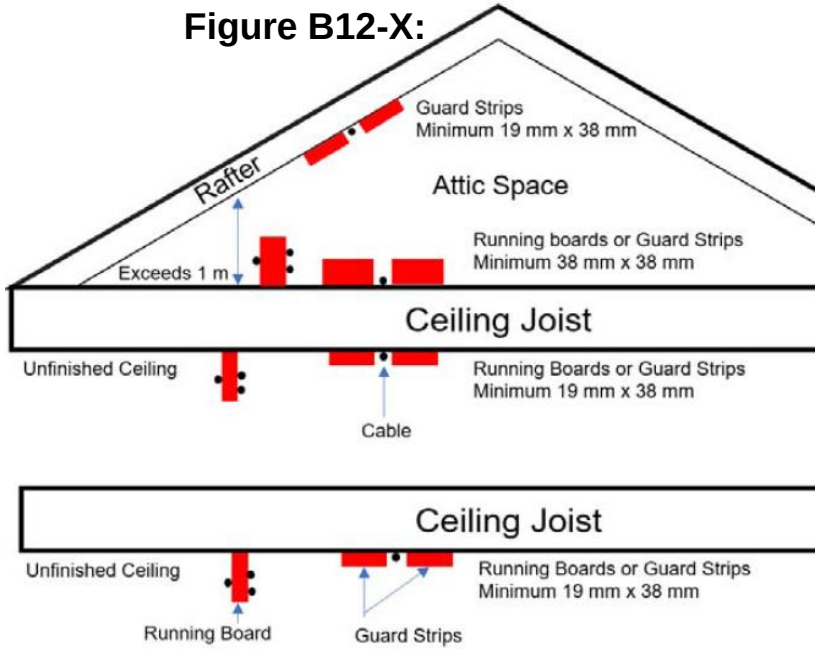



Figure Source: 2021 CE Code

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# SECTION 12 – REVISED RULE

**SN 4241 Revised Rule 12-516: Protection for cable in concealed installations**

New Subrule 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 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

# SECTION 12 – REVISED RULES

## SN 4351, 4521: Revised Rule 12-910: Conductors and cables in conduit and tubing

***A summary of revised Subrule 4:***

a) **useable** interior cross-sectional area for **allowable fill** for various sizes of conduit and tubing shall be as specified in Tables **9A to 9H**

c) diameters and cross-sectional areas of **insulated single conductors** cables shall be as indicated in **Tables 6A to 6D and 6J to 6K** or as obtained by measurement; and

d) notwithstanding Item c) dimensions of **insulated** single conductors and **cables** shall be permitted from Tables 10A to 10D, **Table D5, or from field measurement** for the constructions in **Tables 6A to 6D and 6J to 6K**.

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# SECTION 12 – REVISED RULES

## SN 4351, 4521: Revised Rule 12-910: Conductors and cables in conduit and tubing

**Revised Subrule 5:**

5) Notwithstanding Subrule 4), the maximum permitted number of conductors shall be determined by the summation of the cross-sectional areas of all conductors, the value of which shall not exceed the limits set out in Tables 9A to 9H for the specified Conduit and Tubing.

~~6) Tables 6A to 6K shall not be used to determine the maximum permitted number of insulated conductors of the same size in one HDPE conduit.~~

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# SECTION 12 – REVISED RULE

## SN 4332: Revised Rule 12-2002: Insulated conductors and cables in cable trays (Appendix B)

1) Cable tray shall be permitted as a means for supporting cables within their conditions of use.

2) Except as permitted in Subrules 3) to 5), cables for use in cable trays shall have a continuous metal sheath or interlocking armour.

3) Type TC and TC-ER tray cable shall be permitted in cable trays.…

4) Notwithstanding Subrule 3) a) & b) Type TC-ER tray cable shall be permitted to transition between cable trays, and between cable trays and utilization equipment or devices **provided the portion of the cable outside of the cable tray is**

a) Supported at intervals not exceeding 1.5 m and

b) Protected when subject to damage either i) mechanically; or ii) by location

# SECTION 12 – REVISED RULE

**SN 4332: Revised Rule 12-2002: Insulated conductors and cables in cable trays continued..**

5) **Single and/or insulated RW75 and RW90** conductors marked in accordance with **Rule 2-130, and not smaller than 1/0 AWG** shall be permitted in ventilated or non-ventilated cable trays where not subject to damage during or after installation

6) **Insulated** conductors and cables installed in cable tray shall be fastened by straps, cable ties, or other devices located at intervals of not more than 1.5 m throughout the run

# REVISED TABLES

## Section 4267: Revised Tables 1 to 4 to include metric size ($mm^2$)

**Table 1**: Allowable ampacities for single copper conductors bare, covered, or insulated rated not more than 5000 V and unshielded, in free air

**Table 2**: Allowable ampacities for not more than three insulated copper conductors, rated not more than 5000 V and unshielded, in raceway or cable

**Table 3**: Allowable ampacities for single aluminum conductors, bare, covered, or insulated, rated not more thar 5000 V and unshielded, in free air

**Table 4**: Allowable ampacities for not more than three insulated aluminum conductors, rated not more than 5000 V and unshielded, in raceway or cable

**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, 26-142, 42-008, and 42-016 and Tables 5A, 5B, and 19.)

| Size, AWG or kcmil | mm² | Allowable ampacity† | | | | | |
|---|---|---|---|---|---|---|---|
| | | 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 |

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# REVISED TABLES

## Section 4521: Revised Tables 6A to 6K to be easier to read

### Tables 6A to 6K: Dimensions of single conductors and cables for calculating conduit and tubing fill

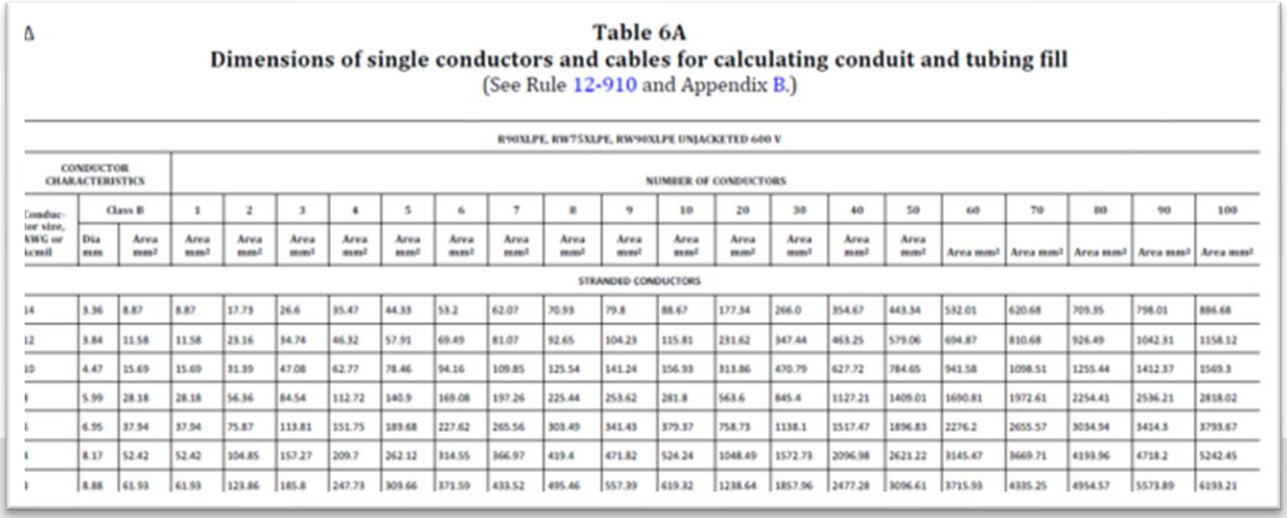

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**Table 6A**
**Dimensions of single conductors and cables for calculating conduit and tubing fill**
(See Rule 12-910 and Appendix B.)

R90XLPE, RW75XLPE, RW90XLPE UNJACKETED 600 V

| CONDUCTOR CHARACTERISTICS | | | NUMBER OF CONDUCTORS | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conductor size, AWG or kcmil | Class B | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| | Dia mm | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² | Area mm² |
| STRANDED CONDUCTORS | | | | | | | | | | | | | | | | | | | | | |
| 14 | 3.36 | 8.87 | 8.87 | 17.73 | 26.6 | 35.47 | 44.33 | 53.2 | 62.07 | 70.93 | 79.8 | 88.67 | 177.34 | 266.0 | 354.67 | 443.34 | 532.01 | 620.68 | 709.35 | 798.01 | 886.68 |
| 12 | 3.84 | 11.58 | 11.58 | 23.16 | 34.74 | 46.32 | 57.91 | 69.49 | 81.07 | 92.65 | 104.23 | 115.81 | 231.62 | 347.44 | 463.25 | 579.06 | 694.87 | 810.68 | 926.49 | 1042.31 | 1158.12 |
| 10 | 4.47 | 15.69 | 15.69 | 31.39 | 47.08 | 62.77 | 78.46 | 94.16 | 109.85 | 125.54 | 141.24 | 156.93 | 313.86 | 470.79 | 627.72 | 784.65 | 941.58 | 1098.51 | 1255.44 | 1412.37 | 1569.3 |
| 8 | 5.99 | 28.18 | 28.18 | 56.36 | 84.54 | 112.72 | 140.9 | 169.08 | 197.26 | 225.44 | 253.62 | 281.8 | 563.6 | 845.4 | 1127.21 | 1409.01 | 1690.81 | 1972.61 | 2254.41 | 2536.21 | 2818.02 |
| 6 | 6.95 | 37.94 | 37.94 | 75.87 | 113.81 | 151.75 | 189.68 | 227.62 | 265.56 | 303.49 | 341.43 | 379.37 | 758.73 | 1138.1 | 1517.47 | 1896.83 | 2276.2 | 2655.57 | 3034.94 | 3414.3 | 3793.67 |
| 4 | 8.17 | 52.42 | 52.42 | 104.85 | 157.27 | 209.7 | 262.12 | 314.55 | 366.97 | 419.4 | 471.82 | 524.24 | 1048.49 | 1572.73 | 2096.98 | 2621.22 | 3145.47 | 3669.71 | 4193.96 | 4718.2 | 5242.45 |
| 3 | 8.88 | 61.93 | 61.93 | 123.86 | 185.8 | 247.73 | 309.66 | 371.59 | 433.52 | 495.46 | 557.39 | 619.32 | 1238.64 | 1857.96 | 2477.28 | 3096.61 | 3715.93 | 4335.25 | 4954.57 | 5573.89 | 6193.21 |

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# REVISED TABLES

## Section 4521: Revised Tables 9A to 9H to be easier to read

### Tables 9A to 9H: Internal diameter and cross-sectional areas of various trade conduit and tubing

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**Table 9A**
**Internal diameter and cross-sectional areas of various trade conduit and tubing**
(See Rule 12-910 and Table 8.)

| Nominal trade size | Internal diameter and cross-sectional areas of rigid metal conduit | | Internal diameter and cross-sectional areas of flexible metal conduit | | Internal diameter and cross-sectional areas of rigid PVC conduit | | Internal diameter and cross-sectional areas of rigid Type EB1 PVC conduit and rigid Type DB2/ES2 PVC conduit | | Internal diameter and cross-sectional areas of metallic liquid-tight flexible conduit | | Internal diameter and cross-sectional areas of non-metallic liquid-tight flexible conduit | | Internal diameter and cross-sectional areas of electrical metallic tubing | | Internal diameter and cross-sectional areas of electrical non-metallic tubing | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 100% | | 100% | | 100% | | 100% | | 100% | | 100% | | 100% | | 100% |
| Dia | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² | ID mm | Area mm² |
| 12 | – | – | 9.52 | 71 | – | – | – | – | 12.29 | 119 | 12.07 | 114 | – | – | – | – |
| 16 | 16.05 | 202 | 15.88 | 198 | 14.57 | 167 | – | – | 15.8 | 196 | 15.49 | 188 | 15.4 | 186 | 14.58 | 167 |
| 21 | 21.23 | 354 | 20.62 | 334 | 19.77 | 307 | – | – | 20.83 | 341 | 20.45 | 328 | 20.5 | 330 | 19.66 | 304 |
| 27 | 27.0 | 573 | 25.4 | 507 | 25.4 | 507 | – | – | 26.44 | 549 | 25.91 | 527 | 26.2 | 539 | 25.37 | 506 |
| 35 | 35.41 | 985 | 31.75 | 792 | 31.75 | 792 | – | – | 35.05 | 965 | 34.54 | 937 | 34.6 | 940 | 33.73 | 894 |
| 41 | 41.25 | 1336 | 38.1 | 1140 | 38.1 | 1140 | – | – | 40.01 | 1257 | 40.01 | 1257 | 40.5 | 1288 | 39.57 | 1230 |
| 53 | 52.91 | 2199 | 50.8 | 2027 | 50.8 | 2027 | 50.8 | 2027 | 51.31 | 2068 | 51.69 | 2098 | 52.1 | 2132 | 51.18 | 2057 |

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# REVISED TABLES

## SN 4547, 4291, 4395: Revised Table 19 to be easier to read & remove notes

**Table 19: Conditions of use for insulated conductors and cables other than flexible cords, portable power cables and equipment wires**

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**Table 19**
**Conditions of use for insulated conductors and cables other than flexible cords, portable power cables, and equipment wires**
(See Rules 12-100, 12-302, 12-406, 12-602, 12-606, 12-902, 12-904, 12-1606, 12-2104, and 22-202, and Tables 1, 2, 3, 4, D1, and D3.)

| Group or Classification | | Thermoset insulated conductor | | | | Thermoset cable | | | Thermoplastic insulated conductor | | | | Thermoplastic cable | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSA Type designation | | R90 | RW75 | RW90 | RPV90 | RWU75 | RWU90 | RPVU90 | T90 Nylon | TW | TW75 | TWN75 | TWU | TWU75 |
| Maximum conductor temperature (unless otherwise marked) | | 90 °C | 75 °C | 90 °C | 90 °C | 75 °C | 90 °C | 90 °C | 90 °C | 60 °C | 75 °C | 75 °C | 60 °C | 75 °C |
| Location | Dry | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Damp | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Wet | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | – | ✓ | ✓ | ✓ | ✓ | ✓ |
| Can be used for | Consumer's services | – | ✓ | ✓ | – | ✓ | ✓ | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Feeders | ✓ | ✓ | ✓ | – | ✓ | ✓ | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Branch circuits | ✓ | ✓ | ✓ | – | ✓ | ✓ | – | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Control and instrumentation circuits | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Class 2 circuits (Section 16) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Fire alarm systems | ✓ [* 32-100 and 32-102] | | | | | | | | | | | | |

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# SUMMARY

- Section 0: Definition changes (SN4426: ampacity & SN4065: sheath etc..)
- Section 2: Revised Rule (SN4453: Rule 2-134)
- Section 4: Revised Subrules (SN4341: Subrule 4-004 (7)) and Deleted Subrule 4-004 (22)
- Section 12: New and Revised Rules (SN4007, SN4486: New Rule 12-022 etc..)
- Revised Tables: SN4267 Tables 1-4, SN4521 Tables 6A to 6K etc..

NEXT WEBINAR

# Utility Products

**Date & Time:**

**TBD End of February**

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# Q&A

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## When do these changes take effect?

Well that depends…
Each province has their own timetable for the changes to come into effect.
You need to check with your local provincial jurisdiction.

# Can you show me how Tables 6, 8 and 9 are used?

Lets work through an example.

Let’s start with

7 conductor 14 AWG Class B  T90 conductors
You want to size the non-metallic liquid-tight flexible conduit.

# Determine the conductor area

T90 for Table 6K

14 AWG and quantity 7

Uses 43.1 $mm^2$

Δ

**Table 6K**

**Dimensions of single conductors and cables for**

(See Rule 12-910 and Ap

**TWN75, T90 NYLON**

| CONDUCTOR CHARACTERISTICS | | | NUMBER OF | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Class B | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Conductor size, AWG or kcmil | Dia mm | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ | Area $mm^2$ |
| | | | STRANDED CONDUCTORS | | | | | | | | | |
| 14 | 2.8 | 6.16 | 6.16 | 12.32 | 18.47 | 24.63 | 30.79 | 36.95 | 43.1 | 49.26 | 55.42 | 61.58 |
| 12 | 3.28 | 8.45 | 8.45 | 16.9 | 25.35 | 33.8 | 42.25 | 50.7 | 59.15 | 67.6 | 76.05 | 84.5 |
| 10 | 4.17 | 13.66 | 13.66 | 27.31 | 40.97 | 54.63 | 68.29 | 81.94 | 95.6 | 109.26 | 122.91 | 136.57 |

# 7 conductors of 14 AWG T90

## What is the non-metallic liquid-tight flexible conduit size?

We have determined that we have 43.1 mm$^2$ of conductor.
From Rule 12-910 and Table 8. We must use Table 9G for 3 or more conductors.

Conduit size 12

**Table 9G**

**Internal diameter and maximum conductor cross-sectional areas allowable fill at 40% fo**
**trade conduit and tubing used for 3 or more conductors or multi-conductor cables (not lea**
(See Rule 12-910 and Table 8.)

| Nominal trade size | Internal diameter and cross-sectional areas of rigid metal conduit | | Internal diameter and cross-sectional areas of flexible metal conduit | | Internal diameter and cross-sectional areas of rigid PVC conduit | | Internal diameter and cross-sectional areas of rigid Type EB1 PVC conduit and rigid Type DB2/ ES2 PVC conduit | | Internal diameter and cross-sectional areas of metallic liquid-tight flexible conduit | | Internal diameter and cross-sectional areas of non-metallic liquid-tight flexible conduit | | Internal and cross-sectional electrical tub |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 40% | | 40% | | 40% | | 40% | | 40% | | 40% | |
| Dia | ID mm | Area mm$^2$ | ID mm | Area mm$^2$ | ID mm | Area mm$^2$ | ID mm | Area mm$^2$ | ID mm | Area mm$^2$ | ID mm | Area mm$^2$ | ID mm |
| 12 | — | — | 9.52 | 28.47 | — | — | — | — | 12.29 | 47.45 | 12.07 | 45.77 | — |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | [illegible] | [illegible] | [illegible] | [illegible] | 15.4 |
| 21 | 21.23 | 141.6 | 20.62 | 133.58 | 19.77 | 122.79 | — | — | 20.83 | 136.31 | 20.45 | 131.38 | 20.5 |

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