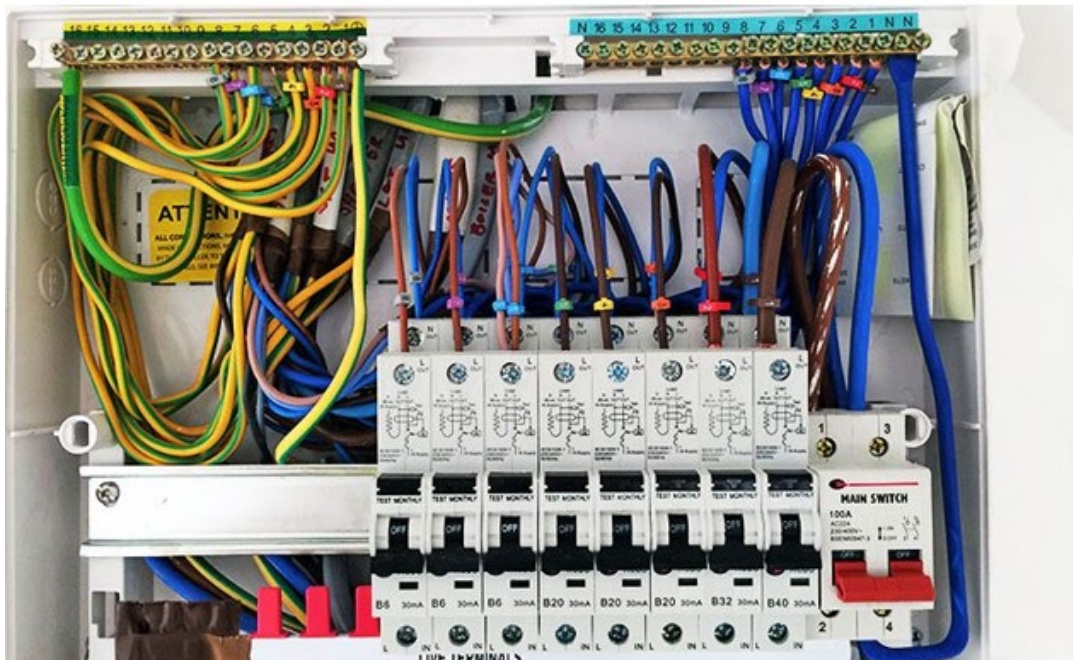




FDA Course #

NEC 2017 Code Changes in Wiring Methods & Materials



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Wiring Methods & Materials

Articles 300 – 370

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Articles in 310	Conductors for General Wiring
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Table 300.5, Footnotes a and b Minimum Cover Requirements

Minimum Cover Requirements, 0 to 1000 Volts, Nominal, Burial to Millimeters (Inches)										
Location of Wiring Method or Circuit	Type of Wiring Method or Circuit									
	Column (1) Direct-Buried Cables or Conductors		Column (2) Rigid Metal Conduit or Intermediate Metal Conduit		Column (3) Nonmetallic Raceways Listed for Direct Burial (No Concrete Encasement)		Column (4) Residential BC (120 Volts or Less, GFCI, Max. OCPD of 20 Amperes)		Column (5) Irrigation and Landscape Ltg. (30 Volts Max., Type UF or Other Identified Cable or Raceway)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
All locations not specified below	600	24	150	6	450	18	300	12	150 ^a	6 ^b
In trench below 50 mm (2 in.) thick concrete or equivalent	450	18	150	6	300	12	150	6	150	6
Under a building (see NEC text)	0	0	0	0	0	0	0	0	0	0
Under min. 102 mm (4 in.) thick concrete exterior slab with no vehicular traffic [slab extending not less than 152 mm (6 in.)]	450	18	100	4	100	4	150 (direct burial) 100 (in raceway)	6 4	150 (direct burial) 100 (in raceway)	5 4
Under streets, highways, roads, alleys, driveways, parking lots	600	24	600	24	600	24	500	24	600	24
One- and two-family dwelling driveways/parking areas, (dwelling-related purposes only)	450	18	450	18	450	18	300	12	450	18
In or under airport runways	450	18	450	18	450	18	450	18	450	18

Reproduction of NEC Table 300.5 (in part)(see next slide for Footnotes and Notes to table)

Table 300.5 Underground Installations

Type of Change: New

Summary of change: Two new footnotes were added to [Table 300.5](#) allowing lesser depths for listed low-voltage lighting system and pool, spa, and fountain lighting where they are part of a listed low-voltage lighting system.

Code Language: Table 300.5 Minimum Cover Requirements, 0 to 1000 Volts, Nominal, Burial in Millimeters (Inches) (See *NEC* text for complete table.)(See below for notes to table.)

^aA lesser depth shall be permitted where specified in the installation instructions of a listed low-voltage lighting system.

^bA depth of 150 mm (6 in.) shall be permitted for pool, spa, and fountain lighting, installed in a nonmetallic raceway, limited to not more than 30 volts where part of a listed low-voltage lighting system.

Notes:

1. Cover is defined as the shortest distance in millimeters mm (inches in.) measured between a point on the top surface of any direct-buried conductor, cable, conduit, or other raceway and the top surface of finished grade, concrete, or similar cover.
2. Raceways approved for burial only where concrete encased shall require concrete envelope not less than 50 mm (2 in.) thick.
3. Lesser depths shall be permitted where cables and conductors rise for terminations or splices or where access is otherwise required.
4. Where one of the wiring method types listed in Columns 1 through 3 is used for one of the circuit types in Columns 4 and 5, the shallowest depth of burial shall be permitted.

5. Where solid rock prevents compliance with the cover depths specified in this table, the wiring shall be installed in a metal raceway, or a nonmetallic raceway permitted for direct burial. The raceways shall be covered by a minimum of 50 mm (2 in.) of concrete extending down to rock.

What caused the 2017 NEC Change?

Two new footnotes were added below [Table 300.5](#). These notes address a reduction of burial depth of 150 mm (6 in.) for pool, spa, and fountain lighting that is limited to not more than 30 volts. The installation is required to be within a nonmetallic raceway and part of a listed low-voltage lighting system.

300.5(D)(4)

Protection from Physical Damage

Type of Change: New

Summary of change: Electrical metallic tubing (EMT) was added as an acceptable wiring method to afford protection from physical damage for conductors installed underground and subject to physical damage.

Code Language: 300.5 Underground Installations.

(D) Protection from Damage. Direct-buried conductors and cables shall be protected from damage in accordance with 300.5(D)(1) through [\(D\)\(4\)](#).

(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in electrical metallic tubing, rigid metal conduit, intermediate metal conduit, RTRC-XW, Schedule 80 PVC conduit, or equivalent.

What caused the 2017 NEC Change?

Electrical metallic tubing (EMT) was added to the list of acceptable wiring methods that can be used to provide protection from physical damage for conductors installed underground and subject to physical damage.

Table 310.15(B)(3)(c)

Raceways and Cables on Rooftops

Type of Change: Deletion and Revision

Summary of change: Raceways or cables installed on rooftops are now required to be installed 23 mm (⁷/₈ in.) above the rooftop to avoid a temperature adder of 33°C (60°F). Previous [Table 310.15\(B\)\(3\)\(c\)](#) was deleted.

Code Language: 310.15 Ampacities for Conductors Rated 0-2000 Volts.

(B) Tables. Ampacities for conductors rated 0 to 2000 volts shall be as specified in the Allowable Ampacity

Table 310.15(B)(16) through Table 310.15(B)(19), and Ampacity Table 310.15(B)(20) and Table 310.15(B)(21) as modified by 310.15(B)(1) through (B)(7). The temperature correction and adjustment factors shall be permitted to be applied to the ampacity for the temperature rating of the conductor, if the corrected and adjusted ampacity does not exceed the ampacity for the temperature.

(3) Adjustment Factors.

(c) Raceways and Cables Exposed to Sunlight on Rooftops.

Where raceways or cables are exposed to direct sunlight on or above rooftops, ~~the adjustments shown in Table 310.15(B)(3)(e)~~ raceways or cables shall be installed a minimum distance above the roof to the bottom of the raceway or cable of 23 mm ($\frac{7}{8}$ in.). Where the distance above the roof to the bottom of the raceway is less than 23 mm ($\frac{7}{8}$ in.), a temperature adder of 33°C (60°F) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Table 310.15(B)(2)(a) or Table 310.15(B)(2)(b).

Exception: *Type XHHW-2 insulated conductors shall not be subject to this ampacity adjustment.*

Informational Note: One source for the ambient temperatures in various locations is the ASHRAE Handbook — Fundamentals.

Informational Note to Table 310.15(B)(3)(c): ~~The temperature adders in Table 310.15(B)(3)(e) are based on the measured temperature rise above the local climatic ambient temperatures due to sunlight heating. Table 310.15(B)(3)(e) Ambient Temperature Adjustment for Raceways or Cables Exposed to Sunlight on or Above Rooftops~~ (see 2014 *NEC* for complete content of deleted table).

What caused the 2017 NEC Change?

Table 310.15(B)(3)(c) was deleted and replaced with text added at 310.15(B)(3)(c). This new text requires a temperature adder of 33°C (60°F) only when a raceway or cable is installed directly on or less than 23 mm ($\frac{7}{8}$ in.) above a rooftop.

Table 310.15(B)(7)

120/240 Volt or 208Y-120 Volt, Single-Phase Dwelling Services and Feeders

Type of Change: Revision

Summary of change: 120/208 volts were added to allowable voltages for dwelling unit service conductor ampacity rating requirements. A new informational note was added indicating service rating based on standard ampacity ratings of 240.6(A). Correction or adjustment factors required by 310.15(B)(2) or (3) are permitted to be applied to the ampacity associated with the temperature rating of the conductor.

Code Language: 310.15 Ampacities for Conductors Rated 0-2000 Volts.

(B) Tables. Ampacities for conductors rated 0 to 2000 volts shall be as specified in the Allowable Ampacity Table 310.15(B)(16) through Table 310.15(B)(19), and Ampacity Table 310.15(B)(20) and Table 310.15(B)(21) as modified by 310.15(B)(1) through (B)(7). The temperature correction and adjustment factors shall be permitted to be applied to the ampacity for the temperature rating of the conductor if the corrected and adjusted ampacity does not exceed the ampacity for the temperature.

(7) ~~120/240 Volt~~, Single-Phase Dwelling Services and Feeders.

For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, service and feeder conductors supplied by a single-phase, 120/240-volt system shall be permitted to be sized in accordance with 310.15(B)(7)(1) through (4). For one-family dwellings and the individual dwelling units of two-family and multifamily dwellings, single-phase feeder conductors consisting of 2 ungrounded conductors and the neutral conductor from a 208Y/120-volt system shall be permitted to be sized in accordance with 310.15(B)(7)(1) through (3).

(1) For a service rated 100 through 400 ~~A amperes~~, the service conductors supplying the entire load associated with a one-family dwelling, or the service conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than 83 percent of the service rating.

(2) For a feeder rated 100 through 400 ~~A amperes~~, the feeder conductors supplying the entire load associated with a one-family dwelling, or the feeder conductors supplying the entire load associated with an individual dwelling unit in a two-family or multifamily dwelling, shall be permitted to have an ampacity not less than 83 percent of the feeder rating.

(3) In no case shall a feeder for an individual dwelling unit be required to have an ampacity greater than that specified in 310.15(B)(7)(1) or (2).

(4) Grounded conductors shall be permitted to be sized smaller than the ungrounded conductors, ~~provided that~~ if the requirements of 220.61 and 230.42 for service conductors or the requirements of 215.2 and 220.61 for feeder conductors are met.

Where correction or adjustment factors are required by 310.15(B)(2) or (3), they shall be permitted to be applied to the ampacity associated with the temperature rating of the conductor.

Informational Note No. 1: ~~The conductor ampacity may require other correction or adjustment factors applicable to the conductor installation.~~ The service or feeder ratings addressed by this section are based on the standard ampacity ratings from 240.6(A).

Informational Note No. 2: See [Example D7 in Annex D](#).

What caused the 2017 NEC Change?

The provisions of 310.15(B)(7) for sizing dwelling unit service and certain feeder conductors was expanded to single-phase, 208Y/120-volt systems as well as single-phase, 120/240-volt systems. Explanatory language was added to address the permitted application of correction or adjustment factors required by 310.15(B)(2) or (3) applied to the ampacity associated with the temperature rating of the conductors. A new informational note directs the user of the *Code* to 240.6(A) for service ratings based on standard ampacity ratings for application of 310.15(B)(7). Previous [Table 310.15\(B\)\(7\)](#) was added back into the *Code* as part of [Example D7 in Informational Annex D](#).

312.5(C), Exception, Item (g) **Cable Raceway**

Type of Change: New

Summary of change: Note 2 to the tables in [Chapter 9](#) does not apply to the limited length of raceway required in 312.5(C), Exception, and the conductor fill limits of [Chapter 9](#), Table 1 do apply.

Code Language: 312.5 Cabinets, Cutout Boxes, and Meter Socket Enclosures.

Conductors entering enclosures within the scope of this article shall be protected from abrasion and shall comply with 312.5(A) through (C).

(C) Cables. Where cable is used, each cable shall be secured to the cabinet, cutout box, or meter socket enclosure.

Exception: *Cables with entirely nonmetallic sheaths shall be permitted to enter the top of a surface-mounted enclosure through one or more nonflexible raceways not less than 450 mm (18 in.) and not more than 3.0 m (10 ft) in length, provided all of the following conditions are met:*

- (a) Each cable is fastened within 300 mm (12 in.), measured along the sheath, of the outer end of the raceway.*
- (b) The raceway extends directly above the enclosure and does not penetrate a structural ceiling.*
- (c) A fitting is provided on each end of the raceway to protect the cable(s) from abrasion, and the fittings remain accessible after installation.*
- (d) The raceway is sealed or plugged at the outer end using approved means so as to prevent access to the enclosure through the raceway.*
- (e) The cable sheath is continuous through the raceway and extends into the enclosure beyond the fitting not less than 6 mm (1/4 in.).*
- (f) The raceway is fastened at its outer end and at other points in accordance with the applicable article.*
- (g) Where installed as conduit or tubing, the cable fill does not exceed the amount that would be permitted for complete conduit or tubing systems by Table 1 of [Chapter 9](#) of this Code and all applicable notes thereto. Note 2 to the tables in [Chapter 9](#) does not apply to this condition.*

Informational Note: See Table 1 in [Chapter 9](#), including Note 9, for allowable cable fill in circular raceways. See 310.15(B)(3)(a) for required ampacity reductions for multiple cables installed in a common raceway.

What caused the 2017 NEC Change?

A new sentence was added to 312.5(C), Exception, Item (g) to indicate that Note 2 to the tables in

Chapter 9 does not apply to this “sleeve” of conduit or tubing required if 312.5(C), Exception is employed.

Table 312.6(A)

Minimum Wire-Bending Space at Terminals and Minimum Width of Wiring Gutters

Type of Change: Revision

Summary of change: New minimum wire-bending spaces for AA-8000 series compact stranded aluminum conductors have been added to Table 310.6(A).

Code Language: 312.6 Deflection of Conductors.

Conductors at terminals or conductors entering or leaving cabinets or cutout boxes and the like shall comply with 312.6(A) through (C).

Exception: *Wire-bending space in enclosures for motor controllers with provisions for one or two wires per terminal shall comply with 430.10(B).*

(A) Width of Wiring Gutters. Conductors shall not be deflected within a cabinet or cutout box unless a gutter having a width in accordance with [Table 312.6\(A\)](#) is provided. Conductors in parallel in accordance with 310.10(H) shall be judged on the basis of the number of conductors in parallel.

Table 312.6(A) Minimum Wire-Bending Space at Terminals and Minimum Width of Wiring Gutters

(See *NEC* for complete table content).

Notes [to [Table 312.6\(A\)](#)]:

1. Bending space at terminals shall be measured in a straight line from the end of the lug or wire connector (in the direction that the wire leaves the terminal) to the wall, barrier, or obstruction.
2. This column shall be permitted to be used to determine the minimum wire-bending space for compact stranded aluminum conductors in sizes up to 1000 kcmil and manufactured using AA-8000 series electrical grade aluminum alloy conductor material in accordance with 310.106(B). The minimum width of the wire gutter space shall be determined using all other conductors' value in this table.

What caused the 2017 NEC Change?

The requirements for wire-bending space at terminals and the use of [Table 312.6\(A\)](#) or [Table 312.6\(B\)](#) remained the same. A new column was added to [Table 312.6\(A\)](#) addressing wire-bending space for compact stranded AA-8000 aluminum alloy conductors for consistency.

312.8(B) Switch and Overcurrent Device Enclosures

Type of Change: New

Summary of change: Power monitoring equipment is now required to be listed for the application when installed in free spaces of cabinets and cutout boxes.

Code Language: ~~312.8 Switch and Overcurrent Device Enclosures with Splices, Taps, and Feed-Through Conductors.~~

The wiring space within enclosures for switches and overcurrent devices shall be permitted for other wiring and equipment subject to limitations for specific equipment as provided in (A) and (B).

(A) Splices, Taps, and Feed-Through Conductors. The wiring space of enclosures for switches or overcurrent devices shall be permitted for conductors feeding through, spliced, or tapping off to other enclosures, switches, or overcurrent devices where all of the following conditions are met:

- (1) The total of all conductors installed at any cross section of the wiring space does not exceed 40 percent of the cross-sectional area of that space.
- (2) The total area of all conductors, splices, and taps installed at any cross section of the wiring space does not exceed 75 percent of the cross-sectional area of that space.
- (3) A warning label complying with 110.21(B) is applied to the enclosure that identifies the closest disconnecting means for any feed-through conductors.

(B) Power Monitoring Equipment. The wiring space of enclosures for switches or overcurrent devices shall be permitted to contain power monitoring equipment where all of the following conditions are met:

- (1) The power monitoring equipment is identified as a field-installable accessory as part of the listed equipment, or is a listed kit evaluated for field installation in switch or overcurrent device enclosures.
- (2) The total area of all conductors, splices, taps, and equipment at any cross section of the wiring space does not exceed 75 percent of the cross-sectional area of that space.

What caused the 2017 NEC Change?

A new 312.8(B) was added to allow power monitoring equipment within the wiring space of enclosures for switches or overcurrent devices with specific conditions.

314.16(A) and (B)

Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies

Type of Change: New

- **Summary of change:** New text was added to accommodate boxes with internal barriers for box volume and box fill calculations.
- **Code Language: 314.16 Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies.**

Boxes and conduit bodies shall be of an approved size to provide free space for all enclosed conductors. In no case shall the volume of the box, as calculated in 314.16(A), be less than the fill calculation as calculated in 314.16(B). The minimum volume for conduit bodies shall be as calculated in 314.16(C).

The provisions of this section shall not apply to terminal housings supplied with motors or generators.

Informational Note: For volume requirements of motor or generator terminal housings, see 430.12.

Boxes and conduit bodies enclosing conductors 4 AWG or larger shall also comply with the provisions of 314.28.

(A) Box Volume Calculations. The volume of a wiring enclosure (box) shall be the total volume of the assembled sections and, where used, the space provided by plaster rings, domed covers, extension rings, and so forth, that are marked with their volume or are made from boxes the dimensions of which are listed in Table 314.16(A). Where a box is provided with one or more securely installed barriers, the volume shall be apportioned to each of the resulting spaces. Each barrier, if not marked with its volume, shall be considered to take up 8.2 cm^3 ($1/2 \text{ in.}^3$) if metal and 16.4 cm^3 (1 in.^3) if nonmetallic.

(1) Standard Boxes. (No change to *Code* text; see *NEC* for complete text)

(2) Other Boxes. (No change to *Code* text; see *NEC* for complete text)

(B) Box Fill Calculations. The volumes in paragraphs 314.16(B)(1) through (B)(5), as applicable, shall be added together. No allowance shall be required for small fittings such as locknuts and bushings. Each space within a box installed with a barrier shall be calculated separately.

(B)(1) through (B)(5) (No change to *Code* text; see *NEC* for complete text)

What caused the 2017 NEC Change?

The volume or space that is occupied by an internal barrier in a box or enclosure was added to the items previously addressed for performing a box fill calculation.

314.17(B)

Type NM Cable Entering Metal Boxes

Type of Change: New

Summary of change: The outside sheath of Type NM or Type UF cable used with a metal box must now extend not less than 6 mm ($1/4$ in.) inside the box as currently required for nonmetallic boxes.

Code Language: 314.17 Conductors Entering Boxes, Conduit Bodies, or Fittings.

Conductors entering boxes, conduit bodies, or fittings shall be protected from abrasion and shall comply with 314.17(A) through (D).

(B) Metal Boxes and Conduit Bodies. Where metal boxes or conduit bodies are installed with messenger-supported wiring, open wiring on insulators, or concealed knob-and-tube wiring, conductors shall enter through insulating bushings or, in dry locations, through flexible tubing extending from the last insulating support to not less than 6 mm ($1/4$ in.) inside the box and beyond any cable clamps. Where nonmetallic-sheathed cable or multiconductor Type UF cable is used, the sheath shall extend not less than 6 mm ($1/4$ in.) inside the box and beyond any cable clamp. Except as provided in 300.15(C), the wiring shall be firmly secured to the box or conduit body. Where raceway or cable is installed with metal boxes or conduit bodies, the raceway or cable shall be secured to such boxes and conduit bodies.

What caused the 2017 NEC Change?

New text added at 314.17(B) will now require nonmetallic-sheathed (Type NM) cable or multiconductor Type UF cable used with metal boxes or conduit bodies to have its sheath extend not less than 6 mm ($1/4$ in.) inside the box and beyond any cable clamp.

314.27(E)

Separable Attachment Fittings

Type of Change: New

Summary of change: Outlet boxes are permitted to support listed locking support and mounting receptacles used in combination with compatible attachment fittings.

■ **Code Language: 314.27 Outlet Boxes**

(E) Separable Attachment Fittings. Outlet boxes required in 314.27 shall be permitted to support listed locking support and mounting receptacles used in combination with compatible attachment fittings. The combination shall be identified for the support of equipment within the weight and mounting orientation limits of the listing. Where the supporting receptacle is installed within a box, it shall be included in the fill calculation covered in 314.16(B)(4).

What caused the 2017 NEC Change?

In addition to the previous requirements at 314.27(A) through (D) for a box supporting a luminaire, lampholder, ceiling-suspended (paddle) fan, or other types of utilization equipment, 314.27(E) will now permit listed locking support and mounting receptacles and support means for supporting a luminaire, lampholder, or ceiling-suspended (paddle) fan.

320.6

Listing Requirements. (Armored Cable: Type AC)

- **Type of Change:** New
- **Summary of change:** Cable-type wiring methods and associated fittings are required to be listed.
- **Code Language: 320.6 Listing Requirements. (Armored Cable: Type AC).**
Type AC cable and associated fittings shall be listed.
- **What caused the 2017 NEC Change?**
New listing requirements were added in a number of the cable-type wiring method articles that will require the wiring method (cable) and associated fittings to be listed.

324.12(5)

Uses Not Permitted. (Flat Conductor Cable: Type FCC)

Type of Change: Revision

Summary of change: Type FCC cable will now be permitted in administrative office areas of hospitals and school buildings.

Code Language: 324.12 Uses Not Permitted. (Flat Conductor Cable: Type FCC)

FCC systems shall not be used in the following locations:

Outdoors or in wet locations

Where subject to corrosive vapors

In any hazardous (classified) location

In residential, school, and hospital buildings

In school, and hospital buildings, other than administrative office areas

What caused the 2017 NEC Change?

Type FCC cable systems are still prohibited in outdoor or in wet locations, where subject to corrosive vapors, in any hazardous (classified) location, or in residential buildings. Type FCC cable is still prohibited in school and hospital buildings, but not in the “administrative office areas” of a school or hospital building.

336.10(9) **Uses Permitted for Type TC Cable**

Type of Change: Revision and New

Summary of change: Type TC-ER cable with a designation of “JP” will now be allowed to be installed without a raceway at dwelling units.

Code Language: 336.10 Uses Permitted. (Power and Control Tray Cable: Type TC)

Type TC cable shall be permitted to be used as follows:

- (1) For power, lighting, control, and signal circuits.
- (2) In cable trays, including those with mechanically discontinuous segments up to 300 mm (1 ft).
- (3) In raceways.
- (4) In outdoor locations supported by a messenger wire.
- (5) For Class 1 circuits as permitted in Parts II and III of Article 725.
- (6) For non-power-limited fire alarm circuits if conductors comply with the requirements of 760.49.
- (7) Between a cable tray and the utilization equipment or device(s), provided all of the following apply:
 - (a) The cable is Type TC-ER.
 - (b) The cable is installed in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation.
 - (c) The cable is continuously supported and protected against physical damage using mechanical protection such as struts, angles, or channels.
 - (d) The cable that complies with the crush and impact requirements of Type MC cable and is identified with the marking “TC-ER.”
 - (e) The cable is secured at intervals not exceeding 1.8 m (6 ft).
 - (f) Equipment grounding for the utilization equipment ~~shall be~~ is provided by an equipment grounding conductor within the cable. In cables containing conductors sized 6 AWG or smaller, the equipment grounding conductor ~~shall~~ must be provided within the cable or, at the time of installation, one or more insulated conductors shall be permanently identified as an equipment grounding conductor in accordance with 250.119(B).

Exception to (7): Where not subject to physical damage, Type TC-ER shall be permitted to transition between cable trays and between cable trays and utilization equipment or devices for a distance not to exceed 1.8 m (6 ft) without continuous support. The cable shall be mechanically supported where exiting the cable tray to ensure that the minimum bending radius is not exceeded.

- (8) Where installed in wet locations, Type TC cable shall also be resistant to moisture and corrosive agents.
- (9) In one- and two-family dwelling units, Type TC-ER cable containing both power and control conductors that is identified for pulling through structural members shall be permitted. Type TC-ER cable used as interior wiring shall be installed per the requirements of Part II of Article 334.

Exception: Where used to connect a generator and associated equipment having terminals rated 75°C (167°F) or higher, the cable shall not be limited in ampacity by 334.80 or 340.80.

Informational Note No. 1: TC-ER cable that is suitable for pulling through structural members is marked “JP.”

Informational Note No. 2: See 725.136 for limitations on Class 2 or 3 circuits contained within the same cable with conductors of electric light, power, or Class 1 circuits.

(10) Direct buried, **unless** where identified for such use. (*was located in "Uses Not Permitted"*)

Informational Note: See 310.15(A)(3) for temperature limitation of conductors

What caused the 2017 NEC Change?

There are now 11 different list items under "Uses Permitted" for Type TC cable. New List Item (9) now permits Type TC-ER cable containing both power and control conductors that are identified for pulling through structural members to be installed in one-and two-family dwelling units.

344.14 **Dissimilar Metals: Type RMC**

Type of Change: Revision

Summary of change: Stainless steel RMC must be used only with stainless steel fittings, approved accessories, outlet boxes, and enclosures.

Code Language: 344.14 Dissimilar Metals. (Rigid Metal Conduit: Type RMC)

Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action. Aluminum fittings and enclosures shall be permitted to be used with galvanized steel RMC, and galvanized steel fittings and enclosures shall be permitted to be used with aluminum RMC where not subject to severe corrosive influences. **Stainless steel RMC shall only be used with stainless steel fittings and approved accessories, outlet boxes, and enclosures.**

What caused the 2017 NEC Change?

Revisions occurred at 344.14 to clarify the acceptable fittings that can be used with different types of RMC, based on galvanic compatibility. With this revision, stainless steel RMC can only be used with stainless steel fittings, approved accessories, stainless steel outlet boxes, and stainless steel enclosures.

350.28 **Trimming of LFMC**

Type of Change: New

Summary of change: Cut ends of LFMC shall be trimmed inside and outside to remove rough edges. This requirement will provide consistency between Article 350 and Article 356 (LFNC).

Code Language: 350.28 Trimming. (Liquidtight Flexible Metal Conduit: Type LFMC)

All cut ends of conduit shall be trimmed inside and outside to remove rough edges.

What caused the 2017 NEC Change?

Language was added at 350.28 requiring cut ends of LFMC to be trimmed inside and outside to remove rough edges.

358.10

Uses Permitted. (Electrical Metallic Tubing: Type EMT)

Type of Change: Revision

Summary of change: The “Uses Permitted” for EMT have been revised for consistency with other steel conduit articles (Type IMC and RMC).

Code Language: 358.10 Uses Permitted. (Electrical Metallic Tubing: Type EMT)

Exposed and Concealed. The use of EMT shall be permitted for both exposed and concealed work for the following: (1) In concrete, in direct contact with the earth or in areas subject to severe corrosive influences where installed in accordance with 358.10(B)

(2) In dry, damp, and wet locations

(3) In any hazardous (classified) location ~~except~~ as permitted by other articles in this *Code* (Was in “Uses Not Permitted”)

(A) Corrosion

Protection

Environments.

(1) Galvanized Steel and Stainless Steel EMT, Elbows, and Fittings. ~~Ferrous or nonferrous~~

Galvanized steel and stainless steel EMT, elbows, ~~couplings~~, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and approved as suitable for the condition.

(2) Supplementary Protection of Aluminum EMT. Aluminum EMT shall be provided with approved supplementary corrosion protection where encased in concrete or in direct contact with the earth.

(B) Cinder Fill. Galvanized steel and stainless steel EMT shall be permitted to be installed in cinder concrete or cinder fill where subject to permanent moisture ~~unless~~ when protected on all sides by a layer of non-cinder concrete at least 50 mm (2 in.) thick or when ~~unless~~ the tubing is installed at least 450 mm (18 in.) under the fill. (Was in “Uses Not Permitted”)

(C) Wet Locations. All supports, bolts, straps, screws, and so forth shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials.

Informational Note: See 300.6 for protection against corrosion.

What caused the 2017 NEC Change?

Section 358.10 for “Uses Permitted” for EMT was revised for consistency with other steel conduit articles. The requirements for installations in cinder concrete and hazardous (classified) locations for EMT were moved from 358.12 for “Uses Not Permitted” for EMT and reworded into positive text. Provisions for stainless steel EMT were also added to 358.10.

366.20

Parallel Conductors in Auxiliary Gutters

Type of Change: New

Summary of change: Language was added to address how to install conductors in parallel in an auxiliary gutter.

Code Language: 366.20 Conductors Connected in Parallel.

Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.10(H), the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

What caused the 2017 NEC Change?

The new requirements were added at 366.20 for the safe and proper installation of parallel conductors in an auxiliary gutter.

370.80

Ampacity of Conductors. (Cablebus)

Type of Change: Revision and New

Summary of change: Additional information was added to provide clarity for the allowable ampacities for cables installed in cablebus assemblies (Article 370) and align ampacities with cable tray installations (Article 392).

Code Language: 370.80 Ampacity of Conductors. (Cablebus)

Ampacity of Single Insulated Conductors. The ampacity of conductors in cablebus shall be in accordance with Table 310.15(B)(17) and Table 310.15(B)(19) for installations up to and including 2000 volts, or with Table 310.60(C)(69) and Table 310.60(C)(70) for installations 2001 to 35,000 volts.

- (A) Ampacity of Cables Rated 2000 Volts or Less.** In cablebus that terminates at equipment with conductor temperature limitations, the allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The adjustment factors of 310.15(B)(3) (a) shall not apply to the ampacity of cables in cablebus. The ampacity of single-conductor cables, nominally rated 2000 volts or less, shall comply with the following: (1) The ampacities for 600 kcmil and larger single conductor cables in ventilated cablebus shall not exceed 75 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19). (2) Where cablebus are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19). (3) The ampacities for 1/0 AWG through 500 kcmil single conductor cables in ventilated cablebus shall not exceed 65 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19). (4) Where cablebus are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.15(B)(17) and Table 310.15(B)(19).

(B) Ampacity of Type MV and Type MC Cables Rated 2001 Volts or Over. The ampacity of Type MV and Type MC cables, nominally rated 2001 volts or over, in cablebus shall comply with the following:

(1) The ampacities for 1/0 AWG and larger single-conductor cables in ventilated cablebus shall not exceed 75 percent of the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

(2) Where the cablebus are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.60(C)(69) and Table 310.60(C)(70).

Informational Note No. 1: See 110.14(C) for conductor temperature limitations due to termination provisions for installations up to and including 2000 volts.

Informational Note No. 2: See [110.40](#) for conductor temperature limitations due to termination provisions for installations 2001 to 35,000 volts.

What caused the 2017 NEC Change?

With the same requirements for ampacity tables to use with cablebus remaining, new requirements have been added for ampacities of typical cablebus that align with the same requirements for single conductors installed in a cable tray. New informational notes will direct users of Article 370 back to the conductor termination requirements of 110.14(C) and [110.40](#).