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Carlson
2002 National Electrical Code
Changes Pertaining to Carlson Products

The National Electrical Code (NEC) is revised every three years to reflect the latest installation practices in the electrical industry. Over 4500 proposals and 2500 comments were submitted to revise the 1999 NEC. In addition, the NEC Usability Task Group developed proposals to revise the numbering scheme of the articles and to standardize on the numbering of sections within several articles to make the NEC more user friendly.

Carlson is proud to participate in the development of the NEC. Carlson is represented on several Code Making Panels, the NEC Usability Task Group and other NEC Task Groups. We are current members of the Electrical Section of the National Fire Protection Association (NFPA). Carlson continues to participate in the education of the International Association of Electrical Inspectors (IAEI), International Brotherhood of Electrical Workers (IBEW), National Electrical Contractors Association (NECA) and the Independent Electrical Contractors (IEC).

The purpose of this document is to familiarize parties associated with Carlson and Carlson products with the major changes that occurred for the 2002 NEC pertaining to Carlson. It is to also educate those on the format changes effecting the NEC.

General

Then following are changes that are general in nature and occurred throughout the 2002 NEC:

Metrification: Each article of the NEC has been revised to add International Units (SI) of measure. The SI units will appear before the English units. The general rule is to use a "hard conversion" where the SI units are rounded off. (Example: 30" (762mm) would read 750mm (30")) Where the measurement has an impact of safety, a "soft conversion" is used. (Example: 30" (762mm) would read 762mm (30")).

Luminaire: The term luminaire (lighting unit) was added throughout the NEC to replace the terms "fixture(s)" and "lighting fixture(s)". Since the NEC is an International Code the term luminaire was more appropriate. The terms "fixture(s)" and "lighting fixture(s)" will follow the term luminaire in parentheses to help make the conversion easier for the user.

Parallel Numbering: Some articles in the NEC, including all the raceway and cable articles, have been rewritten to have parallel numbering. As an example, article Scopes have been designated ".1" and Uses Permitted ".10". This will help the user of the NEC to locate this type of common material without having to

search for it in different locations in each article. This change will make it easier to compare two products for each of their uses.

Article Renumbering: Articles of Chapter 3 of the 2002 NEC have been renumbered (Example: Article 331 for Electrical Nonmetallic Tubing (ENT) has been renumbered to Article 362). Cross-Reference Tables have been added to the 2002 NEC in Annex F. These cross reference tables will compare the renumbering from the 2002 NEC to the 1999 NEC, the 1999 NEC to the 2002 NEC, and Alphabetically by article title.

Product Related Changes

Article 300 Wiring Methods

300.5(D)(5) Listing. (RNC, HDPE, LFNC and Fittings). All conductors installed in underground raceways or enclosures are required to be listed for use in a wet location.

300.5(K) Directional Boring. (Bore-Gard). Raceways installed using directional boring equipment shall be approved for the purpose. Bore-Gard has been approved by Underwriters Laboratories Inc. for the use with directional boring equipment.

Article 314 (1999 NEC Article 370) Outlet, Device, Pull, and Junction Boxes

314.27(A) Exception. (Outlet Boxes). Wall-mounted luminaires (fixtures) weighing 3kg (6lb) or less are allowed to be supported by standard outlet boxes. This rule was allowed in the 1999 NEC but the luminaire was restricted to a dimension of 16" (406mm). The 2002 NEC has removed the dimensional restriction.

314.27(B) Maximum Luminaire (Fixture) Weight. (Ceiling Boxes). The maximum weight for a Carlon ceiling box is 23kg (50lb). This rule was moved from Section 410-16 of the 1999 NEC and placed in Article 314.

Article 334 (1999 NEC Article 336) Nonmetallic-Sheathed Cable: Types NM, NMC, and NMS

334.10(2)&(3) Uses Permitted. (Outlet Boxes). Nonmetallic-Sheathed Cable is permitted to be used above three stories in Types III, IV and V Multifamily construction and is also permitted in other buildings with the same types of construction as long as the cable assembly is concealed behind a wall with a 15 minute finish rating. This is a very controversial issue and is currently being appealed to the NFPA Board of Directors. As of right now the language has been adopted in the 2002 NEC. This expanded use will

increase the amount of outlet boxes used with NM Cable. Cities may restrict this expanded use of NM Cable by writing amendments to the NEC. Annex E was added to the 2002 NEC to help understand the different building types.

Article 344
(1999 NEC Article 346)
Rigid Metal Conduit: Type RMC

Table 344.24 Radius of Conduit Bends. (All raceways). This revised table clarifies the minimum bending radius for all raceways described in Chapter 3. Individual nonmetallic raceway articles will refer back to this table.

Article 352
(1999 NEC Article 347)
Rigid Nonmetallic Conduit: Type RNC

352.6 Listing Requirements. (Fittings and Elbows). This section now clarifies that all fittings and elbows are required to be listed when used with Rigid Nonmetallic Conduit.

Article 354
(1999 NEC Article 343)
Nonmetallic Underground Conduit with Conductors: Type NUCC

354.100(B) Nonmetallic Underground Conduit. (HDPE Raceway). This is a new product for Carlon but a old product for Pyramid. This HDPE Raceway is permitted to ship with pre-installed conductors. 354.100(B) now requires the raceway, as a component, to be a listed product.

Article 356
(1999 NEC Article 351 Part B)
Liquidtight Flexible Nonmetallic Conduit: Type LFNC

Article 356 Liquidtight Flexible Nonmetallic Conduit: Type LFNC. (LFNC-B). This article for Liquidtight Flexible Nonmetallic Conduit is now a stand alone article. In the 1999 NEC this product was Part B of the Liquidtight Flexible Metal Conduit article.

Article 362
(1999 NEC Article 331)
Electrical Nonmetallic Tubing: Type ENT

362.10(2) Uses Permitted. (ENT). The words “or noncombustible” were accidentally omitted after the word “combustible” in the last sentence. This will be added to the NEC Errata and corrected in the printing of the next edition of the 2002 NEC.

362.10(2) Exception. (ENT). The 1999 NEC permits Electrical Nonmetallic Tubing (ENT) to be used in buildings above three floors when concealed behind a 15 minute finish rated thermal barrier. 1999 NEC Section 331-3(2)

The 2002 NEC will have an exception to this rule. The 2002 NEC will permit the installation of ENT in buildings above three floors either EXPOSED or CONCEALED (without a 15 minute finish rated thermal barrier) when a fire sprinkler system is installed in accordance with NFPA 13, *Installation of Sprinkler Systems*.

Section 362.10(2) of the 2002 NEC will read as follows:

362.10

(2) In any building exceeding three floors above grade, ENT shall be concealed within walls, floors, and ceilings where the walls, floors, and ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies. The 15-minute finish rated thermal barrier shall be permitted to be used for combustible or noncombustible walls, floors, and ceilings.

Exception: When a fire sprinkler system(s) is installed in accordance with NFPA 13, Installation of Sprinkler Systems on all floors, ENT is permitted to be used within walls, floors and ceilings exposed or concealed in buildings exceeding three floors above grade.

FPN: A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 121°C (250°F) or an individual temperature of 163°C (325°F) as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling.

This exception will also be adopted for suspended ceilings, section 363.10(5) where currently a 15 minute finish thermal barrier for the ceiling assembly is required. 1999 NEC Section 331-3(5)

One is hard pressed to find a building built today without a fire sprinkler system installed. NFPA 13 is probably the most recognized system used by architects and approved by building officials today. This exception will expand the use of ENT in buildings above three floors by removing a restriction for the installation of the raceway.

Article 378
(1999 NEC Article 362 Part B)
Nonmetallic Wireways

Article 378 Nonmetallic Wireways. This article for Nonmetallic Wireway is now a stand alone article. In the 1999 NEC this product was Part B of the Metal Wireway article.

Article 388
(1999 NEC Article 352 Part B)
Surface Nonmetallic Raceways

Article 388 Surface Nonmetallic Raceways. This article for Surface Nonmetallic Raceways is now a stand alone article. In the 1999 NEC this product was Part B of the Surface Metal Raceway article.

Article 392
(1999 NEC Article 318)
Cable Trays

Table 392.3(A) Wiring Methods. (Optical Fiber/Communication Raceways). Optical Fiber and Communication Raceways have been added to this table as a permitted wiring method to be used in Cable Trays.

Article 406
(1999 NEC Article 410 Part L)
Receptacles, Cord Connectors, and Attachment Plugs (Caps)

406.8(B)(1) 15- and 20-Ampere Outdoor Receptacles. (In-Use Weatherproof Covers). Currently the 1999 NEC, Section 410-57(b), requires outdoor receptacles to be covered with a weatherproof cover listed for a Wet Location, with the plug inserted or removed, where products that will be used are unattended. Such products are landscape lighting, sprinkler systems and holiday lights (410-57(b)(1)). If the receptacle is intended for temporary use, when product that is attended or supervised, such as drills and landscaping tools are used, than the cover is only required to be listed for a Wet Location when the plug is removed (410-57(b)(2)).

The majority of new homes built today utilizes only the cover listed for a Wet Location when the plug is removed. Contractors will install this standard weatherproof cover indicating to the inspector that the receptacle is to be used strictly for attended, temporary use. It is the homeowner's responsibility to change the cover if they ever intend to use holiday lights.

NEC Code Making Panel 18 Accepted in Principle and Part a proposal to revise this section and to read as follows:

406.8 Receptacles in Damp or Wet Locations

(B) Wet Locations.

(1) 15- and 20-Ampere outdoor Receptacles. 15-and 20-ampere, 125- and 250-volts receptacles installed outdoors in a wet location shall have an enclosure that is weatherproofed whether or not the attachment plug cap is inserted.

Per Article 100, a Wet Location is defined as: Installations underground or in concrete slabs or masonry in direct contact with earth; in locations subject to saturation with water or other liquids, such as vehicle washing areas; and in unprotected locations exposed to weather.

If the receptacle is either a 15 or 20 amp, 125 or 250 volt receptacle, exposed to the weather, an in-use weatherproof cover, also know as a bubble cover or hood cover, must be used. A roofed open porch or under a canopy would be considered a Damp Location if it protects the outlet from the elements. A Damp Location is a location not normally subject to the effects of the weather.

GFCI receptacle manufacturers have required that their devices have adequate protection from exposure to moisture to prevent the corrosion of internal components. The result of prolonged exposure to moisture could compromise the ability of the GFCI to provide personnel protection. Since it was nearly impossible to predict that an outdoor receptacle was to be attended or unattended, Code Making Panel 18 decided it was safer to require an In-Use Weatherproof Cover to be installed for all outdoor applications regardless if it is a GFCI or a standard receptacle or whether or not it is attended.

This change to the 2002 NEC may go unnoticed at first, but as contractors and inspectors become educated about the new requirement, it will have a very large impact on both the residential and commercial construction and Carlon's In-Use Weatherproof Covers.

Article 430 Motors, Motor Circuits, and Controllers

Table 430.91 Motor Controller Enclosure Selection. (Enclosures). A new NEMA Type Enclosure Rating has been added to Table 430.91. They include Types 3X, 3RX and 3SX. These enclosures are approved for outdoor use and provide a degree of protection against corrosive environments. These new NEMA Type Enclosures Ratings should become popular in coastal areas.

Article 518 Places of Assembly

518.4(C) Spaces with Finish Rating. (ENT and RNC). The list of places of assemblies where ENT and RNC are permitted to be used has been expanded. Places of Assembly has been expanded to include: club rooms, college and university classrooms, courtrooms, drinking establishments, museums, passenger stations and terminals of air, surface, underground, and marine public transportation facilities, and libraries. Church chapels has been expanded to include: mortuary chapels and places of religious worship.

Article 527
(1999 NEC Article 305)
Temporary Installations

527 Temporary Installations. This article was relocated from Chapter 3 of the 1999 NEC to Chapter 5 of the 2002 NEC.

Article 640
Audio Signal Processing, Amplification, and Reproduction Equipment

640.3(A) Spread of Fire or Products of Combustion. (ENT, RNC, & LFNC). Abandoned audio distribution cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 645
Information Technology Equipment

645.5(D)(2) Under Raised Floors. (ENT, Nonmetallic Wireway, and Surface Nonmetallic Raceways). ENT, Nonmetallic Wireway, and Surface Nonmetallic Raceways are now acceptable wiring methods to be used in raised floors in computer rooms. This should be a good market expansion for ENT.

645.5(D)(6) Under Raised Floors. (ENT, RNC, LFNC, Nonmetallic Wireway, and Surface Nonmetallic Raceways). Abandoned cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 680
Swimming Pools, Fountains, and Similar Installations

680.23(F)(1)Exception Wiring Methods. (LFNC-B). Liquidtight Flexible Nonmetallic Conduit, Type-B, is permitted to be used in lengths longer than 1.8m (6ft) for connecting to transformers for pool lights. 1999 NEC Section was 680-25(b)(3) Exception.

Article 692
Fuel Cell Systems

692 Fuel Cell Systems. (All nonmetallic raceways and products). This is a new article in the 2002 NEC. Fuel Cell Systems is a growing technology for alternative stand-alone and interactive energy production sources.

Article 695
Fire Pumps

695.14(E) Electrical Fire Pump Control Wiring Methods. (LFNC-B). Liquidtight Flexible Nonmetallic Conduit, Type B, is acceptable as a wiring method for all electrical motor-driven fire pump control wiring.

Article 725

Class 1, Class 2, and Class 3 Remote-Control, Signaling, and Power-Limited Circuits

725.3(B) Spread of Fire or Products of Combustion. (ENT, RNC, & LFNC). Abandoned Class 2, Class 3 and PLTC cables are required to be removed. Cables installed in raceways are easily removed and replaced.

725.55(D) In Hoistways. (LFNC). Liquidtight Flexible Nonmetallic Conduit is permitted to be used in hoistways for Class 2 or Class 3 circuit conductors.

725.61(B) Riser. (ENT, RNC, & LFNC). Abandoned CL2R and CL3R cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 760 Fire Alarm Systems

760.30(A)(3) Hoistways. (LFNC). Liquidtight Flexible Nonmetallic Conduit is permitted to be used in hoistways for multiconductor non-power-limited fire alarm cables.

760.61(B)(1) Riser. (ENT, RNC, & LFNC). Abandoned FPLR cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 770 Optical Fiber Cables and Raceways

770.3(A) Spread of Fire or Products of Combustion. (Optical Fiber/Communications Raceways, ENT, RNC, & LFNC). Abandoned Optical Fiber Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

770.53(A) Plenum. (Optical Fiber/Communications Raceways). Abandoned Plenum Rated Optical Fiber Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

770.53(A) Plenum. (Optical Fiber/Communications Raceways). Permits the installation of Nonconductive and Conductive Plenum Rated Optical Fiber Cables into Optical Fiber/Communications Raceways.

770.53(B) Riser. (Optical Fiber/Communications Raceways, ENT, RNC, & LFNC). Abandon Riser Rated Optical Fiber Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

770.53(B) Riser. (Optical Fiber/Communications Raceways, ENT, RNC, & LFNC). Permits the insulation of Nonconductive and Conductive Riser Rated Optical Fiber Cables into Optical Fiber/Communications Raceways.

Article 800
Communications Systems

800.52(B) Spread of Fire or Products of Combustion. (Optical Fiber/Communications Raceways, ENT, RNC, & LFNC). Abandoned Communication Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

800.53(A) Plenum. (Optical Fiber/Communications Raceways). Abandoned Plenum Rated Communication Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

800.53(B)(1) Riser. (Optical Fiber/Communications Raceways, ENT, RNC, & LFNC). Abandoned Riser Rated Communication Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 820
Community Antenna Television and Radio Distribution Systems

820.3(A) Spread of Fire or Products of Combustion. (ENT, RNC, & LFNC). Abandoned Coaxial Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

820.53(B)(1) Riser. (ENT, RNC, & LFNC). Abandoned Riser Rated Coaxial Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

820.53(D) Other Wiring Within a Building. (ENT, RNC, & LFNC). Abandoned General Rated Coaxial Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

Article 830
Network-Powered Broadband Communications Systems

830.3(A) Spread of Fire or Products of Combustion. (ENT, RNC, & LFNC). Abandoned Network-Powered Broadband Communications Cables are required to be removed. Cables installed in raceways are easily removed and replaced.

830.55(B)(1) Riser. (ENT, RNC, & LFNC). Abandoned Riser Rated Network-Powered Broadband Communications Cables are required to be removed. Cables installed in raceways are easily removed and replaced.