Public Input No. 3234-NFPA 70-2023 [Global Input]

New Article X00 General Requirements

Additional Proposed Changes

File Name	Description	Approved
Article_X00_General_Requirements_Public_Input.docx		
Limited_Energy_TG_Substantiation.docx		

Statement of Problem and Substantiation for Public Input

See attached document.

Submitter Information Verification

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Submittal Date: Wed Aug 30 15:04:13 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Article X00
General Requirements for Limited Energy Systems.

X00.1 Scope

This article covers general requirements for limited energy systems. The defined energy limits for Limited Energy circuits shall be:

Information Note No. 1: The term “limited energy systems” includes systems and circuits that met the requirements for Class 4 Fault-Managed Power Systems, Class 2, 3 Power Limited Circuits, Power Limited Fire Alarm Circuits and Optical Fiber Cables formerly covered by Articles 725, 760 and 770 and Communications, Radio and Television Equipment, Community Antenna Television and Radio Distribution Systems, Network-Powered Broadband Communications Systems and Premises-Powered Broadband Communications Systems formally covered by Articles 800, 805, 810, 820, 830 and 840.

Informational Note No. 2: Class 4 (FMPS) and digital power or pulsed power circuits, being non-continuous, would fall outside the defined energy level, but can be included in the “limited energy” status through their property of being continuously monitored for faults to ensure the energy delivered into any fault is limited.

Informational Note No. 3: The defined energy limits for limited energy circuits can include VA less than 100 for continuous operation for systems up to 100 volts; VA less than 150 for short duration for systems up to 100 volts and VA less than 350 for low voltage for systems less than 30 volts.

X00.2 Reconditioned Equipment.

Reconditioned equipment shall be marked with the following:

(1) Name, trademark, or other descriptive marking of the organization that performed the reconditioning

(2) The date of the reconditioning

(3) The term *reconditioned* or other approved wording or symbol indicating that the equipment has been reconditioned

The original listing mark shall be removed or made permanently illegible. The equipment nameplate shall not be required to be removed or made permanently illegible, only the part of the nameplate that includes the listing mark, if applicable. Approval of the reconditioned equipment shall not be based solely on the equipment’s original listing.

Exception: In industrial occupancies, where conditions of maintenance and supervision ensure that only qualified persons service the equipment, the markings indicated in 110.21(A)(2) shall not be required for equipment that is reconditioned by the owner or operator as part of a regular equipment maintenance program.

Informational Note No. 1: ANSI-approved standards are available for application of reconditioned and refurbished equipment.

Informational Note No. 2: The term *reconditioned* may be interchangeable with the terms *rebuilt*, *refurbished*, or *remanufactured* even though these are sometimes different processes.

X00.4 Hazardous Locations.

Circuits and equipment installed in a location that is classified as hazardous in accordance with 500.5 and 505.5 shall comply with the applicable requirements of Chapter 5.

X00.5 Spread of Fire or Products of Combustion.

Installations of limited energy circuits in hollow spaces, vertical shafts, and ventilation or air-handling ducts shall be made so that the possible spread of fire or products of combustion will not be substantially increased. Openings around electrical penetrations into or through fire-resistant-rated walls, partitions, floors, or ceilings shall be firestopped using approved methods to maintain the fire resistance rating.

Informational Note: Directories of electrical construction materials published by qualified testing laboratories contain many listing installation restrictions necessary to maintain the fire-resistive rating of assemblies where penetrations or openings are made. Building codes also contain restrictions on membrane penetrations on opposite sides of a fire-resistance-rated wall assembly. An example is the 600-mm (24-in.) minimum horizontal separation that usually applies between boxes installed on opposite sides of the wall. Assistance in complying with the requirements of X00.5 can be found in building codes, fire resistance directories, and product listings.

X00.6 Ducts, Plenums, and Other Air-Handling Spaces.

The requirements of this section shall apply to the installation and uses of wiring and equipment in ducts used for dust, loose stock, or vapor removal; ducts specifically fabricated for environmental air; and other spaces used for environmental air (plenums).

(A) Ducts for Dust, Loose Stock, or Vapor Removal.

No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors. No wiring system of any type shall be installed in any duct, or shaft

containing only such ducts, used for vapor removal or for ventilation of commercial-type cooking equipment.

(B) Ducts Specifically Fabricated for Environmental Air.

Equipment, devices, and the wiring methods specified in this section shall be permitted within such ducts only if necessary for the direct action upon, or sensing of, the contained air. Where equipment or devices are installed and illumination is necessary to facilitate maintenance and repair, enclosed gasketed-type luminaires shall be permitted.

Only wiring methods consisting of Type MI cable without an overall nonmetallic covering, Type MC cable employing a smooth or corrugated impervious metal sheath without an overall nonmetallic covering, electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, or rigid metal conduit without an overall nonmetallic covering shall be installed in ducts specifically fabricated to transport environmental air. Flexible metal conduit shall be permitted, in lengths not to exceed 1.2 m (4 ft), to connect physically adjustable equipment and devices permitted to be in these fabricated ducts. The connectors used with flexible metal conduit shall effectively close any openings in the connection.

Exception: Wiring methods and cabling systems, listed for use in other spaces used for environmental air (plenums), shall be permitted to be installed in ducts specifically fabricated for environmental air-handling purposes under both of the following conditions:

(1) The wiring methods or cabling systems shall be permitted only if necessary to connect to equipment or devices associated with the direct action upon or sensing of the contained air.

(2) The total length of such wiring methods or cabling systems shall not exceed 1.2 m (4 ft).

(C) Other Spaces Used for Environmental Air (Plenums).

This section shall apply to spaces not specifically fabricated for environmental air-handling purposes but used for air-handling purposes as a plenum. This section shall not apply to habitable rooms or areas of buildings, the prime purpose of which is not air handling.

Informational Note No. 1: The space over a hung ceiling used for environmental air-handling purposes is an example of the type of other space to which this section applies.

Informational Note No. 2: See NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, and other mechanical codes for information on how the term *other spaces used for environmental air (plenum)*, as used in this section, correlates with the use of the term *plenum* where the plenum is used for return air purposes, as well as some other air-handling spaces.

Exception: This section shall not apply to the joist or stud spaces of dwelling units where the wiring passes through such spaces perpendicular to the long dimension of such spaces.

X00.21 Access to Electrical Equipment Behind Panels Designed to Allow Access.

Access to electrical equipment shall not be denied by an accumulation of cables that prevents removal of panels, including suspended ceiling panels.

X00.24 Mechanical Execution of Work.

Circuits and equipment shall be installed in a professional and skillful manner. The installation shall conform to 300.4 and 300.11.

X00.25 Abandoned Cables.

The accessible portion of abandoned cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.

X00.100 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 2, Class 3 or Class 4 Circuits.

Conductors of two or more limited energy circuits of the same class shall be permitted within the same limited energy cable.

(B) Class 2, Class 3 and Class 4 Circuits with the Same Limited Energy Cable.

(1) Class 3 Cables. Class 2 circuits shall be permitted to use listed Class 3 cables.

(2) Dual-Listed Class 3/Class 4 Cables. Class 2 and Class 3 circuits shall be permitted to use dual-listed Class 3/Class 4 cables.

(C) Class 2 and Class 3 Circuits with Communications Circuits.

(C)(1) Communications Cables.

Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits if the cable is a listed communications cable installed in accordance with Part IV of Article 800. The cables shall be listed as communications cables.

(C)(2) Composite Cables.

Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified and listed as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

(D) Class 2, Class 3 or Class 4 Cables with Other Limited Energy Cables.

(1) Plenum, Riser and General Purpose Limited Energy Cables shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly.

(2) Plenum, Riser, General Purpose and Limited Use Limited Energy Cables shall be permitted in the same enclosure or raceway.

(E) Class 2, Class 3 or Class 4 Circuits and Audio System Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2, Class 3 or Class 4 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited cables.

(F) Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm, and Medium-Power Network-Powered Broadband Communications Circuits in Raceways, Compartments, and Boxes.

Metallic conductor limited energy cables shall not be placed in any raceway, compartment, enclosure, manhole, outlet box, device box, or similar fitting with conductors of electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits.

Exception No. 1: Metallic conductor limited energy cables shall be permitted to be placed in any raceway, compartment, outlet box, junction box, or other enclosures with conductors of electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits if the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits are separated from the limited energy and cables by a permanent barrier or listed divider.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

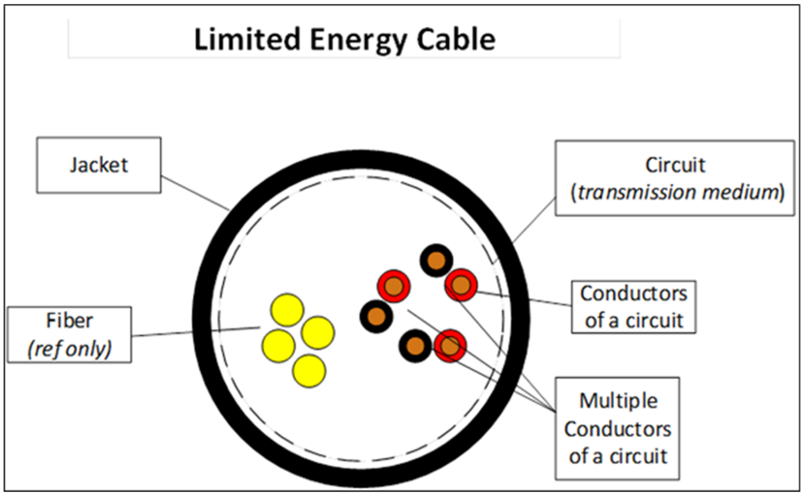
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

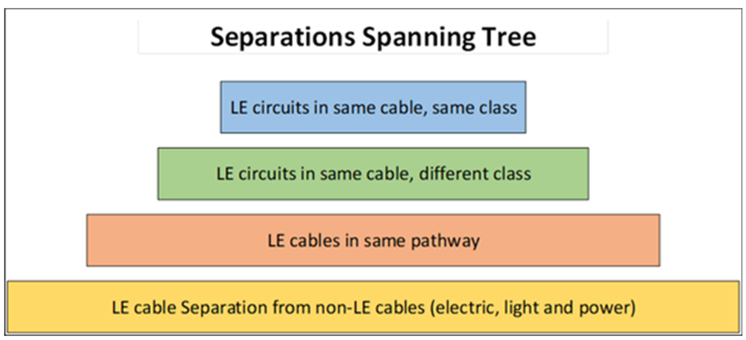
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 3332-NFPA 70-2023 [Global Input]

New Article X90 Overcurrent Protection

Additional Proposed Changes

File Name	Description	Approved
Article_X90_Overcurrent_Protection_Public_Input.docx		
Limited_Energy_TG_Substantiation.docx		

Statement of Problem and Substantiation for Public Input

See attached document.

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Submittal Date: Fri Sep 01 10:05:30 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8607-NFPA 70-2024

Statement: A new article was created to relocate all power source requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

The Panel chose to title the new article as “Power Sources for Limited-Energy Systems,” instead of “Overcurrent Protection” because the power source provides the circuit protection.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Article X90 Overcurrent Protection

X90.1 Scope

This Article covers overcurrent protection requirements for Class 1, Class 2, Class 3 and Class 4 Circuits.

X90.10 Class 1 Circuit Overcurrent Protection.

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG.

Exception: Where other articles of this Code permit or require other overcurrent protection.

X90.20 Class 1 Circuit Overcurrent Device Location.

Overcurrent devices shall be located as specified in X90.20(A) through (E).

(A) Point of Supply.

Overcurrent devices shall be located at the point where the conductor to be protected receives its supply.

(B) Feeder Taps.

Class 1 circuit conductors shall be permitted to be tapped, without overcurrent protection at the tap, where the overcurrent device protecting the circuit conductor is sized to protect the tap conductor.

(C) Branch-Circuit Taps.

Class 1 circuit conductors 14 AWG and larger that are tapped from the load side of the overcurrent protective device(s) of a controlled light and power circuit shall require only short-circuit and ground-fault protection and shall be permitted to be protected by the branch-circuit overcurrent protective device(s) where the rating of the protective device(s) is not more than 300 percent of the ampacity of the Class 1 circuit conductor.

(D) Primary Side of Transformer.

Class 1 circuit conductors supplied by the secondary of a single-phase transformer having only a 2-wire (single-voltage) secondary shall be permitted to be protected by overcurrent protection provided on the primary side of the transformer if the protection is in accordance with 450.3 and does not exceed the value determined by multiplying the secondary conductor ampacity by the secondary-to-primary transformer voltage ratio. Transformer secondary conductors other than 2-wire shall not be considered to be protected by the primary overcurrent protection.

(E) Input Side of Electronic Power Source.

Class 1 circuit conductors supplied by the output of a single-phase, listed electronic power source other than a transformer having only a 2-wire (single-voltage) output for connection to Class 1 circuits shall be permitted to be protected by overcurrent protection provided on the input side of the electronic power source if the protection does not exceed the value determined by multiplying the Class 1 circuit conductor ampacity by the output-to-input voltage ratio. Electronic power source outputs other than 2-wire (single voltage) shall not be considered to be protected by the primary overcurrent protection.

X90.30 Power Sources for Class 2 and Class 3 Circuits.

(A) Power Source.

The power source for a Class 2 or a Class 3 circuit shall be as follows:

> *Informational Note No. 1: Informational Note Figure X90.30 illustrates the relationships between Class 2 or Class 3 power sources, their supply, and the Class 2 or Class 3 circuits.*
>
> *Informational Note No. 2: See Chapter 9, Table 11(A) and Table 11(B), for requirements for listed Class 2 and Class 3 power sources.*

(1) A listed Class 2 or Class 3 transformer
(2) A listed Class 2 or Class 3 power supply
(3) Other listed equipment marked to identify the Class 2 or Class 3 power source

Exception No. 1 to (3): Thermocouples shall not require listing as a Class 2 power source.
Exception No. 2 to (3): Limited power circuits of listed equipment where these circuits have energy levels rated at or below the limits established in Chapter 9, Table 11(A) and Table 11(B).

> *Informational Note No. 3: Examples of other listed equipment are as follows:*
> *(1) A circuit card listed for use as a Class 2 or Class 3 power source where used as part of a listed assembly*
> *(2) A current-limiting impedance, listed for the purpose, or part of a listed product, used in conjunction with a non-power-limited transformer or a stored energy source, for example, storage battery, to limit the output current*
> *(3) A thermocouple*
> *(4) Limited voltage/current or limited impedance secondary communications circuits of listed industrial control equipment*

(4) Listed audio/video, information technology (computer), communications, and industrial equipment limited-power circuits

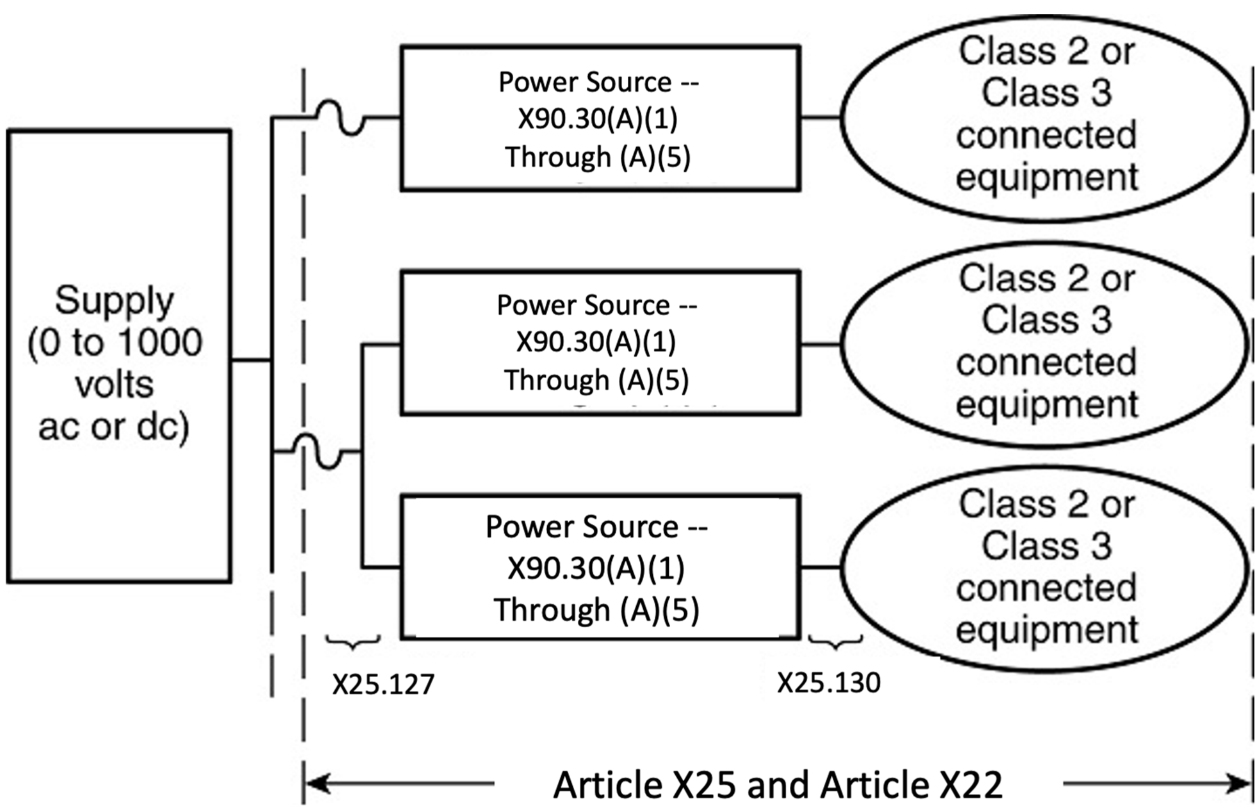
> *Informational Note No. 4: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, Standard*

for Safety of Information Technology Equipment. Another way to determine applicable requirements for listing of audio/video, information technology, and communications equipment is to refer to UL 62368-1-2014, Safety of audio/video, information and communication technology equipment. Typically such circuits are used to interconnect data circuits for the purpose of exchanging information data. One way to determine applicable requirements for listing of industrial equipment is to refer to UL 61010-2-201, Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-201: Particular requirements for control equipment, and/or UL 61800-5-1, Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy.

(5) A battery source or battery source system that is listed and identified as Class 2

(B) Interconnection of Power Sources.

Class 2 or Class 3 power sources shall not have the output connections paralleled or otherwise interconnected unless listed for such interconnection.



Informational Note Figure X90.30 Class 2 and Class 3 Circuits.

(C) Marking.

The equipment supplying the circuits shall be durably marked where plainly visible to indicate each circuit that is a Class 2 or Class 3 circuit. The power sources for limited power circuits in X90.30(A)(3), limited power circuits for listed audio/video equipment, listed information technology equipment, listed communications equipment, and listed industrial equipment in X90.30(A)(4) shall have a label indicating the maximum voltage and rated current output per conductor for each connection point on the power source. Where multiple connection points have the same rating, a single label shall be permitted to be used.

> Informational Note No. 1: Rated current for power sources covered in X25.144 is the output current per conductor the power source is designed to deliver to an operational load at normal operating conditions, as declared by the manufacturer.
>
> Informational Note No. 2: An example of a label is “52V @ 0.433A, 57V MAX” for an IEEE 802.3 compliant Class 8 power source.

X90.40 Wiring Methods on Supply Side of the Class 2 or Class 3 Power Source.

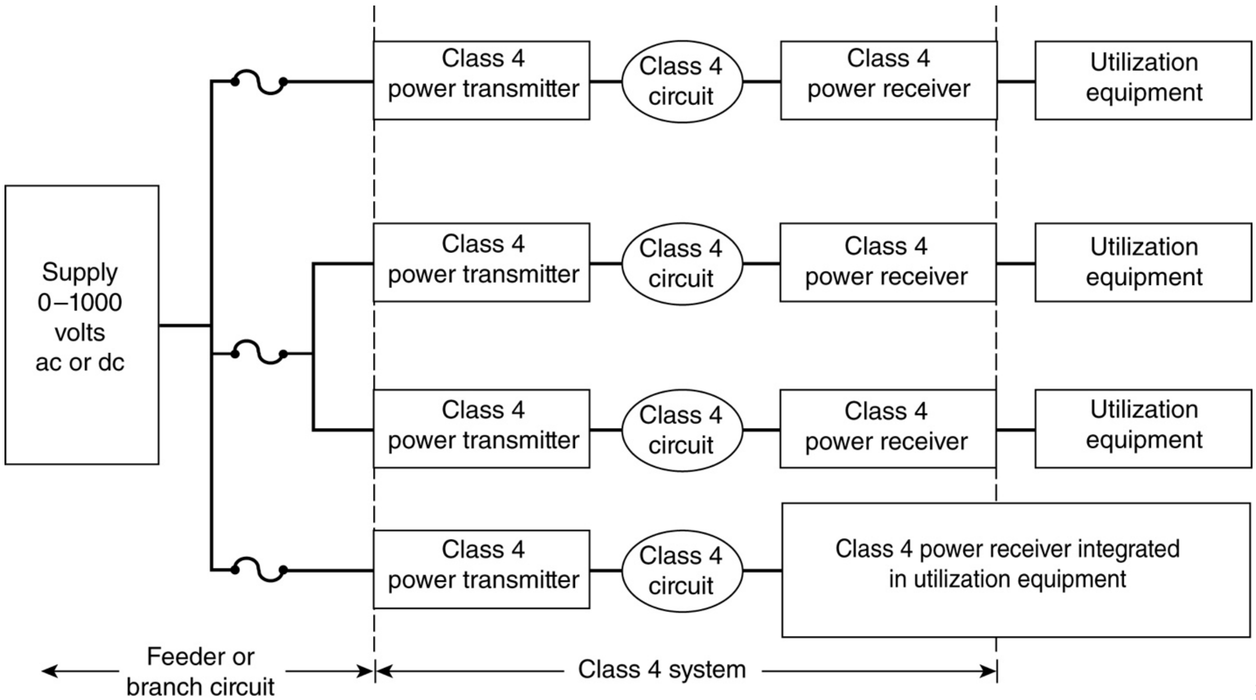
Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Chapters 1 through 4.

Exception: The input leads of a transformer or other power source supplying Class 2 and Class 3 circuits shall be permitted to be smaller than 14 AWG but not smaller than 18 AWG if they are protected by an overcurrent device rated not over 20 amperes, are not over 305 mm (12 in.) long, and have insulation that complies with X24.49(B).

X90.50 Power Sources for Class 4 Circuits.

The power source shall be a listed Class 4 power transmitter or a listed Class 4 power transmitter as part of a transmitter/receiver system and shall provide the protections in accordance with X90.50(A). Class 4 circuits shall be supplied from a power source (transmitter) that has a voltage output of not more than 450 volts peak or dc.

> Informational Note No. 1: Informational Note Figure X90.50 illustrates the relationships between Class 4 power transmitters (power sources), Class 4 circuits, Class 4 power receivers, and utilization equipment.
>
> Informational Note No. 2: See UL 1400-1, Outline for Fault-Managed Power Systems—Part 1: General Requirements, for information on determining applicable requirements for the listing of Class 4 power systems.



Informational Note Figure X90.50 Class 4 Circuits.

(A) Fault Management.

For listing purposes, a transmitter shall interrupt an energized circuit when any of the following conditions occur on the circuit between the transmitter and receiver:

(1) A short circuit

(2) A line-to-line fault condition that presents an unacceptable risk of fire or electric shock

(3) A ground-fault condition that presents an unacceptable risk of fire or electric shock

(4) An overcurrent condition

(5) A malfunction of the monitoring or control system that presents an unacceptable risk of fire or electric shock

(6) Any other condition that presents an unacceptable risk of fire or electric shock

Informational Note: See UL 1400-1, Outline for Fault-Managed Power Systems — Part 1: General Requirements, for information on determining applicable requirements for the listing of Class 4 power systems, including safe operation and limiting the risk of fire and electric shock.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

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The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

The following information and diagrams are provided to outline the thought process.

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This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

The structure follows this logic:

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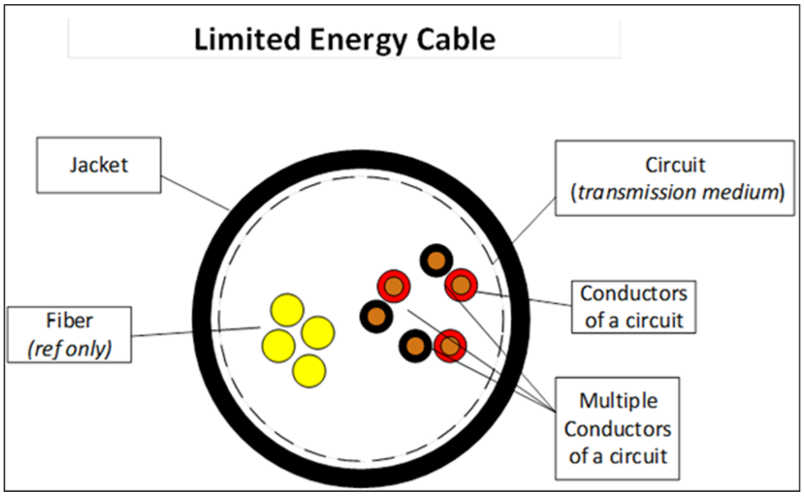

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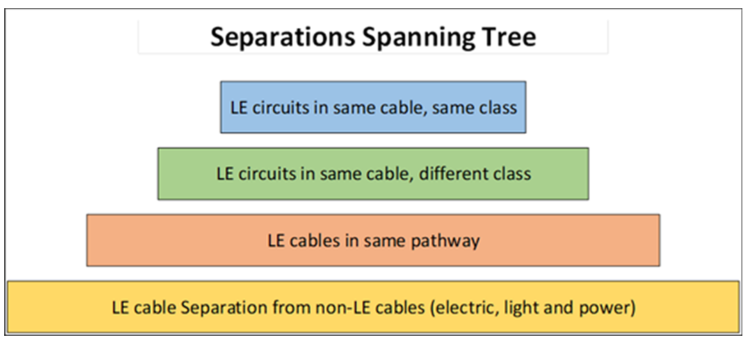

Public Input No. 3339-NFPA 70-2023 [Global Input]

New Article X22 Limited Energy Cables for Power-Limited Circuits, Fault-Managed Power Circuits, Optical Fiber Circuits, and Communications Circuits.

Additional Proposed Changes

File Name	Description	Approved
Articles_X22_Limited_Energy_Cables_for_Power-Limited_Circuits_Fault-Managed_Power_Circuits_Optical_Fiber_Circuits_and_Communication_PI.docx		
Limited_Energy_TG_Substantiation.docx		
Combined_Tables.docx		

Statement of Problem and Substantiation for Public Input

See attached document.

Submitter Information Verification

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Submittal Date: Fri Sep 01 13:23:02 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8611-NFPA 70-2024

Statement: A new article was created to relocate all cable requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

The revision incorporates cabling requirements from Article 770 and Chapter 8.

Article X22 Limited Energy Cables for Power-Limited Circuits, Fault-Managed Power Circuits, Optical Fiber Circuits, and Communications Circuits.

Part I. General

X22.1 Scope.

This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 1, Class 2, and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, Class 4 fault-managed power circuits, optical fiber cables, and communications systems. Power-limited circuits remote-control and signaling circuits that are not an integral part of a device or utilization equipment. The circuits described herein are characterized by usage and electrical power limitations that differentiate them from electric light and power circuits; therefore, alternative requirements are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials. The installation of fire alarm systems covers wiring and equipment including all circuits controlled and powered by the fire alarm system.. The general requirements for communications systems apply to communications circuits, community antenna television and radio distribution systems, network-powered broadband communications systems, and premises-powered broadband communications systems, unless modified by Articles 805, 820, 830, or 840.

Informational Note: See 300.26 for classifications of Class 1 remote-control and signaling circuits.
Informational Note No. 1: The circuits described herein are characterized by usage and electrical power limitations that differentiate them from electric light and power circuits; therefore, alternative requirements are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials.
Informational Note No. 2: See 300.26 for classifications of remote-control and signaling circuits.
Informational Note No. 1: Class 4 fault-managed power systems consist of a Class 4 power transmitter and a Class 4 power receiver connected by a Class 4 cabling system. These systems are characterized by monitoring the circuit for faults and controlling the source current to ensure the energy delivered into any fault is limited. Class 4 systems differ from Class 1, Class 2, and Class 3 systems in that they are not limited for power delivered to an appropriate load. They are current limited for faults between the Class 4 transmitter and Class 4 receiver.
Informational Note No. 1: Fire alarm systems include fire detection and alarm notification, guard's tour, sprinkler waterflow, and sprinkler supervisory systems. Circuits controlled and powered by the fire alarm system include circuits for the control of building systems safety functions, elevator capture, elevator shutdown, door release, smoke doors and damper control, fire doors and damper control, and fan shutdown, but only where these circuits are powered by and controlled by the fire alarm system.
Informational Note No. 2: See *NFPA 72*, *National Fire Alarm and Signaling Code*, for further information on the installation and monitoring for integrity requirements for fire alarm systems.
Informational Note No. 1: See 90.2(D)(4) for installations of circuits and equipment that are not covered.
Informational Note No. 2: See Part II of Article 725 for information on the installation of Class 2 and Class 3 circuits and X22.135(E) for the substitution of communications cables for Class 2 and Class 3 cables.
Informational Note No. 3: See Part II of Article 760 for information on the installation of power-limited fire alarm circuits, including the substitution of communications cables for power-limited fire alarm cables.

X22.3 Other Articles.

In addition to the requirements of this article, installation of cables shall comply with the articles or sections listed in X22.3(A) through (O). Only those sections of Article 300 referenced in this article shall apply.

X22.3 (?) Installation of Cables and Conductors in Raceway.

The number and size of conductors and cables, as well as raceway sizing, shall comply with 300.17.

X22.3 (?) Hybrid Cables.

Hybrid optical fiber cables shall be classified as electrical cables in accordance with the type of electrical conductors. They shall be constructed, listed, and marked in accordance with the appropriate article for each type of electrical cable.

X22.3 (?) Cable Trays.

Cable tray installations shall comply with Parts I and II of Article 392.

X22.3 (?) Raceways or Sleeves Exposed to Different Temperatures.

Section 300.7(A) shall apply.

X22.3 (?) Vertical Support for Fire-Resistive Cables and Conductors.

Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems and fire resistive-cable systems shall be installed in accordance with 300.19. Vertical installations of non-conductive optical circuit integrity (CI) cables installed in a raceway or cables of fire-resistive cable systems shall be installed in accordance with their listing.

X22.3 (?) Corrosive, Damp, or Wet Locations.
The installation of power-limited cables shall comply with the applicable requirements in 110.11, 300.5(B), 300.6, 300.9, and 310.10(F) when installed in corrosive, damp, or wet locations.

X22.3 (?) Cable Routing Assemblies.
Cables installed in cable routing assemblies shall be selected in accordance with Table 800.154(c), listed in accordance with 800.182, and installed in accordance with 800.110(C)(1)), 800.110(C)(2), and 800.113.

X22.3 (?) Communications Raceways.
Cables communications raceways shall be selected in accordance with Table 800.154(b), listed in accordance with 800.182, and installed in accordance with 800.113 and 362.24 through 362.56, where the requirements applicable to electrical nonmetallic tubing (ENT) apply.

X22.3 (?) Temperature Limitation of Cables.
The requirements of 310.14(A)(3) on the temperature limitation of conductors shall apply to power-limited circuit cables, fault-managed power cables, and power-limited fire alarm cables. No wire or cable (to include optical fiber cable) shall be used in such a manner that its operating temperature exceeds that of its rating.

X22.3 (?) Identification of Equipment Grounding Conductors.
Equipment grounding conductors shall be identified in accordance with 250.119.

Exception No. 1: Cables that do not contain an equipment grounding conductor shall be permitted to use a conductor with green insulation, or green insulation with one or more yellow stripes, for other than equipment grounding purposes.

Exception No. 2: Conductors with green insulation shall be permitted to be used as ungrounded signal conductors for Types FPLP, FPLR, FPL, and substitute cables installed in accordance with 760.154(A).

X22.3 (?) Instrumentation Tray Cable.
Circuits wired using instrumentation tray cable shall comply with 335.1 and 335.4 through 335.9.

X22.3 (?) Specific Requirements.
As appropriate, the installation of wires and cables shall also comply with the following:

(1) Class 2 and Class 3 cables — Part II of Article 725

(2) Class 4 cables — Part IV of Article 726

(3) Fire alarm cables — Part III of Article 760

(4) Optical fiber cables — Part V of Article 770

X22.12 Uses Not Permitted.
Class 4 cables shall not be permitted for any applications that are not part of a Class 4 system.

Exception: Use of Class 4 cable for other applications shall be permitted if the cable has been listed as suitable for the other applications.

X22.24 Mechanical Execution of Work.

(A) Support of Cables.
Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support. Raceways shall be used for their intended purpose.

Exception No. 1: Class 2 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2).

Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.

X22.31 Safety-Control Equipment.
Where damage to power-limited circuits can result in a failure of safety-control equipment that would introduce a direct fire or life hazard, the power limited circuits shall be installed using Class 1 circuit wiring methods in accordance with 724.46. All conductors of such circuits shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, Type MI cable, or Type MC cable, or be otherwise suitably protected from physical damage.

X22.130 Wiring Methods

(A) Wiring Methods and Materials on Load Side of the Class 2 or Class 3 Power Source.
Class 2 and Class 3 circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 725.130(A), (B), or a combination of both. Parts I and II of Article 722 shall apply.

(1) Class 1 Wiring Methods and Materials.
Use of Class 1 wiring methods for Class 2 and Class 3 circuits shall be permitted. Separation from electric light, power, Class 1, non-power-limited fire alarm circuit conductors, and medium-power network-powered broadband communications cables shall comply with 725.136.

Exception: The ampacity adjustment factors given in 310.15(C)(1) shall not apply.

(2) Class 2 and Class 3 Wiring Methods and Materials.
Conductors on the load side of the power source shall be insulated in accordance with 722.179 and be installed in accordance with 722.135 and 725.136 through 725.144.

Exception No. 1: As provided for in 620.21 for elevators and similar equipment.

Exception No. 2: Other wiring methods and materials installed in accordance with 725.3 shall be permitted to extend or replace the conductors and cables described in 722.179(A) and permitted by 725.130(B).

Exception No. 3: Bare Class 2 conductors shall be permitted as part of a listed intrusion protection system where installed in accordance with the listing instructions for the system.

(B) Wiring Methods and Materials on Load Side of the PLFA Power Source.
Fire alarm circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 760.130(A), (B), or a combination of both. Parts I and II of Article 722 shall apply.

(1) NPLFA Wiring Methods and Materials.
NPLFA wiring methods shall be permitted when used in accordance with 760.46, 760.49, or 760.53 for PLFA circuits. Conductors shall be solid or stranded copper. Separation from electric light, power, Class 1, non-power-limited fire alarm circuit conductors, and medium-power network-powered broadband communications cables shall comply with 760.136.

Exception: The ampacity adjustment factors specified in 310.15(C)(1) shall not apply.

(2) PLFA Wiring Methods and Materials.
Power-limited fire alarm conductors and cables described in 722.179 shall be installed as detailed in 722.135 and 760.130(B)(1) through (B)(4). Devices shall be installed in accordance with 110.3(B), 300.11(A), and 300.15.

(a) In Raceways, Exposed on Ceilings or Sidewalls, or Fished in Concealed Spaces.
Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed such that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).

(b) Passing Through a Floor or Wall.
Cables shall be installed in metal raceways or rigid nonmetallic conduit where passing through a floor or wall to a height of 2.1 m (7 ft) above the floor, unless adequate protection can be afforded by building construction such as detailed in 760.130(B)(1) or unless an equivalent solid guard is provided.

(c) Nonconcealed Spaces.
Cables specified in Chapter 3 and meeting the requirements of 722.179(A)(15)(a) and (A)(15)(b) shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft).

(d) Portable Fire Alarm Systems.
A portable fire alarm system provided to protect a stage or set when not in use shall be permitted to use wiring methods in accordance with 530.12.

X22.135 Installation of Cables.
The installation of cables shall comply with X22.135(A) through (?), as applicable.

(A) Listing.
Cables installed in buildings shall be listed.

(B) Cables in Buildings.
The installation of cables shall comply with Table X22.135(B).

[EDITORS NOTE: SEE ATTACHED TABLE NOTED AS "COMBINED TABLES"

Table X22.135(B) Installation of Listed Cables in Buildings

Applications		Cable Type[1]					
		enum	ser	General-Purpose	imited-Use	Under Carpet	LTC
ı ducts specifically fabricated for environmental air as described in 300.22(B)[2]	ables in lengths as short as practicable to perform the required function						
	ı metal raceway that complies with 300.22(B)						
ı other spaces used for environmental air (plenums) as described in 300.22(C)	ables in other spaces used for environmental air						
	ables in metal raceway that complies with 300.22(C)						
	ables in plenum communications raceways						
	ables in plenum cable routing assemblies						
	ables supported by open metal cable trays						
	ables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers						
ı risers and vertical runs	ables in vertical runs penetrating one or more floors and in vertical runs in a shaft						
	ables in metal raceways						
	ables in fireproof shafts						
	ables in plenum communications raceways						
	ables in plenum cable routing assemblies						
	ables in riser communications raceways						
	ables in riser cable routing assemblies						
	ables in one- and two-family dwellings				[3]		
ables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	ables						
	ables in plenum communications raceways (innerduct)						
	ables in riser communications raceways (innerduct)						
	ables in general-purpose communications raceways (innerduct)						
ı fireproof riser shafts having firestops at each floor[2]	ables						
	ables in plenum communications raceways or plenum cable routing assemblies						
	ables in riser communications raceways or riser cable routing assemblies						

Applications		Cable Type[1]					
		enum	ser	General-Purpose	imited-Use	Under Carpet	LTC
	ables in general-purpose communications raceways or general-purpose cable routing assemblies						
ı cable trays	utdoors						
	ables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors						
ı cross-connect arrays	ables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies						
ı one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	ables				[3]		
	ables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3						
	ables in nonconcealed spaces				[4]		
	nder carpet, floor covering, modular flooring, and planks						

[1]"N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in X22.3(O).

[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

(C) Industrial Establishments.

In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either of the following:

(1) Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as Type PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Where not subject to physical damage, Type PLTC-ER cable 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.

(2) Type PLTC cable, with a metallic sheath or armor in accordance with X22.179(A)(6), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

(D) In Hoistways.

In hoistways, cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21.

X22.135 (E) Applications of Listed PLFA Cables.
PLFA cables shall comply with the requirements described in Table 760.154 or where cable substitutions are made as shown in 760.154(A). Where substitute cables are installed, the wiring requirements of Article 760, Parts I and III, shall apply. Types FPLP-CI, FPLR-CI, and FPL-CI cables shall be permitted to be installed to provide 2-hour circuit integrity rated cables.
Table X22.154 Applications of Listed PLFA Cables in Buildings

Applications		Cable Type		
		FPLP & FPLP-CI	FPLR & FPLR-CI	FPL & FPL-CI
In fabricated ducts as described in 300.22(B)	In fabricated ducts	Y*	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*
In other spaces used for environmental air as described in 300.22(C)	In other spaces used for environmental air	Y*	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*
	In plenum communications raceways	Y*	N	N
	In plenum cable routing assemblies	Y*	N	N
	Supported by open metal cable trays	Y*	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y*	Y*	Y*
In risers	In vertical runs	Y*	Y*	N
	In metal raceways	Y*	Y*	Y*
	In fireproof shafts	Y*	Y*	Y*
	In plenum communications raceways	Y*	Y*	N
	In plenum cable routing assemblies	Y*	Y*	N
	In riser communications raceways	Y*	Y*	N
	In riser cable routing assemblies	Y*	Y*	N
	In one- and two-family dwellings	Y*	Y*	Y*
Within buildings in other than air-handling spaces and risers	General	Y*	Y*	Y*
	Supported by cable trays	Y*	Y*	Y*
	In any raceway recognized in Chapter 3	Y*	Y*	Y*
	In plenum communications raceway	Y*	Y*	Y*
	In plenum cable routing assemblies	Y*	Y*	Y*
	In riser communications raceways	Y*	Y*	Y*
	In riser cable routing assemblies	Y*	Y*	Y*
	In general-purpose communications raceways	Y*	Y*	Y*
	In general-purpose cable routing assemblies	Y*	Y*	Y*

Note:
"N" indicates that the cable type shall not be permitted to be installed in the application.

"Y*" indicates that the cable type shall be permitted to be installed in the application subject to the limitations described in 760.130 through 760.145.

X22.135 (F) Raceways, Cable Routing Assemblies, and Cable Trays for Optical Fiber Cables.

(A) Types of Raceways.

Optical fiber cables shall be permitted to be installed in any raceway that complies with either 770.110(A)(1) or (A)(2).

(1) Raceways Recognized in Chapter 3.

Optical fiber cables shall be permitted to be installed in any raceway included in Chapter 3. The raceways shall be installed in accordance with Chapter 3.

(2) Communications Raceways.

Optical fiber cables shall be permitted to be installed in listed communications raceways selected in accordance with Table 800.154(b).

(B) Raceway Fill for Optical Fiber Cables.

Raceway fill for optical fiber cables shall comply with either 770.110(B)(1) or (B)(2).

(1) Without Electric Light or Power Conductors.

Where optical fiber cables are installed in raceway without electric light or power conductors, the raceway fill requirements of Chapters 3 and 9 shall not apply.

(2) Nonconductive Optical Fiber Cables with Electric Light or Power Conductors.

Where nonconductive optical fiber cables are installed with electric light or power conductors in a raceway, the raceway fill requirements of Chapters 3 and 9 shall apply.

(C) Cable Routing Assemblies.

Optical fiber cables shall be permitted to be installed in listed cable routing assemblies selected in accordance with Table 800.154(c).

(D) Cable Trays.

Optical fiber cables shall be permitted to be installed in metal or listed nonmetallic cable tray systems.

X22.135 (G) Innerduct for Optical Fiber Cables.

Listed plenum communications raceways, listed riser communications raceways, and listed general-purpose communications raceways selected in accordance with Table 800.154(b) shall be permitted to be installed as innerduct in any type of listed raceway permitted in Chapter 3.

X22.135 (H) Installation of Optical Fiber Cables.

Installation of optical fiber cables shall comply with 770.113(A) through (J). Installation of raceways and cable routing assemblies shall comply with 770.110.

(A) Listing.

Optical fiber cables installed in buildings shall be listed in accordance with 770.179 and installed in accordance with the limitations of the listing.

Exception: Optical fiber cables that are installed in compliance with 770.48 shall not be required to be listed.

(B) Ducts Specifically Fabricated for Environmental Air.

Installations of optical fiber cables in ducts specifically fabricated for environmental air shall be in accordance with 770.113(B)(1) and (B)(2).

(1) Uses Permitted.

The following cables shall be permitted in ducts specifically fabricated for environmental air as described in 300.22(B) if they are directly associated with the air distribution system:

(1) Up to 1.22 m (4 ft) of Types OFNP and OFCP

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in raceways that are installed in compliance with 300.22(B)

Informational Note: For information on fire protection of wiring installed in fabricated ducts, see NFPA 90A-2018, *Standard for the Installation of Air-Conditioning and Ventilating Systems*.

(2) Uses Not Permitted.

Types OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall not be permitted to be installed in ducts specifically fabricated for environmental air as described in 300.22(B).

Informational Note: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for information on fire protection of wiring installed in fabricated ducts.

(C) Other Spaces Used for Environmental Air (Plenums).

Installations of optical fiber cables in other spaces used for environmental air shall be in accordance with 770.113(C)(1) and (C)(2).

(1) Uses Permitted.

The following cables shall be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Types OFNP and OFCP

(2) Types OFNP and OFCP installed in plenum communications raceways

(3) Types OFNP and OFCP installed in plenum cable routing assemblies

(4) Types OFNP and OFCP supported by open metal cable tray systems

(5) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in raceways that are installed in compliance with 300.22(C)

(6) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums), as described in 300.22(C)

(7) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in plenum riser and general-purpose communications raceways supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums), as described in 300.22(C)

(2) Uses Not Permitted.
Types OFNR, OFCR, OFNG, OFCG, OFN, and OFC shall not be permitted to be installed in other spaces used for environmental air (plenums).
Informational Note: See NFPA 90A-2018, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for information on fire protection of wiring installed in other spaces used for environmental air.
(D) Risers — Cables in Vertical Runs.
Installations of optical fiber cables in vertical runs shall be in accordance with 770.113(D)(1) and (D)(2).
(1) Uses Permitted.
The following cables shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:

(1) Types OFNP, OFCP, OFNR, and OFCR

(2) Types OFNP, OFCP, OFNR, and OFCR installed in the following:

a. Plenum communications raceways

b. Plenum cable routing assemblies

c. Riser communications raceways

d. Riser cable routing assemblies

(2) Uses Not Permitted.
Types OFNG, OFCG, OFN, and OFC shall not be permitted to be installed in vertical runs.
Informational Note: See 770.26 for firestop requirements for floor penetrations.
(E) Risers — Cables Permitted in Metal Raceways.
The following cables and innerducts shall be permitted in metal raceways in a riser having firestops at each floor:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in the following:

a. Plenum communications raceways (innerduct)

b. Riser communications raceways (innerduct)

c. General-purpose communications raceways (innerduct)

Informational Note: See 770.26 for firestop requirements for floor penetrations.
(F) Risers — Cables Permitted in Fireproof Shafts.
The following cables shall be permitted to be installed in fireproof riser shafts having firestops at each floor:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in the following:

a. Plenum communications raceways
b. Plenum cable routing assemblies
c. Riser communications raceways
d. Riser cable routing assemblies
e. General-purpose communications raceways
f. General-purpose cable routing assemblies

Informational Note: See 770.26 for firestop requirements for floor penetrations.

(G) Risers — Cables Permitted in One- and Two-Family Dwellings.
The following cables shall be permitted in one- and two-family dwellings:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC
(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in the following:
a. Plenum communications raceways
b. Plenum cable routing assemblies
c. Riser communications raceways
d. Riser cable routing assemblies
e. General-purpose communications raceways
f. General-purpose cable routing assemblies

(H) Cable Trays — Cables Permitted.
The following cables shall be permitted to be supported by cable trays:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC
(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in the following:
a. Plenum communications raceways
b. Riser communications raceways
c. General-purpose communications raceways

(I) Distributing Frames and Cross-Connect Arrays — Cables Permitted.
The following cables shall be permitted to be installed in distributing frames and cross-connect arrays:

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC
(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in the following:
a. Plenum communications raceways
b. Plenum cable routing assemblies
c. Riser communications raceways
d. Riser cable routing assemblies
e. General-purpose communications raceways
f. General-purpose cable routing assemblies

(J) Other Building Locations — Cables Permitted.
The following cables shall be permitted to be installed in building locations other than the locations covered in 770.113(B) through (I):

(1) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC

(2) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in:

a. Plenum communications raceways

b. Plenum cable routing assemblies

c. Riser communications raceways

d. Riser cable routing assemblies

e. General-purpose communications raceways

f. General-purpose cable routing assemblies

(3) Types OFNP, OFCP, OFNR, OFCR, OFNG, OFCG, OFN, and OFC installed in a raceway of a type recognized in Chapter 3

X22.135 (I) Applications of Listed Optical Fiber Cables.
Permitted and nonpermitted applications of listed optical fiber cables shall be as indicated in Table 770.154(a). The permitted applications shall be subject to the installation requirements of 770.110 and 770.113. The substitutions for optical fiber cables in Table 770.154(b) and illustrated in Figure 770.154 shall be permitted.

Table X22.135 (I) Applications of Listed Optical Fiber Cables in Buildings

Applications		Listed Optical Fiber Cable Type		
		OFNP, OFCP	OFNR, OFCR	OFNG, OFCG, OFN, OFC
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	Y*	N	N
	In metal raceway that complies with 300.22(B)	Y*	Y*	Y*
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y*	N	N
	In metal raceway that complies with 300.22(C)	Y*	Y*	Y*
	In plenum communications raceways	Y*	N	N
	In plenum cable routing assemblies	Y*	N	N
	Supported by open metal cable trays	Y*	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y*	Y*	Y*
In risers	In vertical runs	Y*	Y*	N
	In metal raceways	Y*	Y*	Y*
	In fireproof shafts	Y*	Y*	Y*
	In plenum communications raceways	Y*	Y*	N
	In plenum cable routing assemblies	Y*	Y*	N
	In riser communications raceways	Y*	Y*	N
	In riser cable routing assemblies	Y*	Y*	N
	In one- and two-family dwellings	Y*	Y*	Y*
Within buildings in other than air-handling spaces and risers	General	Y*	Y*	Y*
	Supported by cable trays	Y*	Y*	Y*
	In distributing frames and cross-connect arrays	Y*	Y*	Y*

Applications		Listed Optical Fiber Cable Type		
		OFNP, OFCP	OFNR, OFCR	OFNG, OFCG, OFN, OFC
	In any raceway recognized in Chapter 3	Y*	Y*	Y*
	In plenum communications raceway	Y*	Y*	Y*
	In plenum cable routing assemblies	Y*	Y*	Y*
	In riser communications raceways	Y*	Y*	Y*
	In riser cable routing assemblies	Y*	Y*	Y*
	In general-purpose communications raceways	Y*	Y*	Y*
	In general-purpose cable routing assemblies	Y*	Y*	Y*

Note: "N" indicates that the cable type shall not be permitted to be installed in the application. "Y*" indicates that the cable type shall be permitted to be installed in the application subject to the limitations described in 770.110 and 770.113.
Informational Note No. 1: Part V of Article 770 covers installation methods within buildings. This table covers the applications of listed optical fiber cables in buildings. The definition of *Point of Entrance* is in 770.2.
Informational Note No. 2: For information on the restrictions to the installation of optical fiber cables in ducts specifically fabricated for environmental air, see 770.113(B).

X22.135 (J) Raceways, Cable Routing Assemblies, and Cable Trays.
(A) Types of Raceways.
Wires and cables shall be permitted to be installed in raceways that comply with 800.110(A)(1), 800.110(A)(2), or 800.110(A)(3). Medium-power network-powered broadband communications cables shall not be installed in raceways that comply with 800.110(A)(2).
(1) Raceways Recognized in Chapter 3.
Wires and cables shall be permitted to be installed in any raceway included in Chapter 3. The raceways shall be installed in accordance with Chapter 3.
(2) Communications Raceways.
Wires and cables shall be permitted to be installed in plenum communications raceways, riser communications raceways, and general-purpose communications raceways selected in accordance with Table 800.154(b), listed in accordance with 800.182, and installed in accordance with 800.113 and 362.24 through 362.56, where the requirements applicable to electrical nonmetallic tubing (ENT) apply.
(3) Innerduct for Communications Wires and Cables, Coaxial Cables, or Network-Powered Broadband Communications Cables.
Listed plenum communications raceways, listed riser communications raceways, and listed general-purpose communications raceways selected in accordance with Table 800.154(b) shall be permitted to be installed as innerduct in any type of listed raceway permitted in Chapter 3.
(B) Raceway Fill.
The raceway fill requirements of Chapters 3 and 9 shall apply to medium-power network-powered broadband communications cables.
(C) Cable Routing Assemblies.
Cables shall be permitted to be installed in plenum cable routing assemblies, riser cable routing assemblies, and general-purpose cable routing assemblies selected in accordance with Table 800.154(c), listed in accordance with 800.182, and installed in accordance with 800.110(C)(1) and (C)(2) and 800.113.
(1) Horizontal Support.
Cable routing assemblies shall be supported where run horizontally at intervals not to exceed 900 mm (3 ft) and at each end or joint, unless listed for other support intervals. In no case shall the distance between supports exceed 3 m (10 ft).
(2) Vertical Support.
Vertical runs of cable routing assemblies shall be supported at intervals not exceeding 1.2 m (4 ft), unless listed for other support intervals, and shall not have more than one joint between supports.
(D) Cable Trays.

Wires and cables and communications raceways shall be permitted to be installed in metal or listed nonmetallic cable tray systems. Ladder cable trays shall be permitted to support cable routing assemblies.

X22.135 (K) Installation of Cables Used for Communications Circuits, Communications Wires, Cable Routing Assemblies, and Communications Raceways.

Installation of wires, cables, cable routing assemblies, and communications raceways shall comply with 800.113(A) through (L). Installation of cable routing assemblies and communications raceways shall comply also with 800.110. Types of cables used by this section are identified in Table 800.113.

Table X22.135 (K) Cables Used for Communications Circuits

	Listed Cable Types
Plenum cables	CMP, CATVP, BLP, OFNP, OFCP
Riser cables	CMR, CATVR, BMR, BLR, OFNR, OFCR
General-purpose cables	CMG, CM, CATV, BM, BL, OFNG, OFN, OFCG, OFC
Limited-use cables	CMX, CATVX, BLX
Undercarpet	CMUC
Underground	BMU, BLU

(A) Listing.

Cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways installed in buildings shall be listed and installed in accordance with the limitations of the listing.

Exception: Cables installed in compliance with 800.48 shall not be required to be listed.

(B) Ducts Specifically Fabricated for Environmental Air.

Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in ducts specifically fabricated for environmental air shall be in accordance with 800.113(B)(1) and (B)(2).

(1) Uses Permitted.

The following cables shall be permitted in ducts specifically fabricated for environmental air as described in 300.22(B) if they are directly associated with the air distribution system:

(1) Plenum cables up to 1.22 m (4 ft) in length

(2) Plenum, rise, general-purpose, and limited-use cables installed in raceways that are installed in compliance with 300.22(B)

(2) Uses Not Permitted.

The following cables, wires, cable routing assemblies, and communications raceways shall not be permitted in ducts specifically fabricated for environmental air as described in 300.22(B):

(1) Plenum, riser, and general-purpose communications raceways

(2) Plenum, riser, and general-purpose cable routing assemblies

(3) Riser, general-purpose, and limited-use cables

(4) Type CMUC cables and wires

(5) Types BMU and BLU cables

(6) Communications wires

(7) Hybrid power and communications cables

Informational Note: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for information on fire protection of wiring installed in fabricated ducts.

(C) Other Spaces Used for Environmental Air (Plenums).

Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in other spaces used for environmental air (plenums) shall be in accordance with 800.113(C)(1) and (C)(2).

(1) Uses Permitted.

The following cables, wires, cable routing assemblies, and communications raceways shall be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Plenum cables

(2) Plenum communications raceways

(3) Plenum cable routing assemblies

(4) Plenum cables installed in plenum communications raceways

(5) Plenum cables installed in plenum cable routing assemblies

(6) Plenum cables and plenum communications raceways supported by open metal cable tray systems

(7) Plenum, riser, general-purpose, and limited-use cables, and communications wires installed in raceways that are installed in compliance with 300.22(C)

(8) Plenum, rise, general-purpose, limited-use cables and plenum, riser, and general-purpose communications raceways supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)

(9) Plenum, riser, general-purpose, and limited-use cables installed in plenum, riser, and general-purpose communications raceways supported by solid bottom metal cable trays with solid metal covers in other spaces used for environmental air (plenums) as described in 300.22(C)

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be permitted in other spaces used for environmental air as described in 300.22(C):

(1) Riser, general-purpose, and limited-use cables

(2) Riser and general-purpose communications raceways

(3) Riser and general-purpose cable routing assemblies

(4) Type CMUC cables and wires

(5) Types BMR, BM, BMU, and BLU cables

(6) Communications wires

(7) Hybrid power and communications cables

Informational Note: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for information on fire protection of wiring installed in other spaces used for environmental air.

(D) Risers — Cables, Cable Routing Assemblies, and Communications Raceways in Vertical Runs.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in risers shall be in accordance with 800.113(D)(1) and (D)(2).

(1) Uses Permitted.
The following cables, cable routing assemblies, and communications raceways shall be permitted in vertical runs penetrating one or more floors and in vertical runs in a shaft:

(1) Plenum and riser cables

(2) Plenum and riser communications raceways

(3) Plenum and riser cable routing assemblies

(4) Plenum and riser cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. Plenum cable routing assemblies

d. Riser cable routing assemblies

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be permitted in risers:

(1) General-purpose and limited-use cables

(2) General-purpose communications raceways

(3) General-purpose cable routing assemblies

(4) Type CMUC cables and wires

(5) Types BMR, BM, BMU, and BLU cables

(6) Communications wires

(7) Hybrid power and communications cables

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(E) Risers — Cables and Innerducts in Metal Raceways.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in metal raceways in a riser having firestops at each floor shall be in accordance with 800.113(E)(1) and (E)(2).

(1) Uses Permitted.
The following cables and innerducts shall be permitted in metal raceways in a riser having firestops at each floor:

(1) Plenum, riser, general-purpose, and limited-use cables

(2) Plenum, riser, and general-purpose communications raceways (innerduct)

(3) Plenum, riser, general-purpose, and limited-use cables installed in the following:

a. Plenum communications raceways (innerduct)

b. Riser communications raceways (innerduct)

c. General-purpose communications raceways (innerduct)

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be permitted in metal raceways in a riser having firestops at each floor:

(1) Plenum, riser, and general-purpose cable routing assemblies

(2) Type CMUC cables and wires

(3) Types BMR, BM, BMU, and BLU cables

(4) Communications wires

(5) Hybrid power and communications cables

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(F) Risers — Cables, Cable Routing Assemblies, and Communications Raceways in Fireproof Shafts.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in fireproof riser shafts having firestops at each floor shall be in accordance with 800.113(F)(1) and (F)(2).

(1) Uses Permitted.
The following cables, cable routing assemblies, and communications raceways shall be permitted to be installed in fireproof riser shafts having firestops at each floor:

(1) Plenum, riser, general-purpose, and limited-use cables

(2) Plenum, riser, and general-purpose communications raceways

(3) Plenum, riser, and general-purpose cable routing assemblies

(4) Plenum, riser, general-purpose, and limited-use cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

d. Plenum cable routing assemblies

e. Riser cable routing assemblies

f. General-purpose cable routing assemblies

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be permitted in metal raceways in fireproof riser shafts having firestops at each floor:

(1) Type CMUC cables and wires

(2) Type BMU and BLU cables

(3) Communications wires

(4) Hybrid power and communications cables

Informational Note: See 800.26 for firestop requirements for floor penetrations.

(G) Risers — One- and Two-Family Dwellings.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in risers in one- and two-family dwellings shafts shall be in accordance with 800.113(G)(1) and (G)(2).

(1) Uses Permitted.
The following cables, cable routing assemblies, and communications raceways shall be permitted in one- and two-family dwellings:

(1) Plenum, riser, and general-purpose cables

(2) Limited-use cables less than 6 mm (0.25 in.) in diameter

(3) Plenum, riser, and general-purpose communications raceways

(4) Plenum, riser, and general-purpose cable routing assemblies

(5) Plenum, riser, and general-purpose cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

d. Plenum cable routing assemblies

e. Riser cable routing assemblies

f. General-purpose cable routing assemblies

(2) Uses Not Permitted.
The following cables and wires shall not be permitted in risers in one- and two-family dwellings:

(1) Type CMUC cables and wires

(2) Type BMU and BLU cables

(3) Communications wires

(4) Hybrid power and communications cables

(H) Cable Trays.

Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways supported by cable trays shall be in accordance with 800.113(H)(1) and (H)(2).

(1) Uses Permitted.
The following wires, cables, and communications raceways shall be permitted to be supported by cable trays:

(1) Plenum, riser, and general-purpose cables

(2) Plenum, riser, and general-purpose communications raceways

(3) Communications wires, plenum, riser, and general-purpose cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

(2) Uses Not Permitted.
The following cables and wires shall not be supported by cable trays:

(1) Limited-use cables

(2) Type CMUC cables and wires

(3) Type BMU and BLU cables

(4) Communications wires

(5) Hybrid power and communications cables

(I) Distributing Frames and Cross-Connect Arrays.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in distributing frames and cross-connect arrays shall be in accordance with 800.113(I)(1) and (I)(2).

(1) Uses Permitted.
The following wires, cables, cable routing assemblies, and communications raceways shall be permitted to be installed in distributing frames and cross-connect arrays:

(1) Plenum, riser, and general-purpose cables and communications wires

(2) Plenum, riser, and general-purpose communications raceways

(3) Plenum, riser, and general-purpose cable routing assemblies

(4) Communications wires, plenum, riser, and general-purpose cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

d. Plenum cable routing assemblies

e. Riser cable routing assemblies

f. General-purpose cable routing assemblies

(2) Uses Not Permitted.
The following cables and wires shall not be installed in distributing frames and cross-connect arrays:

(1) Types BMR, BM, BMU, and BLU cables

(2) Limited-use cables

(3) Type CMUC cables and wires

(4) Hybrid power and communications cables

(J) Other Building Locations.
Installations of cables used for communications circuits, cable communications wires, routing assemblies, and communications raceways in building locations other than those covered in 800.113(B) through (I) shall be in accordance with 800.113(J)(1) and (J)(2).
(1) Uses Permitted.
The following wires, cables, cable routing assemblies, and communications raceways shall be permitted to be installed in building locations other than the locations covered in 800.113(B) through (I):

(1) Plenum, riser, and general-purpose cables

(2) Limited-use cables with a maximum of 3 m (10 ft) of exposed length in nonconcealed spaces

(3) Plenum, riser, and general-purpose communications raceways

(4) Plenum, riser, and general-purpose cable routing assemblies

(5) Communications wires, plenum, riser, and general-purpose cables installed in the following:

  a. Plenum communications raceways

  b. Riser communications raceways

  c. General-purpose communications raceways

(6) Plenum, riser, and general-purpose cables installed in the following:

  a. Plenum cable routing assemblies

  b. Riser cable routing assemblies

  c. General-purpose cable routing assemblies

(7) Communications wires and plenum, riser, general-purpose, and limited-use cables installed in raceways recognized in Chapter 3

(8) Type CMUC undercarpet communications wires and cables installed under carpet, modular flooring, and planks

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be installed in building locations other than the locations covered in 800.113(B) through (I):

(1) Types BMU and BLU cables

(2) Communications wires

(3) Hybrid power and communications cables

(K) Multifamily Dwellings.
Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in multifamily dwellings shall be in accordance with 800.113(K)(1) and (K)(2).
(1) Uses Permitted.
The following cables, cable routing assemblies, and communications raceways shall be permitted to be installed in multifamily dwellings in locations other than the locations covered in 800.113(B) through (G):

(1) Plenum, riser, and general-purpose cables

(2) Limited-use cables less than 6 mm (0.25 in.) in diameter in nonconcealed spaces

(3) Plenum, riser, and general-purpose communications raceways

(4) Plenum, riser, and general-purpose cable routing assemblies

(5) Communications wires and plenum, riser, and general-purpose cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

(6) Plenum, riser, and general-purpose cables installed in the following:

a. Plenum cable routing assemblies

b. Riser cable routing assemblies

c. General-purpose cable routing assemblies

(7) Communications wires and plenum, riser, general-purpose, and limited-use cables installed in raceways recognized in Chapter 3

(8) Type CMUC under-carpet communications wires and cables installed under carpet, modular flooring, and planks

(2) Uses Not Permitted.

The following cables, cable routing assemblies, and communications raceways shall not be installed in multifamily dwellings in locations other than the locations covered in 800.113(B) through (G):

(1) Types BMU and BLU cables

(2) Communications wires

(3) Hybrid power and communications cables

(L) One- and Two-Family Dwellings.

Installations of cables used for communications circuits, communications wires, cable routing assemblies, and communications raceways in one- and two-family dwellings in locations other than those covered in 800.113(B) through (F) shall be in accordance with 800.113(L)(1) and (L)(2).

(1) Uses Permitted.

The following wires, cables, cable routing assemblies, and communications raceways shall be permitted to be installed in one- and two-family dwellings in locations other than the locations covered in 800.113(B) through (F):

(1) Plenum, riser, and general-purpose cables

(2) Limited-use cables less than 6 mm (0.25 in.) in diameter

(3) Plenum, riser, and general-purpose communications raceways

(4) Plenum, riser, and general-purpose cable routing assemblies

(5) Communications wires, plenum, riser, and general-purpose cables installed in the following:

a. Plenum communications raceways

b. Riser communications raceways

c. General-purpose communications raceways

(6) Plenum, riser, and general-purpose cables installed in the following:

a. Plenum cable routing assemblies

b. Riser cable routing assemblies

c. General-purpose cable routing assemblies

(7) Communications wires and plenum, riser, general-purpose, and limited-use cables installed in raceways recognized in Chapter 3

(8) Type CMUC under-carpet communications wires and cables installed under carpet, modular flooring, and planks

(9) Hybrid power and communications cable listed in accordance with 800.179

(2) Uses Not Permitted.
The following cables, wires, cable routing assemblies, and communications raceways shall not be installed in one- and two-family dwellings in locations other than those covered in 800.113(B) through (F):

(1) Types BMU and BLU cables

(2) Communications wires

X22.135 (L)Installation of Communications Wires and Cables and CATV-Type Coaxial Cables.
Installation of communications wires and cables, from the protector to the equipment, or where no protector is required, communications wires and cables attached to the outside or inside of the building, shall comply with 800.133(A) and 800.133(B). Installation of CATV-type coaxial cables, beyond the point of grounding as defined in 820.93, shall comply with 800.133(A) through (C).
(A) In Raceways, Cable Trays, Boxes, Cables, Enclosures, and Cable Routing Assemblies.
(1) Other Circuits.
Communications cables and CATV-type coaxial cables shall be permitted in the same raceway, cable tray, box, enclosure, or cable routing assembly together and with jacketed cables of any of the following:

(1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with 645.5(E)(2) or Parts I and II of Article 725

(2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(3) Nonconductive and conductive optical fiber cables in compliance with Parts I and V of Article 770

(4) Communications circuits in compliance with Parts I and IV of Articles 800 and 805

(5) Community antenna television and radio distribution systems in compliance with Parts I and V of Articles 800 and 820

(6) Low-power network-powered broadband communications circuits in compliance with Parts I and V of Articles 800 and 830

(2) Class 2 and Class 3 Circuits.
Class 1 circuits shall not be run in the same cable with communications circuits. Class 2 and Class 3 circuit conductors shall be permitted in the same listed communications cable with communications circuits.
(3) Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm, and Medium-Power Network-Powered Broadband Communications Circuits in Raceways, Compartments, and Boxes.
Communications wires and cables and CATV-type coaxial cables shall not be placed in any raceway, compartment, outlet box, junction box, or similar fitting with conductors of electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits.
Exception No. 1: Communications wires and cables and CATV-type coaxial cables shall be permitted to be placed in any raceway, compartment, outlet box, junction box, or other enclosures with conductors of electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits where all of the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits are separated from all of the communications wires and cables and CATV-type coaxial cables by a permanent barrier or listed divider.
Exception No. 2: Communications wires and cables and CATV-type coaxial cables shall be permitted to be placed in outlet boxes, junction boxes, or similar fittings or compartments with power conductors where such conductors are introduced solely for power supply to the communications and coaxial cable system distribution equipment. The power circuit conductors shall be routed within the enclosure to maintain a minimum 6 mm (1⁄4 in.) separation from the communications wires and cables and the CATV- type coaxial cables.
Exception No. 3: Separation of circuits shall not be required in elevator traveling cables constructed in accordance with by 620.36.
(B) Other Applications.
Communications wires and cables and CATV-type coaxial cables shall be separated at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits.

Exception No. 1: Separation shall not be required where either (1) all of the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, Type AC or Type UF cables, or (2) all of the communications wires and cables and all of the CATV-type coaxial cables are encased in raceway.
Exception No. 2: Separation shall not be required where the communications wires and cables and CATV-type coaxial cables are permanently separated from the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the wire.
(C) Support of Communications Wires and Cables and CATV-Type Coaxial Cables.
Raceways shall be used for their intended purpose. Communications wires and cables and CATV-type coaxial cables shall not be strapped, taped, or attached by any means to the exterior of any raceway as a means of support.
Exception: Overhead (aerial) spans of communications drop wires, communications cables, and CATV-type coaxial cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such wires and cables.
X22.135 (M) Applications of Listed Communications Wires, Cables, and Raceways, and Listed Cable Routing Assemblies.
Permitted and nonpermitted applications of listed communications wires, cables, coaxial cables, network-powered broadband communications system cables and raceways, and listed cable routing assemblies, shall be in accordance with one of the following:

(1) Listed communications wires and cables as indicated in Table 800.154(a)

(2) Listed communications raceways as indicated in Table 800.154(b)

(3) Listed cable routing assemblies as indicated in Table 800.154(c)

The permitted applications shall be subject to the installation requirements of 800.110 and 800.113.
Table X22.135 (M) (a) Applications of Listed Communications Wires, Cables, and Network-Powered Broadband Communications System Cables in Buildings

Applications		Wire and Cable Type									
		Plenum	Riser	BMR	General-Purpose	BM	Limited-Use	Undercarpet	BMU, BLU	Hybrid Power and Communications Cables	Communications Wires
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	Y	N	N	N	N	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	Y	Y	N	N	N	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N	N	N	N	N	N	N	N
	In metal raceway that complies with 300.22(C)	Y	Y	Y	Y	Y	Y	N	N	N	Y
	In plenum communications raceways	Y	N	N	N	N	N	N	N	N	N

Applications		**Wire and Cable Type**									
		Plenum	**Riser**	**BMR**	**General-Purpose**	**BM**	**Limited-Use**	**Undercarpet**	**BMU, BLU**	**Hybrid Power and Communications Cables**	**Communications Wires**
	In plenum cable routing assemblies	Y	N	N	N	N	N	N	N	N	N
	Supported by open metal cable trays	Y	N	N	N	N	N	N	N	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	Y	Y	N	N	N	N
In risers	In vertical runs	Y	Y	Y	N	N	N	N	N	N	N
	In metal raceways	Y	Y	Y	Y	Y	Y	N	N	N	N
	In fireproof shafts	Y	Y	Y	Y	Y	Y	N	N	N	N
	In plenum communications raceways	Y	Y	N	N	N	N	N	N	N	N
	In plenum cable routing assemblies	Y	Y	N	N	N	N	N	N	N	N
	In riser communications raceways	Y	Y	N	N	N	N	N	N	N	N
	In riser cable routing assemblies	Y	Y	N	N	N	N	N	N	N	N
	In one- and two-family dwellings	Y	Y	Y	Y	Y	Y	N	N	Y	N
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y	Y	Y	Y	N	N	N	N
	In one- and two-family dwellings	Y	Y	Y	Y	Y	Y	Y	N	Y	N
	In multifamily dwellings	Y	Y	Y	Y	Y	Y	Y	N	N	N
	In nonconcealed spaces	Y	Y	Y	Y	Y	Y	Y	N	N	N
	Supported by cable trays	Y	Y	Y	Y	Y	N	N	N	N	N
	Under carpet, modular	N	N	N	N	N	N	Y	N	N	N

Applications		Wire and Cable Type									
		Plenum	Riser	BMR	General-Purpose	BM	Limited-Use	Undercarpet	BMU, BLU	Hybrid Power and Communications Cables	Communications Wires
	flooring, and planks										
	In distributing frames and cross-connect arrays	Y	Y	N	Y	N	N	N	N	N	Y
	In rigid metal conduit (RMC) and intermediate metal conduit (IMC)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	In any raceway recognized in Chapter 3	Y	Y	Y	Y	Y	Y	N	N	N	Y
	In plenum communications raceways	Y	Y	N	Y	N	N	N	N	N	Y
	In plenum cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y
	In riser communications raceways	Y	Y	N	Y	N	N	N	N	N	Y
	In riser cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y
	In general-purpose communications raceways	Y	Y	N	Y	N	N	N	N	N	Y
	In general-purpose cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y

Note: An "N" in the table indicates that the cable type shall not be installed in the application. A "Y" indicates that the cable type shall be permitted to be installed in the application subject to the limitations described in 800.113. The Riser column includes all riser cables except BMR, and the General-Purpose column includes all general-purpose cables except BM.

Informational Note No. 1: Part IV of Article 800 covers installation methods within buildings. This table covers the applications of listed communications wires, cables, and raceways in buildings.

Informational Note No. 2: For information on the restrictions to the installation of communications cables in fabricated ducts, see 800.113(B).

Table X22.135 (M) (b)[800.154(b)] Applications of Listed Communications Raceways in Buildings

Applications		Listed Communications Raceway Type		
		Plenum	Riser	General-Purpose
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	N	N	N
	In metal raceway that complies with 300.22(B)	N	N	N
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N
	In metal raceway that complies with 300.22(C)	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	Supported by open metal cable trays	Y	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y
In risers	In vertical runs	Y	Y	N
	In metal raceways	Y	Y	Y
	In fireproof shafts	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	In riser cable routing assemblies	N	N	N
	In one- and two-family dwellings	Y	Y	Y
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y
	In one- and two-family dwellings	Y	Y	Y
	In multifamily dwellings	Y	Y	Y
	In nonconcealed spaces	Y	Y	Y
	Supported by cable trays	Y	Y	Y
	Under carpet, modular flooring, and planks	N	N	N
	In distributing frames and cross-connect arrays	Y	Y	Y
	In any raceway recognized in Chapter 3	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	In riser cable routing assemblies	N	N	N
	In general-purpose cable routing assemblies	N	N	N

Note: An "N" in the table indicates that the communications raceway type shall not be installed in the application. A "Y" indicates that the communications raceway type shall be permitted to be installed in the application, subject to the limitations described in 800.110 and 800.113.

Table X22.135 (M) (c) [800.154(c)] Applications of Listed Cable Routing Assemblies in Buildings

Applications		Listed Cable Routing Assembly Type		
		Plenum	Riser	General-Purpose
	In fabricated ducts	N	N	N

Applications		Listed Cable Routing Assembly Type		
		Plenum	Riser	General-Purpose
In ducts specifically fabricated for environmental air as described in 300.22(B)	In metal raceway that complies with 300.22(B)	N	N	N
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N
	In metal raceway that complies with 300.22(C)	N	N	N
	In plenum communications raceways	N	N	N
	Supported by open metal cable trays	Y	N	N
	Supported by solid bottom metal cable trays with solid metal covers	N	N	N
In risers	In vertical runs	Y	Y	N
	In metal raceways	N	N	N
	In fireproof shafts	Y	Y	Y
	In plenum communications raceways	N	N	N
	In riser communications raceways	N	N	N
	In one- and two-family dwellings	Y	Y	Y
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y
	In one- and two-family dwellings	Y	Y	Y
	In multifamily dwellings	Y	Y	Y
	In nonconcealed spaces	Y	Y	Y
	Supported by cable trays	Y	Y	Y
	Under carpet, modular flooring, and planks	N	N	N
	In distributing frames and cross-connect arrays	Y	Y	Y
	In any raceway recognized in Chapter 3	N	N	N
	In plenum communications raceways	N	N	N
	In riser communications raceways	N	N	N
	In general-purpose communications raceways	N	N	N

Note: An "N" in the table indicates that the cable routing assembly type shall not be installed in the application. A "Y" indicates that the cable routing assembly type shall be permitted to be installed in the application subject to the limitations described in 800.113.

X22.135 (N) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

CI cable, a fire-resistive cable system, or a listed electrical circuit protective system shall be permitted for use in systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

X22.135 (O) Thermocouple Circuits.

Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.

X22.135 (P) Bundling of 4-Pair Cables Transmitting Power and Data.

Where 4-pair cables are used to transmit power and data to a powered device, 725.144 shall apply.

X22.135 (Q) Installation of Circuit Conductors Extending Beyond One Building.
Circuit conductors that extend beyond one building and are run such that they are subject to accidental contact with electric light or power conductors operating over 300 volts to ground, or are exposed to lightning on interbuilding circuits on the same premises, shall comply with the following:

(1) For other than coaxial conductors, 800.44, 800.53, 800.100, 805.50, 805.93, 805.170(A), and 805.170(B)

(2) For coaxial conductors, 800.44, 820.93, and 820.100

(3) The installation requirements of Part I of Article 300

X22.154 Cable Substitutions.
(A) The substitutions for cables listed in Table X22.154(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in X22.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See X22.135(N).
Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.
Table X22.154(A) Cable Substitutions

Cable Type	Permitted Substitutions
L3P	MP
L2P	MP, CL3P
L3R	MP, CL3P, CMR
L2R	MP, CL3P, CL2P, CMR, CL3R
LTC	one
L3	MP, CL3P, CMR, CL3R, CMG, CM, PLTC
L2	MP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3
L3X	MP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX
L2X	MP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X
PLP	MP
PLR	MP, FPLP, CMR
PL	MP, FPLP, CMR, FPLR, CMG, CM
FNP	one
FCP	FNP
FNR	FNP
FCR	FNP, OFCP, OFNR
FNG, OFN	FNP, OFNR
FCG, OFC	FNP, OFCP, OFNR, OFCR, OFNG, OFN
MUC	one

X22.154 (B) Fire Alarm Cable Substitutions.
The substitutions for fire alarm cables listed in Table 760.154(A) and illustrated in Figure 760.154(A) shall be permitted. Where substitute cables are installed, the wiring requirements of Article 760, Parts I and III, shall apply.
Informational Note: See 800.179 for information on communications cables (CMP, CMR, CMG, CM).
Figure X22.154 (B) Cable Substitution Hierarchy.

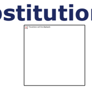
Table X22.154 (B) Cable Substitutions

Cable Type	Permitted Substitutions
FPLP	CMP
FPLR	CMP, FPLP, CMR
FPL	CMP, FPLP, CMR, FPLR, CMG, CM

X22.154 (C) [770.154] Applications of Listed Optical Fiber Cables.
Table X22.154 (C) [770.154(b)] Cable Substitutions

Cable Type	Permitted Substitutions
OFNP	None
OFCP	OFNP
OFNR	OFNP
OFCR	OFNP, OFCP, OFNR
OFNG, OFN	OFNP, OFNR
OFCG, OFC	OFNP, OFCP, OFNR, OFCR, OFNG, OFN

Figure X22.154 (C) [770.154] Cable Substitution Hierarchy.



X22.154 (D) Substitutions for Listed Communications Cables.
The substitutions for communications cables listed in Table 805.154 and illustrated in Figure 805.154 shall be permitted.
Table X22.154 (D) Cable Substitutions

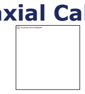
Cable Type	Permitted Substitutions
CMR	CMP
CMG, CM	CMP, CMR
CMX	CMP, CMR, CMG, CM

Figure X22.154 (D) Cable Substitution Hierarchy.

X22.154 (E) Substitutions of Listed CATV Cables.
The substitutions for coaxial cables in Table 820.154 and illustrated in Figure 820.154 shall be permitted.
Informational Note: The substitute cables in Table 820.154 and Figure 820.154 are only coaxial-type cables.
Table X22.154 (E) Coaxial Cable Uses and Permitted Substitutions

Cable Type	Permitted Substitutions
CATVP	CMP, BLP
CATVR	CATVP, CMP, CMR, BMR, BLP, BLR
CATV	CATVP, CMP, CATVR, CMR, CMG, CM, BMR, BM, BLP, BLR, BL
CATVX	CATVP, CMP, CATVR, CMR, CATV, CMG, CM, BMR, BM, BLP, BLR, BL, BLX

Figure X22.135 (E) [Figure 820.154] Coaxial Cable Substitution Hierarchy.



X22.154 (F) Substitutions of Network-Powered Broadband Communications System Cables.
The substitutions for network-powered broadband system cables listed in Table 830.154 shall be permitted.

Table X22.154 (F) Cable Substitutions

Cable Type	Permitted Cable Substitutions
BM	BMR
BLP	CMP, CL3P
BLR	CMP, CL3P, CMR, CL3R, BLP, BMR
BL	CMP, CMR, CM, CMG, CL3P, CL3R, CL3, BMR, BM, BLP, BLR
BLX	CMP, CMR, CM, CMG, CMX, CL3P, CL3R, CL3, CL3X, BMR, BM, BLP, BRP, BL

X22.144 Bundling of Cables Transmitting Power and Data.
Sections 725.144(A) and (B) shall apply to Class 2 and Class 3 circuits that transmit power and data to a powered device over listed cabling. Section 300.11 and Parts I and III of Article 725 shall apply to Class 2 and Class 3 circuits that transmit power and data. The conductors that carry power for the data circuits shall be copper. The current in the power circuit shall not exceed the current limitation of the connectors.

Informational Note No. 1: One example of the use of cables that transmit power and data is the connection of closed-circuit TV cameras (CCTV).

Informational Note No. 2: The 8P8C connector is in widespread use with powered communications systems. IEC 60603-7-2008, *Connectors for electronic equipment — Part 7-1: Detail specification for 8-way, unshielded, free and fixed connectors,* specifies these connectors to have a current-carrying capacity per contact of 1.0 amperes maximum at 60°C (149°F). See IEC 60603-7 for more information on current-carrying capacity at higher and lower temperatures.

Informational Note No. 3: The requirements of Table 725.144 were derived for carrying power and data over 4-pair copper balanced twisted pair cabling. This type of cabling is described in ANSI/TIA 568-C.2-2009, *Commercial Building Telecommunications Cabling Standard — Part 2: Balanced Twisted-Pair Telecommunications Cabling and Components*.

Informational Note No. 4: See TIA-TSB-184-A-2017, *Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling*, for information on installation and management of balanced twisted pair cabling supporting power delivery.

Informational Note No. 5: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems*, for information on installation of cables for PoE lighting systems.

Informational Note No. 6: Rated current for power sources covered in 725.144 is the output current per conductor the power source is designed to deliver to an operational load at normal operating conditions, as declared by the manufacturer. In the design of these systems, the actual current in a given conductor might vary from the rated current per conductor by as much as 20 percent. An increase in current in one conductor is offset by a corresponding decrease in current in one or more conductors of the same cable.

(A) Use of 4-Pair Class 2 or Class 3 Cables to Transmit Power and Data.
Where Type CL3P, Type CL2P, Type CL3R, Type CL2R, Type CL3, or Type CL2 4-pair cables transmit power and data, the rated current per conductor of the power source shall not exceed the ampacities in Table 725.144 at an ambient temperature of 30°C (86°F). For ambient temperatures above 30°C (86°F), the correction factors in Table 310.15(B)(1)(1) or in Equation 310.15(B) shall apply.

Exception: Compliance with Table 725.144 shall not be required for installations where conductors are 24 AWG or larger and the rated current per conductor of the power source does not exceed 0.3 amperes.

Informational Note: One example of the use of Class 2 cables is a network of closed-circuit TV cameras using 24 AWG, 60°C rated, Type CL2R, Category 5e balanced twisted-pair cabling.

(B) Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.
Type CL3P-LP, Type CL2P-LP, Type CL3R-LP, Type CL2R-LP, Type CL3-LP, or Type CL2-LP cables shall be permitted to supply power to equipment from a power source with a rated current per conductor up to the marked current limit located immediately following the suffix "-LP" and shall be permitted to transmit data to the equipment. Where the number of bundled LP cables is 192 or less and the selected ampacity of the cables in accordance with Table 725.144 exceeds the marked current limit of the cable, the ampacity determined from the table shall be permitted to be used.

For ambient temperatures above 30°C (86°F), the correction factors of Table 310.15(B)(1)(1) or Equation 310.15(B) shall apply. The Class 2-LP and Class 3-LP cables shall comply with the following, as applicable:

(1) Cables with the suffix "-LP" shall be permitted to be installed in bundles, raceways, cable trays, communications raceways, and cable routing assemblies.

(2) Cables with the suffix "-LP" and a marked current limit shall follow the substitution hierarchy of 722.135(E) for the cable type without the suffix "-LP" and without the marked current limit.

(3) System design shall be permitted by qualified persons under engineering supervision.

Informational Note: An example of the marking on a 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP(0.6A) 75°C 23 AWG 4-pair". See 722.179(A)(9).

Table X22.144 Ampacities of Each Conductor in Amperes in 4-Pair Class 2 or Class 3 Balanced Twisted-Pair Cables Based on Copper Conductors at an Ambient Temperature of 30°C (86°F) with All Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F), and 90°C (194°F) Rated Cables

	Number of 4-Pair Cables in a Bundle																	
	1–7			8–19			20–37			38–61			62–91			92–192		
	Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating		
AWG	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C
26	1.00	1.23	1.42	0.71	0.87	1.02	0.55	0.68	0.78	0.46	0.57	0.67	0.45	0.55	0.64	NA	NA	NA
24	1.19	1.46	1.69	0.81	1.01	1.17	0.63	0.78	0.91	0.55	0.67	0.78	0.46	0.56	0.65	0.40	0.48	0.55
23	1.24	1.53	1.78	0.89	1.11	1.28	0.77	0.95	1.10	0.66	0.80	0.93	0.58	0.71	0.82	0.45	0.55	0.63
22	1.50	1.86	2.16	1.04	1.28	1.49	0.77	0.95	1.11	0.66	0.82	0.96	0.62	0.77	0.89	0.53	0.63	0.72

Notes:
1. For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision.
2. Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor of 1.4.

Informational Note No. 1: Elevated cable temperatures can reduce a cable's data transmission performance. For information on practices for 4-pair balanced twisted pair cabling, see TIA-TSB-184-A and 6.4.7, 6.6.3, and Annex G of ANSI/TIA-568-C.2, which provide guidance on adjustments for operating temperatures between 20°C and 60°C.

Informational Note No. 2: The per-contact current rating of connectors can limit the maximum allowable current below the ampacity shown in Table 725.144.

X22.144 (C) Class 4 Cable Ampacity.

The ampacity of Class 4 cables shall comply with 300.15 based on the temperature rating of the Class 4 cable for conductors sized 16 AWG to 6 AWG. For conductors sized 24 AWG to 17 AWG, the Class 4 cable shall be rated for the intended ampacity as evidenced by the marking FMP-XXA, where XX is the maximum allowable ampacity permitted.

Informational Note No. 1: See 722.179(A)(16) for additional Class 4 cable requirements.

Informational Note No. 2: See UL 1400-1, *Outline of Investigation for Fault-Managed Power Systems — Part 1: General Requirements*, and UL 1400-2, *Outline of Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for information on determining maximum allowable ampacities.

Part II. Listing Requirements

X22.179 Listing and Marking of Cables.

Cables installed in buildings shall be listed in accordance with X22.179(A) and marked in accordance with X22.179(B), and they shall be permitted to be marked in accordance with X22.179(C).

Exception: Optical fiber cables that are installed in compliance with 770.48 shall not be required to be listed.

(A) Listing of Cables.

Cables installed as wiring methods within buildings shall be listed as resistant to the spread of fire and other criteria in accordance with X22.179(A)(1) through (A)(16).

Informational Note No. 1: See UL 13, *Standard for Power-Limited Circuit Cables*, for applicable requirements for listing of Class 2 and Class 3 cable and power-limited tray cable (PLTC).

Informational Note No. 2: See UL 1424, *Cables for Power-Limited Fire-Alarm Circuits*, for applicable requirements for listing of power-limited fire alarm cable.

Informational Note No. 3: See UL 1651, *Optical Fiber Cable*, for applicable requirements for listing of optical fiber cable.

Informational Note No. 4: See UL 1400-2, *Outline for Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for applicable requirements for listing of Class 4 cable.

(1) Plenum Cable.

Plenum cable shall be listed as suitable for use in ducts, plenums, and other space for environmental air and shall be listed as having adequate fire-resistant and low-smoke producing characteristics. Refer to Table X22.179(B) for plenum cable types.

Informational Note: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*, for the test method used to determine that a cable is low-smoke producing and fire resistant, exhibiting a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less.

(2) Riser Cable.

Riser cable shall be listed as suitable for use in a vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: See ANSI/UL 1666-2012, *Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*, for the cable requirements defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

(3) General-Purpose Cable.

General-purpose cable shall be listed as resistant to the spread of fire and as suitable for general-purpose use, except for use in risers, ducts, plenums, and other space used for environmental air.

Informational Note: See UL 2556, *Wire and Cable Test Methods*, for defining resistant to the spread of fire. One method is to demonstrate that the cables do not spread fire to the top of the tray in the UL Flame Exposure, Vertical Tray Flame Test. The smoke measurements in the test method are not applicable.

A method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the FT4 Vertical Flame Test.

(4) Alternative General-Purpose Cable.

Alternative general-purpose optical fiber cable shall be listed as suitable for general-purpose use, with the exception of risers and plenums, and shall also be resistant to the spread of fire.

Informational Note: See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays, that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(5) Limited-Use Cable.

Limited-use cable shall be listed as suitable for use in dwellings and raceways and shall be listed as resistant to flame spread.

Informational Note: See ANSI/UL 2556, *Standard for Wire and Cable Test Methods,* for one method of determining that cable is resistant to flame spread by testing the cable to the FV-2/VW-1 test.

(6) Type PLTC.

Type PLTC nonmetallic-sheathed, power-limited tray cable shall be listed as being suitable for cable trays, resistant to the spread of fire, and sunlight- and moisture-resistant. Type PLTC cable used in a wet location shall be listed for use in wet locations and marked "wet" or "wet location."

Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.

See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(7) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

Cables that are used for survivability of critical circuits under fire conditions shall comply with either X22.179(A)(7)(a), (A)(7)(b), or (A)(7)(c).

Informational Note: See *NFPA 72*, *National Fire Alarm and Signaling Code*, 12.4.3 and 12.4.4, for additional information on fire alarm CI cable, fire-resistive cable systems, or electrical circuit protective systems used for fire alarm circuits to comply with the survivability requirements to maintain the circuit's electrical function during fire conditions for a defined period of time.

(a) *CI Cables*. CI cables of the types specified in X22.179(A)(1), (A)(2), (A)(3), (A)(4), and (A)(6) and used for survivability of critical circuits shall be marked with the additional classification using the suffix "CI." To maintain its listed fire-resistive rating, CI cable shall only be installed in free air in accordance with X22.24(C). CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of a fire-resistive cable system as covered in X22.179(A)(7)(b).

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables,*and UL 1425, *Cables for Non–Power-Limited Fire-Alarm Circuits*, for information on establishing a rating for CI cable. The *UL Guide Information for Nonpower-limited Fire Alarm Circuits* (HNHT) contains information to identify the cable and its installation limitations to maintain the fire-resistive rating.

(b) *Fire-Resistive Cables*. Fire-resistive cables of the types specified in X22.179(A)(1), (A)(2), (A)(3), (A)(4), (A)(6), and (A)(7)(a) that are part of a fire-resistive cable system shall be identified with the system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the system.

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for information on establishing a rating for a fire-resistive cable system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum fire-resistive rating.

(c) *Electrical Circuit Protective System*. Protectants for cables of the types specified in X22.179(A)(1), (A)(2), (A)(3), (A)(4), and (A)(6) that are part of an electrical circuit protective system shall be identified with the protective system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the protective system.

Informational Note: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems,* for information on establishing a rating for an electrical circuit protective system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain the fire-resistive rating.

(8) Class 3 Single Conductors.

Class 3 single conductors used as other wiring within buildings shall be listed Type CL3 and shall not be smaller than 18 AWG.

Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.

See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(9) Limited Power (LP) Cable.

Class 2 and Class 3 LP cables shall be listed as suitable for carrying power and data up to a specified current limit for each conductor without exceeding the temperature rating of the cable. The cables shall be marked with the suffix "-LP (XXA)" where XXA designates the current limit in amperes per conductor.

Informational Note: An example of the marking on 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP (0.6A) 75°C 23 AWG 4-pair."

(10) Undercarpet Cables.

Undercarpet cable shall be listed as suitable for use under carpet, floor covering, modular tiles, and planks.

Informational Note: See UL 444, *Standard for Safety for Communications Cables*, for the compressive loading test used to determine the suitability of cable for undercarpet use.

(11) Wet Locations.

Cable used in a wet location shall be listed for use in wet locations and be marked "wet" or "wet location" or have a moisture-impervious metal sheath.

(12) Field-Assembled Optical Fiber Cables.

Field-assembled optical fiber cable shall comply with X22.179(A)(12)(a) through (d).

(a) The specific combination of jacket and optical fibers intended to be installed as a field-assembled optical fiber cable shall be one of the types in X22.179(A)(1), (A)(2), or (A)(3) and shall be marked in accordance with Table 179(B).

(b) The jacket of a field-assembled optical fiber cable shall have a surface marking indicating the specific optical fibers with which it is identified for use.

(c) The optical fibers shall have a permanent marking, such as a marker tape, indicating the jacket with which they are identified for use.

(d) The jacket without fibers shall meet the listing requirements for communications raceways in 800.182(A), (B), or (C) in accordance with the cable marking.

(13) Cables Containing Optical Fibers.

Composite optical fiber cables shall be listed as electrical cables based on the type of electrical conductors.

(14) Class 2 and Class 3 Cable Voltage and Temperature Ratings.

Class 2 cables shall have a voltage rating of not less than 150 volts. Class 3 cables shall have a voltage rating of not less than 300 volts. Class 2 and Class 3 cables shall have a temperature rating of not less than 60°C (140°F).

(15) Power-Limited Fire Alarm (PLFA) Cables.

PFLA cables shall comply with X22.179(A)(15)(a) through (A)(15)(d).

(a) Conductors for cables, other than coaxial cables, shall be solid or stranded copper. Coaxial cables shall be permitted to use 30 percent conductivity copper-covered steel center conductor wire.

(b) The size of conductors in a multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG. Conductors of 26 AWG shall be permitted only where spliced with a connector listed as suitable for 26 AWG to 24 AWG or larger conductors that are terminated on equipment or where the 26 AWG conductors are terminated on equipment listed as suitable for 26 AWG conductors.

(c) Cables shall have a voltage rating of not less than 300 volts.

(d) Cables shall have a temperature rating of not less than 60°C (140°F).

(16) Class 4 Cable Construction.

(1) Sizes.

Conductors of sizes not smaller than 24 AWG shall be permitted to be used.

(2) Insulation.

Insulation on conductors shall be rated not less than 450 volts dc.

(3) Voltage Rating.

Cables shall have a voltage rating of not less than 450 volts dc. Voltage ratings shall not be marked on the cables.

(4) Temperature Rating.

Cables shall have a temperature rating of not less than 60°C (140°F).

(5) Cabling.

Cables shall comply with any requirements provided in the listing of the system.

Informational Note: See UL 1400-1, *Outline for Fault-Managed Power Distribution Technologies — Part 1: General Requirements*, for information on determining applicable requirements for the listing of Class 4 power systems. Excessive cable lengths can result in higher capacitance which could affect the safety of the circuit.

X22.179 (B) Marking.

Cables shall be durably marked on the surface in accordance with the following:

(1) The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).

(2) All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).

(3) The proper type designation for the type of cable shall be marked in accordance with Table X22.179(B).

(4) The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.

(5) The AWG size or circular mil area shall be marked.

Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.

(6) The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.

Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.

(7) Voltage ratings shall not be marked on the cables.

Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.

Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.

Table X22.179(B) Cable Type Markings

Cable Type	Cable Marking
lass 4 plenum cable	L4P
lass 3 plenum cable	L3P
lass 2 plenum cable	L2P
ower-limited fire alarm plenum cable	PLP
onconductive optical fiber plenum cable	FNP
onductive optical fiber plenum cable	FCP
lass 4 riser cable	L4R
lass 3 riser cable	L3R
lass 2 riser cable	L2R
ower-limited fire alarm riser cable	PLR
onconductive optical fiber riser cable	FNR
onductive optical fiber riser cable	FCR
lass 4 general-purpose cable	L4
lass 3 general-purpose cable	L3
lass 2 general-purpose cable	L2
ower-limited fire alarm cable	PL
onconductive general-purpose optical fiber cable	FN
onductive general-purpose optical fiber cable	FC
lternative nonconductive general-purpose optical fiber cable	FNG
lternative conductive general-purpose optical fiber cable	FCG
lass 3 cable — limited use	L3X
lass 2 cable — limited use	L2X
ndercarpet cable	MUC

Note: All types of CL2, CL3, and FPL cables containing optical fibers are provided with the suffix "-OF."

(C) Optional Markings.

Cables shall be permitted to be surface marked to indicate special characteristics of the cable materials.

Informational Note No. 1: Examples of these characteristics include, but are not limited to, limited smoke, halogen free, low smoke and halogen free, and sunlight resistant.

Informational Note No. 2: Some examples of optional markings are ST1 to indicate limited smoke characteristics. See UL 2556, *Wire and Cable Test Methods*; HF to indicate halogen free. See in UL 2885, *Outline of Investigation for Acid Gas, Acidity and Conductivity of Combusted Materials*; and LSHF to indicate halogen free and low-smoke characteristics. See IEC 61034-2, *Measurement of smoke density of cables burning under defined conditions — Part 2: Test procedure and requirements*.

X22.179 (D) [800.179] Wires and Cables.

Communications wires and cables, community antenna television cables, and network-powered broadband communications cables shall be listed in accordance with 800.179(A) through (L) and shall have a temperature rating of not less than 60°C (140°F). The temperature rating shall be

marked on the jacket of cables that have a temperature rating exceeding 60°C (140°F).
Conductors in communications cables, other than in a coaxial cable, shall be copper. Cables shall be permitted to contain optical fibers. Cables containing optical fibers shall be marked with the suffix "-OF."

Communications wires and cables and network-powered communications cables shall have a voltage rating of not less than 300 volts; the insulation for the individual conductors, other than the outer conductor of a coaxial cable, shall be rated for 300 volts minimum. The cable voltage rating shall not be marked on the cable or on the under-carpet communications wire.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

Informational Note No. 1: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

Informational Note No. 2: See UL 444-2017, *Standard for Communications Cables*, for information on communications cables.

Informational Note No. 3: See UL1655-2009, *Standard for Community-Antenna Television Cables*, for information on community-antenna television cables.

(A) Plenum Cables.

Type CMP communications plenum cables, Type CATVP community antenna television plenum coaxial cables, and Type BLP network-powered broadband communication low-power plenum cables shall be listed as being suitable for use in ducts, plenums, and other spaces used for environmental air and shall also be listed as having adequate fire-resistant and low-smoke-producing characteristics.

Informational Note: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*, for one method of defining a cable that is low-smoke-producing cable and fire-resistant cable so that the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft).

(B) Riser Cables.

Type CMR communications riser cables, Type CATVR community antenna television riser coaxial cables, Type BMR network-powered broadband communications medium-power riser cables, and Type BLR network-powered broadband communications low-power riser cables shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: See ANSI/UL 1666-2017, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*, for one method of defining fire-resistant characteristics of the cable capable of preventing the carrying of fire from floor to floor.

(C) General-Purpose Cables.

(1) Type CMG.

Type CMG communications general-purpose cables shall be listed as being suitable for general-purpose use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire.

Informational Note: See CSA Vertical Flame Test — Cables in Cable Trays as described in CSA C22.2 No. 0.3-09 (R2019), *Test Methods for Electrical Wires and Cables*, for one method of defining resistance to the spread of fire where the damage (char length) of the cable does not exceed 1.5 m (4 ft 11 in.) or FT4 Flame Test in ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test methods are not applicable.

(2) Types CM, CATV, BM, and BL.

Type CM communications general-purpose cables, Type CATV community antenna television coaxial general-purpose cables, Type BM network-powered broadband communications medium-power general-purpose cables, and Type BL network-powered broadband communications low-power general-purpose cables shall be listed as being suitable for general-purpose use, with the exception of risers and plenums, and shall also be listed as being resistant to the spread of fire.

Informational Note: See UL Flame Exposure in ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables,* for one method of defining *resistance to the spread of fire* where the damage (char length) of the cable does not to exceed 244 cm (8 ft 0 in.). The smoke measurements in the test method are not applicable.

(D) Limited-Use Cables.

Type CMX limited-use communications cables, Type CATVX limited-use community antenna television coaxial cables, and Type BLX limited-use network-powered broadband low-power cables shall be listed as being suitable for use in dwellings and for use in raceway and shall also be listed as being resistant to flame spread.

Informational Note: See ANSI/UL 2556, *Standard for Wire and Cable Test Method*, for one method of determining that cable is resistant to flame spread is by testing the cable to the FV-2/VW-1 flame test.

(E) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

Cables that are used for survivability of critical circuits under fire conditions shall be listed and meet either 800.179(E)(1), (E)(2), or (E)(3).

(1) CI Cables.

Cables specified in 800.179(A) through (C) and used for survivability of critical circuits shall be marked with the additional classification using the suffix "CI." In order to maintain its listed fire rating, CI cable shall only be installed in free air in accordance with 800.24. CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of a fire-resistive cable system as covered in 800.179(E)(2).

Informational Note: See UL 2196, *Standard for Fire Test for Circuit Integrity of Fire-Resistant Power, Instrumentation, Control, and Data Cables*, for one method of defining CI cable by establishing a minimum 2-hour fire resistance rating for the cable as specified in UL 444, *Standard for Safety Communications Cables*.

(2) Fire-Resistive Cable Systems.

Cables specified in 800.179(A) through (C) and 800.179(E)(1) that are part of an electrical circuit protective system shall be fire-resistive cable identified with the protective system number on the product, or on the smallest unit container in which the product is packaged, and shall be installed in accordance with the listing of the protective system.

Informational Note No. 1: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining an electrical circuit protective system rating for the system. UL *Guide Information for Electrical Circuit Integrity Systems (FHIT)* contains information to identify the system and its installation limitations to maintain a minimum fire-resistive rating.

Informational Note No. 2: The listing organization provides information for electrical circuit protective systems (FHIT), including installation requirements for maintaining the fire rating.

(3) Electrical Circuit Protective System.

Protectants for cables specified in 800.179(A) through (E), which are part of an electrical circuit protective system, shall be identified with the protective system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the system.

Informational Note: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for one method of defining an electrical circuit protective system. UL *Guide Information for Electrical Circuit Integrity Systems (FHIT)* contains information to identify the system and its installation limitations to maintain the fire-resistive rating.

(F) Types CMP-LP, CMR-LP, CMG-LP, and CM-LP Limited Power (LP) Cables.

Types CMP-LP, CMR-LP, CMG-LP, and CM-LP communications limited power cables shall be listed as suitable for carrying power and data up to a specified current limit for each conductor without exceeding the temperature rating of the cable where the cable is installed in cable bundles in free air or installed within a raceway, cable tray, or cable routing assembly. The cables shall be marked with the suffix "-LP(XXA)," where XX designates the current limit in amperes per conductor.

Informational Note: An example of the marking on a communications cable with an LP rating is "CMP-LP (0.6A)(75°C) 23 AWG 4 pair," which indicates that it is a 4-pair plenum cable with 23 AWG conductors, a temperature rating of 75°C, and a current limit of 0.6 amperes.

(G) Type CMUC Undercarpet Wires and Cables.

Type CMUC undercarpet communications wires and cables shall be listed as being suitable for undercarpet use and shall also be listed as being resistant to flame spread.

Informational Note: See ANSI/UL 2556, *Standard for Wire and Cable Test Methods*, for one method of determining that cable is resistant to flame spread in accordance with the FV-2/VW-1 flame test.

(H) Communications Wires.

Communications wires, such as distributing frame wire and jumper wire, shall be listed as being resistant to the spread of fire.

Informational Note No. 1: See UL Flame Exposure, Vertical Flame Tray Test in ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for one method of defining *cable flame resistance to the spread of fire* where the cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.

Informational Note No. 2: See CSA Vertical Flame Test — Cables in Cable Trays, as described in CSA C22.2 No. 0.3-09 (R2019), *Test Methods for Electrical Wires and Cables*, for another method of defining *resistance to the spread of fire* is for the damage (char length) of the cable to not exceed 1.5 m (4 ft 11 in.).

(I) Optional Markings.

Cables shall be permitted to be surface marked to indicate special characteristics of the cable materials.

Informational Note: These markings can include, but are not limited to, markings for limited-smoke, halogen-free, low-smoke halogen-free, and sunlight resistance.

X22.179 (E) Plenum Cable Ties.

Cable ties intended for use in other space used for environmental air (plenums) shall be listed as having low smoke and heat release properties.

Informational Note: See NFPA 90A-2018, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, and ANSI/UL 2043-2013, *Standard for Safety Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*, for information on listing discrete products as having low smoke and heat release properties.

X22.179 (F) Optical Fiber Cables.

Optical fiber cables shall be listed and identified in accordance with 770.179(A) through (G) and shall be marked in accordance with Table 770.179. Optical fiber cables shall have a temperature rating of not less than 60°C (140°F). The temperature rating shall be marked on the jacket of optical fiber cables that have a temperature rating exceeding 60°C (140°F).

Informational Note: See UL 1651-2015, *Standard for Optical Fiber Cable, for information on optical fiber cables.*

Table X22.179 (F) Cable Markings

Cable Marking	Type
OFNP	Nonconductive optical fiber plenum cable
OFCP	Conductive optical fiber plenum cable
OFNR	Nonconductive optical fiber riser cable
OFCR	Conductive optical fiber riser cable
OFNG	Nonconductive optical fiber general-purpose cable
OFCG	Conductive optical fiber general-purpose cable
OFN	Nonconductive optical fiber general-purpose cable
OFC	Conductive optical fiber general-purpose cable

(A) Types OFNP and OFCP.

Types OFNP and OFCP nonconductive and conductive optical fiber plenum cables shall be suitable for use in ducts, plenums, and other space used for environmental air and shall also have adequate fire-resistant and low-smoke-producing characteristics.

Informational Note: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*, for one method of defining that a cable has adequate fire-resistant and low-smoke-producing characteristics where the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less.

(B) Types OFNR and OFCR.

Types OFNR and OFCR nonconductive and conductive optical fiber riser cables shall be suitable for use in a vertical run in a shaft or from floor to floor and shall also have the fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: See ANSI/UL 1666-2017, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*, for one method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

(C) Types OFNG and OFCG.

Types OFNG and OFCG nonconductive and conductive general-purpose optical fiber cables shall be suitable for general-purpose use, with the exception of risers and plenums, and shall also be resistant to the spread of fire

Informational Note No. 1: See CSA Vertical Flame Test — Cables in Cable Trays, as described in CSA C22.2 No. 0.3-2009 (R2019), *Test Methods for Electrical Wires and Cables*, for one method of defining *resistant to the spread of fire* for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the test.

Informational Note No. 2: See ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for another method of defining *resistant to the spread of fire* where the cables do not spread fire to the top of the tray in the UL flame exposure, vertical tray flame test. The smoke measurements in the test method are not applicable.

(D) Types OFN and OFC.

Types OFN and OFC nonconductive and conductive optical fiber cables shall be suitable for general-purpose use, with the exception of risers, plenums, and other spaces used for environmental air, and shall also be resistant to the spread of fire.

Informational Note No. 1: See ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for one method of defining *resistant to* *the spread of fire* where the cables do not spread fire to the top of the tray in the UL flame exposure, vertical tray flame test. The smoke measurements in the test method are not applicable.

Informational Note No. 2: See CSA Vertical Flame Test — Cables in Cables Trays, as described in CSA C22.2 No. 0.3-2009 (R2019), *Test Methods for Electrical Wires and Cables*, for another method of defining *resistant to the spread of fire* where the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

Informational Note No. 3: Cable types are listed in descending order of fire resistance rating. Within each fire resistance rating, nonconductive cable is listed first because it is often substituted for conductive cable.

(E) Circuit Integrity (CI), Fire-Resistive Cable System, or Electrical Circuit Protective System.

Cables that are used for survivability of critical circuits under fire conditions shall meet either 770.179(E)(1), (E)(2), or (E)(3).

(1) Circuit Integrity (CI) Cables.

Cables specified in 770.179(A) through (D), and used for survivability of critical circuits, shall be marked with the additional classification using the suffix "CI." In order to maintain its listed fire rating, CI cable shall only be installed in free air in accordance with 770.24. CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of a fire-resistive cable system as covered in 770.179(E)(2).

Informational Note: See UL 2196, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining CI cable for establishing a minimum 2-hour fire resistance rating for the cable as specified in UL 1651, *Optical Fiber Cable*. UL *Guide Information for Optical Cable Fiber (QAYK)* contains information to identify the cable and its installation limitations to maintain the fire-resistive rating.

(2) Fire-Resistive Cables.

Cables specified in 770.179(A) through (D) and 770.179(E)(1) that are part of an electrical circuit protective system shall be fire-resistive cable and identified with the protective system number on the product or on the smallest unit container in which the product is packaged and installed in accordance with the listing of the protective system.

Informational Note: See UL 2196, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for one method of defining an electrical circuit protective system for establishing a rating for the system. UL *Guide Information for Electrical Circuit Integrity Systems (FHIT)* contains information to identify the system and its installation limitations to maintain a minimum fire-resistive rating.

(F) Field-Assembled Optical Fiber Cables.

Field-assembled optical fiber cable shall comply with the following:

(1) The specific combination of jacket and optical fibers intended to be installed as a field-assembled optical fiber cable shall be one of the types in 770.179(A), (B), or (D) and shall be marked in accordance with Table 770.179.

(2) The jacket of a field-assembled optical fiber cable shall have a surface marking indicating the specific optical fibers with which it is identified for use.

(3) The optical fibers shall have a permanent marking, such as a marker tape, indicating the jacket with which they are identified for use.

(4) The jacket without fibers shall meet the listing requirements for communications raceways in 800.182(A), (B), or (C) in accordance with the cable marking.

(G) Optional Markings.

Cables shall be permitted to be surface marked to indicate special characteristics of the cable materials.

Informational Note: These markings can include, but are not limited to, markings for limited-smoke halogen-free, low-smoke halogen-free, and sunlight resistance.

X22.179 (G) Drop Wire and Cable.

Communications wires and cables without a metallic shield, running from the last outdoor support to the primary protector, shall be listed as being suitable for the purpose and shall have current-carrying capacity as specified in 805.90(A)(1)(b) or (A)(1)(c).

X22.179 (H) Network-Powered Broadband Communications Equipment and Cables.

Network-powered broadband communications equipment and cables shall be listed and marked in accordance with 830.179(A) through (C).

Exception No. 1: This listing requirement shall not apply to community antenna television and radio distribution system coaxial cables that were installed prior to January 1, 2000, in accordance with Article 820 and are used for low-power network-powered broadband communications circuits.

Exception No. 2: Substitute cables for network-powered broadband communications cables shall be permitted as shown in Table 830.154.

(A) General Requirements.

The general requirements in 800.179 shall apply.

(B) Network-Powered Broadband Communications Medium-Power Cables.

Network-powered broadband communications medium-power cables shall be factory-assembled cables consisting of a jacketed coaxial cable, a jacketed combination of coaxial cable and multiple individual conductors, or a jacketed combination of an optical fiber cable and multiple individual conductors. The insulation for the individual conductors shall be rated for 300 volts minimum. Cables intended for outdoor use shall be listed as suitable for the application. Cables shall be marked in accordance with 310.8. Type BMU cables shall be jacketed and listed as being suitable for outdoor underground use.

(C) Network-Powered Broadband Communication Low-Power Cables.

Network-powered broadband communications low-power cables shall be factory-assembled cables consisting of a jacketed coaxial cable, a jacketed combination of coaxial cable and multiple individual conductors, or a jacketed combination of an optical fiber cable and multiple individual conductors. The insulation for the individual conductors shall be rated for 300 volts minimum. Cables intended for outdoor use shall be listed as suitable for the application. Cables shall be marked in accordance with 310.8. Type BLU cables shall be jacketed and listed as being suitable for outdoor underground use.

(B) Premises Communications Wires and Cables.

Communications wires and cables shall be listed and marked in accordance with 800.179.

X22.182 Cable Routing Assemblies and Communications Raceways.

Cable routing assemblies and communications raceways shall be listed in accordance with 800.182(A) through (C). Cable routing assemblies shall be marked in accordance with Table 800.182(a). Communications raceways shall be marked in accordance with Table 800.182(b).

Informational Note: See ANSI/UL 2024-5-2015, *Cable Routing Assemblies and Communications Raceways*, for information on listing requirements for both communications raceways and cable routing assemblies.

Table X22.182 (a) Cable Routing Assembly Markings

Type	Marking
Plenum Cable Routing Assembly	Plenum Cable Routing Assembly
Riser Cable Routing Assembly	Riser Cable Routing Assembly
General-Purpose Cable Routing Assembly	General-Purpose Cable Routing Assembly

Table X22.182 (b) Communications Raceway Markings

Type	Marking
Plenum Communications Raceway	Plenum Communications Raceway
Riser Communications Raceway	Riser Communications Raceway
General-Purpose Communications Raceway	General-Purpose Communications Raceway

(A) Plenum Cable Routing Assemblies and Plenum Communications Raceways.

Plenum cable routing assemblies and plenum communications raceways shall be listed as having adequate fire-resistant and low-smoke-producing characteristics.

Informational Note No. 1: See ASTM E84-19B, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or ANSI/UL 723-2018, *Standard Test Method for Surface Burning Characteristics of Building Materials*, for one method of defining cable routing assemblies and communications raceways that have adequate fire-resistant and low-smoke-producing characteristics and exhibit a maximum flame spread index of 25 and a maximum smoke developed index of 50.

Informational Note No. 2: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*, for another method of defining communications raceways that have adequate fire-resistant and low-smoke-producing characteristics and exhibit a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less.

Informational Note No. 3: See 4.3.11.2.6 or 4.3.11.5.5 of NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for information on materials exposed to the airflow in ceiling cavity and raised floor plenums.

(B) Riser Cable Routing Assemblies and Riser Communications Raceways.

Riser cable routing assemblies and riser communications raceways shall be listed as having adequate fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: See ANSI/UL 1666-2017, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*, for one method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor of the cable routing assemblies and communications raceways.

(C) General-Purpose Cable Routing Assemblies and General-Purpose Communications Raceways.

General-purpose cable routing assemblies and general-purpose communications raceways shall be listed as being resistant to the spread of fire.

Informational Note: See ANSI/UL 1685-2015, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for one method of defining resistance to the spread of fire where the cable routing assemblies and communications raceways do not spread fire to the top of the tray.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

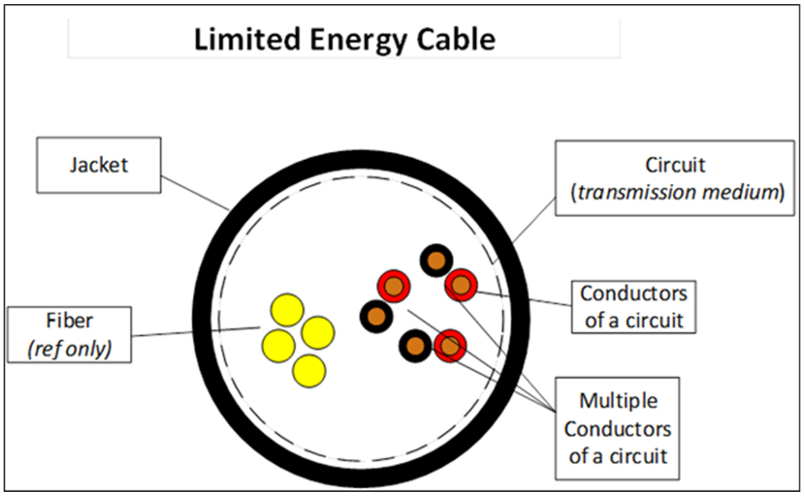
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block

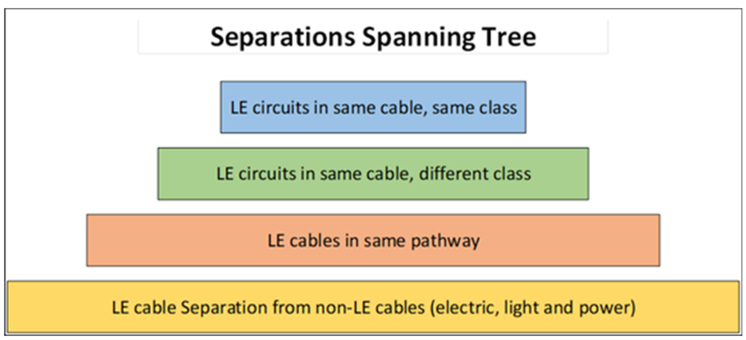


Table 722.xxx (a) ~~800.154(a)~~ Applications of Listed Low Energy ~~Communications~~ Wires, Cables, ~~and Network-Powered Broadband Communications System Cables~~, Listed Optical Fiber Cables in Buildings

Applications		Wire and Cable Type																			
		Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~					
		Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP OFCG,	OFNR, OFCR	OFNG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	Y	N	N	N	N	N	N	N	N	N	Y*	N	N	Y[2]	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y*	Y*	Y*	Y	Y	Y	Y	N	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N	N	N	N	N	N	N	N	Y*	N	N	Y	N	N	N	N	N
	In metal raceway that complies with 300.22(C)	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y*	Y*	Y*	Y	Y	Y	Y	N	Y
	In plenum communications raceways	Y	N	N	N	N	N	N	N	N	N	Y*	N	N	Y	N	N	N	N	N
	In plenum cable routing assemblies	Y	N	N	N	N	N	N	N	N	N	Y*	N	N	Y	N	N	N	N	N
	Supported by open metal cable trays	Y	N	N	N	N	N	N	N	N	N	Y*	N	N	Y	N	N	N	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	Y	Y	N	N	N	N	Y*	Y*	Y*	Y	Y	Y	Y	N	Y
In risers **and vertical runs**	In vertical runs	Y	Y	Y	N	N	N	N	N	N	N	Y*	Y*	N	Y	Y	N	N	N	N
	In metal raceways	Y	Y	Y	Y	Y	Y	N	N	N	N	Y*	Y*	Y*	Y	Y	Y	Y	N	Y
	In fireproof shafts	Y	Y	Y	Y	Y	Y	N	N	N	N	Y*	Y*	Y*	Y	Y	Y	N	N	Y
	In plenum communications raceways	Y	Y	N	N	N	N	N	N	N	N	Y*	Y*	N	Y	Y	N	N	N	N

Applications		Wire and Cable Type																			
		Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~						
		Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP	OFNR, OFCR	OFNG, OFCG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
	In plenum cable routing assemblies	Y	Y	N	N	N	N	N	N	N	N	Y*	Y*	N	Y	Y	N	N	N	N
	In riser communications raceways	Y	Y	N	N	N	N	N	N	N	N	Y*	Y*	N	Y	Y	N	N	N	N
	In riser cable routing assemblies	Y	Y	N	N	N	N	N	N	N	N	Y*	Y*	N	Y	Y	N	N	N	N
	In one- and two-family dwellings	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y*	Y*	Y*	Y	Y	Y	Y[3]	N	Y
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y	Y	Y	Y	N	N	N	N	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In one- and two-family dwellings	Y	Y	Y	Y	Y	Y	Y	N	Y	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	In multifamily dwellings	Y	Y	Y	Y	Y	Y	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	In nonconcealed spaces	Y	Y	Y	Y	Y	Y	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Supported by cable trays	Y	Y	Y	Y	Y	N	N	N	N	N	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	Under carpet, modular flooring, and planks	N	N	N	N	N	N	Y	N	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	In distributing frames and cross-connect arrays	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In rigid metal conduit (RMC) and intermediate metal conduit (IMC)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Applications		Wire and Cable Type																		
		Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~					
Applications		Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP OFCG,	OFNR, OFCR	OFNG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
	In any raceway recognized in Chapter 3	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In plenum communications raceways	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In plenum cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In riser communications raceways	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In riser cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In general-purpose communications raceways	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
	In general-purpose cable routing assemblies	Y	Y	N	Y	N	N	N	N	N	Y	Y*	Y*	Y*	N/A	N/A	N/A	N/A	N/A	N/A
Cables and innerducts installed in metal raceways in a rister having firestops at each floor[2]	**Cables**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways (innerduct)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	N	Y
	Cables in riser communications raceways (innerduct)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	N	Y

Applications		Wire and Cable Type																		
		Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~					
		Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP OFCG,	OFNR, OFCR	OFNG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
	Cables in general-purpose communications raceways (innerduct)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	N	Y
In fireproof riser shafts having firestops at each floor[2]	Cables	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
	Cables in plenum communications raceways or plenum cable routing assemblies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
	Cables in riser communications raceways or riser cable routing assemblies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
In Cable Trays	Outdoors	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N	N	N	N	Y

Applications		Wire and Cable Type																		
		Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~					
		Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP OFCG,	OFNR, OFCR	OFNG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
In cross-connect arrays	Cables, or cables in plenum, riser, or general-purpose communications raceways installed indoors	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
	Cables, and cables in plenum, riser, or general-purpose communications raceways, installed indoors	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	Y
In one-, two-, and multifamily dwellings, and in building locations other than locations covered above	Cables	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y[3]	N	Y
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	N	Y

	Wire and Cable Type																		
	Limited Energy Circuits~~Communications Systems~~										Listed Optical Fiber			~~Limited Energy and Fault Managed Circuits~~					
Applications	Plenum	Riser	BMR	General-Purpose	~~BM~~	Limited-Use	Undercarpet	~~BMU, BLU~~	Hybrid Power and Communications Cables	Communications Wires	OFNP, OFCP OFCG,	OFNR, OFCR	OFNG, OFN OFC	Plenum	Riser	General Purpose	Limited Use	Under Carpet	PLTC
Cables in nonconcealed spaces	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y[4]	N	Y
Under carpet, floor covering, modular flooring, and planks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N	N	N	N	Y	N

Note: An "N" in the table indicates that the cable type shall not be installed in the application. A "Y" indicates that the cable type shall be permitted to be installed in the application subject to the limitations described in **770.110 and 770.113 for Optical Fiber Cables (may need to change this to a 722 clause) and** ~~800.113~~**(722.xxx) for Communications Systems**. The Riser column includes all riser cables except BMR, and the General-Purpose column includes all general-purpose cables except BM.

Informational Note No. 1: Part IV of ~~Article 800~~ **(reference Clause in 722?)** covers installation methods within buildings. This table covers the applications of listed communications wires, cables, and raceways in buildings.

Informational Note No. 2: For information on the restrictions to the installation of communications cables in fabricated ducts, see ~~800.113(B).~~ **722.xxx**

~~Informational Note No. 1: Part V of Article 770 covers installation methods within buildings. This table covers the applications of listed optical fiber cables in buildings. The definition of *Point of Entrance* is in 770.2.~~ **(propose deleting this)**

~~Informational Note No. 2: For information on the restrictions to the installation of optical fiber cables in ducts specifically fabricated for environmental air, see 770.113(B).~~ **(propose deleting this)**

For Limited Energy and Fault Managed Circuits, [1]"N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).

For Limited Energy and Fault Managed Circuits, [2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

For Limited Energy and Fault Managed Circuits, [3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

For Limited Energy and Fault Managed Circuits, [4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. ~~1~~**3**: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. ~~2~~**4**: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. ~~3~~**5**: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. ~~4~~**6**: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

Table 722.xxx~~800.154~~(b) Applications of Listed Communications Raceways in Buildings

Applications		Plenum	Riser	General-Purpose
		Listed Communications Raceway Type		
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	N	N	N
	In metal raceway that complies with 300.22(B)	N	N	N
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N
	In metal raceway that complies with 300.22(C)	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	Supported by open metal cable trays	Y	N	N
	Supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y
In risers	In vertical runs	Y	Y	N
	In metal raceways	Y	Y	Y
	In fireproof shafts	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	In riser cable routing assemblies	N	N	N
	In one- and two-family dwellings	Y	Y	Y
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y
	In one- and two-family dwellings	Y	Y	Y
	In multifamily dwellings	Y	Y	Y
	In nonconcealed spaces	Y	Y	Y
	Supported by cable trays	Y	Y	Y
	Under carpet, modular flooring, and planks	N	N	N
	In distributing frames and cross-connect arrays	Y	Y	Y
	In any raceway recognized in Chapter 3	Y	Y	Y
	In plenum cable routing assemblies	N	N	N
	In riser cable routing assemblies	N	N	N
	In general-purpose cable routing assemblies	N	N	N

Note: An “N” in the table indicates that the communications raceway type shall not be installed in the application. A “Y” indicates that the communications raceway type shall be permitted to be installed in the application, subject to the limitations described in **722.xxx**~~800.110~~ and **722.xxx**~~800.113~~.

Table 722.xxx ~~800.154~~(c) Applications of Listed Cable Routing Assemblies in Buildings

Applications		Listed Cable Routing Assembly Type		
		Plenum	Riser	General-Purpose
In ducts specifically fabricated for environmental air as described in 300.22(B)	In fabricated ducts	N	N	N
	In metal raceway that complies with 300.22(B)	N	N	N
In other spaces used for environmental air (plenums) as described in 300.22(C)	In other spaces used for environmental air	Y	N	N
	In metal raceway that complies with 300.22(C)	N	N	N
	In plenum communications raceways	N	N	N
	Supported by open metal cable trays	Y	N	N
	Supported by solid bottom metal cable trays with solid metal covers	N	N	N
In risers	In vertical runs	Y	Y	N
	In metal raceways	N	N	N
	In fireproof shafts	Y	Y	Y
	In plenum communications raceways	N	N	N
	In riser communications raceways	N	N	N
	In one- and two-family dwellings	Y	Y	Y
Within buildings in other than air-handling spaces and risers	General	Y	Y	Y
	In one- and two-family dwellings	Y	Y	Y
	In multifamily dwellings	Y	Y	Y
	In nonconcealed spaces	Y	Y	Y
	Supported by cable trays	Y	Y	Y
	Under carpet, modular flooring, and planks	N	N	N
	In distributing frames and cross-connect arrays	Y	Y	Y
	In any raceway recognized in Chapter 3	N	N	N
	In plenum communications raceways	N	N	N
	In riser communications raceways	N	N	N
	In general-purpose communications raceways	N	N	N

Note: An "N" in the table indicates that the cable routing assembly type shall not be installed in the application. A "Y" indicates that the cable routing assembly type shall be permitted to be installed in the application subject to the limitations described in **722.xxx**~~800.113~~.

Public Input No. 823-NFPA 70-2023 [Definition: Cable, Limited Use. (Limited-Use Cable)]

Cable, Limited Use. (Limited-Use Cable)

Cables that are intended to be used with protection such as a raceway or for specific restricted applications. (~~722) (~~ CMP-3)

Informational Note: Examples of Limited-Use cables are Types CL2X, CL3X, CMX, CATVX and BLX.

Statement of Problem and Substantiation for Public Input

The definition of limited use cables should not be restricted to Article 722 because there are limited use cables in Chapter 8 also.

Addition of an informational note is recommended to improve usability.

Submitter Information Verification

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Submittal Date:	Sun May 14 04:37:15 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8246-NFPA 70-2024

Statement: The informational note was added to give a few examples without alluding that it is an exhaustive list.

Public Input No. 1204-NFPA 70-2023 [Definition: Class 2 Circuit.]

Class 2 Circuit.

The portion of the wiring system between the load side of a Class 2 power source and the connected equipment. ~~Due to its power limitations, a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock.~~ _ (CMP-3)

Informational Note: Fire initiation is more of a hazard than electrical shock with a Class 2 circuit due to its power limitation

Statement of Problem and Substantiation for Public Input

The second sentence is not a definition of a Class 2 circuit. The informational note was added to keep the content of sentence 2 with the definition. Wording was changed because the word "consider" is not appropriate, a circuit cannot consider anything.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1209-NFPA 70-2023 [New Definition after Definition: Circuit Breaker.]	

Submitter Information Verification

Submitter Full Name: IEC National
Organization: IEC
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Submittal Date: Sun Jun 25 17:19:28 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8249-NFPA 70-2024

Statement: The second sentence of the definition is not a definition. It is appropriate to move it to an informational note. As a circuit cannot consider something, “the design” was added to the front of the informational note.

Public Input No. 3295-NFPA 70-2023 [Definition: Class 2 Circuit.]

Class 2 Circuit.

The portion of the wiring system between the load side of a Class 2 power source and the connected equipment. Due to its power limitations, a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock. (CMP-3)

Informational Note: Some electrical equipment is identified with field connections as SELV (Safety Extra Low Voltage) or PELV (Protected Extra Low Voltage) instead of Class 2 power source but can still meet the requirements for a Class 2 power source in Table 11A or 11B in Chapter 9.

Statement of Problem and Substantiation for Public Input

Many IEC adopted standards have Protected Extra low voltage (PELV) or Safety Extra Low Voltage (SELV) as defined terms that may fit the Class 2 power source requirements defined in table 11A or 11B of chapter 9. A reference to this fact would be helpful as the equipment may not be identified as a class 2 power source, but will be identified as a SELV or PELV output and provide the voltage and current available at the terminals to allow for assessment to the tables in chapter 9.

From IEC PELV
PELV system
electric system in which the voltage cannot exceed the value of extra-low voltage:
under normal conditions and
under single fault conditions, except earth faults in other electric circuits
Note 1 to entry: PELV is the abbreviation for protective extra-low voltage

From IEC –SELV

SELV system
electric system in which the voltage cannot exceed the value of extra-low voltage:
under normal conditions and
under single fault conditions, including earth faults in other electric circuits
Note 1 to entry: SELV is the abbreviation for safety extra-low voltage.

From IEC ELV
voltage not exceeding the maximum value of the prospective touch voltage that is acceptable to be maintained indefinitely under specified conditions of external influences

Submitter Information Verification

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Submittal Date: Thu Aug 31 16:49:33 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: It’s unclear that these power sources would meet the listing requirements in 725.60(A). A user of the NEC needs to be sure that a circuit conforms to the NEC requirements and not rely on an informational note saying “they can meet”.

Public Input No. 1211-NFPA 70-2023 [Definition: Class 3 Circuit.]

Class 3 Circuit.

The portion of the wiring system between the load side of a Class 3 power source and the connected equipment. ~~Due to its power limitations, a Class 3 circuit considers safety from a fire initiation standpoint~~ (CMP-3)

Informational Note: Fire intiation is more of a hazard than electrical shock with a Class 3 circuit due to its power limitation . Since higher levels of voltage and current than ~~for Class 2~~ a Class 2 are permitted, additional safeguards are specified to provide protection from an ~~electric~~ electrical shock hazard that could be encountered. ~~(CMP-3)~~

Statement of Problem and Substantiation for Public Input

The second and third sentences are not a definition of a Class 3 circuit. The informational note was added to keep the content of sentences 2 and 3 with the definition. Wording was changed because the word "consider" is not appropriate, a circuit cannot consider anything.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1209-NFPA 70-2023 [New Definition after Definition: Circuit Breaker.]	

Submitter Information Verification

Submitter Full Name: IEC National
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Submittal Date: Sun Jun 25 18:40:11 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8250-NFPA 70-2024

Statement: The second and third sentences of the definition are not definitions. They are moved to an informational note. As a circuit cannot consider something, “the design” was added to the front of the informational note.

Public Input No. 1960-NFPA 70-2023 [Definition: Class 4 Circuit.]

Class 4 Circuit.

The portion of the wiring system between the load side of a Class 4 transmitter and the Class 4 receiver or Class 4 utilization equipment, as appropriate. (726) (CMP-3)

Informational Note 1: A Class 4 circuit is also commonly referred to as a fault-managed power circuit.

Informational note 2: Due to the active monitoring and control of the voltage and current provided, a Class 4 circuit

~~considers safety~~

is designed from a fire initiation hazard standpoint and provides acceptable protection from electric shock.

~~(726) (CMP-3)~~

~~Informational Note: A Class 4 circuit is also commonly referred to as a fault-managed power circuit.~~

Statement of Problem and Substantiation for Public Input

The second sentence is not a definition of a Class 4 circuit. An informational note was added to keep the content of sentence 2 with the definition. Wording was changed because the word "considers" is not appropriate, a circuit cannot consider anything.

Submitter Information Verification

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Submittal Date:	Tue Aug 08 16:29:16 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8252-NFPA 70-2024

Statement: The second sentence of the definition is not a definition. They are moved to an informational note. As a circuit cannot consider something, “the design” was added to the informational note.726 was deleted from the definition as Class 4 is used in places other than 726.

Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]

Cable Tie.

A band or length of material, employing a locking device, used for bundling, securing, and/or supporting cable, flexible conduit, or flexible tubing.

Informational Note No. 1: See ANSI/UL 62275, Cable Management Systems-Cable Ties for Electrical Installations, for Type designations and additional information.

Informational Note No. 2: The following are cable tie and cable tie fixing device Type designations.

Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Statement of Problem and Substantiation for Public Input

This definition clarifies what a cable tie is, some uses of cable ties for electrical applications (cable management, securement/support). This definition also provides clarity regarding the Type designations of cable ties and the intended use(s). This definition can further clarify proposed PI 300.11(e). This definition is in harmony with the definition found in UL62275.

This is one of several public inputs proposed by the NEMA BI-TI (Cable Tie) Section designed to address the proper application and installation of cable ties.

Related Public Inputs:

New Section:
• 300.11(E) Cable Ties Used As A Means of Securement and Support

New Article 100 Definitions:
• Cable Tie
• Cable Tie Fixing Device
• Cable Tie Integral Device

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3409-NFPA 70-2023 [New Section after 300.11(D)]	

Submitter Information Verification

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Submittal Date: Sat Sep 02 14:32:56 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8962-NFPA 70-2024

Statement: The increased usage of limited energy systems necessitates a clear understanding of terms used for cable support.

Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]

Cable Tie Fixing Device.

A component such as a block or bracket, specifically designed to secure cable tie(s) to a mounting surface.

Informational Note No. 1: See ANSI/UL 62275, Cable Management Systems-Cable Ties for Electrical Installations, for Type designations and additional information.

Informational Note No 2: The following are cable tie and cable tie fixing device Type designations.

Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Statement of Problem and Substantiation for Public Input

This definition helps to clarify what a cable tie fixing device is and the application of the cable tie fixing device with cable ties. This definition also provides clarity regarding the Type designations of cable tie fixing devices and the intended use(s). This definition can further clarify proposed PI 300.11(e), which addresses “Cable Ties Used As A Means of Securement and Support”.

Note from proposed PI 300.11(e)

Cable ties used as a means for securement and support for cable, flexible conduit, and flexible tubing shall be listed and identified for securement and support. If a cable tie fixing device is installed, the cable tie fixing device shall be listed and identified for securement and support. Cable ties shall not be permitted to be installed around framing members.

Informational Note No. 1: A separate cable tie fixing device or a cable tie integral device may be necessary for installation. Cable Tie fixing devices may not be required for all support and securement applications.

This is one of several public inputs proposed by the NEMA BI-TI (Cable Tie) Section designed to address the proper application and installation of cable ties.

Related Public Inputs:

New Section:
• 300.11(E) Cable Ties Used As A Means of Securement and Support

New Article 100 Definitions:
• Cable Tie
• Cable Tie Fixing Device
• Cable Tie Integral Device

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3409-NFPA 70-2023 [New Section after 300.11(D)]	

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Committee: NEC-P03

Committee Statement

Resolution: FR-8963-NFPA 70-2024

Statement: The increased usage of limited energy systems necessitates a clear understanding of terms used for cable support.

Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]

Cable Tie Integral Device.

A single component, as produced, incorporating a cable tie and a cable tie fixing device that are not separable.

Informational Note No. 1: See ANSI/UL 62275, Cable Management Systems-Cable Ties for Electrical Installations, for Type designations and additional information.

Informational Note No. 2: The following are cable tie and cable tie fixing device Type designations.

Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

Type(s) 2S or 21S are also evaluated for securing and supporting cable, flexible conduit, and flexible tubing.

Statement of Problem and Substantiation for Public Input

This definition helps to clarify what a cable tie integral device is. This definition can further clarify "integral fixing device" in proposed PI 300.11(e), which addresses "Cable Ties Used As A Means of Securement and Support".

Informational Note from proposed PI 300.11(e).

Cable ties used as a means for securement and support for cable, flexible conduit, and flexible tubing shall be listed and identified for securement and support. If a cable tie fixing device is installed, the cable tie fixing device shall be listed and identified for securement and support. Cable ties shall not be permitted to be installed around framing members.

Informational Note No. 1: A separate cable tie fixing device or a cable tie integral device may be necessary for installation. Cable Tie fixing devices may not be required for all support and securement applications.

This is one of several public inputs proposed by the NEMA BI-TI (Cable Tie) Section designed to address the proper application and installation of cable ties.

Related Public Inputs:

New Section:
• 300.11(E) Cable Ties Used As A Means of Securement and Support

New Article 100 Definitions:
• Cable Tie
• Cable Tie Fixing Device
• Cable Tie Integral Device

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3409-NFPA 70-2023 [New Section after 300.11(D)]	

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Submittal Date: Sat Sep 02 15:10:25 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8966-NFPA 70-2024

Statement: The increased usage of limited energy systems necessitates a clear understanding of terms used for cable support.

Public Input No. 1209-NFPA 70-2023 [New Definition after Definition: Circuit Breaker.]

TITLE OF NEW CONTENT

Circuit, Power Limited (Power Limited Circuit) - An electrical circuit that is designed from a fire initiation standpoint and provides acceptable protection from electrical shock by limiting the amount of power delivered by the power supply.

Informational Note: Power Limited Circuits are not considered "Prevalent Voltage" even though they operate in the voltage range of 1 volt AC to 120 volts AC and 1 volt DC to 170 volts DC.

Statement of Problem and Substantiation for Public Input

Currently there is not a definition for a power-limited circuit. The definitions for Class 2 and Class 3 circuits contain the definition for Power-Limited Circuits which is confusing to users of the NEC. The scope for Article 725 states "This article covers power-limited circuits, including power-limited remote-control and signaling circuits, that are not an integral part of a device or of utilization equipment." The scope does not state "Class 2 or Class 3 circuits".

Wording was changed because the word "consider" is not appropriate, a circuit cannot consider anything.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1204-NFPA 70-2023 [Definition: Class 2 Circuit.]	
Public Input No. 1211-NFPA 70-2023 [Definition: Class 3 Circuit.]	

Submitter Information Verification

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Committee:	NEC-P03

Committee Statement

Resolution: FR-8254-NFPA 70-2024 - The panel did not include the proposed informational note because it contained an undefined term and the information is not needed.

Statement: It is appropriate to add a definition for Power-Limited Circuit. The scope for Article 725 and the title of Article 722 include the term "power-limited circuits," which was an undefined term.

Public Input No. 1396-NFPA 70-2023 [New Definition after Definition: Fire Alarm Circuit, Power-...]

TITLE OF NEW CONTENT

100 Fished (as applied to wiring methods)

A means of routing wiring methods into the voids of buildings or structures with the use of tools, that otherwise could not feasible be accessed without the removal of building or structure finishes.

Statement of Problem and Substantiation for Public Input

Standard dictionaries do not offer a definition for 'fish' quite the way the electrical industry uses the term. Cables and raceways of Chapter 3 offer fishing as an allowed wiring installation. This new NEC definition for 'fished' aligns with the existing 'Accessible' (as applied to wiring methods) definition.

'Fished' is used frequently and is scattered throughout the NEC; some examples being 330.30D1, 334.30B1, 350.30A Exception 1, 358.30A Exception 2, 760.53A1, and 760.130B1.

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Committee:	NEC-P03

Committee Statement

Resolution: The definition is not needed. The scope of Article 100 states that it is "not intended to include commonly defined general terms..." The 11th Edition of Webster's Collegiate Dictionary defines the transitive verb "fish" as "to pull or draw as if fishing" and specifically uses the example of "fish wires through a conduit."

Public Input No. 3330-NFPA 70-2023 [New Definition after Definition: Limited Care Facility.]

Limited Energy System

Characterized by usage and electrical power limitations that differentiate them from electric light and power circuits. These circuits, cables and equipment are either voltage or current limited, and/or continuously monitored for faults to ensure the energy delivered into any fault is limited for fire prevention and life safety.

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx		

Statement of Problem and Substantiation for Public Input

See attached document.

Submitter Information Verification

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Submittal Date:	Fri Sep 01 09:56:26 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8525-NFPA 70-2024

Statement: The term “Limited-Energy System” is used in new Articles 790, 792, and 794.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

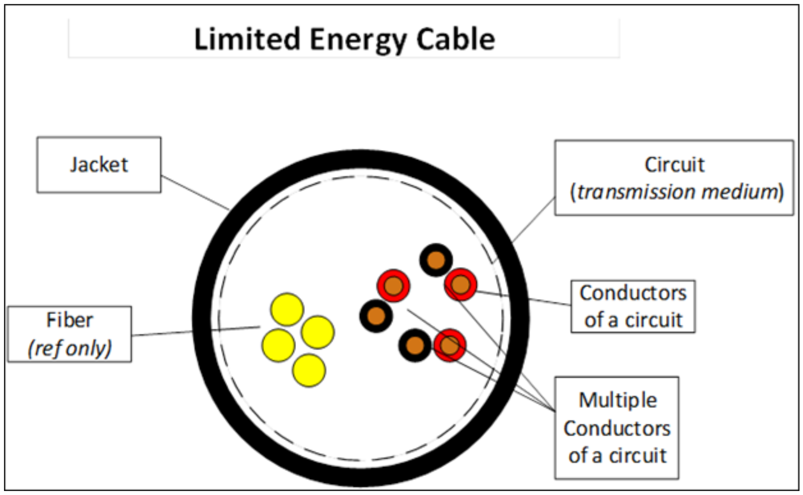
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

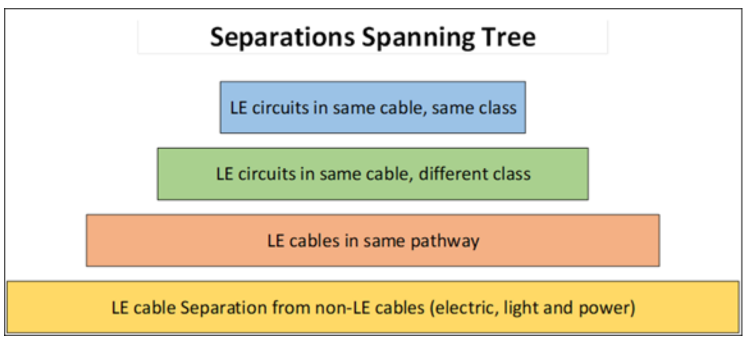
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 4195-NFPA 70-2023 [New Definition after Definition: Slip.]

TITLE OF NEW CONTENT

New definition:

Sleeve:A conduit or raceway that is not continuous between cabinets, boxes, fittings, etc it is a sleeve and not a raceway. Installed for protection from damage and only complete on one end. (Definition would proceed "Slip")

Additional Proposed Changes

File Name	Description	Approved
290720296_5431444623582504_7704444294287004804_n.jpg	Conduit used for protection from damage "sleeve"	

Statement of Problem and Substantiation for Public Input

I feel the definition of "sleeve" needs to be added due to the confusion with conduit fill a sleeve can be filled to 100% of it's volume with no restrictions from the NEC.

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Submittal Date:	Wed Sep 06 20:41:49 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Installers and inspectors are aware of the meaning of the term “sleeve”. Chapter 9 Table 1 Notes (2) and (4) are very clear in describing a sleeve and a nipple. In addition, the proposed definition would not be applicable when the term is used in conjunction with receptacles, such as in sections 555.33(A)(4) and 626.31(C).

Public Input No. 4389-NFPA 70-2023 [New Section after 250.194(B)]

Article 290 Temporary Installations.

290.1 Scope.

The provisions of this article apply to temporary electric power and lighting installations.

290.2 All Wiring Installations.

(A) Other Articles.

Except as specifically modified in this article, all other requirements of this *Code* for permanent wiring shall apply to temporary wiring installations.

(B) Approval.

Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.

290.3 Time Constraints.

(A) During the Period of Construction.

Temporary electric power and lighting installations shall be permitted during the period of construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities.

(B) 90 Days.

Temporary electric power and lighting installations shall be permitted for a period not to exceed 90 days for holiday decorative lighting and similar purposes.

(C) Emergencies and Tests.

Temporary electric power and lighting installations shall be permitted during emergencies and for tests, experiments, and developmental work.

(D) Removal.

Temporary wiring shall be removed immediately upon completion of construction or purpose for which the wiring was installed.

290.4 General.

(A) Services.

Services shall be installed in conformance with Parts I through VIII of Article **230** , as applicable.

(B) Feeders.

Overcurrent protection shall be provided in accordance with 240.4, 240.5 , 245.26, 445.12, and 445.13. Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Single insulated conductors shall be permitted where installed for the purpose(s) specified in 290.3(C) and accessible only to qualified persons.

(C) Branch Circuits.

All branch circuits shall originate in an approved power outlet, switchgear, switchboard or panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4, 240.5, and 245.26. For the purposes of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(1) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Branch circuits installed for the purposes specified in 290.3(B) or 290.3(C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 290.3(B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.

(D) Receptacles.

(1) **All Receptacles.** All receptacles shall be of the grounding type. Unless installed in a continuous metal raceway that qualifies as an equipment grounding conductor in accordance with 250.118 or a continuous metal-covered cable that qualifies as an equipment grounding conductor in accordance with 250.118, all branch circuits shall include a separate equipment grounding conductor, and all receptacles shall be electrically connected to the equipment grounding conductor(s). Receptacles on construction sites shall not be installed on any branch circuit that supplies temporary lighting.

(1) **Receptacles in Wet Locations.** All 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall comply with 406.9(B)(1).

(E) Disconnecting Means.

Suitable disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit. Multiwire branch circuits shall be provided with a means to disconnect simultaneously all ungrounded conductors at the power outlet or panelboard where the branch circuit originated. Identified handle ties shall be permitted.

(F) Lamp Protection.

All lamps for general illumination shall be protected from accidental contact or breakage by a suitable luminaire or lampholder with a guard. Metal guarded sockets shall not be used unless the metal guard is connected to the circuit equipment grounding conductor.

(G) Splices.

A box, conduit body, or other enclosure, with a cover installed, shall be required for all splices.

Exception No. 1: On construction sites, a box, conduit body, or other enclosure shall not be required for either of the following conditions:

(1) *The circuit conductors being spliced are all from nonmetallic multiconductor cord or cable assemblies, provided that the equipment grounding continuity is maintained with or without the box.*

(2) *The circuit conductors being spliced are all from metal-sheathed cable assemblies terminated in listed fittings that mechanically secure the cable sheath to maintain effective electrical continuity.*

Exception No. 2: On construction sites, branch-circuits that are permanently installed in framed walls and ceilings and are used to supply temporary power or lighting, and that are GFCI protected, the following shall be permitted:

(1) *A box cover shall not be required for splices installed completely inside of junction boxes with plaster rings.*

(2) *Listed pigtail-type lampholders shall be permitted to be installed in ceiling-mounted junction boxes with plaster rings.*

(3) *Finger safe devices shall be permitted for supplying and connection of devices.*

(H) Protection from Accidental Damage.

Flexible cords and cables shall be protected from accidental damage. Sharp corners and projections shall be avoided. Where passing through doorways or other pinch points, protection shall be provided to avoid damage.

(I) Termination(s) at Devices.

Flexible cords and cables entering enclosures containing devices requiring termination shall be secured to the box with fittings listed for connecting flexible cords and cables to boxes designed for the purpose.

(J) Support.

Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage. Cable assemblies and flexible cords and cables installed as branch circuits or feeders shall not be installed on the floor or on the ground. Extension cords shall not be required to comply with 290.4(J). Vegetation shall not be used for support of overhead spans of branch circuits or feeders.

Exception: For holiday lighting in accordance with 290.3(B), where the conductors or cables are arranged with strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch-circuit conductors or cables.

290.5 Listing of Decorative Lighting.

Decorative lighting used for holiday lighting and similar purposes, in accordance with ~~590~~ 301 .3(B), shall be listed and shall be labeled on the product.

290.6 Ground-Fault Protection for Personnel.

Ground-fault protection for personnel for all temporary wiring installations shall be provided to comply with 290.6(A) and (B). This section shall apply only to temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This section shall apply to power derived from an electric utility company or from an on-site-generated power source.

(A) Receptacle Outlets.

Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 290.6(A)(1) through (A)(3), as applicable.

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 290.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

(1) **Receptacle Outlets Not Part of Permanent Wiring.** All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel. In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(1) **Receptacle Outlets Existing or Installed as Permanent Wiring.** Ground-fault circuit-interrupter protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(1) **Receptacles on 15-kW or less Portable Generators.** All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.

(B) Other Receptacle Outlets.

For temporary wiring installations, receptacles, other than those covered by 290.6(A)(1) through (A)(3) used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, or similar activities, shall have protection in accordance with 290.6(B)(1) or the assured equipment grounding conductor program in accordance with 290.6(B)(2).

(1) **GFCI Protection.** Ground-fault circuit-interrupter protection for personnel.

(1) **Assured Equipment Grounding Conductor Program.** A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114, 250.138, 406.4(C), 290.4(D).

(1) The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord-and-plug-connected equipment required to be connected to an equipment grounding conductor:

(1) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(1) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(1) All required tests shall be performed as follows:

(1) Before first use on site

(2) When there is evidence of damage

(3) Before equipment is returned to service following any repairs

(4) At intervals not exceeding 3 months

(1) The tests required in 290.6(B)(2)(a) shall be recorded and made available to the authority having jurisdiction.

The assured equipment grounding conductor program shall be documented and made available to the authority having jurisdiction.

Informational Note: See OSHA CFR 1910 and 1926 for requirements for assured equipment grounding conductor programs. See NFPA *70E*, *Standard for Electrical Safety in the Workplace,* for additional information.

290.7 Guarding.

For wiring over 600 volts, nominal, suitable fencing, barriers, or other effective means shall be provided to limit access only to authorized and qualified personnel.

290.8 Overcurrent Protective Devices.

(A) Where Reused.

Overcurrent protective devices that have been previously used and are installed in a temporary installation shall be examined to ensure they have been properly installed and properly maintained, and there is no evidence of impending failure.

Informational Note: See the following standards for further information for properly maintained equipment:

(1) NEMA AB4, *Guidelines for Inspection and Preventive Maintenance of Molded-Case Circuit Breakers Used in Commercial and Industrial Applications.*

(2) NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*

(3) NEMA GD 1, *Evaluating Water-Damaged Electrical Equipment*

(4) IEEE 1458, *IEEE Recommended Practice for the Selection, field Testing, and Life Expectancy of Molded-Case Circuit Breakers for Industrial Applications*

(B) Service Overcurrent Protective Devices.

Overcurrent protective devices for solidly grounded wye electrical services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase, available fault current greater than 10,000 amperes, shall be current limiting.

Statement of Problem and Substantiation for Public Input

Temporary wiring is not a “Special Occupancy” as such it more appropriately belongs in Chapter 2 ”Wiring and Protection” as it involves wiring and protection when under temporary conditions. Temp wiring can be related to any type of occupancies or electrical systems and as such should be in the generally applied code chapters. See companion PIs.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1639-NFPA 70-2023 [Article 590]	
Public Input No. 1639-NFPA 70-2023 [Article 590]	

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Submittal Date: Thu Sep 07 13:48:43 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: "Temporary Wiring" first appeared in the 1971 NEC as Article 305. It remained as Article 305 until the 2002 NEC, when it was moved to Article 527 and renamed "Temporary Installations". The 2005 NEC relocated "Temporary Installations" to Article 590. One of the reasons "Temporary Wiring" was relocated to Chapter 5 was that having the requirements for temporary wiring in Chapter 3 was a violation of 90.3 because it does not apply generally to wiring methods. The new structuring of the NEC for the 2029 edition will find an appropriate location for temporary wiring.

Public Input No. 2242-NFPA 70-2023 [Section No. 300.1(A)]

(A) All Wiring Installations.

This article covers general requirements for wiring methods and materials for all wiring installations <u>included in Chapter 3</u> unless modified by other articles in Chapter 3.

Statement of Problem and Substantiation for Public Input

This added text will clarify that this section is referring to Article 300 wiring methods and doesn't apply to Chapter 7 or Chapter 8 wiring methods for limited energy circuits and cables. Chapter 7 and Chapter 8 have their own general requirements for wiring methods and 300.1(A) should only apply to Chapter 3 wiring methods.

Submitter Information Verification

Submitter Full Name:	Mike Holt
Organization:	Mike Holt Enterprises Inc
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 15 13:15:18 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Many of the requirements in Article 300 and in Chapter 3 apply to subject matter outside of Chapter 3. For example, Chapter 7 and 8 requirements often require compliance with Article 300.

Public Input No. 713-NFPA 70-2023 [Section No. 300.1(A)]

(A) All Wiring Installations.

This article covers general requirements for wiring methods and materials for all wiring installations unless modified by other articles ~~in Chapter 3~~ .

Statement of Problem and Substantiation for Public Input

The current language is in conflict with 90.3. There are numerous rules in Chapters 5 through 7 that modify the rules found in Article 300. Also 90.3 has no provisions for a rule in a Chapter 1 though 4 article to modify another rule in Chapter 1 though 4.

Submitter Information Verification

Submitter Full Name:	Don Ganiere
Organization:	none
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Apr 25 18:24:28 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The section is not in conflict with section 90.3. Section 90.3 does not prohibit Chapter 3 requirements from being modified by other Articles in Chapter 3. The text here in no way changes that. Chapter 3 contains many Articles specific to material and installations. For example, Article 398 “Open Wiring on Insulators” is specific to this installation method and could modify general requirements in Article 300.

Public Input No. 717-NFPA 70-2023 [Section No. 300.1(A)]

(A) All Wiring Installations.

This article covers general requirements for wiring methods and materials for all wiring installations ~~unless~~ covered by the *Code* unless modified by other articles in ~~Chapter 3~~ Chapter 3 or elsewhere in the *Code* .

Statement of Problem and Substantiation for Public Input

As it stands article 300.1(A) contradicts the language in article 90.2(D) in saying that "This article covers general requirements for wiring methods and materials for ALL wiring installations". 90.2(D) covers installations not covered, and as 300.1(A) reads it shall be applied to all electrical installations with no exception to installations not in the scope of the Code. In addition, 300.1 states that it may only be modified by other articles in Chapter 3, when there are other Code sections in chapters 5,6, and 7 that currently modify the rules set forth in article 300. I believe the language could be made to properly define the scope of article 300 and prevent any confusion/improper installations.

Submitter Information Verification

Submitter Full Name:	Trevor Brown
Organization:	International Brotherhood of Electrical Workers (General foreman for White Electric)
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Apr 25 23:13:08 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Section 4.1.4 of the 2023 NEC Style Manual prohibits reference to entire articles, certainly referring to the entirety of the rest of the book falls within the spirit of that prohibition. Furthermore, the submitter is incorrect in stating that this contradicts 90.2(D). If 90.2(D) exempts an installation from complying with the NEC, there is no reason to read anything else in the NEC, including this section, because none of it applies.

Public Input No. 1862-NFPA 70-2023 [Section No. 300.1(C)]

(C) Metric Designators and Trade Sizes.

Metric designators and trade sizes for conduit, tubing, and associated fittings and accessories shall be in accordance with Table 300.1(C).

Table 300.1(C) Metric Designators and Trade Sizes

Metric Designator	Trade Size
12	⅜
16	½
21	¾
27	1
35	1¼
41	1½
53	2
63	2½
78	3
91	3½
103	4
129	5
155	6
205	8

Note: The metric designators and trade sizes are for identification purposes only and are not actual dimensions.

Statement of Problem and Substantiation for Public Input

Limiting conduit to trade sizes 6" max. is restrictive for medium voltage circuits such as 34.5 kV. Utility companies use 8" conduit underground extensively as indicated by one of the major suppliers of cable even indicate in their cable catalog.

Adding this addition would allow conduit manufacturers to pursue an NRTL listing for 8" conduits for use with medium and high voltage applications which is already being manufactured and marketed.

It would only be applicable for underground applications in areas that do not contain hazardous vapors or gases where it doesn't have to terminate aboveground in enclosures. This eliminates the need for 8" conduit bodies or other conduit fittings such as explosion-proof conduit seals, locknuts, cable glands, LBs, T's, etc., normally used in aboveground installations. It is limited to listed conduit and factory elbows of types PVC, HDPE, RTRC, RMC, and IMC due to the issues with bending conduits of this size in the field.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1856-NFPA 70-2023 [Section No. 342.20(B)]	8" conduit
Public Input No. 1857-NFPA 70-2023 [Section No. 344.20(B)]	8" conduit
Public Input No. 429-NFPA 70-2023 [Section No. 352.20(B)]	8" conduit
Public Input No. 430-NFPA 70-2023 [Section No. 353.20(B)]	8" conduit
Public Input No. 1859-NFPA 70-2023 [Section No. 355.20(B)]	8" conduit
Public Input No. 430-NFPA 70-2023 [Section No. 353.20(B)]	
Public Input No. 1856-NFPA 70-2023 [Section No. 342.20(B)]	

Public Input No. 1857-NFPA 70-2023 [Section No. 344.20(B)]
Public Input No. 1875-NFPA 70-2023 [Section No. Table]

Submitter Information Verification

Submitter Full Name: Paul Guidry
Organization: Fluor Enterprises, Inc.
Affiliation: Associated Builders and Contractors
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 06 16:26:57 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8622-NFPA 70-2024

Statement: Limiting conduit to trade sizes 6" max is restrictive for electrical installations. Electrical installation 8" inch conduit is commercially available.

Public Input No. 1066-NFPA 70-2023 [Section No. 300.3(B)(1)]

(1) Paralleled Installations.

Conductors shall be permitted to be run in parallel in accordance with 310.10(G). The requirement to run all circuit conductors within the same raceway, auxiliary gutter, cable tray, trench, cable, or cord shall apply separately to each portion of the paralleled installation, and the equipment grounding conductors shall comply with 250.122. Connections, taps, or extensions made from paralleled conductors shall connect to all conductors of the paralleled set, grounded and ungrounded, as applicable. Section 310.10(G)(1) for minimum sizing shall not be required for tap conductors connected to paralleled sets. Parallel runs in cable trays shall comply with 392.20(C).

Exception: Conductors installed in nonmetallic raceways run underground shall be permitted to be arranged as isolated phase, neutral, and grounded conductor installations. The raceways shall be installed in close proximity, and the isolated phase, neutral, and grounded conductors shall comply with 300.20(B).

Statement of Problem and Substantiation for Public Input

Since the change in the 2020 NEC, connections, taps, or extensions must be made from all parallel conductors in the set. This potentially introduced the tap conductor as a paralleled set. The minimum now being the 1/0 AWG conductor for the tap conductor. I do not think it was the intent to restrict taps conductors made from paralleled sets to have to comply with 310.10(G). However, it would leave some jurisdiction with this conclusion.
Example: 2 sets of 3/0 AWG feeders with a 10-foot tap rule per 240.21(B)(1). The tap conductors would be permitted to have an ampacity of 40-amps, however, since they are required to connect to both 3/0 AWG paralleled conductors, they would be in parallel also, and the minimum would be a 1/0 AWG.

Submitter Information Verification

Submitter Full Name:	Rodney Turco
Organization:	City of San Jose
Affiliation:	City of San Jose
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jun 14 07:15:12 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Tap conductors are not required to be in parallel. The requirement is for the tap conductor to connect to all of the conductors in the parallel set. Article 300 does not have purview over Article 310. Article 310 covers sizing of conductors and is outside of the purview of CMP-3. Conductors being tapped off of parallel conductors do not automatically become parallel.

Public Input No. 791-NFPA 70-2023 [Section No. 300.3(B)(4)]

(4) Column-Width ~~Panelboard Enclosures~~ Panelboards .

Where an auxiliary gutter runs between a column-width panelboard and a pull box, and the pull box includes neutral terminations, the neutral conductors of circuits supplied from the panelboard shall be permitted to originate in the pull box.

Statement of Problem and Substantiation for Public Input

The word "enclosures" is removed from the title as the requirement does not appear to apply to panelboard enclosures.

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:
Submittal Date: Wed May 10 11:22:17 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8625-NFPA 70-2024

Statement: The auxiliary gutter is an extension of the panelboard's enclosure, not the panelboard itself. The text was updated to use the defined term.

Public Input No. 2520-NFPA 70-2023 [New Section after 300.3(C)]

(D) Remote control and Signaling Circuits with Power-Supply Circuits.

Remote control and Signaling circuits shall be permitted to be installed with power-supply conductors as specified in 300.3 (D)(1) through (D)(4). All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

(1) In Cables, Enclosures, or Raceways.

Remote control and Signaling circuits and power-supply circuits shall be permitted to occupy the same cable, enclosure, or raceway without a barrier only where the equipment powered is functionally associated. Remote control and Signaling circuits shall be permitted to be installed together with the conductors of electric light, power, non-power-limited fire alarm systems, and medium-power network-powered broadband communications circuits where separated by a barrier.

(2) In Factory- or Field-Assembled Control Centers.

Remote control and Signaling circuits and power-supply circuits shall be permitted to be installed in factory- or field-assembled control centers.

(3) In Manholes.

Remote control and Signaling circuits and power-supply circuits shall be permitted to be installed as underground conductors in manholes in accordance with one of the following:

(1) The power-supply or Remote control or Signaling circuit conductors are in metal-enclosed cable or Type UF cable.

(2) The conductors are permanently separated from power-supply conductors by continuous firmly fixed nonconductors, such as flexible tubing, in addition to insulation on the wire.

(3) The conductors are permanently and effectively separated from power-supply conductors and securely fastened to racks, insulators, or other approved supports.

(4) In Cable Trays.

Installations in cable trays shall comply with the requirements of one of the following:

(1) Remote control and Signaling conductors and power-supply conductors not functionally associated with the Remote control or Signaling circuit conductors shall be separated by a solid fixed barrier of a material compatible with the cable tray.

(2) Remote control and Signaling circuit conductors and power-supply conductors not functionally associated with the Remote control or Signaling circuit conductors shall be permitted to be installed in a cable tray without barriers where all of the conductors are installed with separate multiconductor Type AC, Type MC, Type MI, or Type TC cables and all the conductors in the cables are insulated for the maximum voltage of any conductor in the cable tray.

OF NEW CONTENT

Type your content here ...

Statement of Problem and Substantiation for Public Input

The added text is the same as 724.48 to allow Class 1 circuits to occupy the same raceways, enclosures, etc. as power wiring. The same installation method should be allowed for Remote control and Signaling circuits.

Submitter Information Verification

Submitter Full Name: Robert Jones
Organization: Independent Electrical Contrac
Street Address:
City:
State:
Zip:
Submittal Date: Sat Aug 19 13:08:22 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding "listing" of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not "listed" for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Public Input No. 3007-NFPA 70-2023 [Section No. 300.3(C)(1)]

(1) 1000 Volts ac, 1500 volts dc, Nominal, or Less.

Conductors of ac and dc circuits rated 1000 volts ac, 1500 volts dc, nominal, or less shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

Secondary wiring to electric-discharge lamps of 1000 volts ac, 1500 volts dc, or less, if insulated for the secondary voltage involved, shall be permitted to occupy the same luminaire, sign, or outline lighting enclosure as the branch-circuit conductors.

Informational Note No. 1: See 725.136(A) for Class 2 and Class 3 circuit conductors.

~~Informational Note No. 2: See 690.31(B) for photovoltaic source and output circuits.~~

Statement of Problem and Substantiation for Public Input

This IN is not necessary since it is merely a pointer to another section. There is no need to point all users of this Code from this general section to the unique requirements of some photovoltaic circuits. Installers of photovoltaic systems use Article 690 for their installations; therefore, they will be aware of modifications made in that article to any general requirements such as these. Furthermore, the IN is no longer accurate as it points to a circuit term that is no longer used. The deletion of this IN#2 would appear to be in alignment with the guidance provided in section 4.1.1 of the NEC Style manual.

Submitter Information Verification

Submitter Full Name: Larry Sherwood
Organization: Sustainable Energy Action Comm
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 16:36:32 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 690 amends the general requirement of this section, and leaving the Informational Note that points to 690.31 gives useful guidance for the Code user.

Public Input No. 3911-NFPA 70-2023 [Section No. 300.3(C)(1)]

(1) 1000 Volts ac, 1500 volts dc, Nominal, or Less.

(a) Insulation Voltage Rating. Conductors of ac and dc circuits rated 1000 volts ac, 1500 volts dc, nominal, or less shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

(b) Electric-Discharge Lamps. Secondary wiring to electric-discharge lamps of 1000 volts ac, 1500 volts dc, or less, if insulated for the secondary voltage involved, shall be permitted to occupy the same luminaire, sign, or outline lighting enclosure as the branch-circuit conductors.

Informational Note No. 1: See 725.136(A) for Class 2 and Class 3 circuit conductors.

Informational Note No. 2: See 690.31(B) for photovoltaic source and output circuits.

Statement of Problem and Substantiation for Public Input

Breaking up 300.3(C)(1) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 10:07:54 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8628-NFPA 70-2024

Statement: The text is separated into paragraphs to meet 3.5.1.2 of the NEC Style Manual. A new Informational Note was added to include Class 4 circuit conductors.

Public Input No. 4143-NFPA 70-2023 [Section No. 300.3(C)(1)]

(1) 1000 Volts ac, 1500 volts dc, Nominal, or Less.

Conductors of ac and dc circuits rated 1000 volts ac, 1500 volts dc, nominal, or less shall be permitted to occupy the same equipment wiring enclosure, cable, or raceway. All conductors shall have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway.

Secondary wiring to electric-discharge lamps of 1000 volts ac, 1500 volts dc, or less, if insulated for the secondary voltage involved, shall be permitted to occupy the same luminaire, sign, or outline lighting enclosure as the branch-circuit conductors.

Informational Note No. 1: See 725.136(A) for Class 2 and Class 3 circuit conductors.

Informational Note No. ~~2:~~ 2: S ee 726.136(A) for Class 4 circuit conductors.

Informational Note No. 3 See 690.31(B) for photovoltaic source and output circuits.

Statement of Problem and Substantiation for Public Input

Just as 725.136(A) is usefully noted in this section, 726.136(A) contains separation requirements that are relevant to users of 300.3.

Submitter Information Verification

Submitter Full Name: Chad Jones
Organization: Cisco Systems
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 18:39:52 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8628-NFPA 70-2024

Statement: The text is separated into paragraphs to meet 3.5.1.2 of the NEC Style Manual. A new Informational Note was added to include Class 4 circuit conductors.

Public Input No. 3353-NFPA 70-2023 [New Section after 300.4]

TITLE OF NEW CONTENT

(I) cables, conduits and raceways embedded in elevator hoistway walls and pit and machine room floors. Where cables, conduits and raceways are encased or embedded in concrete or masonry hoistway walls, pit floor and machine room floor the location shall be indicated by permanent markers set in the walls or floors at intervals of not more than 914mm (3ft.).

Informational Note: The marking should be designed to draw attention to the location and nature of the embedded equipment; it also should be indelible and easily legible through the use of such materials as metal markers and dye markings.

...

Statement of Problem and Substantiation for Public Input

Incidents have occurred where elevator mechanics have drilled into hoistway walls and machine room floors and struck live unmarked conductors. Fortunately, there were no injuries. In the hoistway, it is a common procedure to drill into the concrete to install anchors for rail brackets. The added proposed language adds a requirement to ensure that conductors, cables and other types of wiring methods get marked to avoid being damaged or personal injury.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3361-NFPA 70-2023 [New Section after 620.21(A)(1)]	

Submitter Information Verification

Submitter Full Name:	Kevin Brinkman
Organization:	National Elevator Industry, In
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Sep 01 14:21:37 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The submitter did not provide technical substantiation that the proposed text would solve the identified problem. There are multiple methods to determine the locations of raceways in walls or floors. Permanent markings for encased conduits and cables can be inaccurate once the concrete forms are removed.

Public Input No. 871-NFPA 70-2023 [Section No. 300.4]

300.4 Protection Against Physical Damage.

Where subject to physical damage, conductors, raceways, and cables shall be protected.

(A) Cables and Raceways Through Wood Members.

(1) Bored Holes.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed through bored holes in joists, rafters, or wood members, ~~holes shall be bored so that~~ the ~~edge of the hole is not less than 32 mm (1 1⁄4 in.) from the edges of the wood member. Where this distance cannot be maintained, the~~ cable or raceway shall be protected from penetration by, drills, screws or nails by ~~a steel plate(s) or bushing(s) at~~ two steel plates one on each edge of the wood member, or steel bushing at least 1.6 mm (1⁄16 in.) thick, and of appropriate length and width, installed to cover the area of the wiring.

Exception No. 1: Steel plates or steel bushings shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid PVC conduit, RTRC, or electrical metallic tubing.

Exception No. 2: - ~~A~~ Steel plate(s) or bushings may not be required on one or both edges in larger wood members where the edge of the hole is not less than 89 mm (3-1/2 in) from the edges of the wood member .

Exception No. 3: If the wooden structure is positioned in a place that has a natural protection barrier against drills, nails, or screws. (EX: wood structure against an outer cement wall), a listed and marked steel plate no less than 1.~~6 mm~~ 6 mm (1⁄/ 16 ~~in~~ in .) thick that provides ~~equal or better protection against~~ protection against drill, nail or screw penetration shall ~~be permitted.~~ only be required on the edge of the wood member that is exposed. A listed and marked steel bushing may no less than 1.6 mm (1/16 in.) may also be used in this application.

(2) Notches in Wood.

Where there is no objection because of weakening the building structure, in both exposed and concealed locations, cables or raceways shall be permitted to be laid in notches in wood studs, joists, rafters, or other wood members where the cable or raceway at those points is protected from penetration by drills, nails, or screws by ~~a steel plate~~ two steel plates one on each edge of the wood member, at least 1.6 mm (1⁄16 in.) thick, and of appropriate length and width, installed to cover the area of the wiring. The steel plate shall be installed before the building finish is applied.

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against ~~nail~~ drill, nail or screw penetration shall be permitted.

Exception No. 3: If the wooden structure is positioned in a place that has a natural protection barrier against drills, nails, or screws. (EX: wood structure against an outer cement wall), a listed and marked steel plate no less than 1.6 mm (1/16 in.) thick that provides protection against drill,nail or screw penetration shall only be required on the notched edge of the wood member that is exposed.

(B) Nonmetallic-Sheathed Cables and Electrical Nonmetallic Tubing Through Metal Framing Members.

(1) Nonmetallic-Sheathed Cable.

In both exposed and concealed locations where nonmetallic-sheathed cables pass through either factory- or field-punched, cut, or drilled slots or holes in metal members, the cable shall be protected by listed bushings or listed grommets covering all metal edges that are securely fastened in the opening prior to installation of the cable.

(2) Nonmetallic-Sheathed Cable and Electrical Nonmetallic Tubing.

Where nails or screws are likely to penetrate nonmetallic-sheathed cable or electrical nonmetallic tubing, a steel sleeve, steel plate, or steel clip not less than 1.6 mm (1⁄16 in.) in thickness shall be used to protect the cable or tubing.

Exception: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

(C) Cables Through Spaces Behind Panels Designed to Allow Access.

Cables or raceway-type wiring methods, installed behind panels designed to allow access shall be supported according to their applicable articles.

(D) Cables and Raceways Parallel to Framing Members and Furring Strips.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed parallel to framing members, such as joists, rafters, or studs, or is installed parallel to furring strips, the cable or raceway shall be installed and supported so that the nearest outside surface of the cable or raceway is not less than 32 mm (1¼ in.) from the nearest edge of the framing member or furring strips where nails or screws are likely to penetrate. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1⁄16 in.) thick.

Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: For concealed work in finished buildings, or finished panels for prefabricated buildings where such supporting is impracticable, it shall be permissible to fish the cables between access points.

Exception No. 3: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

(E) Cables, Raceways, or Boxes Installed in or Under Metal-Corrugated Roof Decking.

A cable, raceway, or box, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the cable, raceway, or box. A cable, raceway, or box shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.

> Informational Note: Roof decking material is often repaired or replaced after the initial raceway or cabling and roofing installation and might be penetrated by screws or other mechanical devices designed to provide "hold down" strength of the waterproof membrane or roof insulating material.

Exception No. 1: Rigid metal conduit and intermediate metal conduit, with listed steel or malleable iron fittings and boxes, shall not be required to comply with 300.4(E).

Exception No. 2: The 38 mm (1½in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

(F) Cables and Raceways Installed in Shallow Grooves.

Cable- or raceway-type wiring methods installed in a groove, to be covered by wallboard, siding, paneling, carpeting, or similar finish, shall be protected by 1.6 mm (1⁄16 in.) thick steel plate, sleeve, or equivalent or by not less than 32-mm (1¼-in.) free space for the full length of the groove in which the cable or raceway is installed.

Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid PVC conduit, RTRC, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

(G) Fittings.

Where raceways contain 4 AWG or larger insulated circuit conductors, and these conductors enter a cabinet, a box, an enclosure, or a raceway, prior to the installation of conductors, the conductors shall be protected in accordance with any of the following:

(1) An identified fitting providing a smoothly rounded insulating surface

(2) A listed metal fitting that has smoothly rounded edges

(3) Separation from the fitting or raceway using an identified insulating material that is securely fastened in place

(4) Threaded hubs or bosses that are an integral part of a cabinet, box, enclosure, or raceway providing a smoothly rounded or flared entry for conductors

Conduit bushings constructed wholly of insulating material shall not be used to secure a fitting or raceway. The insulating fitting or insulating material shall have a temperature rating not less than the insulation temperature rating of the installed conductors.

(H) Structural Joints.

A listed expansion/deflection fitting or other approved means shall be used where a raceway crosses a structural joint intended for expansion, contraction, or deflection, used in buildings, bridges, parking garages, or other structures.

Additional Proposed Changes

File Name	Description	Approved
EXHIBIT_A_CODE_PETITION_SUMMARY.pdf	Code petition summary and substantial justification document	
EXHIBIT_B_NFPA_Home_Electrical_Fires_Full_Report_2012-2016.pdf	Supporting document for amendment justification	
EXHIBIT_C_NFPA_Home_Electrical_Fires_Supporting_Tables_2012_-_2016.pdf	Supporting document study tables	
EXHIBIT_D_Effectiveness_of_Circuit_Breakers_in_Mitigation_of_Arc_Faults_UL_2011.pdf	Supporting document	
EXHIBIT_E_Causes_of_Electrical_Fires_The_hidden_dangers_of_arc_fault_Siemens_2018.pdf	Supporting statistics	
EXHIBIT_F_Arc_Faults_The_Hidden_Fire_Risk_Revealed_Schneider_Electric_2020.pdf	Supporting document	
EXHIBIT_G_Typical_TV_and_Monitor_Monitor_Mount_Kits_Instructions_2021.pdf	Supporting Document	
EXHIBIT_H_House_Logic_By_Realtors_Find_and_Prevent_Electrical_Fires_In_Your_Home_2021.pdf	Supporting Document	
.1684772184046	Supporting Document	
EXHIBIT_K_U.S_Fire_Administration_Residential_Building_Electrical_MalfunctionFire_Trends_2011-2020.pdf	Supporting Statistic Document	
EXHIBIT_L_ISHN_Electrical_malfunctions_a_top_cause_of_home_fires_in_the_US.pdf	Supporting Document	
EXHIBIT_M_Home_Depot_DIY_Built_in_Bookshelves_Online_Project_Guide.pdf	Supporting Document	
NFPA_Public_Comment_No_20_-_05.19.23_V2_ML_revised.pptx	Justification Power Point Presentation	

Statement of Problem and Substantiation for Public Input

The problem / Issue this Input is intended to resolve is the penetration of wires as they pass through wood members. In todays construction environment code 300.4.1 bored holes - specifically the 1-1/4in. dimension is not adequate protection against wires passing through wood members. The fact that the code exists recognizes the potential for wires to be damaged. This input addresses todays construction and "do it yourself" modifications to residential homes etc. The uploaded support documents are summarized in Exhibit A document "Code Petition Summary / Justification. It is supported by multiple studies / exhibits which have been uploaded to the public input site The submitter is willing to present this data to the code making panel and if desired also to any subcommittee that may be tasked with the review of this submission.

Submitter Information Verification

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State:

Zip:

Submittal Date: Mon May 22 11:35:57 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: The submitter has not provided proper substantiation for this level of change and restrictive protection approach. There is no correlation between the proposed revisions and the fires in the provided reports. The Code currently does not prevent the installation of the protection proposed by the submitter. As such, the proposed protection could be provided at the discretion of the installer.

NFPA RESEARCH

HOME ELECTRICAL FIRES

Richard Campbell
March 2019

Key Findings

Fires involving electrical failure or malfunction

- Local fire departments responded to an estimated average of 44,880 home fires involving electrical failure or malfunction each year in 2012-2016.
- Home fires involving electrical failure or malfunction caused an estimated average of 440 civilian deaths and 1,250 civilian injuries each year in 2012-2016, as well as an estimated $1.3 billion in direct property damage a year.
- Electrical distribution, lighting, and power transfer equipment accounted for half (50%) of home fires involving electrical failure or malfunction, followed by cooking equipment (15%), heating equipment (9%), fans (6%), air conditioners (3%), and clothes dryers (3%).
- Nearly two of five fires (39%) involving electrical failure or malfunction occurred in the cold weather months from November through February. These fires were less likely to occur in the overnight hours between midnight and 8 a.m. (22% of total), but fires during this time period accounted for 60% of the civilian deaths.

Fires involving electrical distribution and lighting equipment[1]

- Local fire departments responded to an estimated average of 35,150 home fires involving electrical distribution and lighting equipment each year in 2012-2016.
- Home fires involving electrical distribution and lighting equipment caused an estimated average of 490 civilian deaths and 1,200 civilian injuries each year in 2012-2016, as well as an estimated $1.3 billion in direct property damage a year.
- Home fires involving electrical distribution and lighting equipment most often originated in a bedroom (17% of total), attic or ceiling (12%), or a wall assembly or concealed space (9%).
- Approximately one-quarter (24%) of these fires occurred between midnight and 8 a.m., but these fires accounted for 60% of deaths.

[1] Estimates exclude the six structure fire incident types for confined cooking fires, chimney or flue fires, fuel burner or boiler fires, incinerator, compactor, or trash fires.

Home Electrical Fires

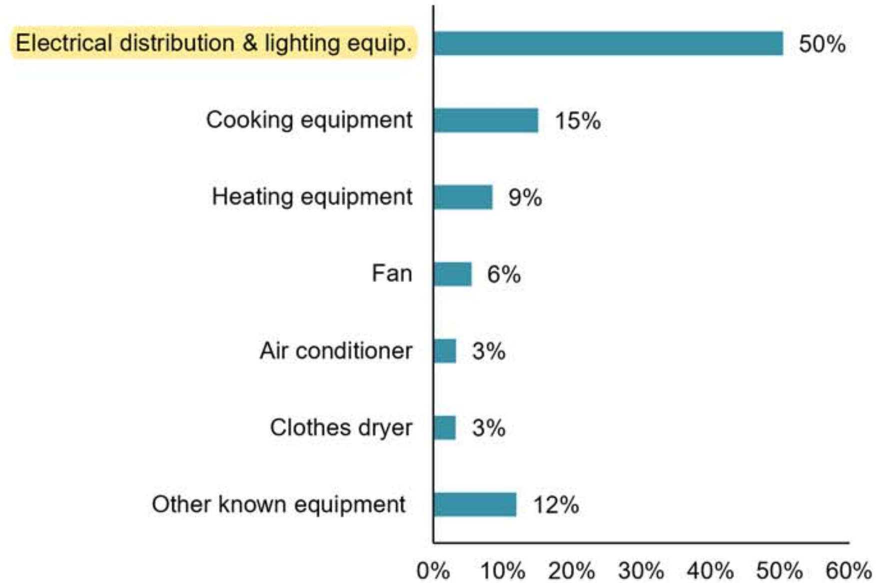
Home electrical fires can start in wiring, electrical distribution systems, and lighting equipment, as well as in any equipment powered by electricity such as cooking, heating, office and entertainment equipment, washers and dryers, as well as electrical distribution or lighting equipment. To better understand if these types of fires can be prevented through code changes, equipment changes, and/or public education, this report splits home electrical fires into two groups, based on data from two separate data elements in the National Fire Incident Reporting System (NFIRS):

1. Fires in which electrical failure or malfunction is a factor contributing to ignition.

2. Fires involving electrical distribution and lighting equipment. These are fires in which electrical distribution or lighting equipment are somehow involved in a fire's ignition. The form of involvement could include electrical failure or malfunction but may also involve other types of involvement, such as serving as a heat source by being in close proximity to combustible material or by overloaded equipment.

Figure 1 shows the types of equipment involved in home fires in which electrical failure or malfunction contributed to ignition. As indicated, electrical distribution and lighting equipment accounts for half of these fires.

Figure 1. Home Fires Involving Electrical Failure or Malfunction by Equipment Involved in Ignition 2012-2016



Home Fires Involving Electrical Failure or Malfunction

Electrical failures or malfunctions are a leading factor in the ignition of fires in U.S. homes. Electrical failures or malfunctions were responsible for 13% of home structure fires in 2012-2016, ranking as the second leading contributing factor behind fires caused by unattended equipment. Electrical failure or malfunction fires also accounted for nearly one-fifth (18%) of civilian deaths (the second leading contributing factor behind fires caused by heat sources too close to combustibles), 11% of civilian injuries, and accounted for the greatest share of direct property damage (20%).

Types of Electrical Failure or Malfunction Contributing to the Ignition of Home Fires

As shown in Figure 2, home fires due to electrical failure or malfunction primarily involve some form of arcing, which results from an unintentional discharge of electrical current between conductors. Given sufficient time and level of current, arc faults can produce enough heat to ignite a fire. Arc faults are produced by damaged conductors and connectors and may involve damaged wiring, frayed appliance cords, loose connections in wall outlets, or faulty switches and junction boxes. Arc faults may originate in different areas of the home or virtually any electrical fixture or equipment.

Electrical fault sparks fire that displaces residents

An electrical fault in a ceiling fan was blamed for an early morning fire in a multifamily residence.

Firefighters were dispatched to the fire following a 911 call from one of the occupants after a smoke alarm in his unit activated just after midnight. On arrival, crews reported fire on the second floor of a two-and-a-half-story wood-frame structure.

The fire escalated to four alarms before firefighters were able to knock it down. News reports indicated that 11 occupants were displaced by the fire, but none were injured. One firefighter was reported to have suffered a back injury at the scene.

Investigators determined that the fire was caused by an electrical short circuit in a ceiling fan in a second-floor bathroom.

The building was composed of five residential units. According to news reports, a city inspector indicated that he did not find the number of smoke alarms in the building that were required by municipal codes. The building did not have sprinkler protection.

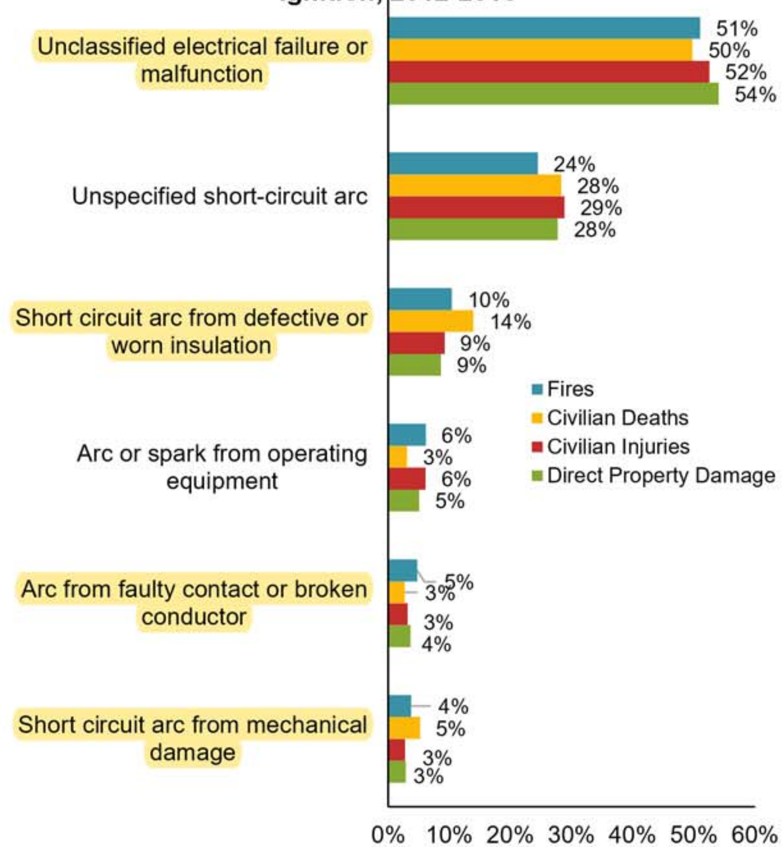
The fire caused an estimated $500,000 in damage to the structure and an additional $500,000 in damage to its contents.

Source: Richard Campbell, "Firewatch," *NFPA Journal*, July/August, 2018.

- Short circuits from defective and worn insulation caused 14% of civilian home fire deaths as shown in Figure 2. This can be caused when cords are pinched by doors or furniture or through repetitive flexing of appliance cords. It can also be due to damaged wiring inside walls from nails, screws, or drill bits that puncture insulation during ordinary activities like hanging a picture. Even electrical cords running under carpets can generate enough heat to produce an arc fault.

- Aging electrical systems in older homes can be a source of arc faults, either through normal wear and tear or because the systems cannot accommodate the greater demands of modern appliances. Circuits can also be overloaded by providing electricity to too many appliances, often through power cords.

Figure 2. Home Fires Involving Electrical Failure or Malfunction by Factor Contributing to Ignition, 2012-2016*



Trends in Home Fires Involving Electrical Failure or Malfunction

The number of home fires involving electrical failure or malfunction has followed a distinct downward trend since 1980, despite year-to-year fluctuations. From a peak of 75,000 fires in 1980, the estimated number of fires involving electrical failure or malfunction has fallen to fewer than 60,000 annual fires since 1998 and fewer than 50,000 each year since 2008, with the 40,900 fires in 2012 representing a new low point (Figure 3).

A recent NFPA report on home structure fires by Marty Ahrens found that overall home structure fires have plateaued over the past two decades. The continued, if uneven, decline in home fires involving electrical failure or malfunction over this same period suggests that this is an area of relative progress. The data indicate that civilian deaths in these fires have not followed a similar downward trend to that seen in fires, showing distinct fluctuations from year to year (Figure 4).

Figure 3. Home Fires Involving Electrical Failure or Malfunction, 1980-2016

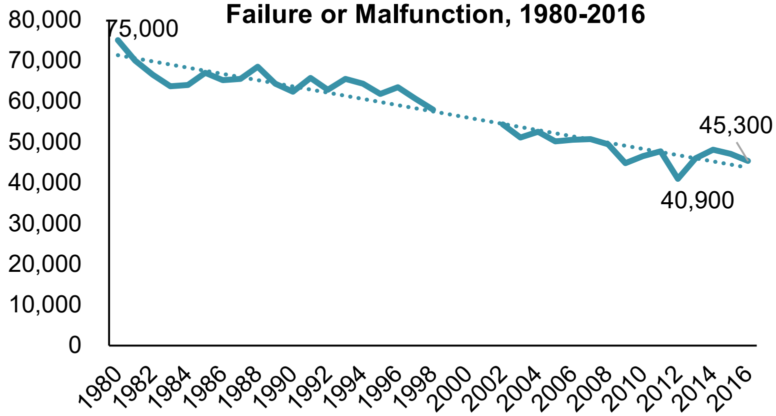
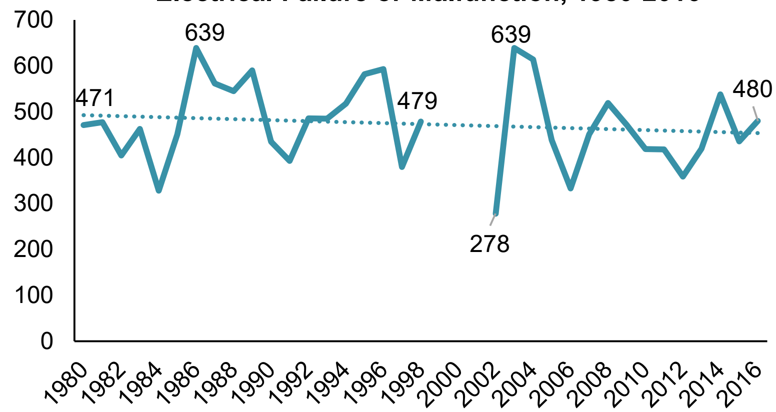


Figure 4. Civilian Deaths in Home Fires Involving Electrical Failure or Malfunction, 1980-2016

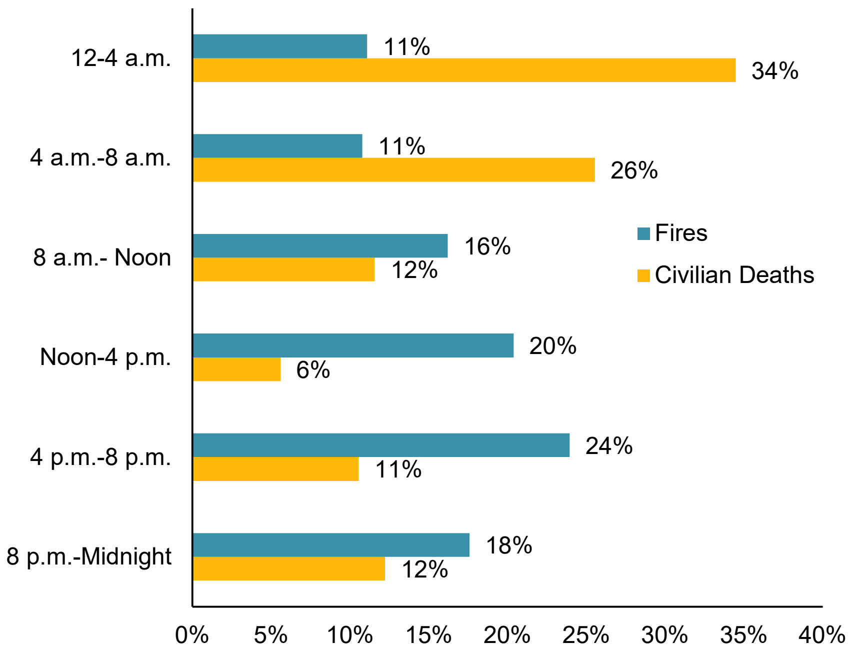


Note: Because of low participation in NFIRS Version 5.0 during 1999-2001, data from these years is not reported in these graphs.

When do home fires involving electrical failure or malfunction occur?

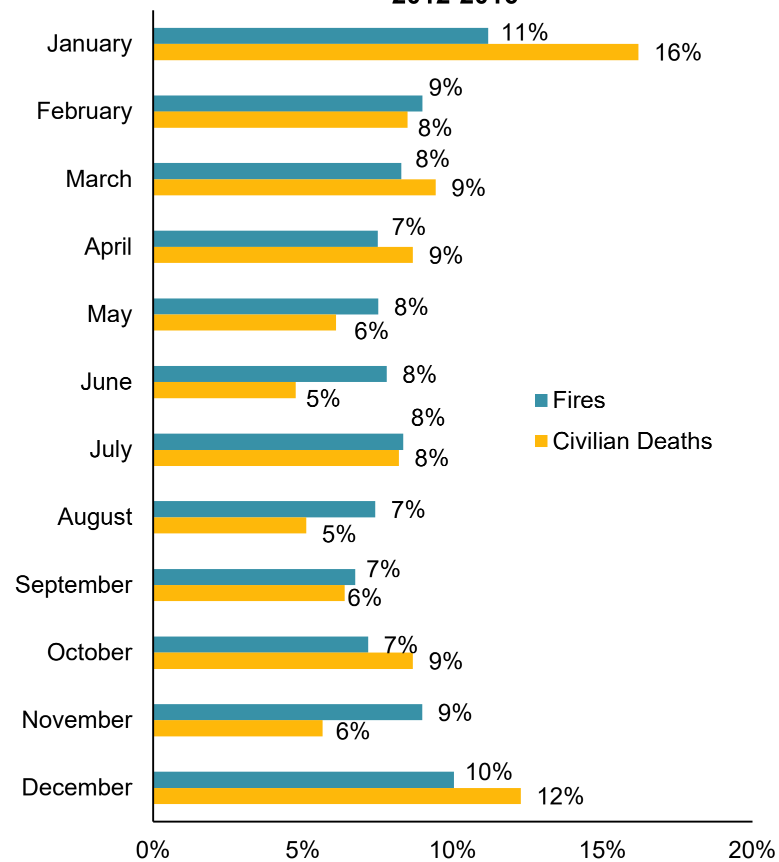
Home fires involving electrical failure or malfunction are less likely to occur in the overnight hours between midnight and 8 a.m. (22% of total), but these fires account for 60% of the civilian deaths. Fires that occur during the night when most people are asleep are more likely to be fatal. Working smoke alarms can provide an early warning of fire and allow additional time for evacuation.

Figure 5. Home Fires Involving Electrical Failure or Malfunction, by Time of Day 2012-2016



The peak months for home fires involving electrical failure or malfunction are November through March (47% of total), and these fires account for 52% of the civilian deaths. This is the time of year when more time is spent indoors, leading to an increased use of electrical equipment.

Figure 6. Home Fires Involving Electrical Failure or Malfunction by Month 2012-2016

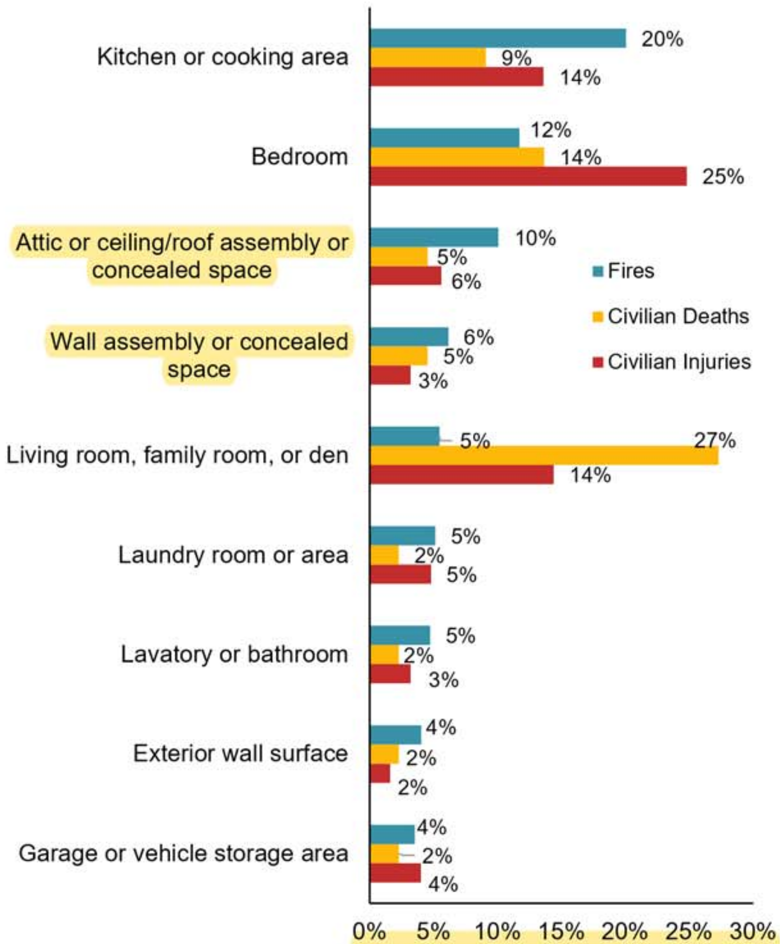


Area of Origin in Home Fires Involving Electrical Failure or Malfunction

One in five home fires (20%) involving electrical failure or malfunction originated in a kitchen or cooking area, with another 12% originating in a bedroom and 10% originating in an attic or ceiling/roof assembly or concealed space. Electrical failures or malfunctions within the wall assembly or concealed space is the fourth leading area of origin for these fires.

Fires originating in a living room, family room, or den accounted for a disproportionately large share of civilian deaths, while those originating in a bedroom accounted for a disproportionately large share of civilian injuries.

Figure 7. Area of Origin in Home Fires Involving Electrical Failure or Malfunction 2012-2016*



*Only leading areas of origin shown

Home Fires Involving Electrical Distribution and Lighting Equipment

Electrical distribution and lighting equipment was the third leading type of equipment involved in fires in U.S. homes in 2012-2016, accounting for 10% of fires (behind cooking equipment and heating equipment). These fires accounted for a disproportionate share of home fire deaths (19%) and direct property damage (20%), as well as 10% of civilian injuries.

The previously mentioned change in data entry rules for incidents with an equipment-related heat source or factor contributing to ignition in 2012 is likely to have influenced estimates of electrical distribution and lighting equipment fires.

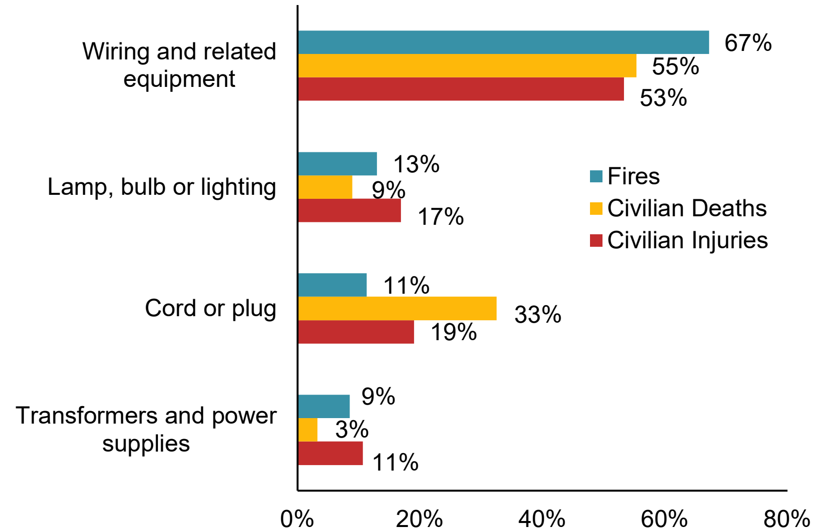
Types of Electrical Distribution and Lighting Equipment Involved in Home Fires

As shown in Figure 8, wiring and related equipment accounted for two-thirds of home fires caused by electrical distribution and lighting equipment and the same share of direct property damage, as well as over half of the civilian deaths and injuries.

Faulty wiring in concealed spaces, such as attics or behind walls, is particularly dangerous because it can start fires that burn for a prolonged period of time before detection.

Aluminum wire connections have been found to be prone to deterioration that results in increased resistance to electric current, with the cumulative damage capable of producing hazardous overheating, leading the Consumer Product Safety Commission (CPSC) to recommend that home aluminum wiring be replaced or repaired by a qualified electrician to reduce the potential for fire.

Figure 8. Types of Electrical Distribution or Lighting Equipment Involved in Home Fires, 2012-2016*

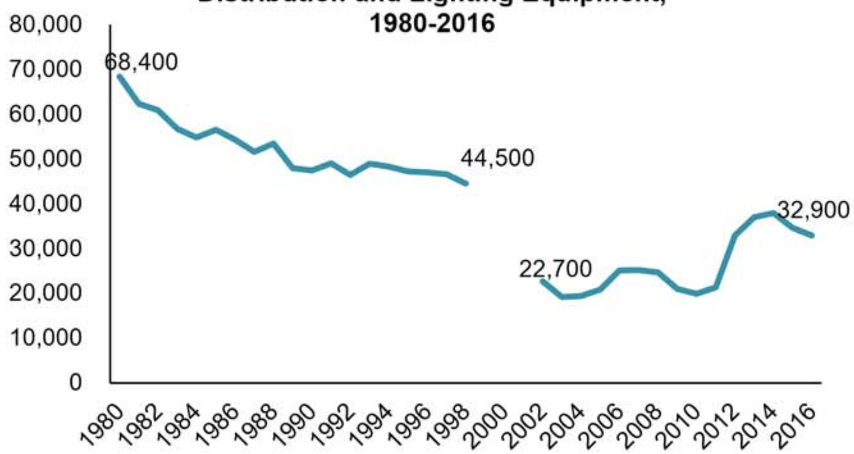


*All data in this section are non-confined fires only.

Trends in Home Fires Involving Electrical Distribution and Lighting Equipment

Home fires involving electrical distribution or lighting equipment showed a steady downward trend between 1980 and 1998, declining by about one-third during this period. See Figure 9. Following the introduction of a new version of NFIRS (NFIRS 5.0) and a transition period of 1999-2001, the downward trend was arrested and even reversed between 2011 and 2014 before falling again in 2015 and 2016, although fires are still well below those reported prior to 1999. A 2012 change in NFIRS data entry rules which required a valid entry in the "equipment involved in ignition" field for incidents having an equipment-related heat source or contributing factor had the largest impact on estimates of electrical distribution or lighting equipment fires.

Figure 9. Home Fires Involving Electrical Distribution and Lighting Equipment, 1980-2016



Note: Because of low participation in NFIRS Version 5.0 during 1999-2001, data from these years is not reported in this graph.

Electrical wiring causes house fire that kills elderly resident

An elderly resident died when degraded electrical wiring ignited combustible material in a wall cavity in the kitchen of his residence.

The fire department was summoned to the scene following a neighbor's call to 911 at 1:15 a.m., but investigators estimated that the fire had burned for an hour before it was detected.

According to news reports, firefighters found flames shooting from the rear of the house upon arrival, but they located the victim on a couch in a front room and quickly rushed him to the hospital. The victim, who had a mobility disability, succumbed to smoke inhalation injuries shortly afterwards.

Reports indicated that the resident had an unspecified physical disability.

The house was equipped with smoke alarms in the living room, bedroom, and on the second floor, and the engine company indicated that they were activated by the fire. It did not have sprinkler protection.

The house was a two story building with brick walls, a wooden roof frame, and an asphalt roof deck. It occupied a ground floor area of 700 square feet (65 square meters).

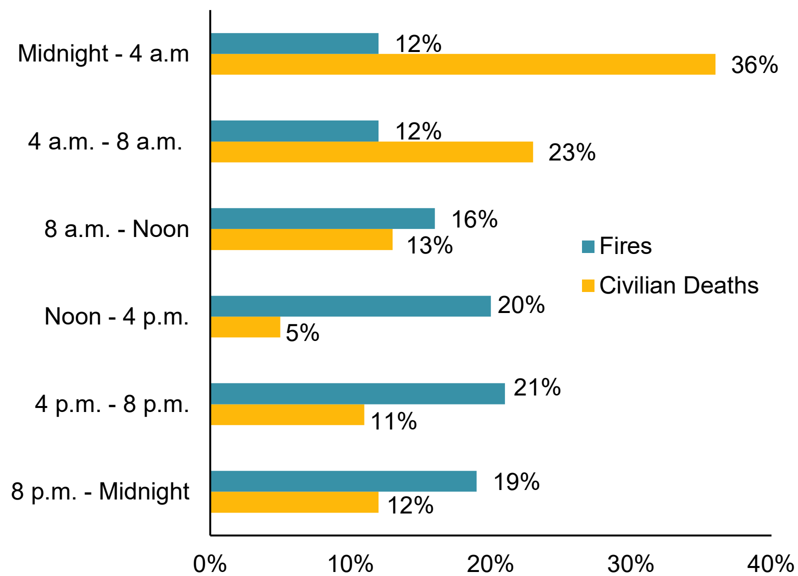
The house, valued at $80,000, and its contents, with an estimated value of $50,000, were a total loss.

Source: Richard Campbell, "Firewatch," *NFPA Journal*, January/February, 2017.

When do Home fires involving electrical distribution and lighting equipment occur?

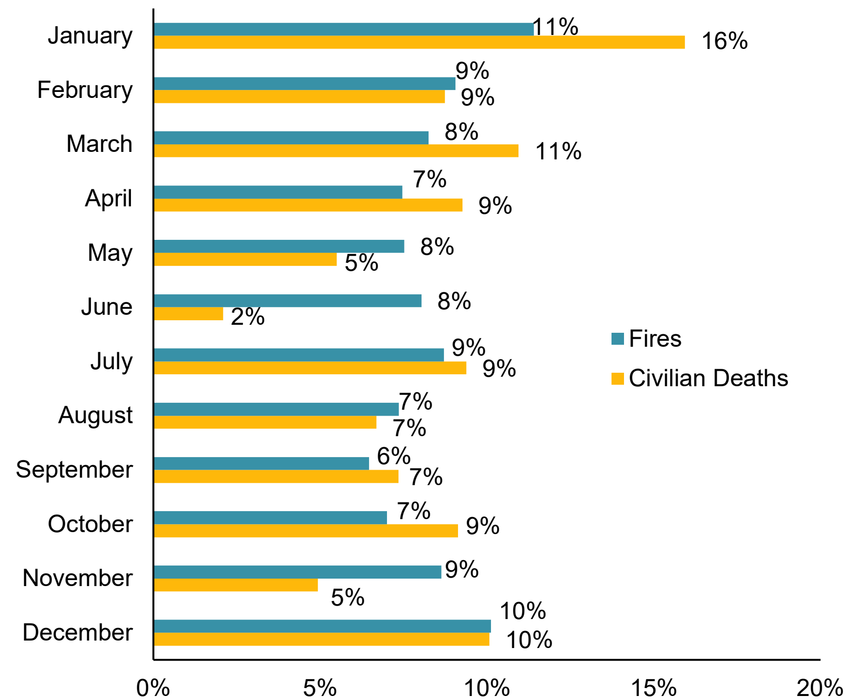
Home fires involving electrical distribution and lighting equipment are less likely to occur in the overnight hours between midnight and 8 a.m. (24% of total), but these fires account for three of five (59%) of the civilian deaths, reflecting the likelihood that people are more apt to be in the home and asleep than in the daytime hours. See Figure 10.

Figure 10. Home Fires Involving Electrical Distribution and Lighting Equipment by Time of Day, 2012-2016



As with fires caused by electrical failure or malfunction, the peak months for home fires involving electrical distribution or lighting equipment are November through March (47% of total). These fires also account for 51% of civilian deaths. This again is likely to reflect the greater tendency for people to be in the home and using electrical equipment during the cold weather months. Another one-quarter (24%) of fires occur from May through July. See Figure 11.

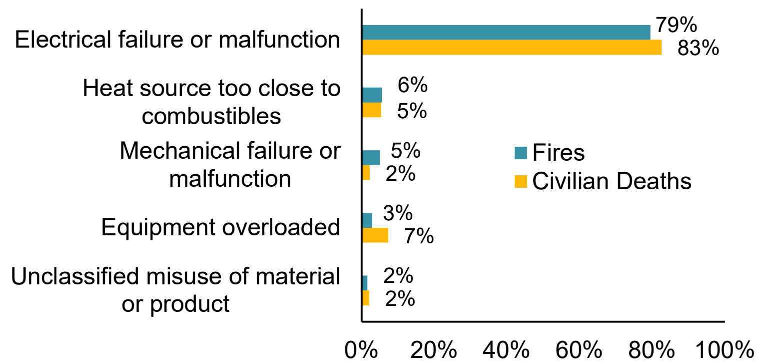
Figure 11. Home Fires Involving Electrical Distribution and Lighting Equipment by Month 2012-2016



Factors Contributing to the Ignition of Home Fires Involving Electrical Distribution or Lighting Equipment

Electrical failures or malfunctions were a factor contributing to the ignition of nearly four of five home fires (79%) involving electrical distribution or lighting equipment, and these fires accounted for 83% of civilian deaths. Other factors contributing to home fires involving electrical distribution and lighting equipment included heat sources being too close to combustibles, mechanical failures or malfunctions, overloaded equipment, and unclassified misuse of productions or materials.

Figure 12. Factors Contributing to the Ignition of Home Fires Involving Electrical Distribution and Lighting Equipment, 2012-2016*



*All data in this section is for non-confined fires only.

Some differences can be observed between specific types of electrical distribution and lighting equipment in relation to factors contributing to the ignition of fires. For instance, electrical failure or malfunction is a factor in nearly nine of ten home fires involving wiring and related equipment (Figure 13), but just less than half of those involving lamps, bulbs, or lighting (Figure 14). Approximately three in ten of the latter fires are caused by lamps, bulbs, or lighting being too close to combustible material.

In home fires involving cords and plugs, in addition to the fires involving electrical failure or malfunction (three-quarters of the total), overloaded equipment contributed to just over one in ten fires, as shown in Figure 15.

Electrical failure or malfunction also accounted for a smaller share of home fires involving transformers and power supplies (65%) than those involving wiring and related equipment or cords and plugs, but higher shares of these fires involved mechanical failures or malfunctions (9%), heat sources too close to combustibles (8%), and equipment overloaded (6%), as shown in Figure 16.

Figure 13. Factors Contributing to the Ignition of Home Fires Involving Wiring and Related Equipment, 2012-2016

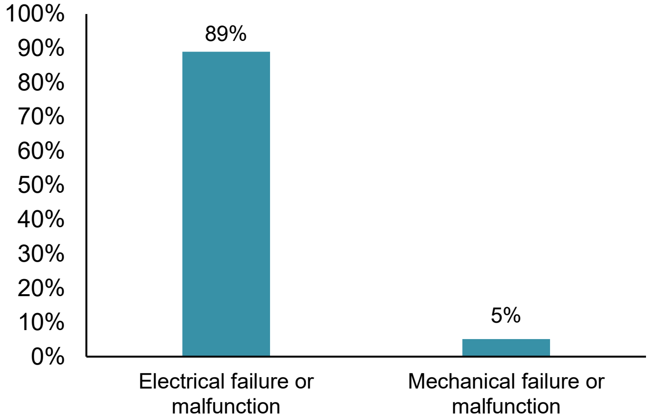


Figure 14. Factors Contributing to the Ignition of Home Fires Involving Lamps, Bulbs, or Lighting, 2012-2016

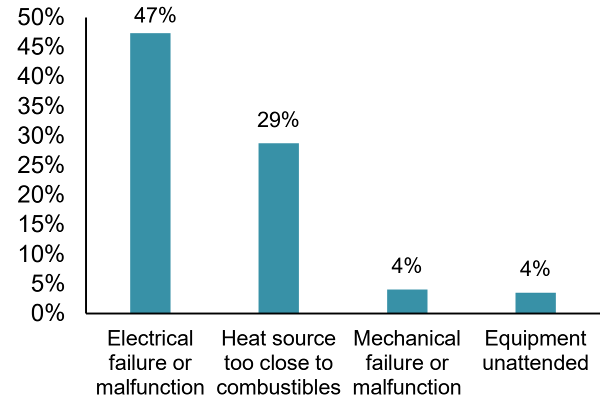


Figure 15. Factors Contributing to the Ignition of Home Fires Involving Cords or Plugs, 2012-2016

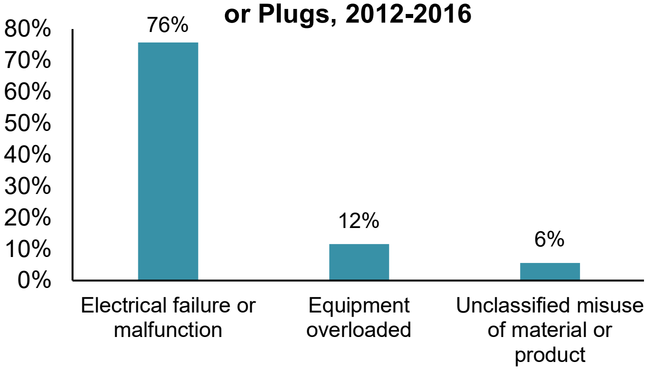
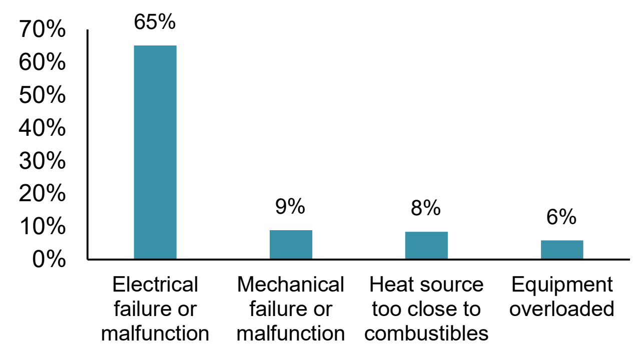


Figure 16. Factors Contributing to the Ignition of Home Fires Involving Transformers and Power Supplies 2012-2016

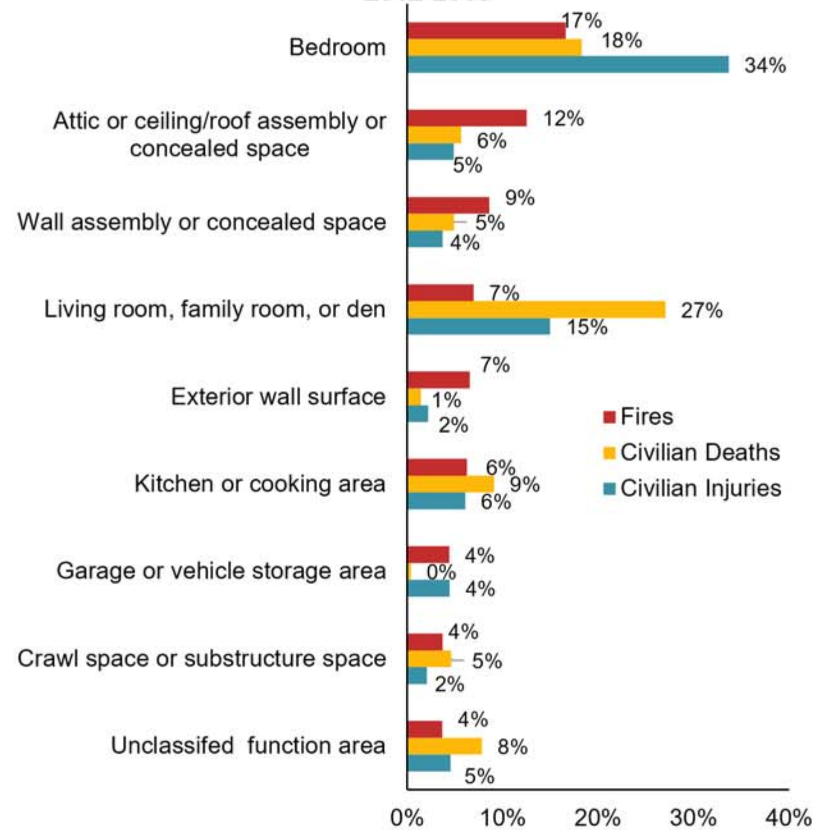


Area of Origin in Home Fires Involving Electrical Distribution or Lighting Equipment

Almost one in five home fires (17%) involving electrical distribution or lighting equipment originated in a bedroom, with another 12% originating in an attic or ceiling/roof assembly or concealed space. Fires originating in a living room, family room, or den accounted for a disproportionately large share of civilian deaths, while those originating in a bedroom accounted for a disproportionately large share of civilian injuries. Fires originating in concealed spaces, such as attics or ceiling roof assemblies, wall assemblies, and crawl spaces, were also common.

Although the bedroom is the leading area of origin for overall electrical distribution and lighting equipment home fires, there are some differences by type of equipment. Figure 18 shows that fires involving wiring and related equipment, which accounts for the great majority of these fires (67%), are most likely to originate in the attic or ceiling/roof assembly or concealed space (16% of total), followed by bedrooms (13%), and wall assemblies or concealed spaces (12%). Hence, over two of five (42%) of the wiring and related equipment fires originate in areas where they are unlikely to be immediately detected.

Figure 17. Area of Origin in Home Fires Involving Electrical Distribution or Lighting Equipment 2012-2016



The bedroom is the leading area of origin in home fires involving lamps, bulbs, or lighting, cords or plugs, and transformers and power supplies. As Figure 19 shows, lamp, bulb, and lighting fires can also originate in areas that may not be readily detected, including attics or ceiling/roof assemblies or concealed spaces, exterior wall surfaces, ceilings/floor assemblies or concealed spaces, and exterior balconies.

Figure 18. Area of Origin in Home Fires Involving Wiring and Related Equipment, 2012-2016

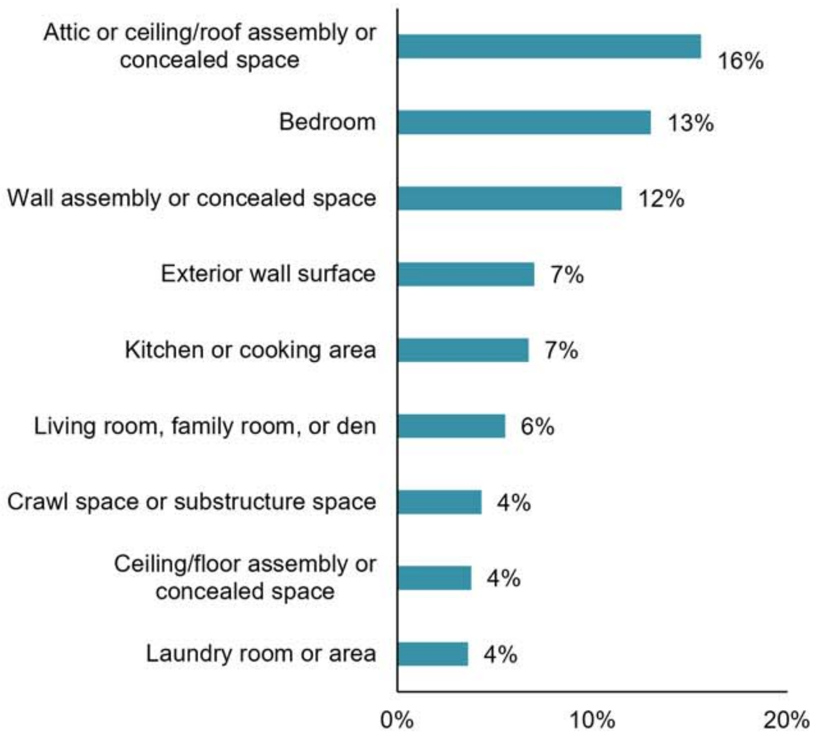


Figure 20 indicates that fires involving cords and plugs are less likely to originate in concealed areas, with nearly half of the fires originating in either the bedroom, living room, family room, or den.

Of home fires involving electrical distribution or lighting equipment that originated in a garage or vehicle storage area, the largest share were those involving transformers and power cords, as shown in Figure 21.

Figure 19. Area of Origin in Home Fires Involving Lamps, Bulbs, or Lighting 2012-2016

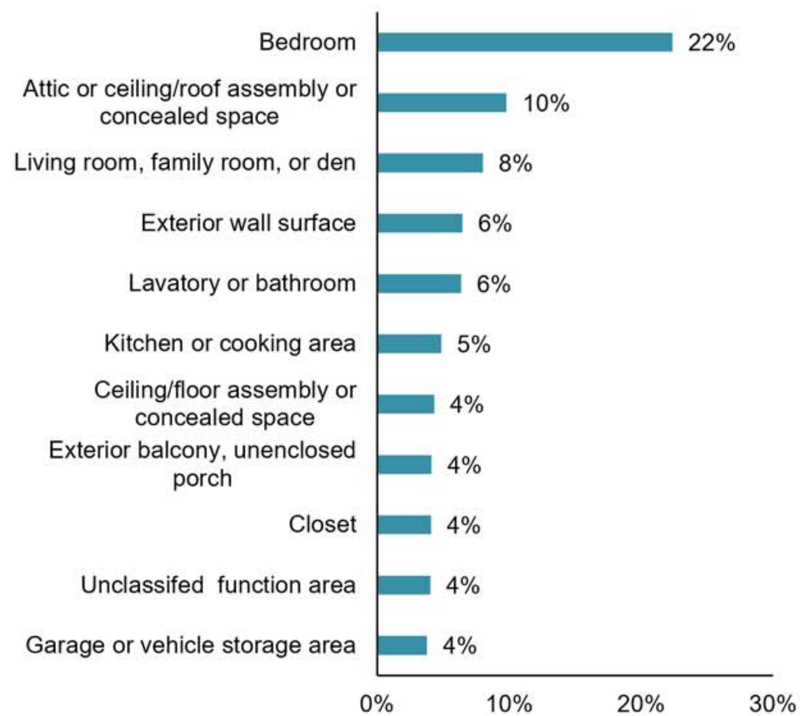


Figure 20. Area of Origin in Home Fires Involving Cords or Plugs, 2012-2016

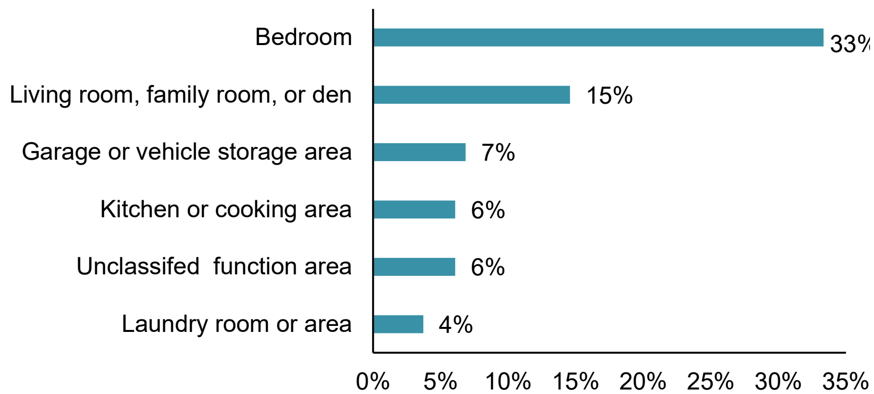
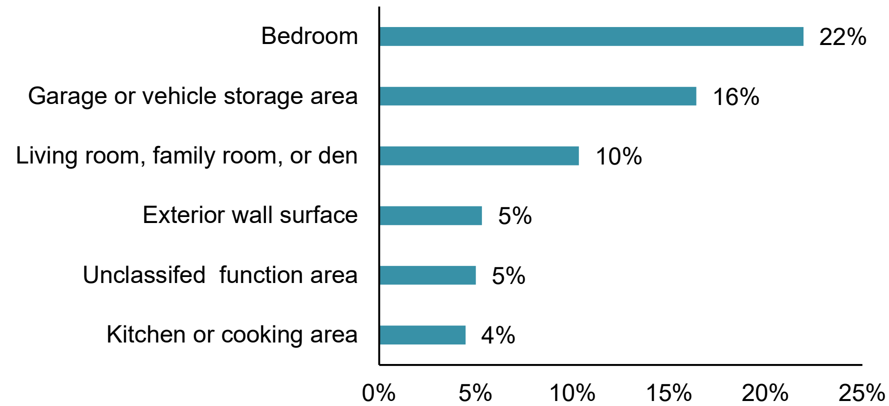


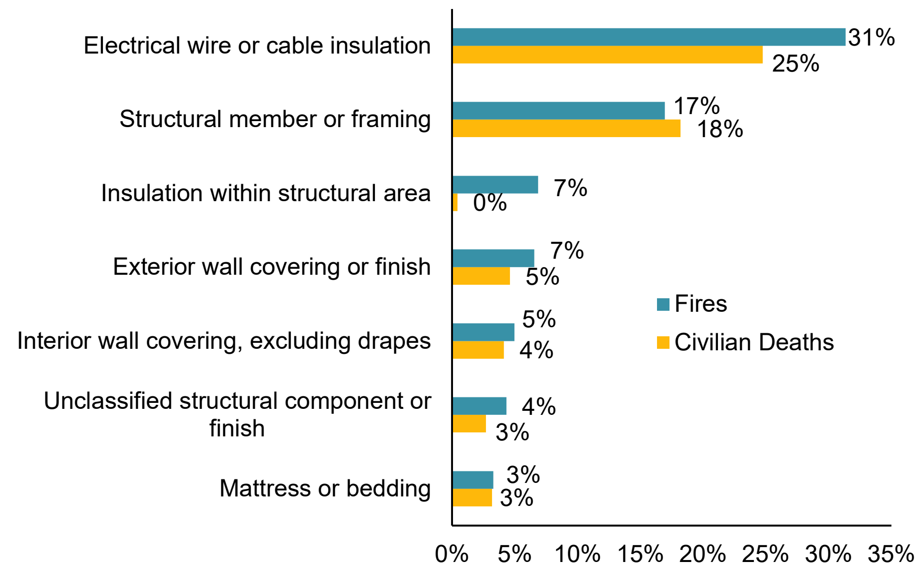
Figure 21. Area of Origin in Home Fires Involving Transformers and Power Supplies, 2012-2016



Home Fires Involving Electrical Distribution and Lighting Equipment by Item First Ignited

The item that first ignited in home fires involving electrical distribution and lighting equipment was electrical wire or cable insulation (31% of fires). Two of five fires (40%) involving electrical distribution and lighting equipment first ignited an item that was part of the building (i.e., structural member or framing, insulation within building area, exterior or interior wall cover or finish, unclassified structural component or finish). See Figure 22. This indicates the need to be attentive to hidden electrical hazards, including electrical distribution and lighting equipment that is installed close to combustible structural elements.

Figure 22. Item First Ignited in Home Fires Involving Electrical Distribution or Lighting Equipment 2012-2016



Methodology

The statistics in this analysis are estimates derived from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey of U.S. fire departments. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates. Only civilian (non-firefighter) casualties are discussed in this analysis.

NFPA's fire department experience survey provides estimates of the big picture. NFIRS is a voluntary system through which participating fire departments report detailed factors about the fires to which they respond. To compensate for fires reported to local fire departments but not captured in NFIRS, scaling ratios are calculated and then applied to the NFIRS database using the formula below.

$$\frac{\text{NFPA's fire experience survey projections}}{\text{NFIRS totals}}$$

The NFIRS data element of Factors Contributing to Ignition was used to identify and estimate electrical failures or malfunctions. In this field, the code "none" is treated as an unknown and allocated proportionally. Multiple entries are allowed in this field. Percentages are calculated on the total number of fires, not entries, resulting in sums greater than 100%. Any fire in which no factor contributing to ignition was entered was treated as unknown.

Entries in the "electrical failure, malfunction" category (factor contributing to ignition 30-39) were grouped together in this analysis.

This category includes:

31. Water-caused short circuit arc
32. Short-circuit arc from mechanical damage
33. Short-circuit arc from defective or worn insulation
34. Unspecified short circuit arc
35. Arc from faulty contact or broken connector, including broken power lines and loose connections
36. Arc or spark from operating equipment, switch, or electric fence
37. Fluorescent light ballast
30. Electrical failure or malfunction, other

NFIRS data element Equipment Involved in Ignition (EII) codes 200-263 were used to identify and estimate electrical distribution and lighting equipment as identified by NFIRS.

NFPA noticed that many fires in which EII was coded as None (NNN) have had other causal factors that indicated equipment was a factor or were completely unknown. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII =NNN and heat source <>40-99])}}$$

In addition, fires and losses associated with code EII 200, "electrical distribution, lighting, and power transfer, other," were allocated proportionally across specific kitchen and equipment codes EII codes, 211-263. Equipment that is totally unclassified (EII code 000) was not allocated further. Unfortunately, equipment that is truly different is erroneously assigned to other categories.

Because of the large number of specific EII codes, most have been grouped into more general categories.

Code Grouping	EII Code	NFIRS definition
Fixed wiring and related equipment	210	Unclassified electrical wiring
	211	Electrical power or utility line
	212	Electrical service supply wires from utility
	213	Electric meter or meter box
	214	Wiring from meter box to circuit breaker
	215	Panel board, switch board or circuit breaker board
	216	Electrical branch circuit
	217	Outlet or receptacle
	218	Wall switch
	219	Ground fault interrupter
Transformers and power supplies	221	Distribution-type transformer
	222	Overcurrent, disconnect equipment
	223	Low-voltage transformer
	224	Generator
	225	Inverter
	226	Uninterrupted power supply (UPS)
	227	Surge protector
	228	Battery charger or rectifier
	229	Battery (all types)
Lamp, bulb or lighting	230	Unclassified lamp or lighting
	231	Lamp-tabletop, floor or desk
	232	Lantern or flashlight
	233	Incandescent lighting fixture
	234	Fluorescent light fixture or ballast
	235	Halogen light fixture or lamp
	236	Sodium or mercury vapor light fixture or lamp
	237	Work or trouble light
	238	Light bulb
	241	Nightlight
	242	Decorative lights – line voltage
	243	Decorative or landscape lighting – low voltage
	244	Sign
Cord or plug	260	Unclassified cord or plug
	261	Power cord or plug, detachable from appliance
	262	Power cord or plug-permanently attached
	263	Extension cord

For more information on the methodology used for this report see, *How NFPA's National Estimates Are Calculated for Home Structure Fires.*

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities that participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

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RESEARCH

Home Electrical Fires
Supporting Tables

March 2019

Richard Campbell

Home Electrical Fires: Supporting Tables

The tables in this document are a companion to the report of the same name. Firefighter deaths and injuries are excluded from this analysis.

Most tables, with the exception of fires by year, show estimates of 2012-2016 annual averages. Estimates were derived from the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS) and NFPA's annual fire department experience survey and include proportional shares of unknown or missing data. Fires are rounded to the nearest 100, deaths and injuries are rounded to the nearest ten, and property loss is rounded to the nearest million dollars. Inflation adjustments were made only for the trend table. Percentages were calculated on unrounded estimates.

NFIRS 5.0 includes a category of structure fires collectively referred to as "confined fires," identified by NFIRS incident type codes 113-118. These include confined cooking fires, confined chimney or flue fires, confined trash fires, and confined fuel burner or boiler fires. Losses are generally minimal in these fires, which by definition, are assumed to have been limited to the object of origin. Although causal data is not required for these fires, it is sometimes present. To obtain estimates of fires, unknown data for confined and non-confined fires were analyzed separately and the results summed.

For more information on how these estimates were calculated, please see full report and *How NFPA's National Estimates Are Calculated for Home Structure Fires*

List of Tables

Table 1.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Year
Structure Fires Reported to U.S. Fire Departments

Year	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions) As Reported		In 2016 Dollars	
1980	75,000		471		1,500		$426		$1,227	
1981	70,000		477		1,670		$409		$1,064	
1982	66,500		405		1,760		$450		$1,104	
1983	63,700		463		1,750		$530		$1,260	
1984	63,960		328		1,440		$551		$1,255	
1985	67,000		451		1,600		$603		$1,326	
1986	65,200		639		1,640		$600		$1,298	
1987	65,500		562		1,880		$616		$1,285	
1988	68,500		545		2,190		$745		$1,494	
1989	64,300		590		2,000		$693		$1,325	
1990	62,300		435		2,000		$737		$1,338	
1991	65,700		393		2,370		$981		$1,706	
1992	62,800		486		2,270		$727		$1,228	
1993	65,500		485		2,540		$936		$1,535	
1994	64,300		518		2,160		$835		$1,336	
1995	61,800		582		2,110		$867		$1,348	
1996	63,400		593		2,070		$1,031		$1,559	
1997	60,600		380		1,790		$980		$1,447	
1998	57,900		479		1,820		$943		$1,372	
1999	46,000	(44,300)	387	(387)	1,620	(1,620)	$917	($917)	$1,319	($1,319)
2000	49,200	(46,400)	348	(348)	1,670	(1,670)	$1,085	($1,082)	$1,512	($1,508)
2001	53,600	(49,200)	548	(548)	1,680	(1,630)	$1,237	($1,235)	$1,676	($1,673)
2002	54,300	(49,300)	278	(278)	1,290	(1,290)	$1,183	($1,181)	$1,577	($1,575)
2003	51,100	(45,200)	639	(639)	1,350	(1,350)	$1,283	($1,281)	$1,674	($1,671)
2004	52,500	(46,400)	614	(614)	1,500	(1,490)	$1,360	($1,357)	$1,729	($1,725)
2005	50,100	(44,500)	438	(438)	1,360	(1,340)	$1,530	($1,522)	$1,879	($1,869)
2006	50,500	(45,100)	333	(333)	1,370	(1,360)	$1,390	($1,389)	$1,653	($1,652)
2007	50,700	(45,500)	451	(451)	1,640	(1,630)	$1,228	($1,227)	$1,419	($1,418)
2008	49,400	(44,800)	519	(519)	1,350	(1,320)	$1,633	($1,632)	$1,821	($1,820)
2009	44,800	(39,500)	472	(472)	1,500	(1,470)	$1,644	($1,643)	$1,837	($1,836)
2010	46,500	(42,000)	419	(419)	1,520	(1,510)	$1,507	($1,506)	$1,659	($1,658)
2011	47,700	(42,600)	418	(418)	1,570	(1,570)	$1,434	($1,432)	$1,530	($1,528)
2012	40,900	(35,300)	359	(359)	1,410	(1,390)	$1,310	($1,309)	$1,370	($1,368)
2013	46,000	(39,900)	419	(419)	1,220	(1,200)	$1,370	($1,368)	$1,410	($1,408)
2014	48,100	(41,200)	538	(538)	1,280	(1,270)	$1,387	($1,385)	$1,404	($1,402)
2015	47,100	(40,700)	435	(435)	1,240	(1,240)	$1,463	($1,460)	$1,480	($1,478)
2016	45,300	(38,700)	480	(480)	1,260	(1,230)	$1,005	($1,003)	$1,005	($1,003)

Table 1.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Year
Structure Fires Reported to U.S. Fire Departments (Continued)

Note: Figures in parentheses exclude confined fires, which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to only federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of a small number of unusually serious fires. Fires are rounded to the nearest hundred, civilian deaths to the nearest one, civilian injuries to the nearest ten, and direct property damage to the nearest million dollars. Figures for 1980-1998 are based on ignition factor 54-55 and reflect a proportional share of home fires with ignition factor unknown, unreported, none, or blank. Figures for 1999 and later years reflect a proportional share of home fires with factor contributing to ignition as unknown, reported, none, or blank. Because of low participation in NFIRS Version 5.0 during 1999-2001, estimates for these years are highly uncertain and must be used with caution. Inflation adjustment to 2014 dollars is calculated using the Consumer Price Index. Home fire property damage figures for 1991 are inflated by estimation problems related to the Oakland fire storm.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 2.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Month
2012-2016 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	5,020	(11%)	70	(16%)	140	(11%)	$160	(13%)
February	4,040	(9%)	40	(8%)	110	(9%)	$125	(10%)
March	3,720	(8%)	40	(9%)	130	(10%)	$110	(9%)
April	3,360	(7%)	40	(9%)	100	(8%)	$102	(8%)
May	3,380	(8%)	30	(6%)	100	(8%)	$90	(7%)
June	3,500	(8%)	20	(5%)	100	(8%)	$96	(7%)
July	3,750	(8%)	40	(8%)	90	(7%)	$111	(9%)
August	3,330	(7%)	20	(5%)	110	(9%)	$89	(7%)
September	3,030	(7%)	30	(6%)	70	(6%)	$77	(6%)
October	3,220	(7%)	40	(9%)	80	(7%)	$85	(7%)
November	4,030	(9%)	20	(6%)	90	(7%)	$110	(9%)
December	4,510	(10%)	50	(12%)	120	(9%)	$124	(10%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 3.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Day of Week
2012-2016 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	6,480	(14%)	50	(11%)	200	(16%)	$177	(14%)
Monday	6,400	(14%)	80	(19%)	150	(12%)	$189	(15%)
Tuesday	6,370	(14%)	40	(10%)	210	(16%)	$177	(14%)
Wednesday	6,300	(14%)	70	(16%)	160	(12%)	$180	(14%)
Thursday	6,400	(14%)	60	(13%)	160	(13%)	$189	(15%)
Friday	6,310	(14%)	70	(15%)	200	(16%)	$182	(14%)
Saturday	6,620	(15%)	70	(17%)	180	(14%)	$184	(14%)
Totals	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 4.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Time of Day
2012-2016 Annual Averages

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	1,390	(3%)	20	(6%)	50	(4%)	$49	(4%)
1:00-1:59 a.m.	1,220	(3%)	50	(11%)	70	(5%)	$46	(4%)
2:00-2:59 a.m.	1,210	(3%)	40	(8%)	60	(5%)	$49	(4%)
3:00-3:59 a.m.	1,170	(3%)	40	(9%)	70	(6%)	$58	(5%)
4:00-4:59 a.m.	1,100	(2%)	30	(7%)	50	(4%)	$43	(3%)
5:00-5:59 a.m.	1,060	(2%)	30	(6%)	60	(5%)	$40	(3%)
6:00-6:59 a.m.	1,240	(3%)	30	(6%)	50	(4%)	$39	(3%)
7:00-7:59 a.m.	1,440	(3%)	30	(6%)	50	(4%)	$46	(4%)
8:00-8:59 a.m.	1,570	(4%)	10	(3%)	50	(4%)	$44	(3%)
9:00-9:59 a.m.	1,790	(4%)	10	(2%)	40	(3%)	$50	(4%)
10:00-10:59 a.m.	1,860	(4%)	20	(4%)	50	(4%)	$47	(4%)
11:00-11:59 a.m.	2,060	(5%)	10	(2%)	40	(3%)	$61	(5%)
12:00-12:59 p.m.	2,200	(5%)	10	(2%)	50	(4%)	$61	(5%)
1:00-1:59 p.m.	2,220	(5%)	0	(1%)	40	(3%)	$63	(5%)
2:00-2:59 p.m.	2,270	(5%)	10	(1%)	40	(3%)	$59	(5%)
3:00-3:59 p.m.	2,450	(5%)	10	(1%)	50	(4%)	$66	(5%)
4:00-4:59 p.m.	2,570	(6%)	10	(2%)	60	(5%)	$68	(5%)
5:00-5:59 p.m.	2,730	(6%)	10	(3%)	50	(4%)	$58	(5%)
6:00-6:59 p.m.	2,840	(6%)	10	(3%)	70	(5%)	$62	(5%)
7:00-7:59 p.m.	2,600	(6%)	10	(2%)	50	(4%)	$56	(4%)
8:00-8:59 p.m.	2,320	(5%)	10	(2%)	70	(6%)	$56	(4%)
9:00-9:59 p.m.	2,130	(5%)	10	(3%)	40	(3%)	$51	(4%)
10:00-10:59 p.m.	1,840	(4%)	20	(5%)	50	(4%)	$55	(4%)
11:00-11:59 p.m.	1,600	(4%)	10	(2%)	50	(4%)	$51	(4%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 5.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition by Equipment Involved in Ignition, 2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical distribution and lighting equipment	**22,620**	**(50%)**	**310**	**(71%)**	**700**	**(56%)**	**$786**	**(62%)**
Wiring and related equipment	17,600	(39%)	190	(43%)	440	(35%)	$588	(46%)
Cord or plug	2,080	(5%)	100	(23%)	130	(11%)	$85	(7%)
Lamp, bulb or lighting	1,850	(4%)	10	(3%)	70	(5%)	$64	(5%)
Transformers and power supplies	1,080	(2%)	10	(2%)	60	(5%)	$49	(4%)
Cooking equipment	**6,780**	**(15%)**	**10**	**(1%)**	**110**	**(9%)**	**$43**	**(3%)**
Confined cooking fire	4,820	(11%)	0	(0%)	10	(1%)	$1	(0%)
Range with or without oven, cooking surface	960	(2%)	0	(1%)	50	(4%)	$18	(1%)
Microwave oven	430	(1%)	0	(0%)	20	(1%)	$10	(1%)
Portable cooking or warming equipment	230	(1%)	0	(0%)	20	(2%)	$8	(1%)
Other known cooking equipment	340	(1%)	0	(0%)	10	(1%)	$6	(1%)
Heating equipment	**3,830**	**(9%)**	**30**	**(8%)**	**60**	**(5%)**	**$80**	**(6%)**
Fixed or portable space heater	1,300	(3%)	30	(6%)	40	(3%)	$46	(4%)
Water heater	1,020	(2%)	0	(0%)	10	(1%)	$16	(1%)
Confined fuel burner or boiler fire	730	(2%)	0	(0%)	0	(0%)	$0	(0%)
Central heat	350	(1%)	0	(0%)	0	(0%)	$9	(1%)
Other known heating equipment	430	(1%)	7	(2%)	5	(0%)	$9	(1%)
Fan	**2,480**	**(6%)**	**10**	**(3%)**	**70**	**(6%)**	**$62**	**(5%)**
Air conditioner	**1,460**	**(3%)**	**20**	**(5%)**	**60**	**(5%)**	**$41**	**(3%)**
Clothes dryer	**1,450**	**(3%)**	**0**	**(0%)**	**30**	**(3%)**	**$32**	**(2%)**
No equipment involved in ignition	**890**	**(2%)**	**10**	**(3%)**	**10**	**(1%)**	**$56**	**(4%)**
Unclassified equipment involved in ignition	**800**	**(2%)**	**0**	**(1%)**	**30**	**(2%)**	**$36**	**(3%)**
Refrigerator or refrigerator/freezer	**560**	**(1%)**	**10**	**(1%)**	**40**	**(3%)**	**$21**	**(2%)**
Dishwasher	**400**	**(1%)**	**0**	**(0%)**	**10**	**(1%)**	**$9**	**(1%)**
Television	**390**	**(1%)**	**0**	**(0%)**	**20**	**(2%)**	**$15**	**(1%)**
Confined incinerator overload or malfunction fire	**290**	**(1%)**	**0**	**(0%)**	**0**	**(0%)**	**$0**	**(0%)**
Contained trash or rubbish fire	**280**	**(1%)**	**0**	**(0%)**	**0**	**(0%)**	**$0**	**(0%)**
Other known equipment involved in ignition	**2,650**	**(6%)**	**30**	**(7%)**	**100**	**(8%)**	**$96**	**(8%)**
Total	**44,880**	**(100%)**	**440**	**(100%)**	**1,250**	**(100%)**	**$1,278**	**(100%)**

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 6.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition by Cause of Ignition, 2012-2016 Annual Averages

Cause of Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Failure of equipment or heat source	23,500	(52%)	190	(43%)	590	(47%)	$536	(42%)
Non-confined	19,370	(43%)	190	(43%)	590	(47%)	$535	(42%)
Confined	4,130	(9%)	0	(0%)	0	(0%)	$1	(0%)
Unintentional	20,680	(46%)	250	(57%)	650	(52%)	$724	(57%)
Non-confined	18,640	(42%)	250	(57%)	640	(51%)	$723	(57%)
Confined	2,050	(5%)	0	(0%)	10	(1%)	$1	(0%)
Act of nature	369	(1%)	0	(0%)	0	(0%)	$9	(1%)
Non-confined	341	(2%)	0	(0%)	0	(1%)	$9	(2%)
Confined	28	(4%)	0	(0%)	0	(0%)	$0	(3%)
Other causes	323	(1%)	0	(0%)	10	(1%)	$9	(1%)
Non-confined	250	(1%)	0	(1%)	10	(1%)	$9	(2%)
Confined	72	(11%)	0	(0%)	0	(0%)	$0	(3%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)
Non-confined	38,600	(86%)	440	(100%)	1,230	(98%)	$1,276	(100%)
Confined	6,270	(14%)	0	(0%)	10	(1%)	$2	(0%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 7.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Heat Source
2012-2016 Annual Averages

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Arcing	27,290	(61%)	300	(69%)	770	(62%)	$785	(61%)
Non-confined	24,530	(55%)	300	(69%)	770	(61%)	$784	(61%)
Confined	2,760	(6%)	0	(0%)	0	(0%)	$1	(0%)
Unclassified heat from powered equipment	6,750	(15%)	50	(12%)	210	(17%)	$170	(13%)
Non-confined	5,300	(12%)	50	(12%)	210	(17%)	$170	(13%)
Confined	1,450	(3%)	0	(0%)	10	(1%)	$0	(0%)
Radiated or conducted heat from operating equipment	2,460	(5%)	20	(5%)	70	(6%)	$54	(4%)
Non-confined	1,770	(4%)	20	(5%)	70	(5%)	$54	(4%)
Confined	690	(2%)	0	(0%)	0	(0%)	$0	(0%)
Spark, ember or flame from operating equipment	2,460	(5%)	10	(3%)	80	(6%)	$61	(5%)
Non-confined	1,810	(4%)	10	(3%)	80	(6%)	$61	(5%)
Confined	650	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified heat source	2,280	(5%)	30	(6%)	60	(5%)	$88	(7%)
Non-confined	1,980	(4%)	30	(6%)	60	(5%)	$88	(7%)
Confined	300	(1%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified hot or smoldering object	1,970	(4%)	20	(4%)	30	(2%)	$68	(5%)
Non-confined	1,780	(4%)	20	(4%)	20	(2%)	$68	(5%)
Confined	180	(0%)	0	(0%)	0	(0%)	$0	(0%)
Other known heat source	1,680	(4%)	10	(1%)	30	(2%)	$51	(4%)
Non-confined	1,430	(3%)	10	(1%)	30	(2%)	$51	(4%)
Confined	240	(1%)	0	(0%)	0	(0%)	$0	(0%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)
Non-confined	38,600	(86%)	440	(100%)	1,230	(99%)	$1,276	(100%)
Confined	6,270	(14%)	0	(0%)	10	(1%)	$2	(0%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 8.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition by Area of Origin, 2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Kitchen or cooking area	9,000	(20%)	40	(9%)	170	(14%)	$114	(9%)
Non-confined	4,360	(10%)	40	(9%)	160	(13%)	$113	(9%)
Confined	4,630	(10%)	0	(0%)	10	(1%)	$1	(0%)
Bedroom	5,260	(12%)	60	(14%)	310	(25%)	$190	(15%)
Non-confined	5,210	(12%)	60	(14%)	310	(25%)	$190	(15%)
Confined	50	(0%)	0	(0%)	0	(0%)	$0	(0%)
Attic or ceiling/roof assembly or concealed space	4,520	(10%)	20	(5%)	70	(6%)	$159	(12%)
Non-confined	4,490	(10%)	20	(5%)	70	(6%)	$159	(12%)
Confined	30	(0%)	0	(0%)	0	(0%)	$0	(0%)
Wall assembly or concealed space	2,760	(6%)	20	(5%)	40	(3%)	$76	(6%)
Non-confined	2,740	(6%)	20	(5%)	40	(3%)	$76	(6%)
Confined	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Common room, living room, family room, lounge or den	2,450	(5%)	120	(27%)	180	(14%)	$120	(9%)
Non-confined	2,390	(5%)	120	(27%)	180	(14%)	$120	(9%)
Confined	50	(0%)	0	(0%)	0	(0%)	$0	(0%)
Laundry room or area	2,300	(5%)	10	(2%)	60	(5%)	$46	(4%)
Non-confined	2,170	(5%)	10	(2%)	50	(4%)	$46	(4%)
Confined	130	(0%)	0	(0%)	0	(0%)	$0	(0%)
Lavatory, bathroom, locker room or check room	2,120	(5%)	10	(2%)	40	(3%)	$39	(3%)
Non-confined	2,080	(5%)	10	(2%)	40	(3%)	$39	(3%)
Confined	40	(0%)	0	(0%)	0	(0%)	$0	(0%)
Exterior wall surface	1,810	(4%)	10	(2%)	20	(2%)	$39	(3%)
Non-confined	1,790	(4%)	10	(2%)	20	(2%)	$39	(3%)
Confined	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Garage or vehicle storage area	1,590	(4%)	10	(2%)	50	(4%)	$99	(8%)
Non-confined	1,520	(3%)	10	(2%)	50	(4%)	$99	(8%)
Confined	70	(0%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified function area	1,370	(3%)	30	(7%)	70	(6%)	$56	(4%)
Non-confined	1,340	(3%)	30	(7%)	70	(6%)	$56	(4%)
Confined	30	(0%)	0	(0%)	0	(0%)	$0	(0%)

Table 8.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition by Area of Origin, 2012-2016 Annual Averages (Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Crawl space or substructure space	1,360	(3%)	10	(2%)	20	(2%)	$42	(3%)
Non-confined	1,310	(3%)	10	(2%)	20	(2%)	$42	(3%)
Confined	50	(0%)	0	(0%)	0	(0%)	$0	(0%)
Ceiling/floor assembly or concealed space	1,200	(3%)	20	(5%)	20	(2%)	$47	(4%)
Non-confined	1,190	(3%)	20	(5%)	20	(2%)	$47	(4%)
Confined	10	(0%)	0	(0%)	0	(0%)	$0	(0%)
Heating equipment room	1,060	(2%)	0	(0%)	10	(1%)	$16	(1%)
Non-confined	740	(2%)	0	(0%)	10	(1%)	$16	(1%)
Confined	330	(1%)	0	(0%)	0	(0%)	$0	(0%)
Closet	740	(2%)	0	(0%)	20	(2%)	$20	(2%)
Non-confined	680	(2%)	0	(0%)	20	(2%)	$20	(2%)
Confined	60	(0%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified structural area	720	(2%)	10	(2%)	20	(2%)	$31	(2%)
Non-confined	680	(2%)	10	(2%)	20	(2%)	$31	(2%)
Confined	40	(0%)	0	(0%)	0	(0%)	$0	(0%)
Confined chimney or flue fire	140	(0%)	0	(0%)	0	(0%)	$0	(0%)
Other known area of origin	6,500	(14%)	50	(11%)	160	(13%)	$184	(14%)
Non-confined	5,900	(13%)	50	(11%)	160	(13%)	$183	(14%)
Confined	600	(1%)	0	(0%)	0	(0%)	$0	(0%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)
Non-confined	38,600	(86%)	440	(100%)	1,230	(98%)	$1,276	(100%)
Confined	6,270	(14%)	0	(0%)	10	(1%)	$2	(0%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 9.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Item First Ignited, 2012-2016 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical wire or cable insulation	14,120	(31%)	110	(26%)	360	(28%)	$307	(24%)
Non-confined	12,410	(28%)	110	(26%)	350	(28%)	$306	(24%)
Confined	1,710	(4%)	0	(0%)	0	(0%)	$1	(0%)
Structural member or framing	5,950	(13%)	80	(18%)	140	(11%)	$266	(21%)
Non-confined	5,950	(13%)	80	(18%)	140	(11%)	$266	(21%)
Confined	10	(0%)	0	(0%)	0	(0%)	$0	(0%)
Appliance housing or casing	4,050	(9%)	10	(2%)	80	(6%)	$48	(4%)
Non-confined	2,120	(5%)	10	(2%)	80	(6%)	$47	(4%)
Confined	1,930	(4%)	0	(0%)	0	(0%)	$1	(0%)
Insulation within structural area	2,510	(6%)	0	(1%)	30	(2%)	$58	(5%)
Non-confined	2,490	(6%)	0	(1%)	30	(2%)	$58	(5%)
Confined	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Interior wall covering, excluding drapes	2,180	(5%)	20	(5%)	60	(5%)	$88	(7%)
Non-confined	2,150	(5%)	20	(5%)	60	(5%)	$88	(7%)
Confined	30	(0%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified item first ignited	2,010	(4%)	0	(0%)	40	(4%)	$35	(3%)
Non-confined	1,390	(3%)	0	(0%)	40	(4%)	$35	(3%)
Confined	620	(1%)	0	(0%)	0	(0%)	$0	(0%)
Exterior wall covering or finish	2,000	(4%)	20	(4%)	30	(2%)	$60	(5%)
Non-confined	1,980	(4%)	20	(4%)	30	(2%)	$60	(5%)
Confined	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Unclassified structural component or finish	1,500	(3%)	20	(4%)	50	(4%)	$62	(5%)
Non-confined	1,490	(3%)	20	(4%)	50	(4%)	$62	(5%)
Confined	10	(0%)	0	(0%)	0	(0%)	$0	(0%)
Cooking materials, including food	1,300	(3%)	0	(0%)	10	(1%)	$3	(0%)
Non-confined	180	(0%)	0	(0%)	10	(1%)	$3	(0%)
Confined	1,120	(2%)	0	(0%)	10	(0%)	$0	(0%)
Interior ceiling cover or finish	970	(2%)	10	(1%)	20	(1%)	$41	(3%)
Non-confined	970	(2%)	10	(1%)	20	(1%)	$41	(3%)
Confined	0	(0%)	0	(0%)	0	(0%)	$0	(0%)
Mattress or bedding	940	(2%)	20	(3%)	80	(6%)	$32	(3%)
Non-confined	930	(2%)	20	(3%)	80	(6%)	$32	(3%)
Confined	10	(0%)	0	(0%)	0	(0%)	$0	(0%)

Table 9.
Home Fires Involving Electrical Failure or Malfunction as Factor Contributing to Ignition, by Item First Ignited, 2012-2016 Annual Averages (Continued)

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Floor covering rug, carpet, or mat	730	(2%)	30	(6%)	40	(3%)	$26	(2%)
Non-confined	730	(2%)	30	(6%)	40	(3%)	$26	(2%)
Confined	0	(0%)	0	(0%)	0	(0%)	$0	(0%)
Other known item first ignited	6,620	(15%)	130	(30%)	310	(25%)	$250	(20%)
Non-confined	5,820	(13%)	130	(30%)	310	(25%)	$250	(20%)
Confined	800	(2%)	0	(0%)	10	(0%)	$0	(0%)
Total	44,880	(100%)	440	(100%)	1,250	(100%)	$1,278	(100%)
Non-confined	38,600	(86%)	440	(100%)	1,230	(99%)	$1,276	(100%)
Confined	6,270	(14%)	0	(0%)	10	(1%)	$2	(0%)

Note: Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 10.
Home Fires Involving Electrical Distribution and Lighting Equipment by Year
Structure Fires Reported to U.S. Fire Departments

				Direct Property Damage (in Millions)	
Year	**Fires**	**Civilian Deaths**	**Civilian Injuries**	**As Reported**	**In 2016 Dollars**
1980	68,400	523	1,650	$493	$1,436
1981	62,300	553	1,500	$459	$1,209
1982	60,900	408	1,820	$519	$1,288
1983	56,700	500	1,570	$548	$1,318
1984	54,800	445	1,520	$549	$1,265
1985	56,500	470	1,400	$720	$1,602
1986	54,300	717	1,420	$597	$1,307
1987	51,600	522	1,580	$512	$1,080
1988	53,400	439	1,720	$715	$1,451
1989	47,900	610	1,500	$642	$1,242
1990	47,400	438	1,540	$683	$1,255
1991	49,000	354	1,890	$958	$1,686
1992	46,400	403	1,770	$617	$1,055
1993	48,900	418	1,900	$818	$1,357
1994	48,300	464	1,640	$714	$1,156
1995	47,200	489	1,650	$775	$1,219
1996	47,000	470	1,560	$839	$1,284
1997	46,600	352	1,580	$865	$1,292
1998	44,500	363	1,370	$843	$1,241
1999	34,800	183	530	$806	$1,160
2000	26,600	122	1,130	$631	$879
2001	26,200	436	1,030	$717	$971
2002	22,700	166	700	$593	$791
2003	19,200	320	600	$698	$911
2004	19,400	292	840	$623	$792
2005	20,800	498	1,060	$858	$1,053
2006	25,100	366	840	$776	$923
2007	25,200	274	1,050	$663	$766
2008	24,700	515	880	$964	$1,075
2009	21,000	318	1,000	$935	$1,045
2010	19,900	242	980	$774	$852
2011	21,300	295	840	$822	$877
2012	32,900	292	1,250	$1,326	$1,386
2013	37,000	601	1,290	$1,418	$1,458
2014	37,900	535	1,290	$1,433	$1,450
2015	34,600	461	1,020	$1,136	$1,149
2016	32,900	562	1,120	$1,020	$1,020

Table 10.
Home Fires Involving Electrical Distribution and Lighting Equipment by Year
Structure Fires Reported to U.S. Fire Departments (Continued)

* All 1991 home fire property damage figures are inflated by estimation problems related to the handling of the Oakland fire storm.

Note: Figures exclude confined fires. Fires are rounded to the nearest hundred, deaths to the nearest one, injuries to the nearest ten, and property damage is rounded to the nearest million dollars. Figures reflect a proportional share of home fires with equipment involved in ignition unknown or reported as electrical distribution or lighting equipment of undetermined type. Because of low participation in NFIRS Version 5.0 during 1999-2001, estimates for those years are highly uncertain and must be used with caution. Inflation adjustment to 2016 dollars is calculated using the Consumer Price Index.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 11.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Month
2012-2016 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	4,010	(11%)	80	(16%)	140	(12%)	$149	(12%)
February	3,180	(9%)	40	(9%)	100	(8%)	$116	(9%)
March	2,900	(8%)	50	(11%)	140	(11%)	$117	(9%)
April	2,620	(7%)	50	(9%)	80	(7%)	$100	(8%)
May	2,640	(8%)	30	(5%)	100	(8%)	$103	(8%)
June	2,820	(8%)	10	(2%)	80	(6%)	$95	(7%)
July	3,060	(9%)	50	(9%)	100	(8%)	$106	(8%)
August	2,580	(7%)	30	(7%)	110	(9%)	$84	(7%)
September	2,270	(6%)	40	(7%)	60	(5%)	$81	(6%)
October	2,460	(7%)	40	(9%)	60	(5%)	$88	(7%)
November	3,030	(9%)	20	(5%)	110	(9%)	$104	(8%)
December	3,560	(10%)	50	(10%)	120	(10%)	$126	(10%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest ten million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 12.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Day of Week
2012-2016 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	5,000	(14%)	50	(9%)	180	(15%)	$189	(15%)
Monday	5,090	(14%)	70	(15%)	130	(11%)	$182	(14%)
Tuesday	5,030	(14%)	80	(15%)	200	(17%)	$178	(14%)
Wednesday	5,060	(14%)	80	(17%)	150	(13%)	$177	(14%)
Thursday	4,860	(14%)	90	(19%)	180	(15%)	$182	(14%)
Friday	5,000	(14%)	50	(11%)	190	(16%)	$184	(14%)
Saturday	5,100	(15%)	70	(14%)	160	(14%)	$178	(14%)
Totals	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 13.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Time of Day
2012-2016 Annual Averages

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	1,250	(4%)	30	(7%)	50	(4%)	$59	(5%)
1:00-1:59 a.m.	1,040	(3%)	60	(13%)	70	(6%)	$50	(4%)
2:00-2:59 a.m.	1,000	(3%)	50	(9%)	60	(5%)	$51	(4%)
3:00-3:59 a.m.	990	(3%)	40	(7%)	40	(4%)	$45	(4%)
4:00-4:59 a.m.	930	(3%)	50	(10%)	60	(5%)	$44	(3%)
5:00-5:59 a.m.	890	(3%)	30	(6%)	40	(3%)	$42	(3%)
6:00-6:59 a.m.	1,090	(3%)	10	(3%)	50	(5%)	$41	(3%)
7:00-7:59 a.m.	1,140	(3%)	20	(5%)	40	(3%)	$44	(3%)
8:00-8:59 a.m.	1,260	(4%)	10	(2%)	50	(4%)	$42	(3%)
9:00-9:59 a.m.	1,370	(4%)	20	(5%)	50	(4%)	$44	(3%)
10:00-10:59 a.m.	1,480	(4%)	10	(2%)	40	(3%)	$45	(4%)
11:00-11:59 a.m.	1,590	(5%)	10	(3%)	40	(4%)	$58	(5%)
12:00-12:59 p.m.	1,580	(5%)	0	(1%)	40	(4%)	$60	(5%)
1:00-1:59 p.m.	1,730	(5%)	0	(1%)	50	(4%)	$58	(5%)
2:00-2:59 p.m.	1,750	(5%)	10	(2%)	40	(4%)	$55	(4%)
3:00-3:59 p.m.	1,870	(5%)	10	(1%)	40	(3%)	$67	(5%)
4:00-4:59 p.m.	1,850	(5%)	10	(2%)	50	(4%)	$72	(6%)
5:00-5:59 p.m.	1,890	(5%)	10	(3%)	50	(4%)	$56	(4%)
6:00-6:59 p.m.	1,860	(5%)	20	(3%)	60	(5%)	$58	(5%)
7:00-7:59 p.m.	1,950	(6%)	10	(3%)	50	(4%)	$66	(5%)
8:00-8:59 p.m.	1,880	(5%)	20	(3%)	50	(4%)	$60	(5%)
9:00-9:59 p.m.	1,790	(5%)	10	(2%)	50	(4%)	$49	(4%)
10:00-10:59 p.m.	1,610	(5%)	20	(4%)	50	(5%)	$48	(4%)
11:00-11:59 p.m.	1,380	(4%)	10	(3%)	70	(6%)	$55	(4%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 14.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Equipment Involved in Ignition
2012-2016 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Wiring and related equipment	24,780	(67%)	270	(55%)	640	(53%)	$853	(67%)
Lamp, bulb or lighting	4,970	(13%)	40	(9%)	200	(17%)	$164	(13%)
Cord or plug	3,330	(11%)	160	(33%)	230	(19%)	$143	(11%)
Transformers and power supplies	2,060	(9%)	20	(3%)	130	(11%)	$108	(9%)
Other known equipment involved in ignition	20	(0%)	0	(0%)	0	(0%)	$0	(0%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 15.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Cause of Ignition
2012-2016 Annual Averages

Cause of Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Unintentional	18,870	(54%)	250	(52%)	690	(57%)	$758	(60%)
Failure of equipment or heat source	15,210	(43%)	230	(47%)	500	(41%)	$481	(38%)
Act of nature	700	(2%)	0	(1%)	10	(1%)	$19	(1%)
Other or unknown cause	370	(1%)	10	(2%)	0	(0%)	$12	(1%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 16.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Factor Contributing to Ignition
2012-2016 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical failure or malfunction	27,940	(79%)	400	(83%)	870	(72%)	$1,037	(82%)
Heat source too close to combustibles	1,960	(6%)	30	(5%)	110	(9%)	$69	(5%)
Mechanical failure or malfunction	1,780	(5%)	10	(2%)	50	(4%)	$56	(4%)
Equipment overloaded	1,030	(3%)	40	(7%)	70	(6%)	$40	(3%)
Unclassified misuse of material or product	580	(2%)	10	(2%)	40	(4%)	$19	(2%)
Other known factor contributing to ignition	3,430	(10%)	50	(9%)	150	(12%)	$122	(10%)
Total fires	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Multiple entries are allowed, which can result in sums higher than totals. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 16A.
Home Fires Involving Wiring and Related Equipment, by Factor Contributing to Ignition
2012-2016 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical failure or malfunction	22,030	(89%)	250	(91%)	580	(91%)	$789	(92%)
Mechanical failure or malfunction	1,290	(5%)	10	(4%)	20	(4%)	$33	(4%)
Equipment overloaded	480	(2%)	10	(3%)	20	(3%)	$14	(2%)
Other known factor contributing to ignition	2,300	(9%)	20	(10%)	70	(10%)	$77	(9%)
Total fires	24,780	(100%)	270	(100%)	640	(100%)	$853	(100%)
Total factors	26,100	(105%)	290	(108%)	690	(108%)	$913	(107%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Multiple entries are allowed, which can result in sums higher than totals. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 16B.
Home Fires Involving Lamps, Bulbs, or Lighting Equipment, by Factor Contributing to Ignition
2012-2016 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical failure or malfunction	2,350	(47%)	20	(39%)	80	(38%)	$91	(55%)
Heat source too close to combustibles	1,430	(29%)	20	(50%)	70	(36%)	$45	(28%)
Mechanical failure or malfunction	200	(4%)	0	(0%)	10	(5%)	$6	(4%)
Equipment unattended	180	(4%)	0	(0%)	10	(4%)	$5	(3%)
Animal	150	(3%)	0	(6%)	0	(1%)	$2	(1%)
Misuse of material or product, other	120	(2%)	0	(0%)	10	(5%)	$3	(2%)
Accidentally turned on, not turned off	120	(2%)	0	(0%)	0	(1%)	$6	(4%)
Other factor contributed to ignition	100	(2%)	0	(0%)	10	(3%)	$4	(3%)
Collision, knock down, run over, turn over	100	(2%)	0	(11%)	20	(7%)	$2	(1%)
Other known factor contributing to ignition	530	(11%)	10	(21%)	20	(10%)	$15	(9%)
Total fires	4,970	(100%)	40	(100%)	200	(100%)	$164	(100%)
Total factors	5,290	(106%)	60	(127%)	220	(109%)	$180	(110%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Multiple entries are allowed, which can result in sums higher than totals. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 16C.
Home Fires Involving Cords or Plugs, by Factor Contributing to Ignition
2012-2016 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical failure or malfunction	2,520	(76%)	130	(81%)	170	(74%)	$111	(77%)
Equipment overloaded	390	(12%)	30	(16%)	40	(17%)	$17	(12%)
Unclassified misuse of material or product	190	(6%)	10	(5%)	20	(7%)	$9	(7%)
Mechanical failure or malfunction	110	(3%)	0	(3%)	10	(3%)	$4	(3%)
Heat source too close to combustibles	110	(3%)	0	(3%)	10	(3%)	$5	(3%)
Equipment used for not intended purpose	60	(2%)	0	(3%)	10	(5%)	$2	(1%)
Other known factor contributing to ignition	180	(5%)	10	(4%)	10	(6%)	$8	(6%)
Total fires	3,330	(100%)	160	(100%)	230	(100%)	$143	(100%)
Total factors	3,560	(107%)	180	(115%)	260	(114%)	$156	(109%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Multiple entries are allowed, which can result in sums higher than totals. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 16D.
Home Fires Involving Transformers and Power Supplies, by Factor Contributing to Ignition
2012-2016 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical failure or malfunction	1,340	(65%)	10	(81%)	70	(54%)	$64	(59%)
Mechanical failure or malfunction	180	(9%)	0	(0%)	10	(8%)	$13	(12%)
Heat source too close to combustibles	170	(8%)	0	(0%)	20	(12%)	$12	(11%)
Equipment overloaded	120	(6%)	0	(0%)	10	(7%)	$7	(7%)
Equipment unattended	80	(4%)	0	(0%)	0	(2%)	$5	(5%)
Unclassified misuse of material or product	60	(3%)	0	(19%)	10	(4%)	$3	(3%)
Equipment not being operated properly	40	(2%)	0	(0%)	0	(4%)	$2	(2%)
Other known factor contributing to ignition	230	(11%)	0	(19%)	20	(19%)	$13	(12%)
Total fires	2,060	(100%)	20	(100%)	130	(100%)	$108	(100%)
Total factors	2,220	(108%)	20	(118%)	140	(110%)	$120	(110%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Multiple entries are allowed, which can result in sums higher than totals. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 17. Home Fires Involving Electrical Distribution and Lighting Equipment, by Heat Source
2012-2016 Annual Averages

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Arcing	25,770	(73%)	340	(69%)	791	(66%)	$902	(71%)
Unclassified heat from powered equipment	4,230	(12%)	70	(14%)	194	(16%)	$177	(14%)
Radiated or conducted heat from operating equipment	2,800	(8%)	50	(9%)	137	(11%)	$96	(8%)
Spark, ember or flame from operating equipment	990	(3%)	10	(3%)	39	(3%)	$47	(4%)
Other known heat source	1,370	(4%)	20	(5%)	40	(3%)	$48	(4%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 18.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Area of Origin
2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bedroom	5,830	(17%)	90	(18%)	400	(34%)	$201	(16%)
Attic or ceiling/roof assembly or concealed space	4,390	(12%)	30	(6%)	60	(5%)	$163	(13%)
Wall assembly or concealed space	3,020	(9%)	20	(5%)	40	(4%)	$92	(7%)
Common room, living room, family room, lounge or den	2,450	(7%)	130	(27%)	180	(15%)	$115	(9%)
Exterior wall surface	2,300	(7%)	10	(1%)	30	(2%)	$51	(4%)
Kitchen or cooking area	2,190	(6%)	40	(9%)	70	(6%)	$75	(6%)
Garage or vehicle storage area	1,550	(4%)	0	(0%)	50	(4%)	$104	(8%)
Crawl space or substructure space	1,300	(4%)	20	(5%)	20	(2%)	$43	(3%)
Unclassified function area	1,290	(4%)	40	(8%)	50	(5%)	$46	(4%)
Ceiling/floor assembly or concealed space	1,200	(3%)	30	(5%)	30	(2%)	$54	(4%)
Laundry room or area	1,110	(3%)	10	(1%)	40	(3%)	$29	(2%)
Lavatory, bathroom, locker room or check room	1,080	(3%)	0	(0%)	20	(1%)	$27	(2%)
Closet	690	(2%)	0	(1%)	30	(2%)	$28	(2%)
Exterior balcony or unenclosed porch	570	(2%)	10	(2%)	10	(1%)	$26	(2%)
Unclassified structural area	530	(2%)	10	(2%)	20	(1%)	$29	(2%)
Other known area of origin	5,660	(16%)	50	(10%)	150	(12%)	$186	(15%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 18A.
Home Fires Involving Wiring and Related Equipment, by Area of Origin
2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Attic or ceiling/roof assembly or concealed space	3,860	(16%)	20	(7%)	50	(8%)	$142	(17%)
Bedroom	3,220	(13%)	40	(15%)	180	(28%)	$105	(12%)
Wall assembly or concealed space	2,850	(12%)	20	(7%)	40	(6%)	$87	(10%)
Exterior wall surface	1,740	(7%)	10	(4%)	20	(3%)	$37	(4%)
Kitchen or cooking area	1,670	(7%)	30	(11%)	40	(6%)	$57	(7%)
Living room, family room, or den	1,370	(6%)	40	(15%)	80	(13%)	$64	(7%)
Crawl space or substructure space	1,070	(4%)	20	(7%)	10	(2%)	$34	(4%)
Ceiling/floor assembly or concealed space	940	(4%)	30	(11%)	20	(3%)	$47	(5%)
Laundry room or area	900	(4%)	0	(0%)	30	(5%)	$25	(3%)
Garage or vehicle storage area	800	(3%)	0	(0%)	20	(3%)	$47	(6%)
Unclassified function area	780	(3%)	20	(7%)	20	(3%)	$29	(3%)
Lavatory, bathroom, locker room or check room	710	(3%)	0	(0%)	10	(2%)	$19	(2%)
Closet	430	(2%)	0	(0%)	20	(3%)	$17	(2%)
Unclassified structural area	390	(2%)	0	(0%)	10	(2%)	$21	(2%)
Conduit, pipe, utility, or ventilation shaft	380	(2%)	0	(0%)	0	(0%)	$8	(1%)
Other known area of origin	3,670	(15%)	30	(11%)	80	(13%)	$116	(14%)
Total	24,780	(100%)	270	(100%)	640	(100%)	$853	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 18B.
Home Fires Involving Lamp, Bulb, or Lighting, by Area of Origin
2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bedroom	1,110	(22%)	20	(45%)	90	(46%)	$32	(19%)
Attic or ceiling/roof assembly or concealed space	490	(10%)	0	(4%)	10	(4%)	$19	(12%)
Living room, family room, or den	400	(8%)	10	(29%)	30	(16%)	$19	(11%)
Exterior wall surface	320	(6%)	0	(0%)	0	(2%)	$6	(4%)
Lavatory, bathroom, locker room or check room	320	(6%)	0	(0%)	0	(1%)	$6	(4%)
Kitchen or cooking area	240	(5%)	0	(4%)	10	(4%)	$8	(5%)
Ceiling/floor assembly or concealed space	210	(4%)	0	(0%)	0	(2%)	$7	(4%)
Exterior balcony, unenclosed porch	200	(4%)	0	(0%)	0	(1%)	$9	(5%)
Closet	200	(4%)	0	(0%)	10	(4%)	$9	(6%)
Unclassified function area	200	(4%)	0	(4%)	10	(4%)	$6	(4%)
Garage or vehicle storage area	190	(4%)	0	(4%)	10	(4%)	$8	(5%)
Wall assembly or concealed space	90	(2%)	0	(0%)	0	(0%)	$3	(2%)
Courtyard, terrace or patio	90	(2%)	0	(0%)	0	(1%)	$4	(3%)
Unclassified outside area	90	(2%)	0	(0%)	0	(0%)	$4	(2%)
Other known area of origin	830	(17%)	0	(9%)	20	(11%)	$23	(14%)
Total	4,970	(100%)	40	(100%)	200	(100%)	$164	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 18C.
Home Fires Involving Cords or Plugs, by Area of Origin
2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bedroom	1,110	(33%)	30	(18%)	100	(42%)	$45	(32%)
Living room, family room, or den	485	(15%)	70	(44%)	50	(21%)	$25	(17%)
Garage or vehicle storage area	228	(7%)	0	(0%)	10	(4%)	$15	(10%)
Kitchen or cooking area	203	(6%)	10	(6%)	10	(5%)	$7	(5%)
Unclassified function area	202	(6%)	20	(10%)	10	(6%)	$8	(6%)
Laundry room or area	124	(4%)	0	(1%)	0	(2%)	$2	(2%)
Crawl space or substructure space	104	(3%)	0	(1%)	10	(3%)	$2	(2%)
Exterior wall surface	91	(3%)	0	(1%)	0	(1%)	$2	(2%)
Exterior balcony, unenclosed porch	67	(2%)	10	(6%)	0	(1%)	$3	(2%)
Wall assembly or concealed space	66	(2%)	0	(1%)	0	(0%)	$2	(1%)
Unclassified structural area	51	(2%)	10	(4%)	0	(2%)	$3	(2%)
Other known area of origin	600	(18%)	10	(8%)	30	(12%)	$28	(19%)
Total	3,330	(100%)	160	(100%)	230	(100%)	$143	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 18D.
Home Fires Involving Transformers and Power Supplies, by Area of Origin
2012-2016 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Bedroom	450	(22%)	10	(45%)	40	(32%)	$21	(19%)
Garage or vehicle storage area	340	(16%)	0	(0%)	20	(14%)	$36	(33%)
Living room, family room, or den	210	(10%)	0	(21%)	20	(13%)	$9	(8%)
Exterior wall surface	110	(5%)	0	(0%)	0	(3%)	$4	(4%)
Unclassified function area	100	(5%)	0	(0%)	10	(8%)	$2	(2%)
Kitchen or cooking area	90	(4%)	0	(0%)	0	(3%)	$2	(2%)
Exterior balcony, unenclosed porch	50	(2%)	0	(12%)	10	(5%)	$4	(3%)
Unclassified outside area	50	(2%)	0	(0%)	0	(1%)	$2	(2%)
Crawl space or substructure space	50	(2%)	0	(0%)	0	(1%)	$3	(2%)
Office	40	(2%)	0	(0%)	0	(0%)	$2	(2%)
Storage of supplies or tools or dead storage	40	(2%)	0	(0%)	0	(1%)	$2	(2%)
Dining room, bar or beverage area, cafeteria	30	(2%)	0	(0%)	10	(6%)	$1	(1%)
Unclassified storage area	30	(2%)	0	(0%)	0	(2%)	$1	(1%)
Other known area of origin	460	(22%)	0	(22%)	10	(12%)	$19	(17%)
Total	2,060	(100%)	20	(100%)	130	(100%)	$108	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Table 19.
Home Fires Involving Electrical Distribution and Lighting Equipment, by Item First Ignited
2012-2016 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical wire or cable insulation	11,020	(31%)	120	(25%)	330	(27%)	$319	(25%)
Structural member or framing	5,960	(17%)	90	(18%)	150	(13%)	$283	(22%)
Insulation within structural area	2,400	(7%)	0	(0%)	20	(2%)	$60	(5%)
Exterior wall covering or finish	2,300	(7%)	20	(5%)	30	(3%)	$75	(6%)
Interior wall covering, excluding drapes	1,740	(5%)	20	(4%)	50	(5%)	$73	(6%)
Unclassified structural component or finish	1,520	(4%)	10	(3%)	40	(3%)	$60	(5%)
Mattress or bedding	1,150	(3%)	20	(3%)	110	(9%)	$38	(3%)
Unclassified item first ignited	950	(3%)	10	(1%)	20	(2%)	$24	(2%)
Interior ceiling cover or finish	760	(2%)	10	(1%)	10	(1%)	$35	(3%)
Clothing	720	(2%)	30	(7%)	50	(5%)	$24	(2%)
Floor covering rug, carpet, or mat	700	(2%)	10	(1%)	40	(3%)	$33	(3%)
Upholstered furniture or vehicle seat	610	(2%)	50	(10%)	70	(6%)	$35	(3%)
Unclassified furniture or utensils	540	(2%)	20	(5%)	20	(2%)	$22	(2%)
Other known item first ignited	4,760	(14%)	80	(16%)	240	(20%)	$188	(15%)
Total	35,150	(100%)	490	(100%)	1,200	(100%)	$1,270	(100%)

Note: Figures exclude confined fires which are fires reported as confined to fuel burner or boiler, chimney or flue, cooking vessel, trash, incinerator, or commercial compactor. Fires, deaths, and injuries are rounded to the nearest ten, and direct property damage to the nearest million dollars. Figures reflect a proportional share of home fires with factor contributing to ignition listed as unknown, unreported, none, or blank. Totals may not equal sums because of rounding error.

Source: Data from NFIRS Version 5.0 and NFPA Fire Experience Survey.

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities that participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA visit www.nfpa.org/research.
E-mail: research@nfpa.org.

NFPA No.USS37ST

U.S. Fire Administration

Working for a fire-safe America

Residential Building Electrical Malfunction Fire Trends (2011-2020)

National estimates

The 2020 national estimates for residential building electrical malfunction fires and losses show that there were:

23,400 fires.

200 deaths.

975 injuries.

$1,135,900,000 in dollar loss.

Overall trends

Overall trends for residential building electrical malfunction fires and losses for the 10-year period of 2011 to 2020 show the following:

A 2% increase in fires.

A 25% decrease in deaths.

A 10% decrease in injuries.

An 18% increase in dollar loss.*

In 2018 and 2019, there were 32 and 14 incidents, respectively, with a reported dollar loss of $1,000,000 or more, which may have contributed to the continued increase in fire dollar loss. The 2019 high-dollar-loss fires included a $26,400,000 hotel fire in New Orleans, Louisiana.

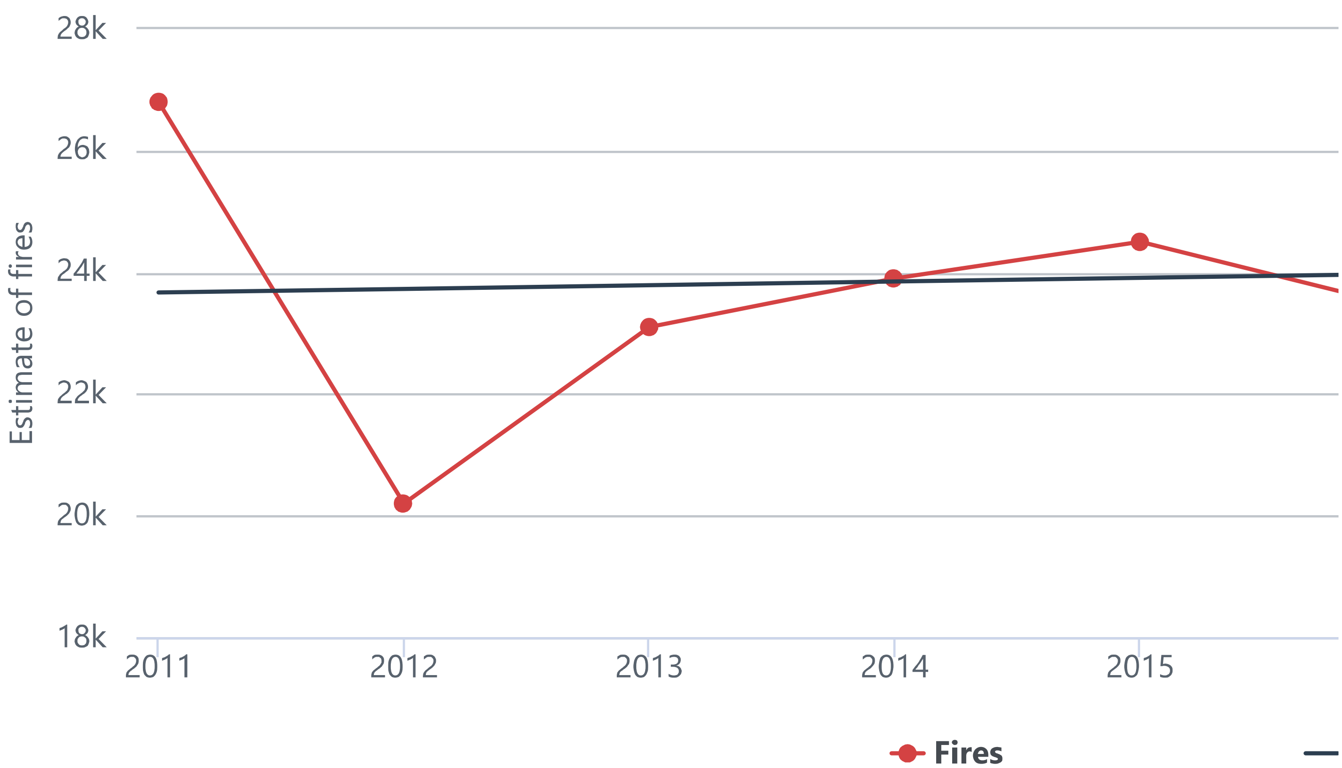
*This overall constant dollar-loss trend takes inflation into account by adjusting each year's dollar loss to its equivalent 2020 value.

Fires, deaths, injuries and dollar loss

Fires | Deaths | Injuries | $ Loss

Residential building electrical malfunction fires

View data in a table | Download chart



Fire estimate summaries present basic data on the size and status of the fire problem in the U.S. as depicted through data reported to the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System from incidents reported by local response agencies. Each Fire Estimate Summary addresses the size of the specific fire or fire-related issue and highlights important trends in the data.

Fire estimate summaries are based on the USFA's "National Estimates Methodology for Building Fires and Losses.". The USFA is committed to providing the best and most current information on the U.S. fire problem and continually examines data received from participating fire departments and the analytical methods used to fulfill this goal. Because of this commitment, data collection strategies and methodological changes are possible and do occur. Previous estimates on specific issues (or similar issues) may have used different methodologies or data definitions and, therefore, may not be directly comparable to current estimates.

Page last reviewed: Sept. 21, 2022

Public Input No. 2220-NFPA 70-2023 [Section No. 300.4(A)]

(A) Cables and Raceways Through Wood and Metal Members.

(1) Bored or Punched-Out Holes.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed through ~~bored~~ bored or punch-out holes in joists, rafters, or wood and metal members, holes shall be bored or punched-out so that the edge of the hole is not less than 32 mm (1¼ in.) from the edges of the wood and metal member. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by screws or nails by a steel plate(s) or bushing(s) at least 1.6 mm (¹⁄₁₆ in.) thick, and of appropriate length and width, installed to cover the area of the wiring.

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid PVC conduit, RTRC, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (¹⁄₁₆ in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

(2) Notches in Wood and Metal .

Where there is no objection because of weakening the building structure, in both exposed and concealed locations, cables or raceways shall be permitted to be laid in notches in wood and metal studs, joists, rafters, or other wood and metal members where the cable or raceway at those points is protected from penetration by nails or screws by a steel plate at least 1.6 mm (¹⁄₁₆ in.) thick, and of appropriate length and width, installed to cover the area of the wiring. The steel plate shall be installed before the building finish is applied.

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (¹⁄₁₆ in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

Statement of Problem and Substantiation for Public Input

The likelihood of passing through cables and raceways being subject to this physical damage is the same for both wood and metal framing members. There is no requirement to protect a cable or raceway passes through a hole in a metal framing member. 300.4(B) only applies to NM cable and ENT passing through metal framing members. This proposed revision will match the requirements cables and raceways other than NM cable and ENT to be protected when passing through both metal and wood framing members.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 15 10:29:01 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The submitter did not provide adequate substantiation to expand the protection requirements for wood framing members to metal framing members.

Public Input No. 2218-NFPA 70-2023 [Section No. 300.4(A)(1)]

(1) Bored or Punch-Out Holes.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed through bored or punch-out holes in joists, rafters, or wood and metal members, holes shall be bored or punched-out so that the edge of the hole is not less than 32 mm (1¼ in.) from the edges of the wood ~~member~~ and metal member . Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by screws or nails by a steel plate(s) or bushing(s) at least 1.6 mm (1⁄16 in.) thick, and of appropriate length and width, installed to cover the area of the wiring.

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid PVC conduit, RTRC, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

Statement of Problem and Substantiation for Public Input

A cable and raceway passing through a punched-out hole in metal members is subject to penetration by screws or nails and should be protected by a steel plate(s) or bushing(s) at least 1.6 mm (1⁄16 in.) thick. The likelihood of cables and raceways being subject to this physical damage is the same for both wood and metal framing members.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 15 10:25:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The submitter did not provide adequate substantiation to expand the protection requirements for wood framing members to metal framing members.

Public Input No. 2219-NFPA 70-2023 [Section No. 300.4(A)(2)]

(2) Notches in Wood and Metal .

Where there is no objection because of weakening the building structure, in both exposed and concealed locations, cables or raceways shall be permitted to be laid in notches in wood and metal studs, joists, rafters, or other wood and metal members where the cable or raceway at those points is protected from penetration by nails or screws by a steel plate at least 1.6 mm (1⁄16 in.) thick, and of appropriate length and width, installed to cover the area of the wiring. The steel plate shall be installed before the building finish is applied.

Exception No. 1: Steel plates shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

Statement of Problem and Substantiation for Public Input

A cable and raceway passing through notches in metal members is subject to penetration by screws or nails and should be protected by a steel plate(s) or bushing(s) at least 1.6 mm (1⁄16 in.) thick. The likelihood of cables and raceways being subject to this physical damage is the same for both wood and metal framing members.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 15 10:27:32 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The submitter did not provide adequate substantiation to expand the protection requirements for wood framing members to metal framing members.

Public Input No. 1027-NFPA 70-2023 [Section No. 300.4(D)]

(D) Cables and Raceways Parallel to Framing Members and Furring Strips.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed parallel to framing members, such as joists, rafters, or studs, or is installed parallel to furring strips, the cable or raceway shall be installed and supported so that the nearest outside surface of the cable or raceway is not less than 32 mm (1¼ in.) from the nearest edge of the framing member or furring strips where nails or screws are likely to penetrate. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1⁄16 in.) thick.

Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: For concealed work in finished buildings, or finished panels for prefabricated buildings where such supporting is impracticable, it shall be permissible to fish the cables between access points.

Exception No. 3: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

Exception No.4 Entrance to a device box installed on wood or metal studs, the cable can be within (1.6mm) 1.25 inch from the framing member and no more than 6 inches above or below the device box.

Statement of Problem and Substantiation for Public Input

Cables entering a deep device box on 4 inch studs require the cables to be closer than allowed per 300.4. Allowing and exception will give the electrical contractor 6 inches below, or above the box to be closer than required per 300,4

Submitter Information Verification

Submitter Full Name: John Plourde
Organization: Portsmouth Nh City Of
Affiliation: Performance Electrical training LLC.
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 12 09:47:51 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Nails or screws are likely to penetrate cable or raceways within 6 inches either above or below a device box if the 1 ¼” spacing from the nearest edge of the framing member is not maintained. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1⁄16 in.) thick.

Public Input No. 1908-NFPA 70-2023 [Section No. 300.4(D)]

(D) Cables and Raceways Parallel ~~to~~ or Through Framing Members and Furring Strips.

In both exposed and concealed locations, where a cable- or raceway-type wiring method is installed parallel ~~to~~ or through framing members, such as joists, rafters, or studs, or is installed parallel ~~to~~ or through furring strips, the cable or raceway shall be installed and supported so that the nearest outside surface of the cable or raceway is not less than 32 mm (1¼ in.) from the nearest edge of the framing member or furring strips where nails or screws are likely to penetrate. Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1⁄16 in.) thick.

Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing.

Exception No. 2: For concealed work in finished buildings, or finished panels for prefabricated buildings where such supporting is impracticable, it shall be permissible to fish the cables between access points.

Exception No. 3: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

Statement of Problem and Substantiation for Public Input

Currently there is not a NEC requirement for nail or screw protection of MC cable or flexible metallic conduit where installed through studs.

Submitter Information Verification

Submitter Full Name:	Mike McGivern
Organization:	[Not Specified]
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Aug 07 14:37:13 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Section 300.4(A) addresses cables and raceways through wood members.

Public Input No. 1422-NFPA 70-2023 [Section No. 300.4(E)]

(E) Cables, Raceways, or Boxes Installed ~~in or Under Metal-Corrugated Roof~~ Under Roof Decking.

A cable, raceway, or box, installed in exposed or concealed locations under ~~metal-corrugated sheet roof~~ any roof decking, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the cable, raceway, or box.

A cable, raceway, or box shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.

Informational Note: Roof decking material is often repaired or replaced after the initial raceway or cabling and roofing installation and might be penetrated by screws or other mechanical devices designed to provide "hold down" strength of the waterproof membrane or roof insulating material.

Exception No. 1: Rigid metal conduit and intermediate metal conduit, with listed steel or malleable iron fittings and boxes, shall not be required to comply with 300.4(E).

Exception No. 2: The 38 mm (1½in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

Statement of Problem and Substantiation for Public Input

This public input correlates with 410.10F. Luminaires require a minimum 1 1/2" gap between any roof decking and the luminaire.

Re-roofs are common on buildings. The metal roof, shingles, clay tiles, etc., get replaced but failed decking gets replaced, too. Roofers miss the trusses or rafters when nailing or screwing plywood or OSB board, and they can miss whether it's a re-roof or new construction. A visit in nearly every attic shows this to be so. Electrical wiring methods cannot withstand power tools such as nail guns and screw guns and could be punctured. The added gap is added precaution from something as busy as a roof can be with the thousands of nails and screws being installed.

The second sentence is made into a new paragraph because the topic changed from any roof decking to metal-corrugated roof decking.

Submitter Information Verification

Submitter Full Name: Norman Feck

Organization: State of Colorado

Affiliation: self

Street Address:

City:

State:

Zip:

Submittal Date: Sat Jul 15 17:47:58 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8656-NFPA 70-2024

Statement: Wiring methods and materials beneath any roof deck can be damaged by screws used for roofing materials, PV equipment, or other applications, so the types of roof deck that this rule applies to were increased.

The language regarding cables, raceways, conduit bodies, etc. were condensed to "wiring methods and materials" to ensure that all components of the installation are afforded the protection required by this section.

Exception No. 2 was revised to use mandatory text.

Exception No. 3 was added to address raceways with 2” of concrete encasement. Such an installation is not likely to experience physical damage.

Public Input No. 1830-NFPA 70-2023 [Section No. 300.4(E)]

(E) Cables, Raceways, or Boxes Installed in or Under ~~Metal-Corrugated~~ Roof Decking.

A cable, raceway, ~~or~~ box, or conduit body installed in exposed or concealed locations under ~~metal-corrugated sheet~~ roof decking ~~,~~ where subject to physical damage shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the cable, raceway, box, or ~~box~~ conduit body . A cable, raceway, box, or ~~box~~ conduit body shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.

Informational Note: Roof decking material is often repaired or replaced after the initial raceway or cabling and roofing installation and might be penetrated by screws or other mechanical devices designed to provide "hold down" strength of the waterproof membrane or roof insulating material.

Exception No. 1: Rigid metal conduit and intermediate metal conduit, with listed steel or malleable iron fittings and boxes, shall not be required to comply with 300.4(E).

Exception No. 2: The 38 mm (1½in.) spacing is not required where metal-corrugated sheet roof decking is covered with a minimum thickness 50 mm (2 in.) concrete slab, measured from the top of the corrugated roofing.

Exception No. 3: Cables, raceways, boxes and conduit bodies shall be permitted in concealed locations where encased in concrete not less than 50 mm (2 in.) thick. Boxes and conduit bodies shall be installed in accordance with 314.29

Additional Proposed Changes

File Name	Description	Approved
300.4_E_.pdf	Wiring in and under roof decking	

Statement of Problem and Substantiation for Public Input

These revisions, in part, seek to correlate with the requirements for luminaries in Section 410.10(F). Damaged wiring is not limited to metal roof decking. Wiring under wooden roofs can also be damaged by nails and screws used for attaching or repairing sheathing and shingles. Conduit bodies are also added since they can be damaged just as easily as boxes can be. Exception 3 is needed to allow wiring methods to be embedded in the concrete slab sometimes used on metal corrugated roof decking.

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 06 07:32:02 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8656-NFPA 70-2024

Statement: Wiring methods and materials beneath any roof deck can be damaged by screws used for roofing materials, PV equipment, or other applications, so the types of roof deck that this rule applies to were increased.

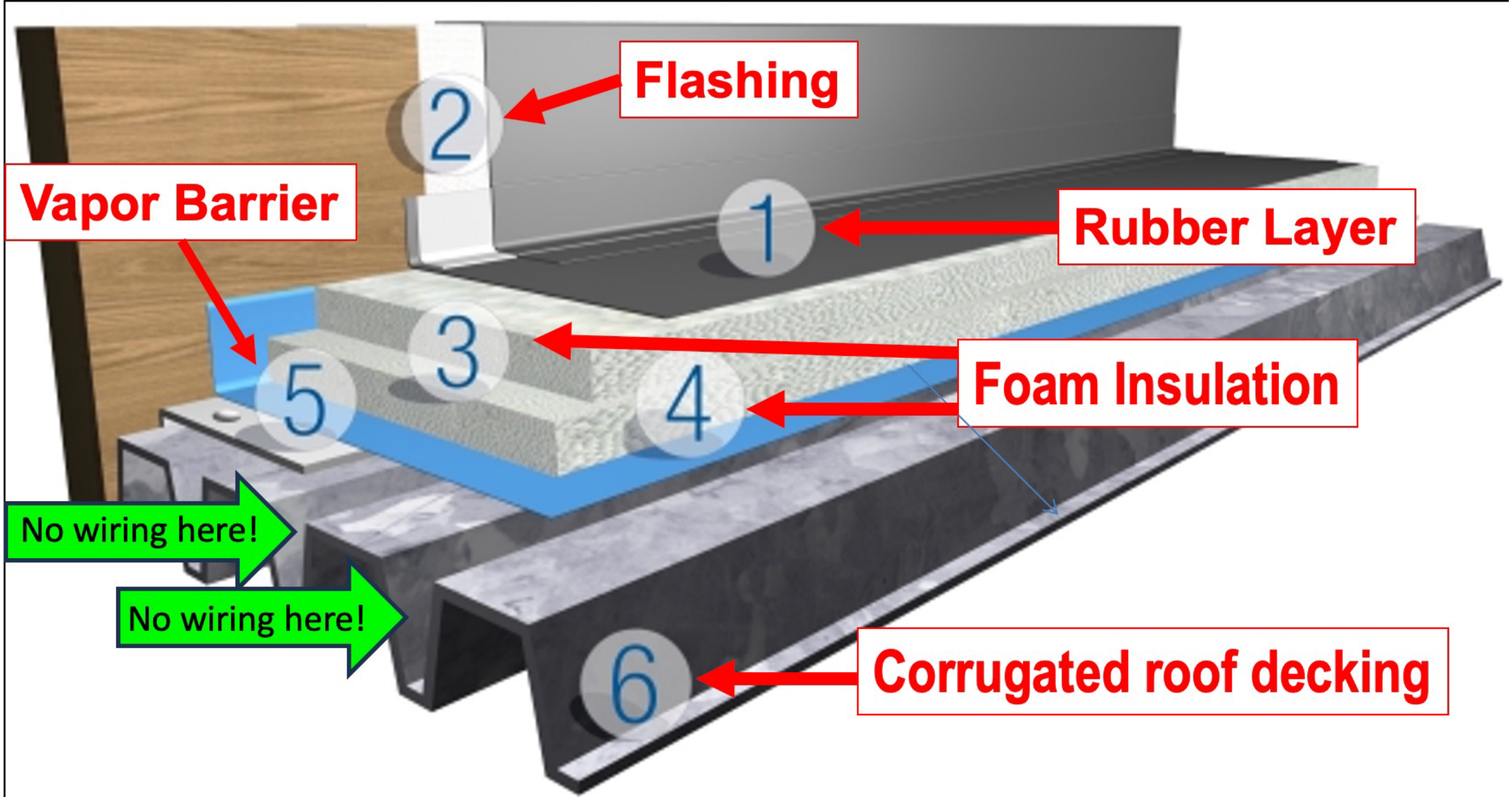
The language regarding cables, raceways, conduit bodies, etc. were condensed to "wiring methods and materials" to ensure that all components of the installation are afforded the protection required by this section.

Exception No. 2 was revised to use mandatory text.

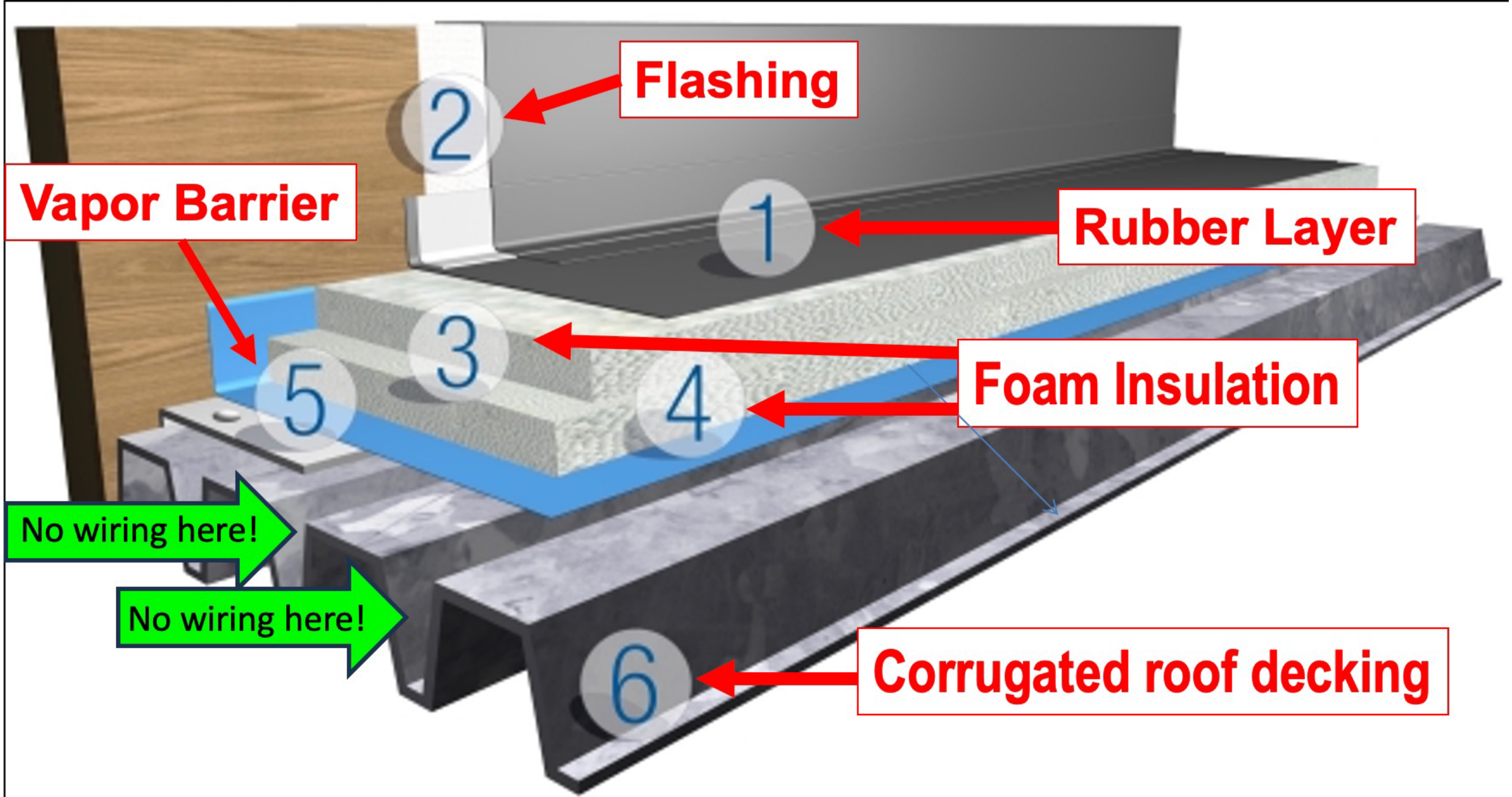
Exception No. 3 was added to address raceways with 2” of concrete encasement. Such an installation is not likely to experience physical damage.

410.10(F)- Luminaires subject to damage by nails or screws penetrating roofing material must be space at least 1 ½ inches from roofing.

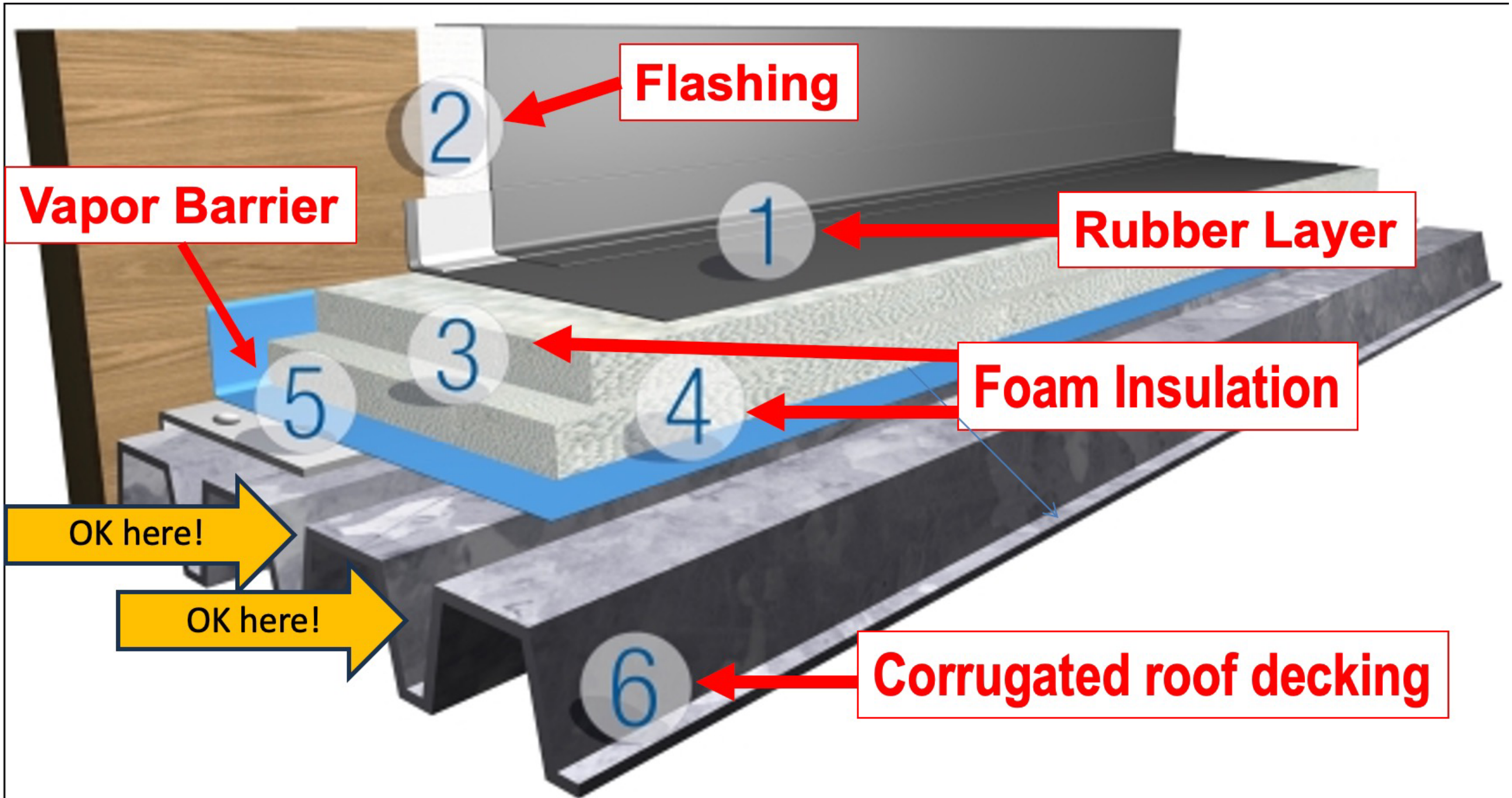
300.4(E)- Wiring methods subject to damage by nails or screws penetrating roofing material must be space at least 1 ½ inches from roofing.



A cable, raceway, box, or conduit body shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.



A cable, raceway, box, or conduit body shall not be installed in concealed locations in metal-corrugated, sheet decking–type roof.



Wiring can be installed concealed if encased in 2” of concrete!

300.4(E) exception 3-Wiring can be installed concealed if encased in 2" of concrete!

Public Input No. 1044-NFPA 70-2023 [Section No. 300.4(F)]

(F) Cables and Raceways Installed in Shallow Grooves.

Cable- or raceway-type wiring methods installed in a groove, to be covered by wallboard, siding, paneling, carpeting, or similar finish, shall be protected by 1.6 mm (1⁄16 in.) thick steel plate, sleeve, or equivalent or by not less than 32-mm (1¼-in.) free space for the full length of the groove in which the cable or raceway is installed.

Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid PVC conduit, RTRC, or electrical metallic tubing.

Exception No. 2: A listed and marked steel plate less than 1.6 mm (1⁄16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

(G) Cables in dwelling unit garages that are bored thru studs, and installed horizontal to the framing members must be protected.

Statement of Problem and Substantiation for Public Input

Cables running thru wall studs in unfished garages must be protected from damage from rakes shovels or other items that are in dwelling unit garages.

Submitter Information Verification

Submitter Full Name: John Plourde

Organization: Portsmouth Nh City Of

Affiliation: Performance Electrical Training LLC

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jun 12 16:05:41 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: Article 300 covers general requirements for wiring methods and material. For specific requirements for exposed work, go to the specific Article addressing the material in question. For example, NM Cable is addressed in 334.15 (B) titled “Protection from Physical Damage”.

Public Input No. 2691-NFPA 70-2023 [Section No. 300.4(G)]

(G) Fittings.

Where raceways contain 4 AWG or larger insulated circuit conductors, and these conductors enter a cabinet, a box, an enclosure, or a raceway, ***prior to the installation of conductors*** , the conductors shall be protected in accordance with any of the following:

(1) An identified fitting providing a smoothly rounded insulating surface

(2) A listed metal fitting that has smoothly rounded edges

(3) Separation from the fitting or raceway using an identified insulating material that is securely fastened in place

(4) Threaded hubs or bosses that are an integral part of a cabinet, box, enclosure, or raceway providing a smoothly rounded or flared entry for conductors

Conduit bushings constructed wholly of insulating material shall not be used to secure a fitting or raceway. The insulating fitting or insulating material shall have a temperature rating not less than the insulation temperature rating of the installed conductors.

Comment on the highlighted section above : **Prior to the installation of conductors.** This verbiage allows no recourse for installers who have already installed conductors without a bushing in place. Inspectors will still flag the installation as not being compliant, and then they will need to perform costly reworks to fix the issue. The creation of Split Bushings was centered around fixing this issue, and these bushings have listings under UL514b and UL467 to meet standard grounding bushing requirements. Does this then block installers from using Cable Pullers/tuggers that can only be operated without a bushing on the end of the conduit run?

Statement of Problem and Substantiation for Public Input

Installation of bushings prior to installation of cables blocks the use of cable pullers/tuggers that require no bushings to be installed for the cable puller to work. It also blocks the usage of split bushings that help an installer that mistakenly ran conductors without installing the proper bushings. This is a relatively common issue that will continue to occur in the field.

Submitter Information Verification

Submitter Full Name: Chris Decesare
Organization: Bridgeport Fittings
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 10:56:13 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The requirement for bushings to be installed prior to the installation of conductors is to protect the conductors during installation. Damage to conductors can occur while the conductors are being installed.

Public Input No. 3471-NFPA 70-2023 [New Section after 300.4(H)]

TITLE OF NEW CONTENT(I) Running Boards

Type your content here ...Where a wiring method is permitted to be installed on running boards, these shall have the following characteristics as installed supporting the wiring, except as modified by the individual article:

(1) They shall not sag.

(2) They shall extend to each side beyond the wiring they support.

(3) Where, in the judgment of the Authority Having Jurisdiction, there is a risk of physical damage coming from the side, side railings at least as high as the wiring method shall be attached unless guard strips are installed adjacent to them.

(4) They shall be constructed of 36 mm (2 in nominal) lumber or an approved equivalent, suitable for the environment, providing acceptable support, rigidity, and protection.

Statement of Problem and Substantiation for Public Input

Running boards appear in about half a dozen articles, are undefined, and have varying and often no specifications. Article 300 seems a good place to pull this together, without stepping on the prerogatives of individual CMPs.

These have been in the NEC since before it was the NEC, and the requirements have varied widely. It is not surprising that if you asked several electricians and inspectors what you need to use to make a running board, you'd get a variety of answers. These serve a safety purpose, and it is only fair to offer more guidance.

This PI does not address the running boards used simply as barriers, either to protect wiring direct-buried in loose fill or to protect individual conductors inserted in bored holes in accessible structural members. It's a start.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3463-NFPA 70-2023 [New Definition after Definition: Riser Cable, Cable Routing...]	Defining the term: Merriam Webster's entry for "Board" isn't enough.

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 03 16:37:22 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The prescriptive requirements submitted for running boards were not substantiated and could result in requirements that are not necessary for every installation. This is best left to the AHJ to decide on a case-by-case basis.

Public Input No. 4146-NFPA 70-2023 [New Section after 300.4(H)]

TITLE OF NEW CONTENT

(I) Seismic Equipment.

A listed deflextion fitting or other approved means shall be used where a raceway supplies listed seismic equipment used for mitgating a seismic event.

Additional Proposed Changes

File Name	Description	Approved
Seismic_damage.pdf	seismic damage	

Statement of Problem and Substantiation for Public Input

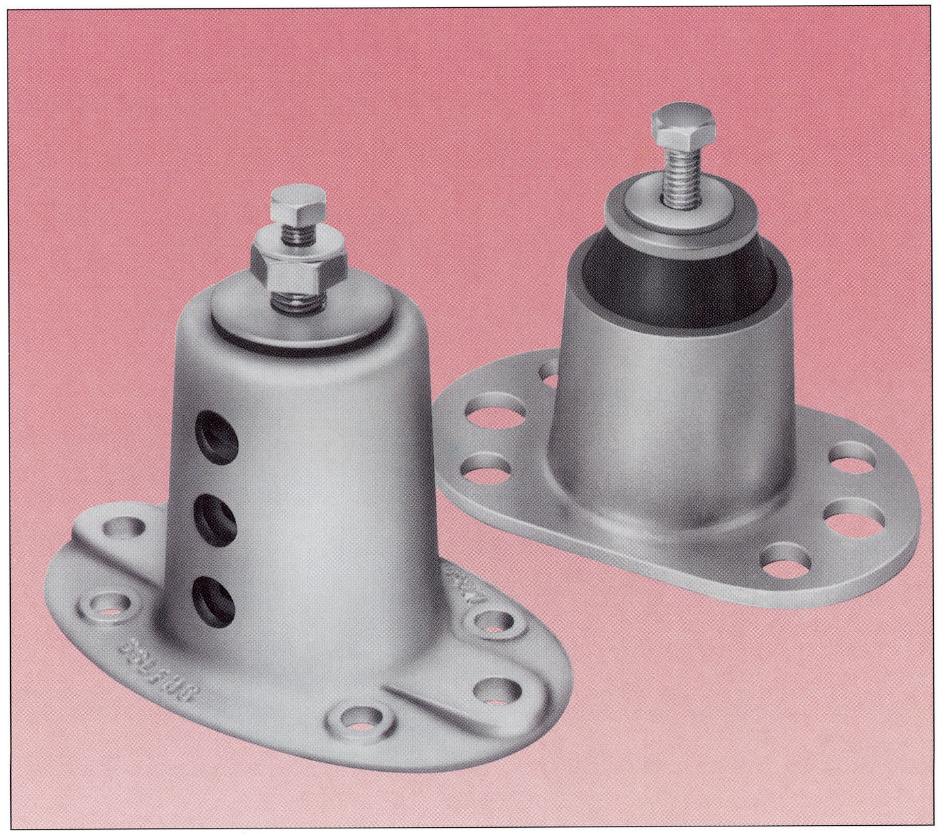
seismic events can cause major damage to fixed wiring supplying equipment designed to move during a seismic event, this section bring an awareness to the issue and guidance on minimizing or removing the damage that may occur.

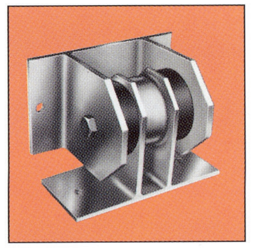
Submitter Information Verification

Submitter Full Name: Alfio Torrisi
Organization: Triad National Security, LLC.
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 18:46:23 EDT 2023
Committee: NEC-P03

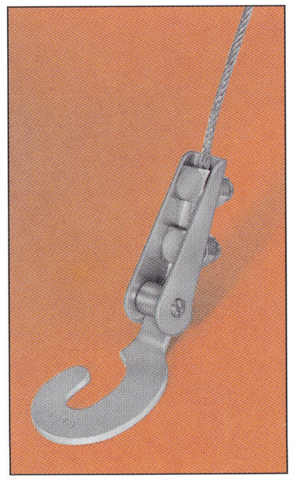
Committee Statement

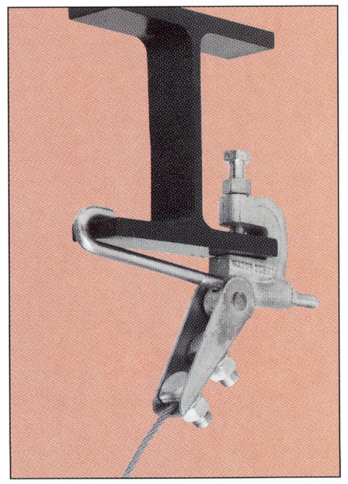
Resolution: Seismic bracing requirements are important but are covered in the building codes and other standards, such as ASCE 7.





At Mason, our vibration control products exceed acceptable seismic code guidelines.



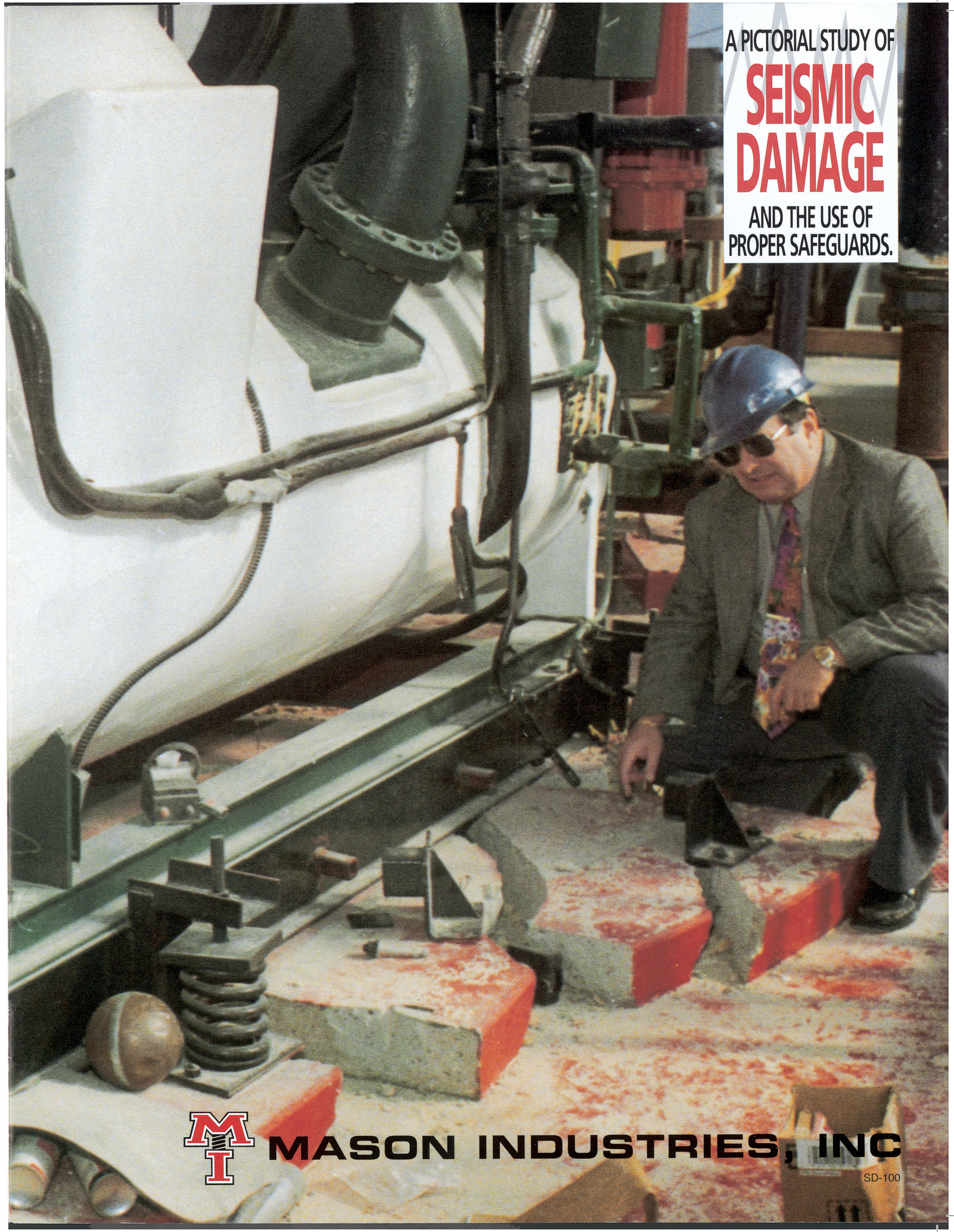


For nearly four decades Mason Industries has created its own standard for developing and building vibration control products for the HVAC industry. "Acceptable" has never been part of our vocabulary. Starting with engineering, and continuing through assembly and quality control testing, Mason products are built to provide the ultimate in seismic vibration isolation.

Our successes have been documented throughout this booklet. Mason springs, mountings, snubbers, anchor bolts, and cable restraints have all responded under severe seismic trauma. Our expansion joint technology has a worldwide reputation for top-notch performance and durability. For all types of seismic vibration control, you can count on Mason to protect lives, and keep equipment securely attached to the structure without interfering with vibration isolation.

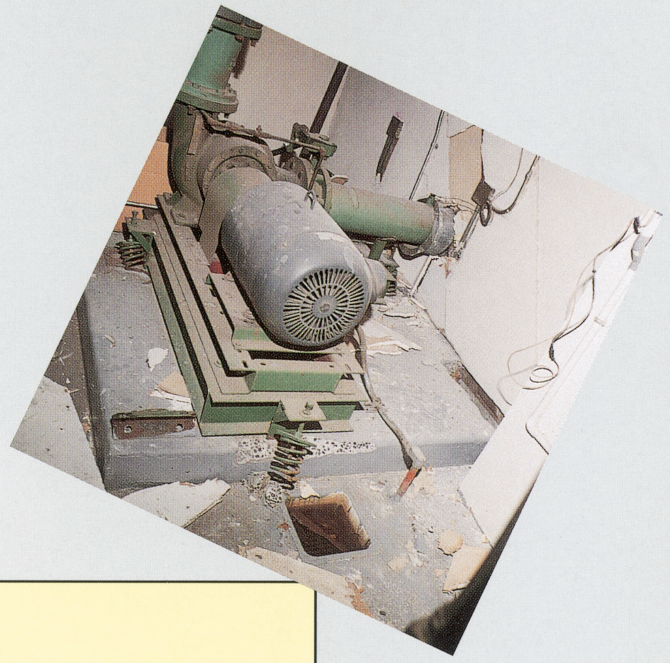
MASON INDUSTRIES, INC.
350 Rabro Drive • Hauppauge, NY 11788
Reply to: P.O. Box 410, Smithtown, NY 11787
631-348-0282 • Fax: 631-348-0279 • E-mail: info@mason-ind.com

Wu1006
SD-100



TRADITIONAL BUILDING CODES ARE STRUCTURED TO PROTECT LIVES.

When it comes to equipment within buildings, the responsibility lies with the engineer to provide the necessary safeguards during seismic activity.



On an early January morning in 1994, the Northridge area of Southern California was shaken by an earthquake that measured 6.6 on the Richter scale and lasted approximately 30 seconds. The repercussions are still being felt throughout the engineering community.

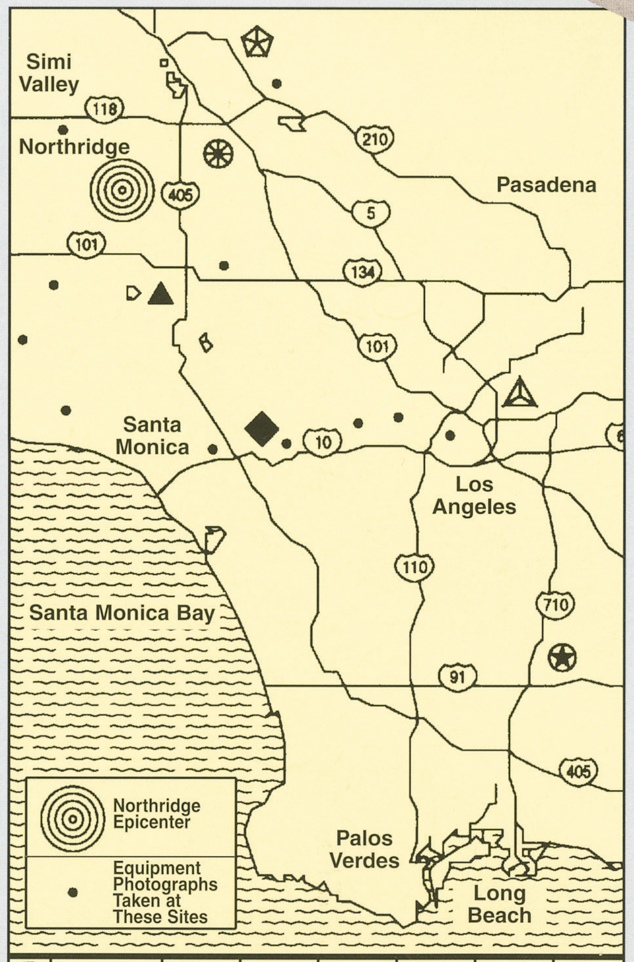
After billions of dollars in building and equipment damage, and an extensive investigation that measured the structural successes and failures of mounted machinery and electrical equipment, the conclusions are quite clear. Cushioning and restraint are the key factors and lack of it can cause earthquake-generated accelerations to amplify 30 to 50 times. Codes simply don't account for proper energy absorption when equipment is not hard mounted and braced, and the Northridge study bears this out.

The data for the study was accumulated by our structural and mechanical licensed engineers using professional photographers to document site damage.

The systems that were documented are specifically covered throughout these pages. We will examine nonisolated as well as isolated, mechanical and electrical, and floor mounted and suspended systems. The data offers excellent insights into which systems survived, which systems failed, and why.

In most cases, the seismic gV and gH next to the photos are ground level readings, depending on the locations of the seismic instrumentation. Since the damage is so extensive, the resonant amplification of these forces by the structural components is self-evident.

We have described the Mason mountings in the photographs wherever Mason was used. Out of courtesy to our competitors, we have not named the companies or products that did not do well. It would seem that we omitted the Mason failures, but that is not the case. If only one of our mountings had failed, we would have examined the failure in detail. Thankfully, we could not find one example.



Typical Input G

Symbol	⊛	⛤	▲	◆	△	✪
Max G Forces	.64V .65H	.6V .90H	1.8V 1.2H	.25V .93H	.1V .19H	.12V .16H

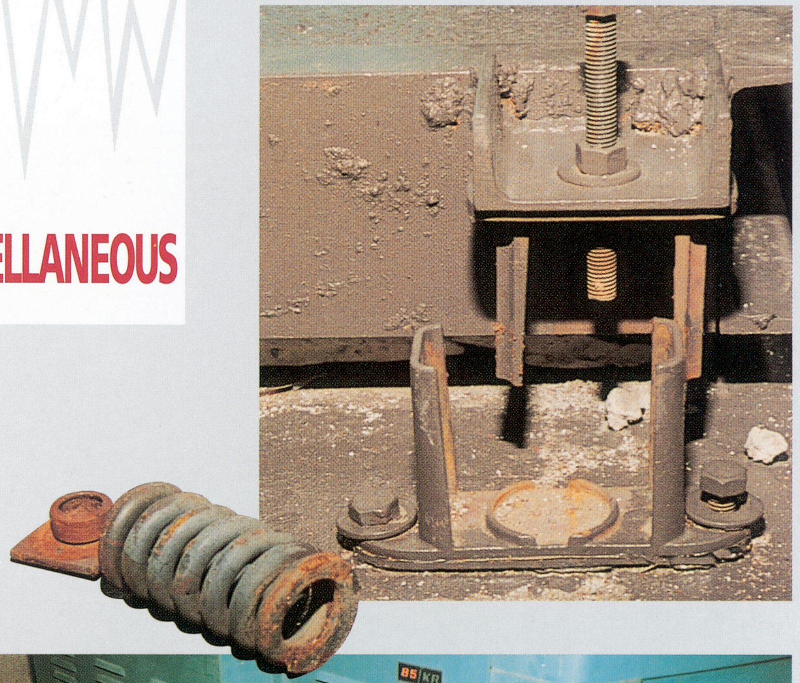
The map to the left highlights the structural sites chosen and demonstrates the variety of locations ringing the epicenter. Most of the mechanical equipment was located on upper floors where the structure itself further amplified ground level acceleration.

Because our seismic mountings are designed using ductile or steel housings rather than cast iron, we are not the successful bidders on every installation. For the most part we determine the strength of our products by testing and building them with the necessary safety factors to resist the indeterminate amplifications. All of these precautions increase cost. But, as you will see, these added safeguards can pay dividends in the long run.

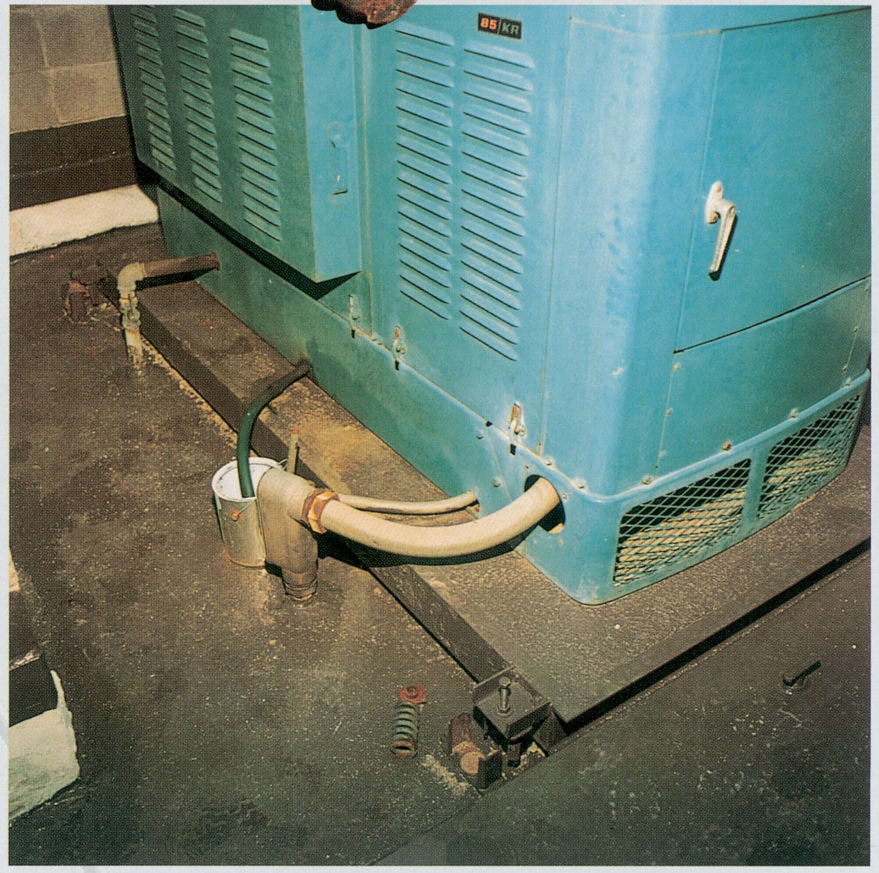
LAY IN SUSPENDED CEILINGS

Suspended ceilings sustained damage in many installations, because sway wires were not used at all or installed improperly. Damage was extensive and very dangerous to people in the spaces below. Fortunately, the earthquake occurred when most offices were not occupied. Forces in this location were 0.2gV and 0.25gH.

MISCELLANEOUS

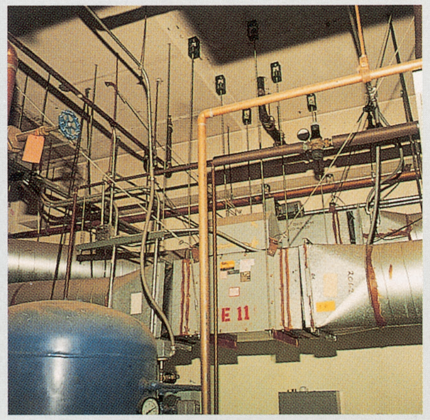


EMERGENCY GENERATOR



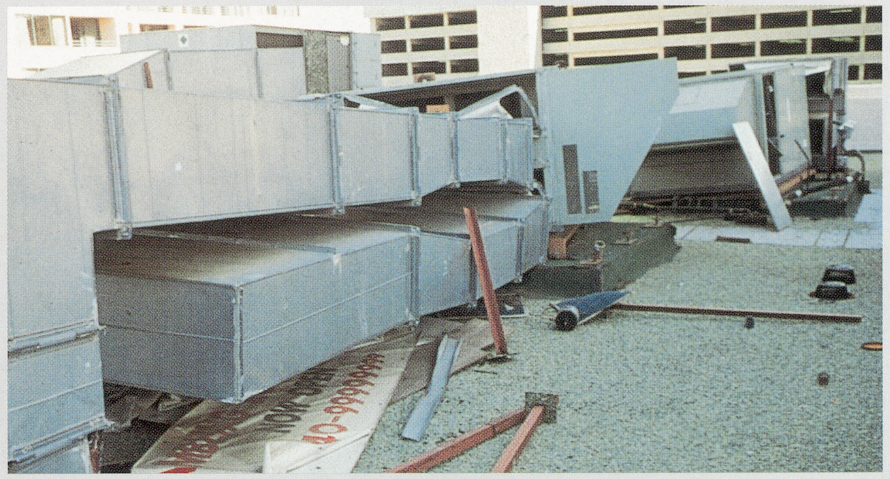
This is a common but unacceptable method of mounting an emergency generator. The generator was bolted to a concrete floating base and supported on springs within gray iron castings. As in other applications, these castings failed to restrain the generator because both the corner rubber inserts and the springs flew out. This design has no upward restraint either. Of all the equipment, every precaution should be taken so the emergency generator remains operational. Failure was total at the very low levels of 0.1gV and 0.15gH. The steel framed reinforced concrete base looks satisfactory, but the supports should have been spring mountings protected by proper snubbers or springs within all directional ductile housings.

The duct work and piping in this photograph is almost all supported by spring hangers. However, the cable sway bracing kept everything in place and there were no failures in this area.

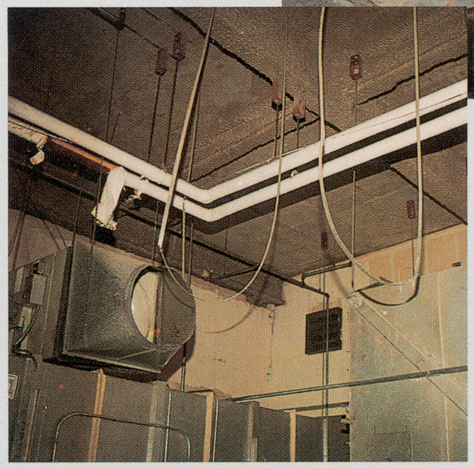


AIRSIDE DUCTS

The roof mounted ducts were supported by the steel columns. The four columns were not inter-connected, because the loading was so light. However, horizontal forces were large enough to cause failure as the supports were not cross braced to form one integral unit.



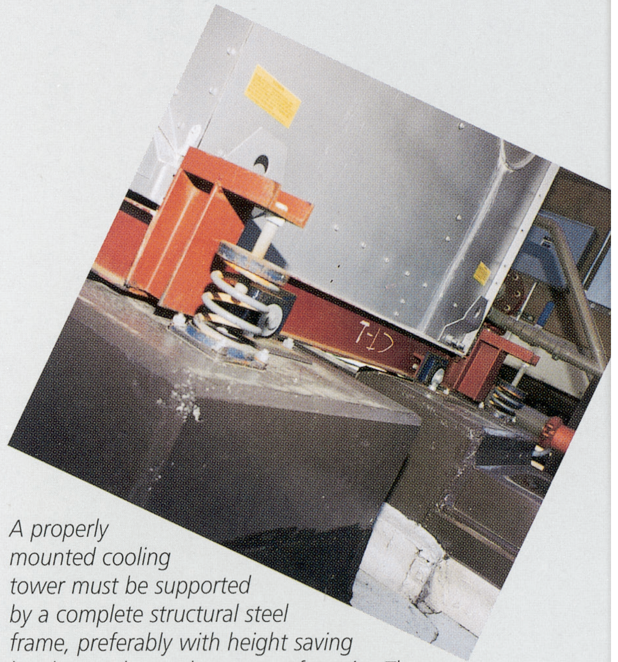
SUSPENDED DUCT WORK



Duct work is very susceptible to seismic damage. Notice the straps that held the ducting that is now on the floor shown in Photograph to the left. This can be prevented by the use of sway bracing to limit sway and keep the duct work in place. Input was 0.15gV and 0.2gH.

The independent rails rotated around their longitudinal axis, snapping anchor bolts and bending the cooling tower base. The problem could have been prevented by using a one piece structural base and double acting snubbers.

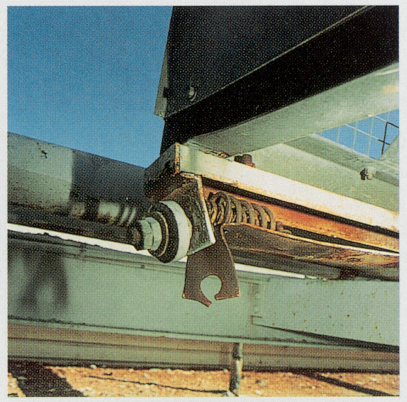
WETSIDE



A properly mounted cooling tower must be supported by a complete structural steel frame, preferably with height saving brackets to lower the center of gravity. The free standing spring mountings need not be bolted down, as the blue all directional seismic snubbers next to each spring, limit the spring's motion. These all directional seismic snubbers are shown in Chapter 49 of the 1991 ASHRAE Guide Application Manual. Snubbers are double acting and selected for maximum calculated forces. Springs should be positioned within holders rather than welded to avoid cracking. Adequate edge distance to snubber anchor bolts is extremely important (Mason WF Base, SLF Spring Mountings, Z-1225 Snubbers).

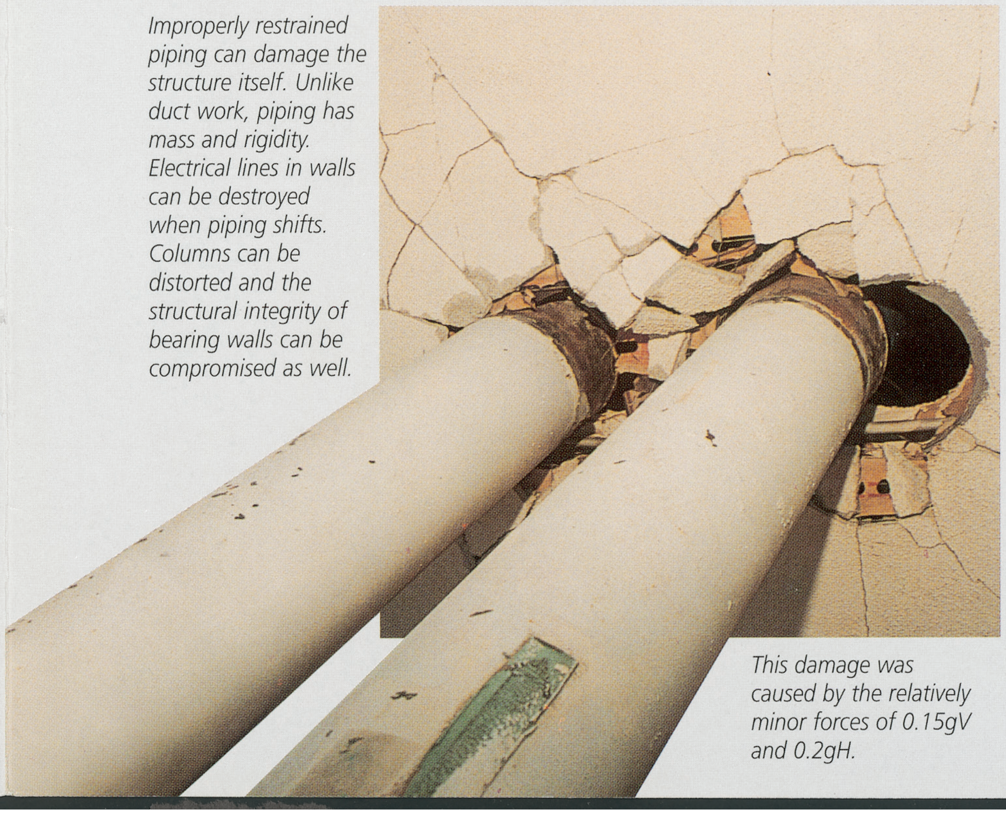
COOLING TOWERS

The vertical snubber bolt could not prevent the rail rotation. The anchor bolt tore through the base plate and the support springs fell over.

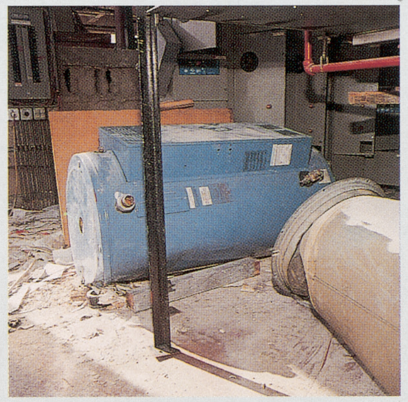


FLOOR MOUNTED PIPE

Improperly restrained piping can damage the structure itself. Unlike duct work, piping has mass and rigidity. Electrical lines in walls can be destroyed when piping shifts. Columns can be distorted and the structural integrity of bearing walls can be compromised as well.



This damage was caused by the relatively minor forces of 0.15gV and 0.2gH.



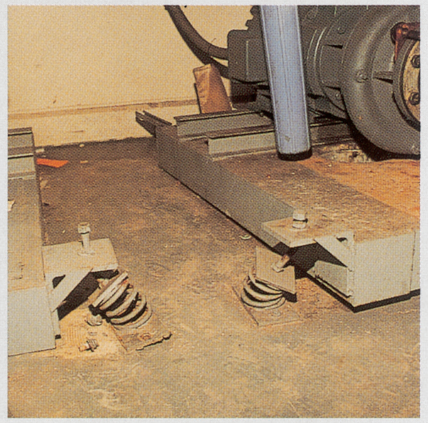
WATER HEATER

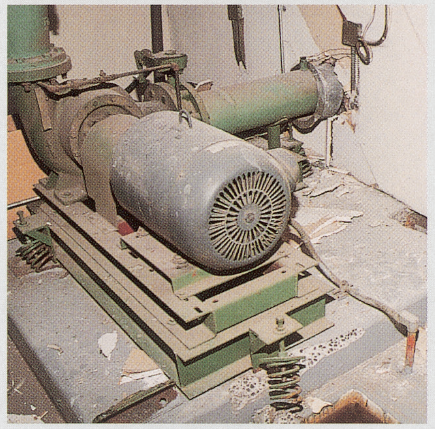
Water heaters have high centers of gravity and tend to turn over easily. The forces on this particular installation were 0.15gV and 0.2gH, heaters should be bolted to the floor and strapped to the nearest wall or column.

WETSIDE

PUMPS

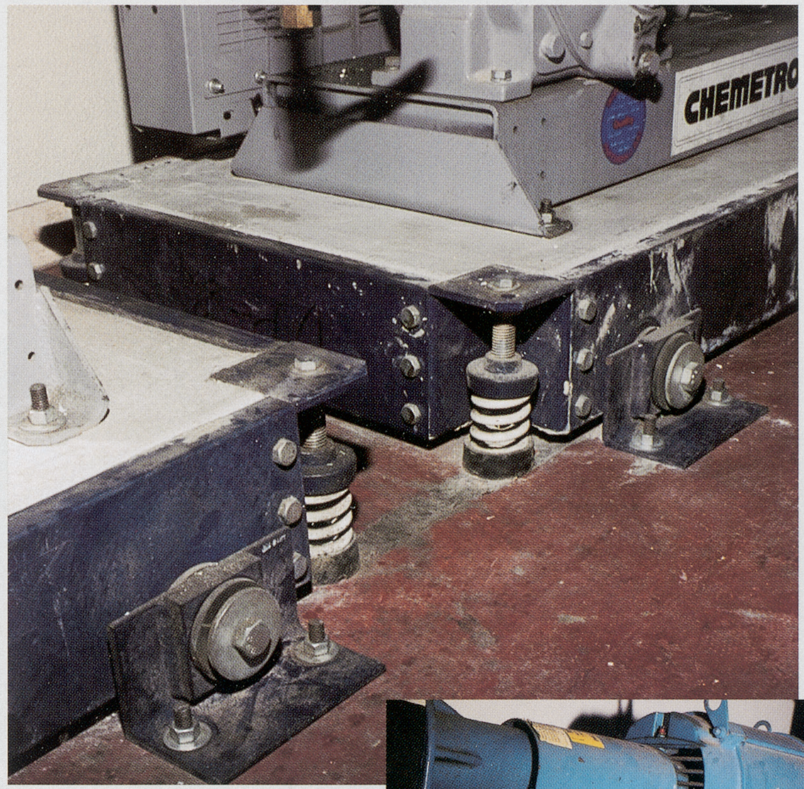
It is unacceptable to consider the horizontal and vertical stiffness of a spring to resist earthquake forces. With no snubbers to limit motion the springs resonate and bend if not break, their attachments. Anchor bolts can bend or shear off when the springs themselves do not fail or fall over. The attachment of proper snubbers to the steel frame would have averted this disaster.

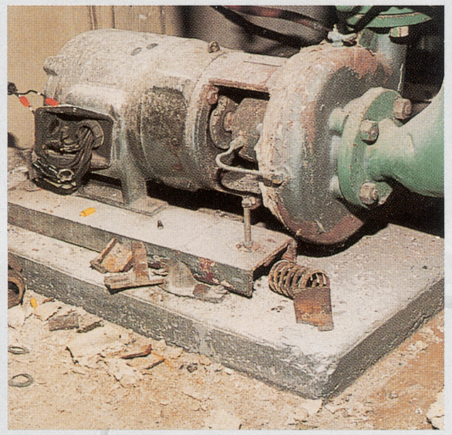




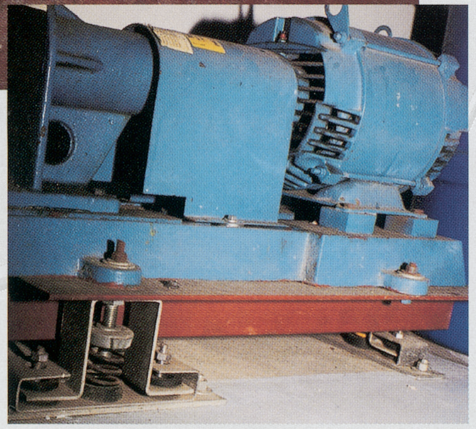
Another example showing free standing springs cannot be used without snubbing devices. The anchor bolts under these spring mountings were too close to the edge, and broke the housekeeping pad. Forces were relatively low at 0.2gV and 0.25gH, but more than sufficient to create havoc on this unsnubbed, resonant system.

This is an excellent installation using all directional seismic snubbers to prevent the concrete bases going into resonance as would happen if the springs were used alone. There is no reason to bolt the springs to the floor as the snubbers restrict motion and the springs do not shift on their friction pads. Snubbers must always be anchored with proper anchor bolts. (Mason BMK Bases, SLF Spring Mountings, Z-1225 Snubbers)





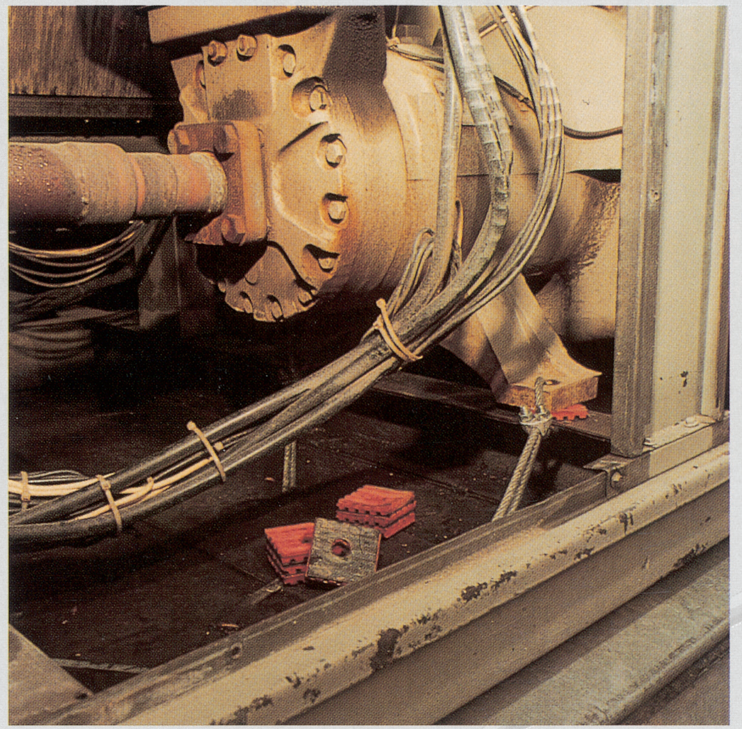
Gray cast iron spring housings invariably shatter as shown. The shrapnel flies in areas that may be occupied by plant room personnel. The only acceptable castings are ductile iron or cast steel.



This pump system is mounted on a steel frame to minimize floor loading. The springs are inside a steel seismic housing with all directional elastomeric grommets to prevent hard surface impact. Anchor bolt edge distance was more than adequate and the system showed no sign of failure. (Mason MSL Base, SLRA Spring Mountings with extended base plates)

Building codes are not concerned with internal mounting systems as the codes are meant for life safety rather than contained equipment disruption. Internal components are subjected to severe damage as are external systems if they do not have proper seismic snubbing devices. Internal damage can be more expensive and harder to repair than external. Typical problems are torn up bearings, couplings, fittings, coil damage, etc.

INTERNAL ISOLATION ROOFTOP UNIT



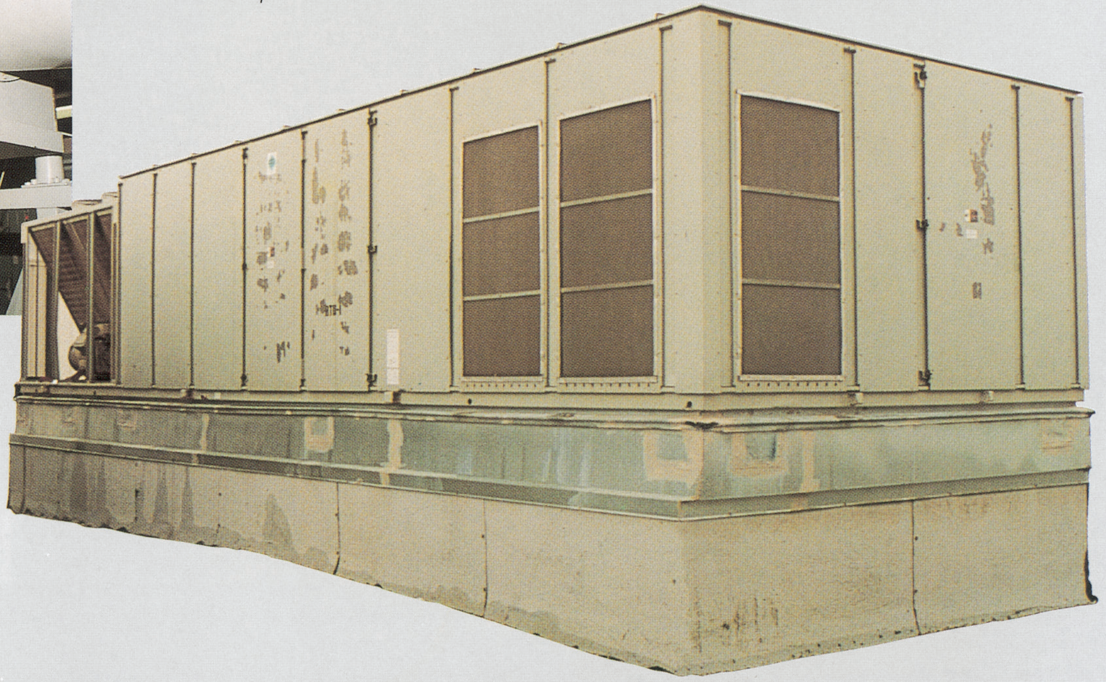
The cable system is an emergency measure to try to keep the compressor in place in anticipation of after shock. Forces were small at approximately 0.15gV and 0.2gH. Equipment with hard mounted internal components and external cushioned seismic isolation systems have a better chance of remaining operative.

STEEL SUPPORT FRAME

This excellent design uses square steel tubing as the support columns, cross braced by steel angles. The frame was securely fastened to the structure and the isolation positioned on top. Self-contained ductile iron, seismic mountings supported a supplementary steel base under the blower. The system was subjected to very high forces of 1.4gV and 1.2gH with no failure to the system. (Mason Industries' MS Lower Base, SSLFH Ductile Iron Seismic Mountings, MSL Steel Base)

COMPLETE ROOF CURB

This properly designed seismically rated spring curb had resistances based on testing to allow for seismic input. The input forces were approximately 0.2gV and 0.25gH. The spring curb prevented damage to the lower support curb and the internal components of the unit.



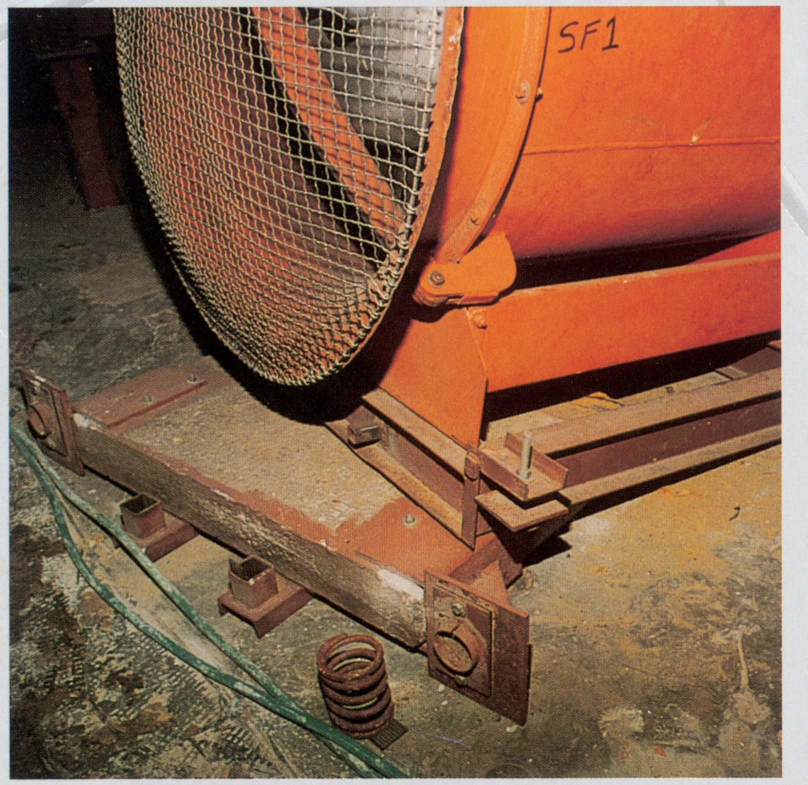
ALUMINUM ISOLATION RAILS

AIRSIDE

Curb top aluminum isolation bases have very little structural capability and generally fail. These failures are difficult to repair as the roof seldom allows for rigging, and the unit has to be lifted by helicopter or crane before bases can be replaced. Forces were small at 0.1gV and 0.15gH. The problem could have been prevented by using a seismically OSHPD approved complete isolation curb for the same application.

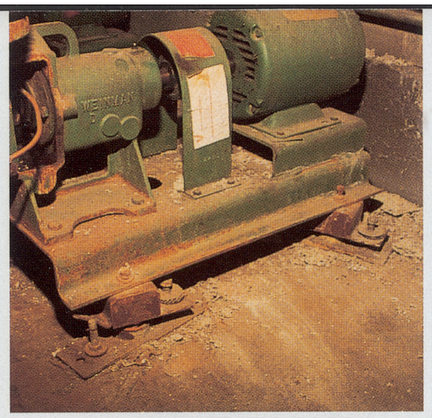
AIR HANDLING UNIT

The self contained restrained mountings held up. However, the formed channel base deformed badly and the mounting anchors let go. All of the isolators either rotated or shifted. Part of this problem was the use of slots in the base plates rather than holes. Slotted holes simplify installation, but they are single acting and minor shifts allow one end to escape the anchor bolts and the other to follow. The system would have survived had it been mounted on a steel frame with adequate anchor bolts through base plate holes. Forces were not high at 0.15gV and 0.2gH.



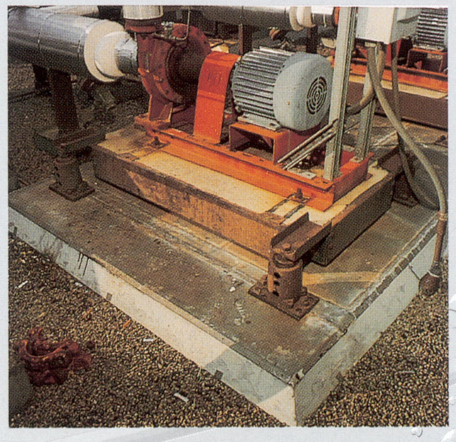
CONCRETE PIERS

This axial fan was mounted on two concrete piers. The piers fell over sideways because of inadequate anchorage to the structural floor and the axial fan fell about 3 feet. This could have been prevented by pouring the piers with a concrete web between them. The entire load path should always be studied from the structural slab right up to and including the equipment mountings. Forces were 0.2gV and 0.25gH.



Mounting a pump directly on mountings without a supplementary steel or concrete base is bad practice because of pump coupling alignment problems when torque twists the bases. The mounting housings proved inadequate as the vertical restraining bolts failed. The restraining angles bent and either the anchor bolts were sized inadequately, of the wrong type or poorly installed as the anchorage broke free and the pump shifted out of position. Input was a low 0.2gV and 0.25gH.

Shatter resistant ductile iron housings are the correct choice in seismic areas. Inputs were very high at approximately 1.5gV and 1.4gH. The systems did not fail because the entire load path was properly designed. Notice that the anchor bolts are widely separated and edge distances are very conservative. Both the floating concrete base and the housekeeping pad were properly reinforced and the housekeeping pad securely attached to the structure. (Mason BMK Base and SSLFH Ductile Spring Mountings)

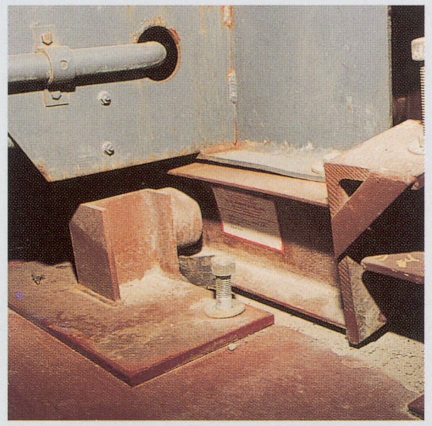


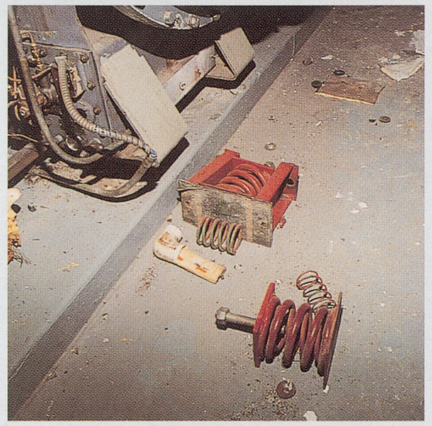
HOUSEKEEPING PADS

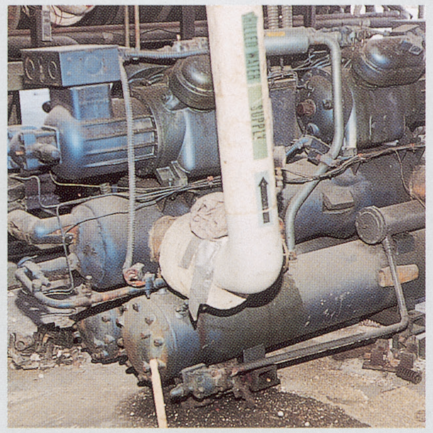
Housekeeping pad failures were common, because of improper doweling or fastening to the structural floor, and inadequate or no reinforcement in the pad itself. These pads, as the pads on the cover, had both problems. Inadequate fastening allows the pads to lift, chatter and shift. Poor reinforcement allows breakage. When the pads fail, the system must fail as nothing remains in place.

The anchor bolts were too close to the edge of the concrete housekeeping pad for the concrete to offer adequate resistance to the horizontal anchor bolt forces. The edges broke off so the anchor bolts were freed. This total failure of the restraint system occurred at only 0.15gV and 0.15gH. The mountings themselves showed considerable distortion as well.

WET SIDE





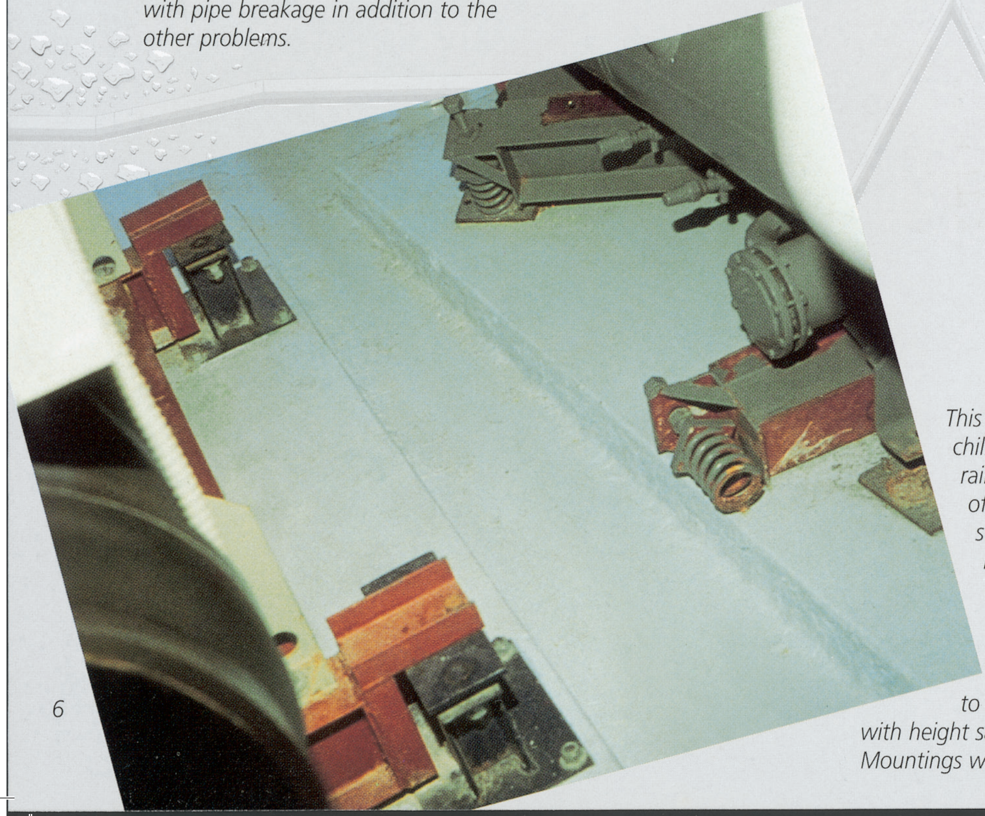


Rails rotated in virtually every application. In the upper photograph the rotation was initiated by the horizontal snubber pushing against the web of the beam. In both photographs the springs were secured by welding. Welding is always poor practice as the intense heat embrittles the spring so it tends to snap at the weld and scale inclusions produce welds that pop off. All systems failed with pipe breakage in addition to the other problems.

Another example of gray iron mounting failure. Fragments shown in the lower left and lower righthand corners can be dangerous to building personnel as well as equipment. Not only is the compressor out of service, but there is the additional worry of potential liability and damage.

Some chillers can be directly mounted on spring isolators, but not as shown in photographs above. Seismic forces were reasonably high at 0.3gV and 0.6gH. Not all the parts are shown in the photographs, but both the restraining bolts between the upper and lower housings and the anchor bolts failed. The top plates came free of the rest of the housing and may still be attached to the chiller. Base plates were weak and showed distortion. Mountings rated by test with OSHPD pre-approval would have been far safer. The chiller dropped some 14" in addition to shifting.

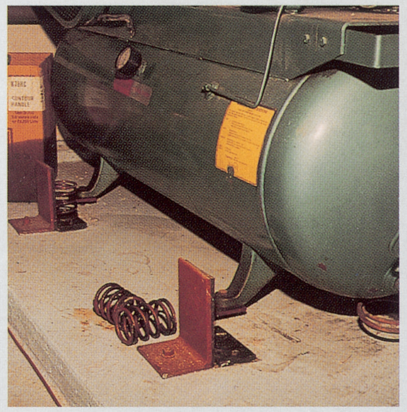
CHILLERS

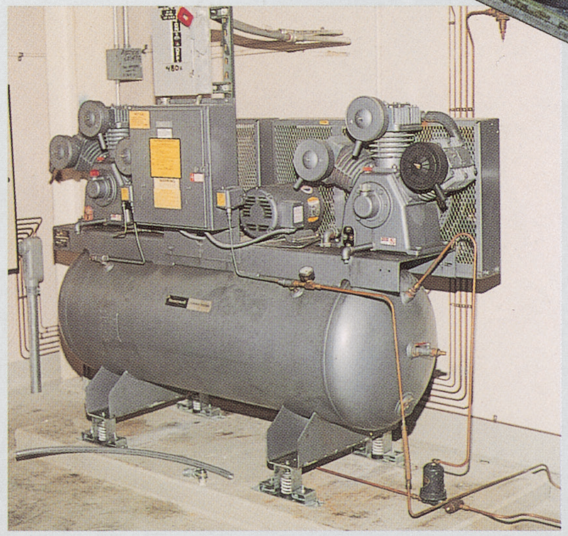


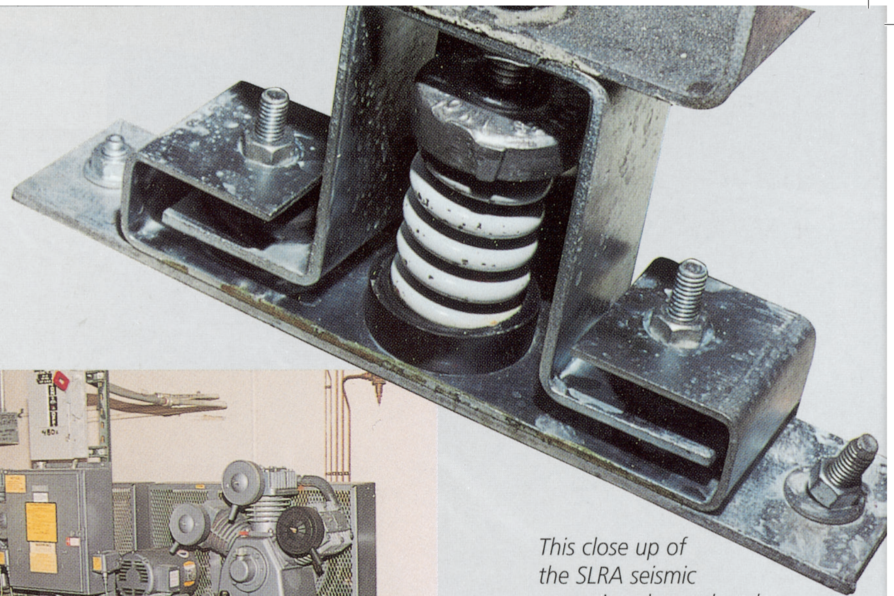
This unusual photograph shows identical chillers side by side. One was mounted on rails with snubbers bearing against the webs of the beams. The other on a one piece structural steel frame supported by spring isolators with seismic restraints built into the steel housings. The base plates were enlarged to insure proper anchor bolt spacing. The rail installation failed completely, but there was no damage to the steel base system. (Mason WF Base with height saving brackets and SSLR Restrained Spring Mountings with enlarged base plates for anchorage.)

TANK MOUNTED AIR COMPRESSORS

The spring mountings under this air compressor failed, because the snubbers were not all directional. Single bolted restraints can rotate. This angle had a simple pad cemented to one face. The arrangement could only contain the system transversely rather than in all directions. As is typical, the equipment resonated and the springs fell over. Forces were about 0.25g Vertical and 0.35g Horizontal. Proper all directional snubbers would have solved the problem.

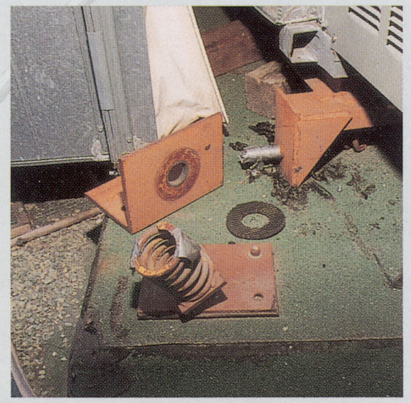






This is a simple isolation method for a horizontal tank mounted compressor (if the base legs are sturdy enough) without the use of a supplementary steel base. Mountings have built in seismic snubbers with ratings from OSHPD in the State of California. Not only these mountings, but similar designs were successful in every reviewed location. Forces were approximately 0.2gV and 9.25gH. (Mason SLRA Mountings)

This close up of the SLRA seismic mounting shows that the righthand anchor bolt was distorted at installation and not by the quake. Were it a seismic shift, the other bolt would have been bent as well. The all directional Neoprene collars reduce the impact of steel on steel. (Mason SLRA with extended base plate for anchorage)



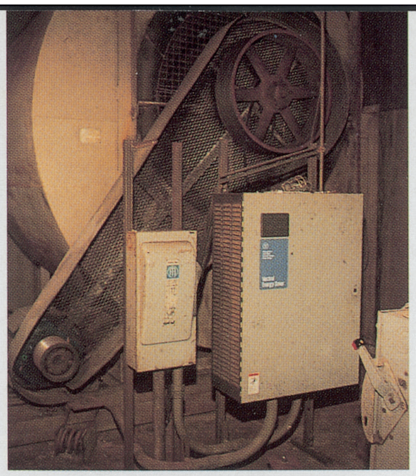
ROOFTOP AIR HANDLING UNIT

Using a poor copy of a good snubber can result in disaster. Rather than a snubber made with a one-piece double acting, all directional Neoprene sleeve with washer faces, this hard rubber washer was cemented to the angle. The rubber bushing does not appear to be thick enough. The minor cost saving, if any, resulted in a dramatic, costly failure and major equipment displacement.

AIRSIDE

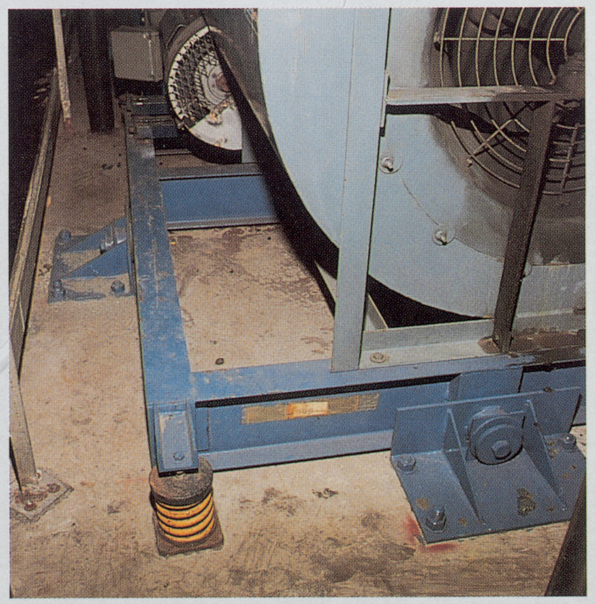
FANS

This close up of the spring shows that the attachment bolt broke allowing the spring to shift and fly free. (The spring was moved back for the photograph.) This would be a dangerous missile anywhere, but particularly in an equipment room with electrical devices. Proper snubbing would have controlled the situation.

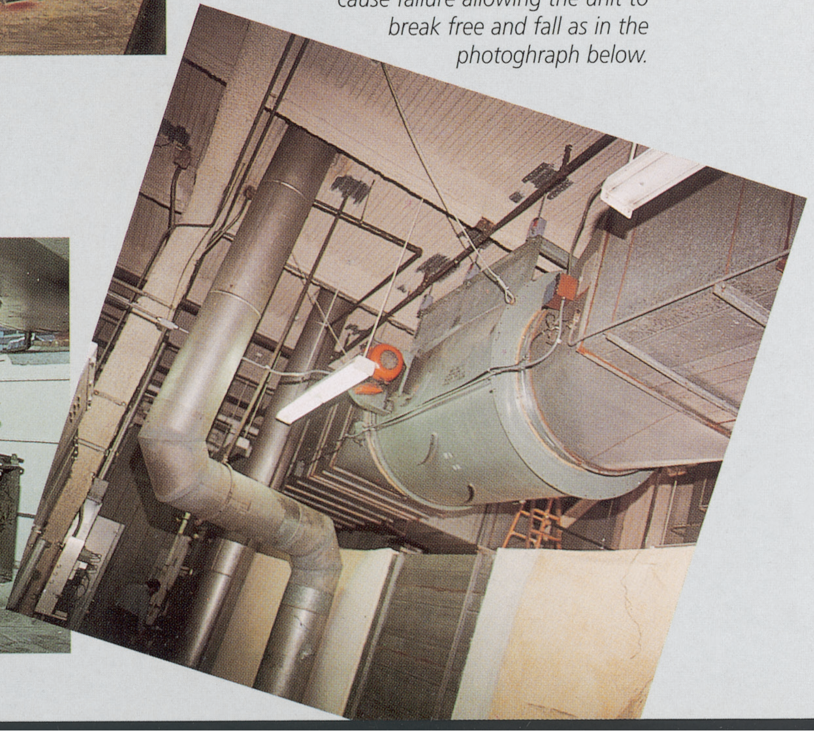


Spring isolators must be used with seismic snubbers to prevent resonance at seismic frequencies. When the horizontal amplitude became excessive, the whole system shifted releasing the springs while still compressed to 1,500 lb. This sudden release of energy can do damage to anything in the path of the flying springs. Unsnubbed systems not only fail, but they can be dangerous even at low input figures of 0.15gV and 0.12gH.

One of the proper ways to mount a fan and motor is to bolt the equipment to a rigid rectangular steel base. The spring mountings friction pads eliminate the need for bolting as the snubbers will limit motion. All directional thick Neoprene snubber bushings both restrain and cushion shock. (Mason WF Base, SLF Springs, Z-1225 Snubbers)



This large fan did not come down because there were control cables to prevent pendulum motion. Unchecked swaying bends suspension rods and can ultimately cause failure allowing the unit to break free and fall as in the photoghraph below.

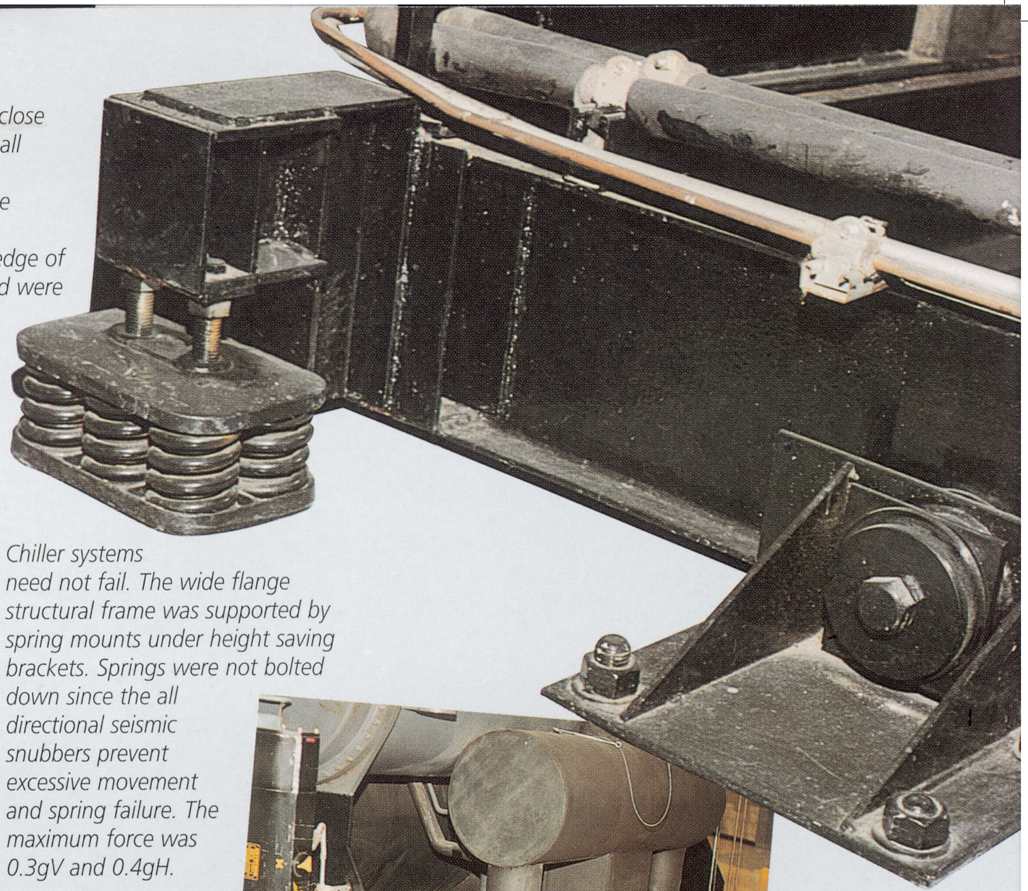


SUSPENDED FANS

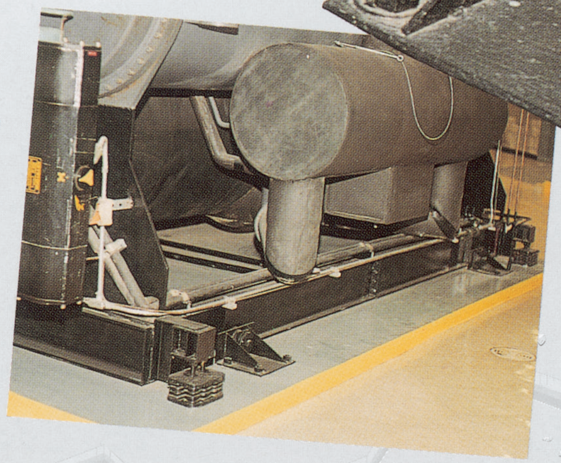
This small tubular fan broke free of the ceiling and landed on the mechanical room floor. It could have caused severe injury or equipment damage. Electrical lines and control panels are particularly sensitive. This swinging almost always takes place when seismic energy is applied to suspended systems. Proper cable sway bracing would have limited the pendulum action.

Here is another example of ragged, shattered pieces of cast iron. Cast iron should not be approved for seismic work regardless of the force levels. The systems were subjected to low inputs of 0.2gV and 0.25gH.

This photograph is a close up of the spring and all directional snubber installation below. The anchor bolts and the clearances from the edge of the housekeeping pad were all carefully calculated. (Mason WF Base, SLF Springs, Z-1011 Snubbers)

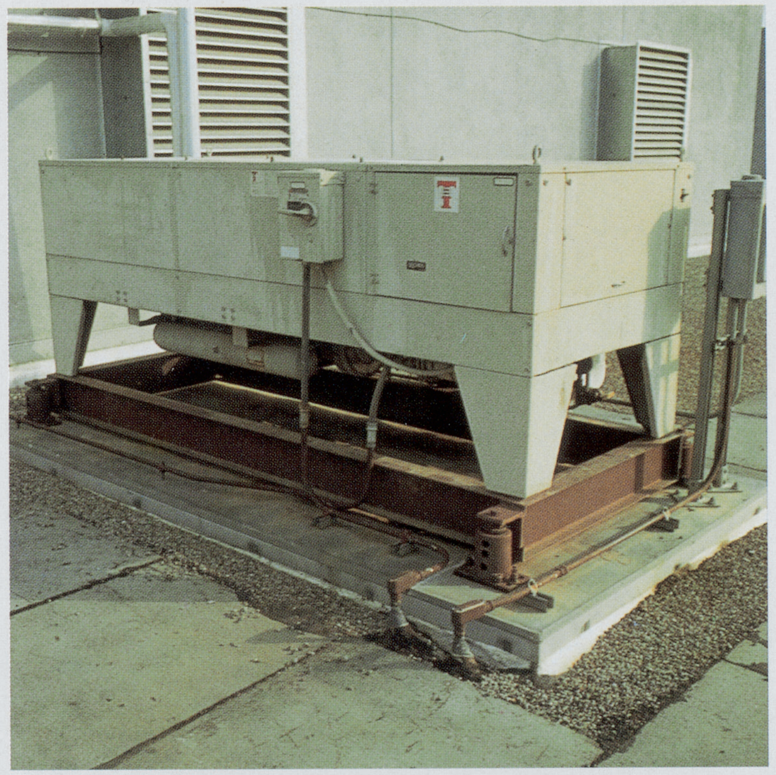


Chiller systems need not fail. The wide flange structural frame was supported by spring mounts under height saving brackets. Springs were not bolted down since the all directional seismic snubbers prevent excessive movement and spring failure. The maximum force was 0.3gV and 0.4gH.



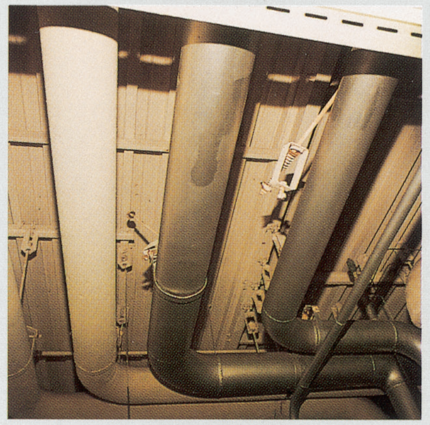
AIR COOLED CHILLERS

This is an excellent installation using a structural steel frame with height saving brackets and spring mounts with their own built in seismic protection. These are not malleable or gray iron, but ductile castings that will not shatter. The air cooled chiller has very light sheet metal legs which did not buckle, because the steel frame tied the four legs together. This unit was almost at the epicenter of the earthquake and saw seismic inputs of 1.0gV and 1.4gH. These are some of the highest forces ever recorded by an instrument anywhere in the world, but the installation survived intact. (Mason WF Base, SSLFH Snubbed Spring Mountings)



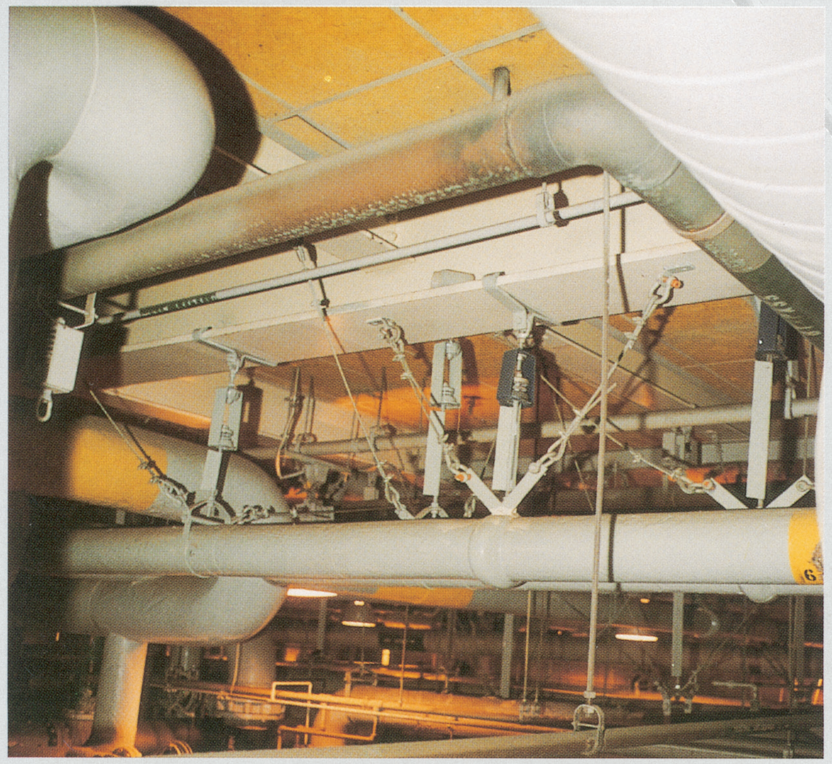
The clevis hanger in the center of the photograph fell apart and the rear hanger clevis is sufficiently displaced to have bent the ceiling bolt. There are chatter marks on the pipe in the front clevis, all indicating that this system went into resonance even though the accelerations were only 0.15gV and 0.2gH. Proper sway bracing, axial restraint and upper limit stops could have prevented this damage.

WET SIDE PIPE



Piping without sway braces will shift position and change elevation. One hanger broke completely free and one pipe is displaced approximately 12" from its original location. On other jobsites, piping systems came down. Sway bracing and axial restraint is essential along with vertical limit stops at anchorage locations. Clevis bolts must be sleeved or braced as well.

SUSPENDED PIPE



Piping with cable sway bracing survives an earthquake with no damage and no distortion. Forces in this area were high at 0.9gV and 1.2gH.

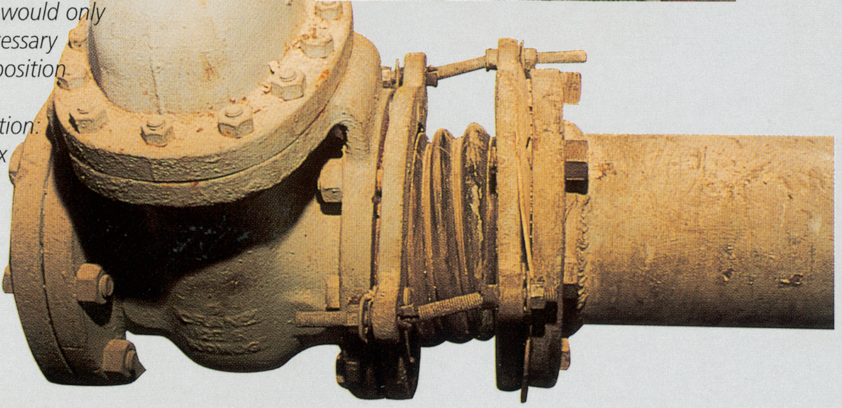
A typical example showing the use of a cable sway brace with swivel fittings for the specific purpose. Fittings are adjustable and the installation simplified by their use. (Mason Type SCB)

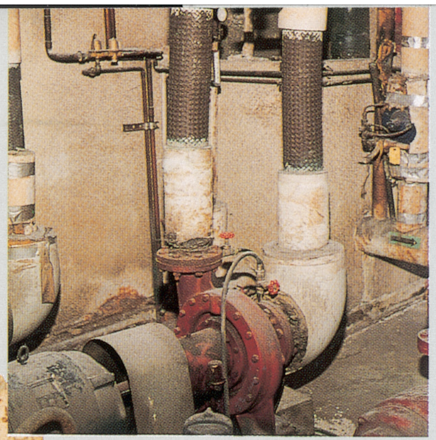
An unusual photograph showing both solid and cable braces. Both systems use swivel fittings specifically designed for the purpose to simplify installation and provide OSHPD approved attachment. Contractors often prefer cable to solid bracing even on non-isolated piping, because cables can be installed more quickly. (Cable Braces Mason Type SCB, Solid Braces Mason Type SSB)

The swivel sway brace fittings at the ends of the angle iron brace eliminate welding, fitting and fabrication time. Solid sway braces can only be used on equipment that is not isolated. When equipment is isolated, bracing must be by cable or isolated devices to prevent transmission of vibration. (Mason SSB)

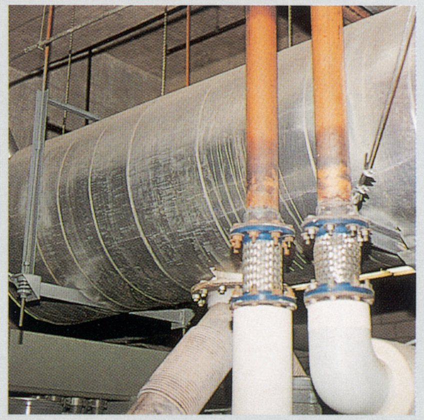
FLEXIBLE JOINTS

Even with this extreme displacement of the flexible connector, the expensive cast iron gate valve was protected. This teflon connector was distorted beyond the manufacturer's movement limitations. A double sphere rubber joint would have had a much better chance of survival and it would only have been necessary to properly reposition the piping. (Recommendation: Mason Safeflex SFDEJ)

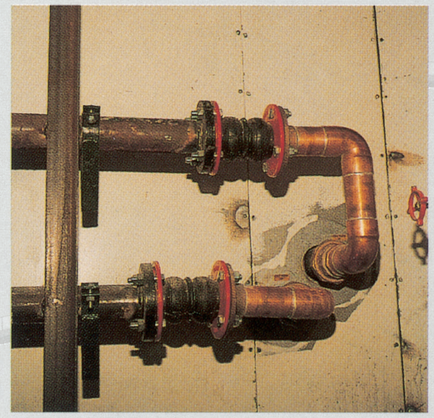




Metal flexible hose is designed to accept motion at right angles to the axis. The hoses prevented pump body failures, but after the system was back on line, the hoses leaked. Leakage was caused by metal fatigue, over travel transverse to the axis or compression and extension. Double sphere rubber connectors are all directional and can respond to motion in any direction without failure. (Recommendation: Mason Safeflex SFDEJ)



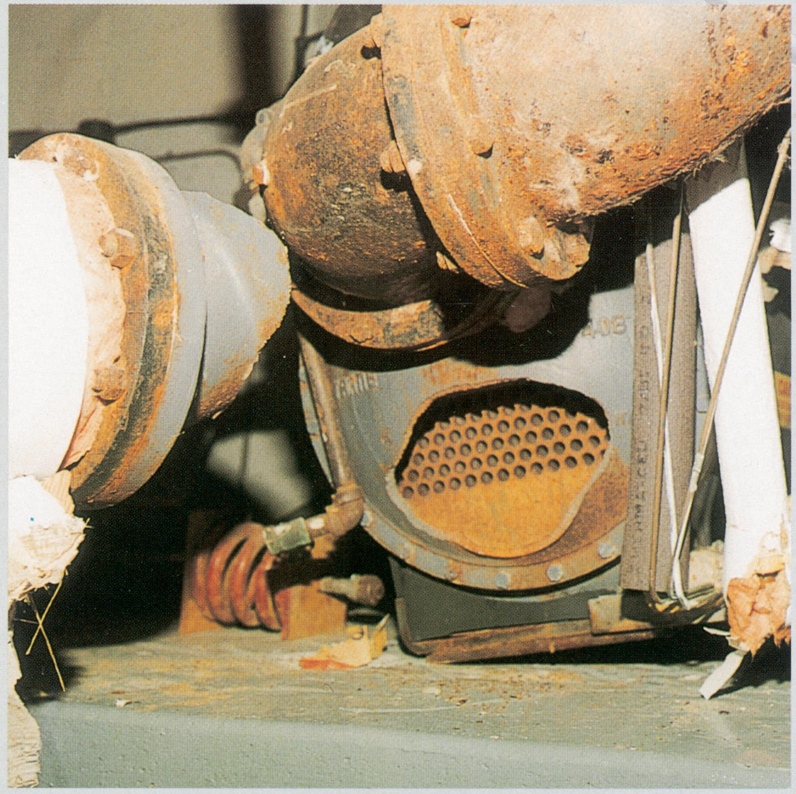
The metal flexible hose prevented pipe failure. However, the metal hose on the right was compressed. Braided metal hoses cannot accept compression and it had to be replaced. Flexible metal joints do not have the same movement capabilities as rubber joints, and tend to fail under seismic conditions. The seismic input was 0.15gV and 0.2gH. (Recommendation: Mason Safeflex SFDEJ)



Even a very fragile copper pipeline with sweat fittings will survive at the equipment interface if proper flexible joints are used. This system was subjected to approximately 0.2gV and 0.25gH, and showed no signs of failure because of the flexibility of the twin sphere rubber connectors. (Mason Twin Sphere Superflex shown. Current improved design is Mason Safeflex.)

PIPE CONNECTION TO CHILLER

An excellent example of equipment failure at the piping interface. Both the restrained equipment and piping move out of phase during an earthquake and the cast shells are not designed to accept the force necessary to drag the piping. Cast component failures are common. The solution is installation of a spherical twin sphere rubber expansion joint to allow for the motion.



Public Input No. 1043-NFPA 70-2023 [Section No. 300.4(H)]

(H) Structural Joints.

A listed expansion/deflection fitting or other approved means shall be used where a raceway crosses a structural joint intended for expansion, contraction, or deflection, used in buildings, bridges, parking garages, or other structures.

Statement of Problem and Substantiation for Public Input

Movement in building should required a device that accepts the movements .

Submitter Information Verification

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State:	
Zip:	
Submittal Date:	Mon Jun 12 16:04:34 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The PI does not comply with the requirements in 4.3.4 of NFPA’s Regulations Governing the Development of NFPA Standards as it does not include proposed text. The existing text seems to address the submitter's concern.

Public Input No. 1423-NFPA 70-2023 [Section No. 300.4(H)]

(H) Structural Joints ~~.~~ and the Conductors Within

A listed expansion/deflection fitting or other approved means shall be used where a raceway crosses a structural joint intended for expansion, contraction, or deflection, used in buildings, bridges, parking garages, or other structures.

Where expansion, contraction, or deflection fittings are used for physical raceway movement, ample lengths of conductor(s) shall be provided in the enclosures at the ends of raceways utilizing such fittings. Conductors within the enclosures shall be routed in the enclosure in a manner that allows for conductor movement.

Statement of Problem and Substantiation for Public Input

It isn't enough to have strictly the raceways compensate for physical movement. A more generous length of conductor must be left within the enclosures at each end of raceways containing expansion, contraction, or deflection fittings. Also, the conductors shouldn't be forced over a fitting immediately entering an enclosure but remain straight for a sufficient length.

This will correlate with the existing text of 300.5J where it mentions, "…. cables shall be arranged so as to prevent damage to the enclosed conductors ….". It also correlates with the modified 300.7B.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1268-NFPA 70-2023 [Section No. 300.5(J)]	
Public Input No. 1424-NFPA 70-2023 [Section No. 300.7(B)]	
Public Input No. 1424-NFPA 70-2023 [Section No. 300.7(B)]	

Submitter Information Verification

Submitter Full Name: Norman Feck
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Street Address:
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State:
Zip:
Submittal Date: Sat Jul 15 18:37:55 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Listed expansion/deflection fittings are required. Therefore, they must be installed in accordance with 110.3(B).

Public Input No. 1616-NFPA 70-2023 [Section No. 300.5(A)]

(A) Minimum Cover Requirements.

Direct-buried cable, conduit, or other raceways shall be installed to meet the minimum cover requirements of ~~Table~~ 300.5(A)(1)-(5) .

(1) Under Buildings. Circuits in raceways or Type MC or Type MI Cable identified for direct burial installed under a building shall require any additional cover then the building itself.

(2) One- and Two-Family Dwelling Unit Driveways and Outdoor Parking Areas. Cables, raceways, and wiring methods identified for direct burial installed under a driveway and outdoor parking areas used for dwelling related purposes shall have a minimum cover of 450 mm (18 in.).

Exception to (2): The minimum cover for circuits rated 120 Volts or less with GFCI protection and a maximum overcurrent device of 20 amperes, may be reduced to 300 mm (12 in.).

(3) Other Than One- and Two-Family Dwelling Unit Streets, Highways, Roads, Alleys, Driveways, and Parking Lots. Cables, raceways, and wiring methods identified for direct burial installed under streets, highways, roads, alleys, driveways, and parking lots shall have a minimum cover of 600 mm (24 in.).

(4) In or Under Airport Runways and Adjacent Areas. Cables, raceways, and wiring methods identified for direct burial installed in or under airport runways, including adjacent areas where trespass is prohibited shall have a minimum cover of 450 mm (18 in.).

(5) All Other Areas. All other areas not specified in 300.5(A)(1)-(4) shall be installed to meet the cover requirements in Table 300.5(A)(5)

Table 300.5(A)(5) Minimum Cover Requirements, 0 to 1000 Volts ac, 1500 Volts dc, Nominal, Burial in Millimeters (Inches)

~~a building~~

Location of Wiring Method or Circuit	-		**Type of Wiring Method or Circuit**							
	Column 1 Direct Burial Cables or Conductors		**Column 2** Rigid Metal Conduit or Intermediate Metal Conduit		**Column 3** Electrical Metallic Tubing, Nonmetallic Raceways Listed for Direct Burial Without ~~Concrete Encasement,~~ or Other Approved Raceways		**Column 4** Residential Branch Circuits Rated 120 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes		**Column 5** Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in 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[1,2]	6[1,2]
In trench below or encased in 50 mm (2 in.) thick concrete or equivalent	450	18	150	6	300	12	150	6	150	6
Under	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~	~~0~~
	-	~~(in raceway or Type MC or Type MI cable identified for direct burial)~~	-	-	-	-	~~(in raceway or Type MC or Type MI cable identified for direct burial)~~		~~(in raceway or Type MC or Type MI cable identified for direct burial)~~	
~~Under~~ minimum of 102 mm (4 in.) thick concrete	450	18	100	4	100	4	150	6	150	6

100 (in raceway)	exterior slab with no vehicular traffic and the slab extending not less than 152 mm (6 in.) beyond the underground installation						(direct burial) 4	100 (in raceway)	4	(direct burial)
~~Under streets, highways, roads, alleys, driveways, and parking lots~~	~~600~~	~~24~~	~~600~~	~~24~~	~~600~~	~~24~~	~~600~~	~~24~~	~~600~~	~~24~~
~~One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes~~	~~450~~	~~18~~	~~450~~	~~18~~	~~450~~	~~18~~	~~300~~	~~12~~	~~450~~	~~18~~
~~In or under airport runways, including adjacent areas where trespassing is prohibited~~	~~450~~	~~18~~	~~450~~	~~18~~	~~450~~	~~18~~	~~450~~	~~18~~	~~450~~	~~18~~

[1] A lesser depth shall be permitted where specified in the installation instructions of a listed low-voltage lighting system.

[2] A 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 shall be defined as the shortest distance in mm (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 a 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.

6. Directly buried electrical metallic tubing (EMT) shall comply with 358.10.

Statement of Problem and Substantiation for Public Input

A revision of Section 300.5 (A) and Table 300.5(A) is needed for clarification as the Table is confusing to use and unclear for certain installation conditions. Examples of the unclear installation conditions are as follows:

1. Why is the minimum cover for an airport runway less than a street or roadway? Airport runways are subject to

the same types of traffic and in many cases much heavier traffic.

2. In trench below 50 mm (2 in.) thick concrete or equivalent has a burial depth listed under condition 3 which states no concrete encasement creating confusion.

3. Under minimum of 102 mm (4 in.) thick concrete exterior slab with no vehicular traffic and the slab extending not less than 152 mm (6 in.) beyond the underground installation also has a burial depth under condition 3 no concrete encasement which creates user confusion.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1619-NFPA 70-2023 [Section No. 305.15(A)]	
Public Input No. 1619-NFPA 70-2023 [Section No. 305.15(A)]	

Submitter Information Verification

Submitter Full Name:	Kyle Krueger
Organization:	NECA
Affiliation:	NECA
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Jul 27 13:15:21 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The Panel sees potential value in changing to a list format but the effect of the proposed changes were unclear.

Public Input No. 2268-NFPA 70-2023 [Section No. 300.5(A)]

(A) Minimum Cover Requirements.

Direct-buried cable, conduit, or other raceways shall be installed to meet the minimum cover requirements of Table 300.5(A).

Table 300.5(A) Minimum Cover Requirements, 0 to 1000 Volts ac, 1500 Volts dc, Nominal, Burial in Millimeters (Inches)

Location of Wiring Method or Circuit	-	Type of Wiring Method or Circuit								
	Column 1 Direct Burial Cables or Conductors		Column 2 Rigid Metal Conduit or Intermediate Metal Conduit		Column 3 Electrical Metallic Tubing, Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement, or Other Approved Raceways		Column 4 Residential Branch Circuits Rated 120 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes		Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in 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[1,2]	6[1,2]
In trench below 50 mm (2 in.) thick concrete or equivalent	450	18	150	6	300	12	150	6	150	6
Under a building, not including under garage floors	0	0	0	0	0	0	0	0	0	0
	-	(in raceway or Type MC or Type MI cable identified for direct burial)	-	-	-	-			(in raceway or Type MC or Type MI cable identified for direct burial)	(in raceway or Type MC or Type MI cable identified for direct burial)
Under minimum of 102 mm (4 in.) thick concrete exterior slab with no vehicular traffic and the slab extending not less than 152 mm (6 in.) beyond the	450	18	100	4	100	4	150 (direct burial) 100 (in raceway)	6 4	150 (direct burial) 100 (in raceway)	6 4

underground installation Under streets, highways, roads, alleys, driveways, ~~and~~ parking lots, and garages	600	24	600	24	600	24	600	24	600	24
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	450	18	450	18	450	18	300	12	450	18
In or under airport runways, including adjacent areas where trespassing is prohibited	450	18	450	18	450	18	450	18	450	18

[1]A lesser depth shall be permitted where specified in the installation instructions of a listed low-voltage lighting system.

[2]A 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 shall be defined as the shortest distance in mm (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 a 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.

6. Directly buried electrical metallic tubing (EMT) shall comply with 358.10.

Statement of Problem and Substantiation for Public Input

There is no cover requirement for raceways under (or even within) a garage floor that is inside a building. It seems odd that 24" of cover is required beneath every area that has vehicle access, unless it is inside a building.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 15 14:31:43 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Concrete slabs are not typically repaired or redone on a scheduled basis. If they are, it’s typically not with heavy equipment. If the building is removed, power would be de-energized prior to demolition.

Public Input No. 3078-NFPA 70-2023 [Section No. 300.5(A)]

(A) Minimum Cover Requirements.

Direct-buried cable, conduit, or other raceways shall be installed to meet the minimum cover requirements of Table 300.5(A).

Table 300.5(A) Minimum Cover Requirements, 0 to 1000 Volts ac, 1500 Volts dc, Nominal, Burial in Millimeters (Inches)

Location of Wiring Method or Circuit	-		Type of Wiring Method or Circuit									
	Column 1 Direct Burial Cables or Conductors		Column 2 Rigid Metal Conduit ~~or~~, Intermediate Metal Conduit, or Schedule 80 PVC Conduit		Column 3 Electrical Metallic Tubing, Nonmetallic Raceways Listed for Direct Burial Without Concrete Encasement, or Other Approved Raceways		Column 4 Residential Branch Circuits Rated 120 Volts or Less with GFCI Protection and Maximum Overcurrent Protection of 20 Amperes		Column 5 Circuits for Control of Irrigation and Landscape Lighting Limited to Not More Than 30 Volts and Installed with Type UF or in 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[1,2]	6[1,2]		
In trench below 50 mm (2 in.) thick concrete or equivalent	450	18	150	6	300	12	150	6	150	6		
Under a building	0	0	0	0	0	0	0	0	0	0		
	-	(in raceway or Type MC or Type MI cable identified for direct burial)	-	-	-	-					(in raceway or Type MC or Type MI cable identified for direct burial)	(in raceway or Type MC or Type MI cable identified for direct burial)
Under minimum of 102 mm (4 in.) thick concrete exterior slab with no vehicular traffic and the slab extending not less than 152 mm (6 in.) beyond the underground installation	450	18	100	4	100	4	150 (direct burial) 100 (in raceway)	6 4	150 (direct burial) 100 (in raceway)	6 4		
Under streets,	600	24	600	24	600	24	600	24	600	24		

highways, roads, alleys, driveways, and parking lots										
One- and two-family dwelling driveways and outdoor parking areas, and used only for dwelling-related purposes	450	18	450	18	450	18	300	12	450	18
In or under airport runways, including adjacent areas where trespassing is prohibited	450	18	450	18	450	18	450	18	450	18

[1]A lesser depth shall be permitted where specified in the installation instructions of a listed low-voltage lighting system.

[2]A 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 shall be defined as the shortest distance in mm (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 a 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.

6. Directly buried electrical metallic tubing (EMT) shall comply with 358.10.

Statement of Problem and Substantiation for Public Input

Added Schedule 80 PVC to Column 2 since Schedule 80 PVC is listed to provide protection for “physical damage.” Sections 352.10(K), 250.64(B)(3), 300.5(D)(4), 334.15(B), and 230.50(B)(1) all validate Schedule 80 PVC as suitable for protection from physical damage.

Submitter Information Verification

Submitter Full Name: Mike Holt

Organization: Mike Holt Enterprises Inc

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City:

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Zip:

Submittal Date: Tue Aug 29 11:06:58 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: Although Schedule 80 PVC and RTRC-XW are permitted for physical damage protection, they are not equivalent to RMC or IMC. EMT is listed to provide protection from physical damage but remains in the column with nonmetallic raceways.

Public Input No. 1858-NFPA 70-2023 [Section No. 300.5(D)(3)]

(3) Service Conductors and Service Raceways .

Underground service conductors and service raceways that are not encased in concrete and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.

Statement of Problem and Substantiation for Public Input

While the change in language in the parent text of (D) in the 2023 code was intended to clarify that this rule applies to both directly buried service conductors and service conductors installed in raceways, that is not clear to many code users. This will make it very clear that the warning ribbon is required for all underground service conductors that are in a raceway, a directly buried cable, or are directly buried conductors.

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:
Submittal Date: Sun Aug 06 16:05:10 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8680-NFPA 70-2024
Statement: The revision adds clarity that a warning ribbon is required for all service conductors.

Public Input No. 2193-NFPA 70-2023 [Section No. 300.5(D)(3)]

(3) Service Conductors.

Underground direct buried service conductors or underground raceways containing service conductors that are not encased in concrete and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.

Statement of Problem and Substantiation for Public Input

Adding the words 'underground raceways containing service conductors' makes it clear that the waring ribbon requirements applies to both direct buried service conductors and service conductors installed in underground raceways.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 14 13:49:04 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8680-NFPA 70-2024

Statement: The revision adds clarity that a warning ribbon is required for all service conductors.

Public Input No. 2052-NFPA 70-2023 [Section No. 300.5(G)]

(G) Raceway Seals.

Conduits or raceways through which moisture might contact live parts shall be sealed or plugged at either or both ends. Spare or unused conduits or raceways shall also be sealed. Sealants shall be identified for use with the cable insulation, conductor insulation, bare conductor, shield, or other components.

Informational Note: Presence of hazardous gases or vapors might also necessitate the sealing of underground conduits or raceways entering buildings.

Statement of Problem and Substantiation for Public Input

300.5 (G) added "conduits" for consistency with other parts of the same article for consistency and enforceability.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 12:40:56 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: A conduit is a raceway. The extra terminology is not necessary.

Public Input No. 1268-NFPA 70-2023 [Section No. 300.5(J)]

(J) Earth Movement.

Where direct-buried conductors, raceways, or cables are subject to movement by settlement or frost, direct-buried conductors, raceways, or cables shall be arranged so as to prevent damage to the enclosed conductors or to equipment connected to the raceways. See 352.44B for PVC conduit, specifically.

Informational Note: This section recognizes “S” loops in underground direct burial cables and conductors to raceway transitions, expansion fittings in raceway risers to fixed equipment, and, generally, the provision of flexible connections to equipment subject to settlement or frost heaves.

Statement of Problem and Substantiation for Public Input

2 points:

1. The NEC's wording on 300.5J allows some discretion on whether or not an expansion/contraction fitting will be mandatory by stating, "Where.... subject to movement....". Discretion is not allowed for the more frail of the hard raceways, PVC conduit, according to 352.44B unless it meets the requirement of the newly proposed 352.44B exception. All conduits emerging from the earth are subject to earth movement but PVC conduit and its fittings are more prone to damage from this movement. The physical damage problem is not exclusive to but is a greater threat to PVC conduit and its fittings as compared to other listed hard raceways that are NEC permissible to be installed below grade. Without the expansion/contraction fittings, these PVC conduits frequently fail where the raceway connects to the first enclosure encountered after emerging from grade. Buckling or separating at coupling or conduit bodies is also common.

Protection of conductors and their terminations is duly noted and covered by 300.5J.

2. 352.44B could be relocated and adapted to 300.5J but 300.5J would have to grow and be edited, causing NEC users to read specifics of particular raceways in the general requirements of Article 300. NEC's 352.44B belongs at its present 2023 location beside the neighboring 352.44A Thermal Expansion and Contraction. Adhering to the General Requirements for Wiring Methods and Materials title of Article 300 is most apt.

Please see my 2026 public input at 352.44 and 352.44 Exception as well.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1266-NFPA 70-2023 [Section No. 352.44(B)]	
Public Input No. 1267-NFPA 70-2023 [New Section after 352.44(B)]	
Public Input No. 1266-NFPA 70-2023 [Section No. 352.44(B)]	
Public Input No. 1267-NFPA 70-2023 [New Section after 352.44(B)]	
Public Input No. 1423-NFPA 70-2023 [Section No. 300.4(H)]	
Public Input No. 1424-NFPA 70-2023 [Section No. 300.7(B)]	

Submitter Information Verification

Submitter Full Name: Norman Feck
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Affiliation: self
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City:
State:
Zip:
Submittal Date: Mon Jul 03 16:41:36 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: Section 352.44 already applies. There is no need to include the reference.

Public Input No. 1999-NFPA 70-2023 [Section No. 300.5(J)]

(J) Earth Movement.

Where direct-buried conductors, raceways, or cables are subject to movement by settlement or frost, direct-buried conductors, raceways, or cables shall be arranged so as to prevent damage to the enclosed conductors ~~or~~ , to raceways, or to equipment connected to the raceways.

Informational Note: This section recognizes “S” loops in underground direct burial cables and conductors to raceway transitions, expansion fittings in raceway risers to fixed equipment, and, generally, the provision of flexible connections to equipment subject to settlement or frost heaves.

Statement of Problem and Substantiation for Public Input

This change will help ensure underground raceways remain compliant with 300.12 “Mechanical Continuity of Raceways and Cables”. Current language is limited to preventing damage to enclosed conductors or to equipment connected to the raceways.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 10 12:48:40 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8721-NFPA 70-2024
Statement: The revised text makes it clear that raceways shall be protected from damage due to earth movement.

Public Input No. 1045-NFPA 70-2023 [Section No. 300.6]

300.6 Protection Against Corrosion and Deterioration.

Raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, fittings, supports, and support hardware shall be of materials suitable for the environment in which they are to be installed.

(A) Ferrous Metal Equipment.

Ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, nipples, fittings, <u>concrete encased electrode emerging out of the concrete,</u> supports, and support hardware shall be suitably protected against corrosion inside and outside (except threads at joints) by a coating of approved corrosion-resistant material. Where corrosion protection is necessary and the conduit is threaded anywhere other than at the factory where the product is listed, the threads shall be coated with an approved electrically conductive, corrosion-resistant compound.

Exception: Stainless steel shall not be required to have protective coatings.

(1) Protected from Corrosion Solely by Enamel.

Where protected from corrosion solely by enamel, ferrous metal raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, nipples, fittings, <u>concrete encases electrodes,</u> supports, and support hardware shall not be used outdoors or in wet locations as described in 300.6(D).

(2) Organic Coatings on Boxes or Cabinets.

Where boxes, cabinets, or enclosures (other than surrounding fences and walls) have an approved system of organic coatings and are marked “Raintight,” “Rainproof,” or “Outdoor Type,” they shall be permitted outdoors.

(3) In Concrete or in Direct Contact with the Earth.

Ferrous metal raceways, cable armor, boxes, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, nipples, fittings, <u>concrete encased electrodes,</u> supports, and support hardware shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where made of material approved for the condition or where provided with corrosion protection approved for the condition.

(B) Aluminum Metal Equipment.

Aluminum raceways, cable trays, cablebus, auxiliary gutters, cable armor, boxes, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, nipples, fittings, supports, and support hardware embedded or encased in concrete or in direct contact with the earth shall be provided with supplementary corrosion protection.

(C) Nonmetallic Equipment.

Nonmetallic raceways, cable trays, cablebus, auxiliary gutters, boxes, cables with a nonmetallic outer jacket and internal metal armor or jacket, cable sheathing, cabinets, enclosures (other than surrounding fences and walls), elbows, couplings, nipples, fittings, supports, and support hardware shall be made of material approved for the condition and shall comply with 300.6(C)(1) and (C)(2) as applicable to the specific installation.

(1) Exposed to Sunlight.

Where exposed to sunlight, the materials shall be listed as sunlight resistant or shall be identified as sunlight resistant.

(2) Chemical Exposure.

Where subject to exposure to chemical solvents, vapors, splashing, or immersion, materials or coatings shall either be inherently resistant to chemicals based on their listing or be identified for the specific chemical reagent.

(D) Indoor Wet Locations.

In portions of dairy processing facilities, laundries, canneries, and other indoor wet locations, and in locations where walls are frequently washed or where there are surfaces of absorbent materials, such as damp paper or wood, the entire wiring system, where installed exposed, including all boxes, cabinets, enclosures (other than surrounding fences and walls), fittings, raceways, and cable used therewith, shall be mounted so that there is at least a 6 mm (¼ in.) airspace between it and the wall or supporting surface.

Exception: Nonmetallic raceways, boxes, and fittings shall be permitted to be installed without the airspace on a concrete, masonry, tile, or similar surface.

Informational Note: In general, areas where acids and alkali chemicals are handled and stored might present such corrosive conditions, particularly when wet or damp. Severe corrosive conditions might also be present in portions of meatpacking plants, tanneries, glue houses, and some stables; in installations immediately adjacent to a seashore and swimming pool areas; in areas where chemical deicers are used; and in storage cellars or rooms for hides, casings, fertilizer, salt, and bulk chemicals.

Statement of Problem and Substantiation for Public Input

Concrete encased electrode should be protected when leaving the concrete, and exposed to the air.

Submitter Information Verification

Submitter Full Name:	John Plourde
Organization:	Portsmouth Nh City Of
Affiliation:	Performance Electrical Training LLC.
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Jun 12 16:12:07 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Protection of concrete encased electrodes is under the purview of Article 250 (CMP-5).

Public Input No. 3942-NFPA 70-2023 [Section No. 300.7(A)]

(A) ~~Sealing.~~ Condensation

Where portions of a raceway or sleeve are known to be subjected to different temperatures, and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway or sleeve shall be ~~sealed~~

(1) Sealed to prevent the circulation of warm air to a colder section of the raceway or sleeve. Sealants shall be identified for use with cable insulation, conductor insulation, a bare conductor, a shield, or other components. An explosionproof seal shall not be required for this purpose ~~.~~ or

(2) installed using a thermal break coupling at the point of temperature change to eliminate condensation

Statement of Problem and Substantiation for Public Input

There was no way to prevent condensation in metal conduit leaving a refrigerator or cold storage and entering an area that is not temperature controlled. Even by sealing the air the raceway itself would build condensation on the outside and this is not acceptable in food processing facilities. A thermal break coupling is made of a non-metallic conduit with a bonding jumper to attach the two metal conduits together at point of penetration or temperature change. This will prevent the buildup of condensation on the inside and the outside of the conduit in food processing facilities. These couplings will also provide as a means of making transitions between different types of metal without the concern of a galvanic reaction (dissimilar metals)

Submitter Information Verification

Submitter Full Name:	Raymond Horner
Organization:	Atkore
Affiliation:	Atkore
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Sep 06 10:58:53 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8724-NFPA 70-2024

Statement: List item two is added to recognize another method for preventing the buildup of condensation on the inside and the outside of the conduit especially in food processing facilities.

Public Input No. 1424-NFPA 70-2023 [Section No. 300.7(B)]

(B) Expansion, Expansion-Deflection, and Deflection Fittings~~.~~; and the Conductors Within

Raceways shall be provided with expansion, expansion-deflection, or deflection fittings where necessary to compensate for thermal expansion, deflection, and contraction.

Where expansion, expansion-deflection, or deflection fittings are used for thermal or physical raceway movement, ample lengths of conductor(s) shall be provided in the enclosures at the ends of the raceways utilizing such fittings. Conductors within the enclosures shall be routed in the enclosure in a manner that allows for conductor movement.

Informational Note No. 1: Table 352.44(A) and Table 355.44 provide the expansion information for polyvinyl chloride (PVC) and for reinforced thermosetting resin conduit (RTRC), respectively. A nominal number for steel conduit can be determined by multiplying the expansion length in Table 352.44(A) by 0.20. The coefficient of expansion for steel electrical metallic tubing, intermediate metal conduit, and rigid metal conduit is 1.170×10^{-5} (0.0000117 mm per mm of conduit for each °C in temperature change) [0.650×10^{-5} (0.0000065 in. per in. of conduit for each °F in temperature change)].

A nominal number for aluminum conduit and aluminum electrical metallic tubing can be determined by multiplying the expansion length in Table 352.44(A) by 0.40. The coefficient of expansion for aluminum electrical metallic tubing and aluminum rigid metal conduit is 2.34×10^{-5} (0.0000234 mm per mm of conduit for each °C in temperature change) [1.30×10^{-5} (0.000013 in. per in. of conduit for each °F in temperature change)].

Informational Note No. 2: See NEMA FB 2.40-2019, *Installation Guidelines for Expansion and Expansion/Deflection Fittings*, for further information on expansion and expansion deflection fittings.

Statement of Problem and Substantiation for Public Input

It isn't enough to have strictly the raceways compensate for thermal raceway movement. A more generous length of conductor must be left within the enclosures at each end of raceways containing expansion, expansion-deflection, or deflection fittings. Also, the conductors shouldn't be forced over fitting upon entering an enclosure but remain straight for a sufficient length.

This public input correlates with the modified 300.4H and the existing text of 300.5J.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1423-NFPA 70-2023 [Section No. 300.4(H)]	
Public Input No. 1268-NFPA 70-2023 [Section No. 300.5(J)]	
Public Input No. 1423-NFPA 70-2023 [Section No. 300.4(H)]	

Submitter Information Verification

Submitter Full Name:	Norman Feck
Organization:	State of Colorado
Affiliation:	self
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sat Jul 15 18:55:57 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Listed expansion/deflection fittings must be installed in accordance with 110.3(B).

Public Input No. 2028-NFPA 70-2023 [Section No. 300.8]

300.8 Installation of Conductors With Other Systems.

Raceways or cable trays containing electrical conductors <u>or cables </u> shall not contain any pipe, tube, or equal for steam, water, air, gas, drainage, or any service other than electrical.

Statement of Problem and Substantiation for Public Input

This public input is being submitted on behalf of the Minnesota Department of Labor and Industry. Currently, the Department's inspection staff includes 14-office/field staff, 12-state field inspectors, 2-virtual inspectors and 50 plus contract electrical inspectors that complete over 170,000 electrical inspections annually.

Other trades may not associate "cables" in a raceway or cable tray as being a "conductor". This minimal change makes it clear the no other foreign equipment can be in a raceway or cable tray with electrical conductors or cables.

Submitter Information Verification

Submitter Full Name: Dean Hunter

Organization: Minnesota Department of Labor

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 11 10:26:16 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: <u>FR-8729-NFPA 70-2024</u>

Statement: Adding "or cables" makes it clear that cables are permitted no other foreign equipment can be in a raceway or cable tray with electrical conductors or cables.

"Equal" is changed to "other means" for clarity.

Public Input No. 2051-NFPA 70-2023 [Section No. 300.9]

300.9 Raceways in Wet Locations Above Grade.

Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceways in wet locations above grade shall comply with 310.10(C). Conduits or raceways through which moisture might contact live parts shall be sealed or plugged at either or both ends. Spare or unused conduits or raceways shall also be sealed. Sealants shall be identified for use with the cable insulation, conductor insulation,bare conductor shield, or other components.

Statement of Problem and Substantiation for Public Input

300.9 – states the interior of raceways installed above ground in wet locations shall be considered a wet location and that the conductor insulation/type must be compatible for use in a wet location. Add language to 300.9 or in another suitable location requiring raceways to be sealed to prevent the introduction of moisture which may come into contact with live parts. Article 300.5 (G) requires similar protection for underground conductors.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 12:32:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Other requirements in the Code, such as 225.22 and 312.2, address this issue adequately.

Public Input No. 3658-NFPA 70-2023 [Section No. 300.9]

300.9 Raceways in Wet Locations Above Grade.

(A) Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceways in wet locations above grade shall comply with 310.10(C).

(B) Raceways installed in wet locations abovegrade, shall be arranged to drain and shall be listed or approved for use in wet locations

Statement of Problem and Substantiation for Public Input

This same PI was rejected in the last code cycle with a panel statement that said: "While similar, the locations included in Section 300.9, covering all wiring methods, are broader and cover a wide range of locations". While this is a broader statement in that it is intended to apply to indoor wet locations, it does not cover all wiring methods. It is specific to raceways, just like the rule in 225.22 is specific to raceways.
The hazard is the same in both locations, that being water that accumulates in a raceways that are not arranged to drain may end up in the actual electrical equipment. It will be no more difficult to arrange inside wet location raceways to drain than it is to arrange outside raceways to drain.

Submitter Information Verification

Submitter Full Name:	Don Ganiere
Organization:	none
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Sep 05 12:26:48 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: This issue is adequately covered in other sections of the Code, such as 225.22.

Public Input No. 187-NFPA 70-2023 [Section No. 300.10]

300.10 Electrical Continuity of Metal Raceways, Cable Armor, and Enclosures.

Metal raceways, cable armor, and other metal enclosures for conductors shall be metallically joined together into a continuous electrical conductor and shall be connected to all boxes, fittings, and cabinets to provide effective electrical continuity. Unless specifically permitted elsewhere in this *Code*, raceways and cable assemblies shall be mechanically secured to boxes, fittings, cabinets, and other enclosures.

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be made electrically continuous.

Exception No. 2: Equipment enclosures to be isolated, as permitted by 250.96(B), shall not be required to be metallically joined to the metal raceway.

Exception No. 3: Raceways that pass unbroken and completely through an enclosure shall not be required to be secured to the enclosure.

Statement of Problem and Substantiation for Public Input

Where separation of various systems is required, raceways are sometimes passed completely through another enclosure. There is no practical way to terminate these pass through raceways, and no need to do so. This will clarify that such an installation is permitted.

Submitter Information Verification

Submitter Full Name:	Don Ganiere
Organization:	none
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Jan 17 14:23:49 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: The practice described by the submitter is a violation of this section. Electrical and mechanical continuity are required.

Public Input No. 3080-NFPA 70-2023 [Section No. 300.10]

300.10 Electrical Continuity of Metal Raceways, Cable Armor, and Enclosures.

Metal raceways, cable armor, and other metal enclosures for conductors shall be metallically joined together into a continuous electrical conductor and shall be connected to all boxes, fittings, and cabinets to provide ~~effective electrical continuity.~~ an effective ground-fault current path in accordance with 250.4(A)(5). Unless specifically permitted elsewhere in this *Code*, raceways and cable assemblies shall be mechanically secured to boxes, fittings, cabinets, and other enclosures.

Exception No. 1: ~~Short sections of raceways~~ Raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be made electrically continuous.

Exception No. 2: Equipment enclosures to be isolated, as permitted by 250.96(B), shall not be required to be metallically joined to the metal raceway.

Statement of Problem and Substantiation for Public Input

Removing "Short sections of" from the text because the electrical worker is only going to run the raceway long enough to meet the needs of the installation. There is no need to have vague text to cause confusion between the electrical installer and electrical inspector. In accordance with the NEC Style manual section 3.2.1. “The documents shall not contain references or requirements that use unenforceable or vague terms.”
Change 'electrical continuity to an effective ground-fault path, which is the proper term.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 11:08:41 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8739-NFPA 70-2024 - [Public Input 3080] The proposed deletion of “short sections” of raceways is not accepted, as unlimited lengths of raceways that are not bonded could prove to be a safety hazard.

Statement: The term “effective ground fault current path” is defined in Article 100 and is the appropriate term to be used.

The second sentence is deleted and relocated to 300.12, as it is more appropriately located in the mechanical continuity requirement.

Public Input No. 3081-NFPA 70-2023 [Section No. 300.10]

300.10 Electrical Continuity of Metal Raceways, Cable Armor, and Enclosures.

Metal raceways, cable armor, and other metal enclosures for conductors shall be metallically joined together into a continuous electrical conductor and shall be connected to all boxes, fittings, <u>wireways,</u> and cabinets to provide effective electrical continuity. Unless specifically permitted elsewhere in this *Code*, raceways and cable assemblies shall be mechanically secured to boxes, fittings, <u>wireways,</u> cabinets, and other enclosures.

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be made electrically continuous.

Exception No. 2: Equipment enclosures to be isolated, as permitted by 250.96(B), shall not be required to be metallically joined to the metal raceway.

Statement of Problem and Substantiation for Public Input

The addition of the word “wireway” is necessary since cables and raceways often terminate to a wireway (which is a raceway, not an enclosure). This added text will make it 100% clear that raceways and cables must secured to a wireway.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Tue Aug 29 11:09:50 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: As the submitter indicates, a wireway is a raceway. It is, therefore, not necessary to add “wireway” to the items in the section because it is already included.

Public Input No. 665-NFPA 70-2023 [Section No. 300.10]

300.10 Electrical Continuity of Metal Raceways, Cable Armor, and Enclosures.

Metal raceways, cable armor, and other metal enclosures for conductors shall be metallically joined together into a continuous electrical conductor and shall be connected to all boxes, fittings, and cabinets to provide effective electrical continuity. ~~Unless specifically permitted elsewhere in this *Code* , raceways and cable assemblies shall be mechanically secured to boxes, fittings, cabinets, and other enclosures.~~

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be made electrically continuous.

Exception No. 2: Equipment enclosures to be isolated, as permitted by 250.96(B), shall not be required to be metallically joined to the metal raceway.

Statement of Problem and Substantiation for Public Input

This language belongs in 300.12, not 300.10. This is a requirement for MECHANICAL continuity to the enclosure. It belongs in the MECHANICAL continuity requirement (300.12). Notice that the second exception in 300.12 excepts out THIS requirement in 300.10...because it is in the wrong section. A companion proposal to 300.12 has been made.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 666-NFPA 70-2023 [Section No. 300.12]	

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Affiliation: Steel Tube Institute
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 13:09:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8739-NFPA 70-2024 - [Public Input 3080] The proposed deletion of “short sections” of raceways is not accepted, as unlimited lengths of raceways that are not bonded could prove to be a safety hazard.

Statement: The term “effective ground fault current path” is defined in Article 100 and is the appropriate term to be used.

The second sentence is deleted and relocated to 300.12, as it is more appropriately located in the mechanical continuity requirement.

Public Input No. 1516-NFPA 70-2023 [New Section after 300.11]

(E) Raceway 900 mm (3 ft) or Less

For the following raceways not subject to physical damage, unbroken lengths of less than or equal to 900 mm (3 ft) between enclosures securely fastened as per 314.23(A) through 314.23(D), shall not be required to be securely fastened. Reducing fittings or bushings are not permitted.

(1) Intermediate metal conduit, IMC

(2) Rigid metal conduit, RMC

(3) Rigid polyvinyl chloride conduit, PVC

(4) Reinforced thermosetting resin conduit, RTRC

(5) Electrical metallic tubing, EMT

Statement of Problem and Substantiation for Public Input

Currently as written raceways in the submitted list in this public input are being required to be supported by inspectors regardless of length. A 6 inch piece of IMC that is installed between two securely supported boxes is required to be secured and supported per the text. Prior to the 2008 NEC it was common practice to install up to 3 feet of conduit between enclosures without additional support. The support provision was removed in response James Carpenter's proposal 8-125 Log #2204 NEC-P08. He stated as part of his substantiation "...Raceways generally require support within 3 ft of terminations, and when the entire length is just that long or shorter, no additional support should be needed. In effect, the locknuts and bushings or connectors and locknuts at each end are supports. This is not a new concept for the NEC: CMP 7 just added the wording “(wiring method) fittings shall be permitted as a means of cable support” in a number of cable articles. If carried to its logical conclusion and routinely enforced (however unlikely), this new support rule will likely drive the market in the direction of cabled wiring methods without any technical justification. ..."

The current text on using cable connectors as support is clear and allows for those lengths of cable installed under those applicable conditions to not be supported. However, the presence of this language in one wiring method and the lack of the language for the raceways listed in this public input implies by omission that these raceways require securement and support regardless of how short the raceway may be and where it is installed.

Submitter Information Verification

Submitter Full Name: John McCamish
Organization: NECA IBEW Electrical Training
Affiliation: self
Street Address:
City:
State:
Zip:
Submittal Date: Sat Jul 22 19:16:08 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 300 establishes general requirements for electrical installations. Specific securing and supporting requirements for various types of raceways are contained within the specific article for that type of raceway.

Public Input No. 1355-NFPA 70-2023 [Section No. 300.11]

300.11 Securing and Supporting.

(A) Secured in Place.

Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place.

(B) Wiring Systems Installed Above Suspended Ceilings.

Support wires that do not provide secure support shall not be the sole support. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires shall be permitted as the sole support. Where independent support wires are used, they shall be secured at both ends. Cables and raceways shall not be supported by ceiling grids.

(1) Fire Resistance -Rated Assemblies.

Wiring located within the cavity of a fire resistance -rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means from those that are part of the fire resistance -rated design.

Exception: The ceiling support system shall be permitted to support wiring and equipment that have been tested as part of the fire-rated assembly.

Informational Note: See ASTM E119-22 , *Standard Test Methods for Fire Tests of Building Construction and Materials*, for one method of testing to determine fire rating.

(2) Non-Fire Resistance -Rated Assemblies.

Wiring located within the cavity of a non-fire-resistance- rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means.

Exception: The ceiling support system shall be permitted to support branch-circuit wiring and associated equipment where installed in accordance with the ceiling system manufacturer's instructions.

(C) Raceways Used as Means of Support.

Raceways shall be used only as a means of support for other raceways, cables, or nonelectrical equipment under any of the following conditions:

(1) Where the raceway or means of support is identified as a means of support

(2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2 or Class 3 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits

(3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires in accordance with 410.36(E)

(D) Cables Not Used as Means of Support.

Cable wiring methods shall not be used as a means of support for other cables, raceways, or nonelectrical equipment.

Statement of Problem and Substantiation for Public Input

This PI addresses two issues. The first issue is terminology. ASTM E119 (or any other fire resistance test) measures a fire resistance rating and not a fire rating. Fire ratings could be ones assessed in terms of flame spread or some other property but ASTM E119 assesses the time for which a fire resistance rated assembly will provide protection. The second issue is that the date of the standard (ASTM E119) needs to be added and the most recent edition of ASTM E119 is dated 2022.

Submitter Information Verification

Submitter Full Name: Marcelo Hirschler

Organization: GBH International
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jul 10 17:08:00 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8755-NFPA 70-2024

Statement: The requirements for ceilings with a fire-resistance rating and those without one are now the same, so there is no need to have two independent subsections. Furthermore, the phrase “fire-rated” is changed to “fire-resistance-rated” for consistency with ASTM E119.

Public Input No. 4516-NFPA 70-2023 [Section No. 300.11]

300.11 Securing and Supporting.

(A) Secured in Place.

Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place.

(B) Wiring Systems Installed Above Suspended Ceilings.

Support wires that do not provide secure support shall not be the sole support. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires shall be permitted as the sole support. Where independent support wires are used, they shall be secured at both ends. Cables and raceways shall not be supported by ceiling grids.

(1) Fire-Rated Assemblies.

Wiring located within the cavity of a fire-rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means from those that are part of the fire-rated design.

Exception: The ceiling support system shall be permitted to support wiring and equipment that have been tested as part of the fire-rated assembly.

Informational Note: See ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, for one method of testing to determine fire rating.

(2) Non-Fire-Rated Assemblies.

Wiring located within the cavity of a non-fire-rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means.

Exception: The ceiling support system shall be permitted to support branch-circuit wiring and associated equipment where installed in accordance with the ceiling system manufacturer's instructions.

(C) Raceways Used as Means of Support.

Raceways shall be used only as a means of support for other raceways, cables, or nonelectrical equipment under any of the following conditions:

(1) Where the raceway or means of support is identified as a means of support

(2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2 or Class 3 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits

(3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires in accordance with 410.36(E)

(D) Cables Not Used as Means of Support.

Cable wiring methods shall not be used as a means of support for other cables, raceways, or nonelectrical equipment.

<u>(E) Metallic Means of Support Above Stairways.</u>

<u>Metallic means of support shall be required above stairways.</u>

Statement of Problem and Substantiation for Public Input

Emergency personnel and building occupant safety is risked during fires because people can become entangled and trapped in cabling which has fallen out of molten or failing plastic supports.

Whereas past PI's encompassed all egress, this PI is focused to Stairways which is the building location in which cable entanglement could cause the most significant obstacle to exiting a building.

Even if people can free themselves from fallen cabling, this takes time which is otherwise needed to exit the building or fulfill the objectives of emergency personnel.

Melting temperatures of metallic and non-metallic materials are significantly different – compare the low carbon steel melting temperature of approximately 1450 °C versus 200-400 °C for many typical thermoplastics used in cable supports. This difference translates to a greater resistance to heat for steel which enables a metallic support to survive and carry load significantly longer than nonmetallic supports.

Submitter Information Verification

Submitter Full Name:	Ward Judson
Organization:	nVent Electric
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Sep 07 16:45:30 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The proposed language would apply too broadly. It addresses metal means of support above all stairwells but the substantiation is specific to stairwells used as a required means of egress. To address the submitter's concerns, the installation of raceways and wiring methods inside exit enclosures is limited to those systems associated with the exit enclosure by 300.25 and adopted building codes.

Public Input No. 1083-NFPA 70-2023 [Section No. 300.11(A)]

(A) Secured in Place.

Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place. <u>Where adjacent equipment or enclosures are securely fastened in place, and the raceway or cable connecting them is short enough that each end is within the distance of the other that is required for securing by the rules for the wiring method, no additional means shall be required to secure or support the wiring method, where the wiring is not subject to damage.</u>

Additional Proposed Changes

File Name	Description	Approved
PI_1083_Attachment_C_.pdf	Fairly inaccessible FMC connecting enclosures, unstrapped yet not at risk.	

Statement of Problem and Substantiation for Public Input

This type of installation never is cited, in my experience. I see it accepted all the time, despite technically being a violation. Adding a strap or clamp would be goofy and the effort would be way out of proportion for the putative benefit. Let's acknowledge that there are plenty of places where despite equipment's not being subject to excess vibration or needing to be moved, it doesn't make sense to add that extra strap to the connected wiring.

This is low-hanging fruit.

Submitter Information Verification

Submitter Full Name: David Shapiro
Organization: Safety First Electrical
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jun 14 15:54:08 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 300 establishes general requirements for electrical installations, and it is difficult to write a requirement that applies broadly across all wiring methods. Exceptions for securing and supporting methods for the various wiring methods are best suited for the article that covers those wiring methods. Parameters, such as raceway size, oversized knockouts, and conductor size, need to be considered.

Public Input No. 1297-NFPA 70-2023 [Section No. 300.11(A)]

(A) Secured in Place.

Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place with listed mounting hardware .

Statement of Problem and Substantiation for Public Input

Proposed change will help the NEC to meet a concern in the industry of the lack of safety standards when securing large loads with any type of fasteners. The securing of large loads with with non approved mounting hardware can result in the potential for structural failure and injury due to poor quality products or lack of validate load testing. It is important to make sure the proper mounting hardware is used and approved in order to reduce risk to the installer and the building occupants.

Thank you

Submitter Information Verification

Submitter Full Name: Bryan Smith

Organization: Mag Daddy LLC

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jul 07 10:13:50 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: Not all support hardware is listed. The AHJ makes the determination that an electrical installation complies with the NEC. Section 110.3 does not require listing or labeling of equipment, but it does require considerable evaluation for approval.

Public Input No. 2880-NFPA 70-2023 [Section No. 300.11(A)]

(A) Secured in Place.

Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place using listed hardware .

Statement of Problem and Substantiation for Public Input

To avoid damage to raceways, cable assemblies, boxes, cabinets, fittings and undue stress transferred to electrical connections, the use of listed hardware for securement, in Article 300 and throughout the code is necessary. The need for listed mounting hardware is compounded on account of 300.11(C)© of the NEC permits raceways to be used as a means of support for other raceways, cables or other nonelectrical equipment. UL 2239, the Standard for Safety for Hardware for the Support of Conduit, Tubing, and Cable, contains all of the necessary hardware construction, performance, marking and installation instructions needed to assist installers and AHJs.

Submitter Information Verification

Submitter Full Name:	David Gerstetter
Organization:	Ul Solutions
Affiliation:	UL Solutions
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Aug 25 20:41:45 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Not all support hardware is listed. The AHJ makes the determination that an electrical installation complies with the NEC. Section 110.3 does not require listing or labeling of equipment, but it does require considerable evaluation for approval.

Public Input No. 552-NFPA 70-2023 [Section No. 300.11(B)]

(B) Wiring Systems Installed Above Suspended Ceilings.

~~Support wires that do not provide secure support~~ Wiring shall not be ~~the sole support. Support~~ secured to, or be supported by, the ceiling assembly, including the ceiling support wires. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires shall be permitted ~~as the sole support~~ . Where independent support wires are used, they shall be secured at both ends ~~. Cables~~ and ~~raceways~~ shall ~~not be supported by ceiling grids.~~

~~**(1)** Fire-Rated Assemblies.~~

~~Wiring located within the cavity of a fire-rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where~~

be permitted to be attached to the ceiling assembly. Support wires that do not provide secure support shall not be the sole support. . Cables and raceways shall not be supported by ceiling grids. If independent support wires are used, they shall be distinguishable by color, tagging, or other effective means from those that are part of the fire-rated design.

Exception No. 1 : ~~The~~ A fire-resistance-rated ceiling support system shall be permitted to support wiring and equipment that have been tested as part of the fire~~-rated assembly.~~

~~Informational Note: See ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials* , for one method of testing to determine fire rating.~~

~~**(2)** Non-Fire-Rated Assemblies.~~

~~Wiring located within the cavity of a non-fire-rated floor–ceiling or roof–ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means.~~

~~Exception~~ -resistance-rated assembly.

Exception No. 2 : The ceiling support system shall be permitted to support branch-circuit wiring and associated equipment ~~where~~ if installed in accordance with the ceiling system manufacturer's instructions.

Statement of Problem and Substantiation for Public Input

These editorial revisions seek to simplify the requirements for suspended ceiling systems. There was a time that the requirements in this section were different for ceilings with a fire-resistance rating and those without one, hence the two subsections. The requirements are now the same regardless, so there is no need to have two independent subsections when the rules are the same.

Submitter Information Verification

Submitter Full Name:	Ryan Jackson
Organization:	Self-employed
Affiliation:	Steel Tube Institute
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Apr 10 12:51:38 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8755-NFPA 70-2024

Statement: The requirements for ceilings with a fire-resistance rating and those without one are now the same, so there is no need to have two independent subsections. Furthermore, the phrase “fire-rated” is changed to “fire-resistance-rated” for consistency with ASTM E119.

Public Input No. 188-NFPA 70-2023 [Section No. 300.11(C)]

(C) Raceways Used as Means of Support.

Raceways shall be used only as a means of support for other raceways, cables, or nonelectrical equipment under any of the following conditions:

(1) Where the raceway or means of support is identified as a means of support

(2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2 or Class 3 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits

(3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires in accordance with 410.36(E)

(4) <u>Where the raceway is used to support an equipment bonding jumper that is associated with the circuit conductors within the raceway.</u>

Statement of Problem and Substantiation for Public Input

Equipment bonding jumpers are often attached to flexible raceways to provide bonding around those raceways. Nothing in the code currently permits this practice. It is actually prohibited by the current code language.

Submitter Information Verification

Submitter Full Name: Don Ganiere

Organization: none

Street Address:

City:

State:

Zip:

Submittal Date: Tue Jan 17 14:31:11 EST 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8764-NFPA 70-2024

Statement: The addition of item (4) aligns with 250.102(E), which allows bonding jumpers or conductors and equipment bonding jumpers to be installed inside or outside of a raceway or an enclosure.

The word “where” was changed to “if” in multiple locations to comply with the 2023 NEC Style Manual, section 3.5.4.

Public Input No. 3896-NFPA 70-2023 [Section No. 300.11(C)]

(C) Raceways Used as Means of Support.

Raceways shall be used only as a means of support for other raceways, cables, or nonelectrical equipment under any of the following conditions:

(1) Where the raceway or means of support is identified as a means of support

(2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2, Class 3, or ~~Class 3~~ Class 4 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits

(3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires in accordance with 410.36(E)

Statement of Problem and Substantiation for Public Input

Class 4 systems were designed to coexist with all these systems in a raceway. Article 722 governs the installation of Class 4 cables, as well as Class 2 and Class 3 cables, and 722 makes no distinction that Class 4 cannot be used in the same spaces as Class 2, 3. Class 4 should have been added for the 2023 code, it was an oversight to not correct this definition when Class 4 was added.

Submitter Information Verification

Submitter Full Name: Chad Jones

Organization: Cisco Systems

Street Address:

City:

State:

Zip:

Submittal Date: Wed Sep 06 09:20:21 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: The text of 300.11(C)(2) refers to equipment control circuits. Including Class 4 in this list would be inappropriate as they are generally not control circuits. The existing language is self-limiting in the number of cables that can be supported by the raceway because the control circuit must be associated with the power circuit contained in the raceway. By extending this concept to Class 4 circuits, this limiting factor would be lost.

Public Input No. 3409-NFPA 70-2023 [New Section after 300.11(D)]

300.11(E) Cable Ties Used As A Means of Securement and Support

Cable ties used as a means for securement and support for cable, flexible conduit, and flexible tubing shall be listed and identified for securement and support. If a cable tie fixing device is installed, the cable tie fixing device shall be listed and identified for securement and support. Cable ties shall not be permitted to be installed around framing members.

Informational Note No. 1: A separate cable tie fixing device or a cable tie integral device may be necessary for installation. Cable Tie fixing devices may not be required for all support and securement applications.

Informational Note No. 2: See ANSI/UL 62275, Cable Management Systems-Cable Ties for Electrical Installations, for Type designations and additional information.

Informational Note No. 3: The following are cable tie and cable tie fixing device Type designations.

Type(s) 1, 11, 2, 21, 2S, or 21S are evaluated for use in cable management applications.

Type(s) 2S or 21S are also evaluated for securing and suppporting cable, flexible conduit, and flexible tubing.

Statement of Problem and Substantiation for Public Input

A new Section 300.11(E) addresses concerns over the proper installation and use of cable ties when used as a means as
securement and support of cable, flexible conduit, and flexible tubing. The proposed text will provide clarity on the proper installation and use of cable ties and cable tie fixing devices where these products are used as a means of securement and support. Cable ties are not evaluated for securement and support when wrapped around a framing member.

Some cable ties require the installation and use of a listed cable tie fixing device to properly secure and support the installed wiring method to the building structure or mounting surface, and some do not, and this guidance is provided in Informational Note: 1. Additional Information Notes provide guidance to the UL 62275 Standard requirements for cable ties and cable tie fixing devices, and the Types of cable ties and cable tie fixing devices that are identified for securement and support.

Photos of improper installation of cables ties and cable tie fixing devices can be provided to support the addition of this text into the NEC.

This is one of several public inputs proposed by the NEMA BI-TI (Cable Tie) Section designed to address the proper application and
installation of cable ties.

Related Public Inputs:

New Article 100 Definitions:
• Cable Tie
• Cable Tie Fixing Device
• Cable Tie Integral Device

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3400-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3401-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	
Public Input No. 3402-NFPA 70-2023 [New Definition after Definition: Cable Termination.]	

Submitter Information Verification

Submitter Full Name: Megan Hayes
Organization: NEMA
Street Address:

City:
State:
Zip:
Submittal Date: Sat Sep 02 17:12:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 300 establishes general requirements for electrical installations. Specific securing and supporting requirements for various types of raceways, cable assemblies, boxes, cabinets, and fittings are contained within the specific article for that type of raceway. For instance, refer to 320.30(A) for securing and supporting Type AC cable.

Public Input No. 2325-NFPA 70-2023 [Section No. 300.11(D)]

(D) Cables and Single Conductors Not Used as Means of Support.

Cable and single conductor wiring methods shall not be used as a means of support for other cables, single conductors, raceways, or nonelectrical equipment.

Statement of Problem and Substantiation for Public Input

In the PV industry installers use single conductors and just like cables these conductors must not be used as a means of support.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 12:31:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8770-NFPA 70-2024 - The word "single" was not included to ensure that the requirement applies to wiring methods, such as knob-and-tube, messenger-supported, and open wiring on insulators.

Statement: Similar to cables, conductors must not be used as a means of support.

Public Input No. 2447-NFPA 70-2023 [Section No. 300.12]

300.12 Mechanical Continuity — Raceways and Cables.

Raceways, cable armors, and cable sheaths shall be continuous between cabinets, boxes, conduit bodies, fittings, or other enclosures or outlets.

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be mechanically continuous.

Exception No. 2: Raceways and cables installed into the bottom of open bottom equipment, such as switchboards, motor control centers, ~~and~~ floor or pad-mounted transformers, and wireways with an open botttom shall not be required to be mechanically secured to the equipment.

Statement of Problem and Substantiation for Public Input

Adding language to 300.12 Exception 2 to permit a wireway with an open bottom side seated against the floor surface to not require the raceways or cables to be secured to the equipment. This gives installers the same options as open bottom equipment such as switchboards or pad mounted transformers and not make them have the raceway or cable secured to the wireway.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 17 12:21:17 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The proposed exception is too broad. Wireways can be installed in many different locations, and this would give permission for an installer to remove the bottom of a wireway simply because it would be easier than terminating the conduits to the wireway. In many instances, the wireway with an open bottom would no longer be an effective enclosure.

Public Input No. 3083-NFPA 70-2023 [Section No. 300.12]

300.12 Mechanical Continuity — Raceways and Cables.

Raceways, cable armors, and cable sheaths shall be continuous between cabinets, boxes, conduit bodies, fittings, wireways, or other enclosures or outlets.

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be mechanically continuous.

Exception No. 2: Raceways and cables installed into the bottom of open bottom equipment, such as switchboards, motor control centers, and floor or pad-mounted transformers, shall not be required to be mechanically secured to the equipment.

Statement of Problem and Substantiation for Public Input

The addition of the word “wireway” is necessary since cables and raceways often terminate to a wireway (which is a raceway, not an enclosure). This added text will make it 100% clear that raceways and cables must secured to a wireway.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 11:11:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8779-NFPA 70-2024

Statement: Adding “wireway” makes it clear that raceways and cables must secured to a wireway.

The second sentence is relocated from 300.10 to recognize that this requirement is for mechanical continuity.

Public Input No. 666-NFPA 70-2023 [Section No. 300.12]

300.12 Mechanical Continuity — Raceways and Cables.

Raceways, cable armors, and cable sheaths shall be continuous between cabinets, boxes, conduit bodies, fittings, or other enclosures or outlets. Unless specifically permitted elsewhere in this *Code* , raceways and cable assemblies shall be mechanically secured to boxes, fittings, cabinets, and other enclosures.

Exception No. 1: Short sections of raceways used to provide support or protection of cable assemblies from physical damage shall not be required to be mechanically continuous.

Exception No. 2: Raceways and cables installed into the bottom of open bottom equipment, such as switchboards, motor control centers, and floor or pad-mounted transformers, shall not be required to be mechanically secured to the equipment.

Statement of Problem and Substantiation for Public Input

This is a companion to the proposal that removes this language from 300.10, where it DOES NOT BELONG and replaces it here WHERE IT DOES.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 665-NFPA 70-2023 [Section No. 300.10]	companion

Submitter Information Verification

Submitter Full Name:	Ryan Jackson
Organization:	Self-employed
Affiliation:	Steel Tube Institute
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Apr 20 13:14:22 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8779-NFPA 70-2024

Statement: Adding “wireway” makes it clear that raceways and cables must secured to a wireway.

The second sentence is relocated from 300.10 to recognize that this requirement is for mechanical continuity.

Public Input No. 2195-NFPA 70-2023 [Section No. 300.13]

300.13 Mechanical and Electrical Continuity — Conductors.

~~**(A)** General.~~

Conductors in raceways shall be continuous between outlets, boxes, devices, and so forth. There shall be no splice or tap within a raceway unless permitted by 300.15 , 368.56(A) , 376.56 , 378.56 , 384.56 , 386.56 , 388.56 , or 390.56 .

~~**(B)** Device Removal.~~

~~In multiwire branch circuits, the continuity of a grounded conductor shall not depend on device connections such as lampholders, receptacles, and so forth where the removal of such devices would interrupt the continuity.~~

Statement of Problem and Substantiation for Public Input

Relocating this requirement to new subdivision 210.4(E) from 300.13(B) would group all the rules regarding multiwire branch circuits together. This facilitates searching for Code users and places all the requirements for multiwire branch under 210.4.

Submitter Information Verification

Submitter Full Name:	Mike Holt
Organization:	Mike Holt Enterprises Inc
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Aug 14 13:52:33 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: CMP-3 cannot delete this requirement until it is duplicated in another section of the NEC.

Public Input No. 274-NFPA 70-2023 [Section No. 300.13(B)]

(B) Device Removal.

(1) Multiwire Branch Circuit . In multiwire branch circuits, the continuity of a grounded conductor shall not depend on device connections such as lampholders, receptacles, and so forth where the removal of such devices would interrupt the continuity.

(2) Higher Rating . Where a receptacle is installed on a branch circuit with a higher rating in accordance with 210.21(B)(3), the continuity of a grounded conductor or ungrounded conductor shall not depend on device connections where removal of such devices would interrupt the continuity.

-

Additional Proposed Changes

File Name	Description	Approved
IMG_8032.jpg	Recep 1	
IMG_8039.jpg	Recep 1b	
IMG-8041.jpg	Recep 2	
IMG-8042.jpg	Recep 2b	
IMG-8043.jpg	Recep 2c	

Statement of Problem and Substantiation for Public Input

When a 15 amp device is installed on a 20 amp branch circuit and continuity of the circuit conductors is achieved through the device, the device is subject to being exposed to downstream currents above its rating. This requirement would assure that a receptacle is subjected only to the loads it serves and no current from other loads being served by the circuit. I have had multiple service calls to replace damaged 15 amp receptacles due to high current demand equipment being utilized downstream of a 15 amp receptacle on a 20 amp branch circuit. In one case a downstream space heater being used in addition to loads served by other receptacles on a circuit caused significant damage to an unused upstream receptacle. In another instance birthday blow-up attractions in a homeowner's back yard caused a receptacle located in their inside entryway to melt. Once again the damaged receptacle itself was not being used. The high current was caused by downstream loads. If the receptacles would have been rated for 20 amps OR not relied upon for continuity of the conductors (pigtailed), the receptacle likely would have suffered less damage.

Submitter Information Verification

Submitter Full Name: Steven Gibson
Organization: ETA of Western Oklahoma
Street Address:
City:
State:
Zip:
Submittal Date: Thu Feb 02 13:50:40 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Duplex receptacles are required to meet the requirements in UL 498, Standard for Safety for Attachment Plugs and Receptacles. A 15-amp receptacle is evaluated in accordance with its electrical rating, which anticipates the installation on a 20-amp branch circuit and the related downstream loads.

Public Input No. 2050-NFPA 70-2023 [Section No. 300.14]

300.14 Length of Free Conductors at Outlets, Junctions, and Switch Points.

At least 150 mm (6 in.) of free conductor, including equipment grounding conductor(s), measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction, and switch point for splices or the connection of luminaires or devices. The 150 mm (6 in.) free conductor shall be permitted to be spliced or unspliced. Where the opening to an outlet, junction, or switch point is less than 200 mm (8 in.) in any dimension, each conductor shall be long enough to extend at least 75 mm (3 in.) outside the opening.

Exception: Conductors that are not spliced or terminated at the outlet, junction, or switch point shall not be required to comply with 300.14.

Statement of Problem and Substantiation for Public Input

300.14 – Provide modified code language or create an Informational Note that the length of spliced conductors applies to all conductors including equipment grounding conductors. It's not uncommon for multiple equipment grounding conductors in the same device box to be cut short which are then connected to one long equipment grounding conductor.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 12:29:23 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The requirement applies to all conductors, which includes equipment grounding conductors. It is not necessary to identify all types of conductors, and it could cause confusion that other types might not be included.

Public Input No. 2054-NFPA 70-2023 [Section No. 300.14]

300.14 Length of Free Conductors at Outlets, Junctions, and Switch Points.

At least 150 mm (6 in.) of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at or provided for at each outlet, junction including extension rings that are installed initially or subsequently added that are either exposed or concealed , and switch point for splices or the connection of luminaires or devices. The 150 mm (6 in.) free conductor shall be permitted to be spliced or unspliced. Where the opening to an outlet, junction, or switch point is less than 200 mm (8 in.) in any dimension, each conductor shall be long enough to extend at least 75 mm (3 in.) outside the opening.

Exception: Conductors that are not spliced or terminated at the outlet, junction, or switch point shall not be required to comply with 300.14.

Statement of Problem and Substantiation for Public Input

300.14 - add clarity regarding conductor length when extension rings are used initially or subsequently added, exposed, or concealed.

It is not uncommon for a non-flexible conduit(s) to be attached to an exposed extension ring, especially post original installation, making removal of the extension ring impractical which often makes the original conductors “short” and difficult to work with. When an installer makes a change, they should be responsible for ensuring that all of the conductor lengths are compliant even existing spliced conductors.

Submitter Information Verification

Submitter Full Name: Gary Hein

Organization: [Not Specified]

Street Address:

City:

State:

Zip:

Submittal Date: Fri Aug 11 12:46:17 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: The current text already covers the opening of an extension ring. The opening includes the extension ring if an extension ring is installed, and each conductor must be long enough to extend at least 75 mm (3 in.) outside the opening.

Public Input No. 3936-NFPA 70-2023 [Section No. 300.14]

300.14 Length of Free Conductors at Outlets, Junctions, and Switch Points.

(A) 6 in. of Free Conductor. At least 150 mm (6 in.) of free conductor, measured from the point in the box where it emerges from its raceway or cable sheath, shall be left at each outlet, junction, and switch point for splices or the connection of luminaires or devices. The 150 mm (6 in.) free conductor shall be permitted to be spliced or unspliced.

(B) 3 in. Outside the Box Opening. Where the opening to an outlet, junction, or switch point is less than 200 mm (8 in.) in any dimension, each conductor shall be long enough to extend at least 75 mm (3 in.) outside the opening.

Exception: Conductors that are not spliced or terminated at the outlet, junction, or switch point shall not be required to comply with 300.14.

Statement of Problem and Substantiation for Public Input

Breaking up 300.14 into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Wed Sep 06 10:51:35 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8832-NFPA 70-2024

Statement: Breaking up 300.14 into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements. Additionally, the panel titled each new sub-section to reflect when each requirement will be applicable.

Public Input No. 2690-NFPA 70-2023 [Section No. 300.15(F)]

(F) Fitting.

A fitting identified for the use shall be permitted in lieu of a box or conduit body where conductors are not spliced or terminated within the fitting. The fitting shall be accessible after installation~~, unless listed for concealed installation~~ .

Statement of Problem and Substantiation for Public Input

Clarification is required on this, as there is nothing in the UL514b spec for fittings that provides guidance on how to list a product for concealment. UL's Standard Engineers need to be included in the discussion, because as of now, they only say that there is no listing process for concealment of fittings.

Submitter Information Verification

Submitter Full Name: Chris Decesare

Organization: Bridgeport Fittings

Street Address:

City:

State:

Zip:

Submittal Date: Thu Aug 24 10:52:17 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8834-NFPA 70-2024

Statement: Clearly identifying that fittings that are used as a pull point shall be accessible after installation clarifies the intent. Removing "unless listed for concealment" meets the current listing standards.

Public Input No. 3179-NFPA 70-2023 [Section No. 300.15(F)]

(F) Fitting.

A fitting identified for the use shall be permitted in lieu of a box or conduit body where conductors are not spliced or terminated within the fitting. ~~The fitting~~ **A fitting used as a pull point** **shall be** ~~accessible after installation, unless listed for concealed installation~~ **installed so that the conductors are accessible without removing any fixed part of the building or structure** **.**

Statement of Problem and Substantiation for Public Input

Clarity is needed for fittings with covers that are used as “pull points” for conductors. While “go-to’s” or “change over” fittings are treated the same as a standard coupling, fittings with covers are not the same and need to be accessible after installation in order to allow access to the conductors inside of them. As written the current language is not clear and leas to confusion with both enforcers and installers as not all fittings are specifically listed for concealment.

Submitter Information Verification

Submitter Full Name:	Timothy Mikloiche
Organization:	Town of West Hartford
Affiliation:	Self
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Aug 30 07:16:32 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8834-NFPA 70-2024

Statement: Clearly identifying that fittings that are used as a pull point shall be accessible after installation clarifies the intent. Removing "unless listed for concealment" meets the current listing standards.

Public Input No. 4317-NFPA 70-2023 [Section No. 300.15(F)]

(F) Fitting.

A fitting identified for the use shall be permitted in lieu of a box or conduit body where conductors are not spliced or terminated within the fitting. ~~The~~ If used as a pull point, the fitting shall be accessible after installation~~, unless listed for concealed installation~~ .

Statement of Problem and Substantiation for Public Input

This subsection never should have applied to all the applications indicated in 300.15. If a fitting is used as a pull point, such as a 90 degree fitting for flexible metal conduit or a conduit body, it makes sense that the fitting remain accessible after installation. But with recent changes to this section we are now left with a requirement that often connot be satisfied at all. For example, transitioining from PVC to IMC in an underground location is no longer possible. The fitting used for that transitition is not listed for concealment because no fittings are listed for concealment. Fittings do not get listed for concealment. The word "conceal," and any of its derivitives, is not used in UL 514B.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 11:11:16 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8834-NFPA 70-2024

Statement: Clearly identifying that fittings that are used as a pull point shall be accessible after installation clarifies the intent. Removing "unless listed for concealment" meets the current listing standards.

Public Input No. 2654-NFPA 70-2023 [Section No. 300.15(L)]

(L) Manholes and Handhole Enclosures.

A box or conduit body shall not be required for conductors in manholes or handhole enclosures, except where connecting to electrical equipment. The installation shall comply with ~~Part V of~~ Article 110 - ~~for~~ , Part V for manholes, and 314.30 for handhole enclosures.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 07:58:51 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8835-NFPA 70-2024
Statement: The change meets the NEC Style Manual requirement in section 4.1.4.

Public Input No. 2399-NFPA 70-2023 [Section No. 300.17]

300.17 Number and Size of Conductors and Cables in Raceway.

(A) General. The number and size of conductors and cables in any raceway shall not be more than will permit dissipation of the heat and ready installation or withdrawal of the conductors or cables without damage to the conductors or cables, or to their insulation.

(B) Percentage Fill. The number of conductors and cables in a complete raceway run shall not exceed the allowable percentage fill specified in Table 1, Chapter 9.

Informational Note: See the following sections of this *Code*: intermediate metal conduit, 342.22; rigid metal conduit, 344.22; flexible metal conduit, 348.22; liquidtight flexible metal conduit, 350.22; PVC conduit, 352.22; HDPE conduit, 353.22; RTRC, 355.22; liquidtight nonmetallic flexible conduit, 356.22; electrical metallic tubing, 358.22; flexible metallic tubing, 360.22; electrical nonmetallic tubing, 362.22; cellular concrete floor raceways, 372.22; cellular metal floor raceways, 374.22; metal wireways, 376.22; nonmetallic wireways, 378.22; surface metal raceways, 386.22; surface nonmetallic raceways, 388.22; underfloor raceways, 390.22; fixture wire, 402.7; theaters, 520.6; signs, 600.31(C); elevators, 620.33; audio signal processing, amplification, and reproduction equipment, 640.23(A) and 640.24; Class 1 circuits, 724.3(A); Class 2, Class 3, Class 4, and power-limited fire alarm (PLFA) circuits, 722.3(A); non-power-limited fire alarm (NPLFA) circuits, 760.3(H); and optical fiber cables and raceways, 770.110(B).

Statement of Problem and Substantiation for Public Input

The requirement in the xxx.22 section of each raceway are difficult to find for Code users. This should be a general requirement to make sure the percentage fills in Table 1, Chapter 9 are enforceable and not just an informational note.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 16:40:14 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8836-NFPA 70-2024

Statement: The general requirement to make sure the percentage fills in Table 1, Chapter 9 are enforceable and not just an informational note.

Public Input No. 324-NFPA 70-2023 [Section No. 300.17]

300.17 Number and Size of Conductors and Cables in Raceway.

The number and size of conductors and cables in any raceway shall not be more than will permit dissipation of the heat and ready installation or withdrawal of the conductors or cables without damage to the conductors or cables, or to their insulation.

Where different raceway wiring methods are joined together without a pull point at the transition, there shall not be more than 360 degrees total between pull points, e.g., conduit bodies and boxes.

Informational Note: See the following sections of this *Code*: intermediate metal conduit, 342.22; rigid metal conduit, 344.22; flexible metal conduit, 348.22; liquidtight flexible metal conduit, 350.22; PVC conduit, 352.22; HDPE conduit, 353.22; RTRC, 355.22; liquidtight nonmetallic flexible conduit, 356.22; electrical metallic tubing, 358.22; flexible metallic tubing, 360.22; electrical nonmetallic tubing, 362.22; cellular concrete floor raceways, 372.22; cellular metal floor raceways, 374.22; metal wireways, 376.22; nonmetallic wireways, 378.22; surface metal raceways, 386.22; surface nonmetallic raceways, 388.22; underfloor raceways, 390.22; fixture wire, 402.7; theaters, 520.6; signs, 600.31(C); elevators, 620.33; audio signal processing, amplification, and reproduction equipment, 640.23(A) and 640.24; Class 1 circuits, 724.3(A); Class 2, Class 3, Class 4, and power-limited fire alarm (PLFA) circuits, 722.3(A); non-power-limited fire alarm (NPLFA) circuits, 760.3(H); and optical fiber cables and raceways, 770.110(B).

Additional Proposed Changes

File Name	Description	Approved
300.17.pdf	360 degrees between pull points	

Statement of Problem and Substantiation for Public Input

Having too many bends between pull points could make pulling wires through a raceway difficult, if not impossible. It could also lead to damage of the conductor insulation or cable jacket. There is presently no code rule limiting the number of bends between pull points where multiple types of raceways are joined together between those pull points. A run of RMC is not permitted to have 1080 degrees between pull points. A run of IMC is not permitted to have 1080 degrees between pull points. A run of PVC conduit is not permitted to have 1080 degrees between pull points. Each one of these raceways is individually limited to no more than 360 degrees of bends between pull points, but a run of RMC having 360 degrees of bends joined to a run of IMC having another 360 degrees of bends joined to a run of PVC conduit having another 360 degrees of bends IS permitted and would have 1080 degrees between pull points! Joining different wiring methods together is not a violation. A pull point such as a box or conduit body is not required at these transition points. A coupling could be used here in accordance with 300.15(F). To protect conductors and cables from being damaged, a limit needs to be placed on having too many bends between pull points when different wiring methods are joined together.

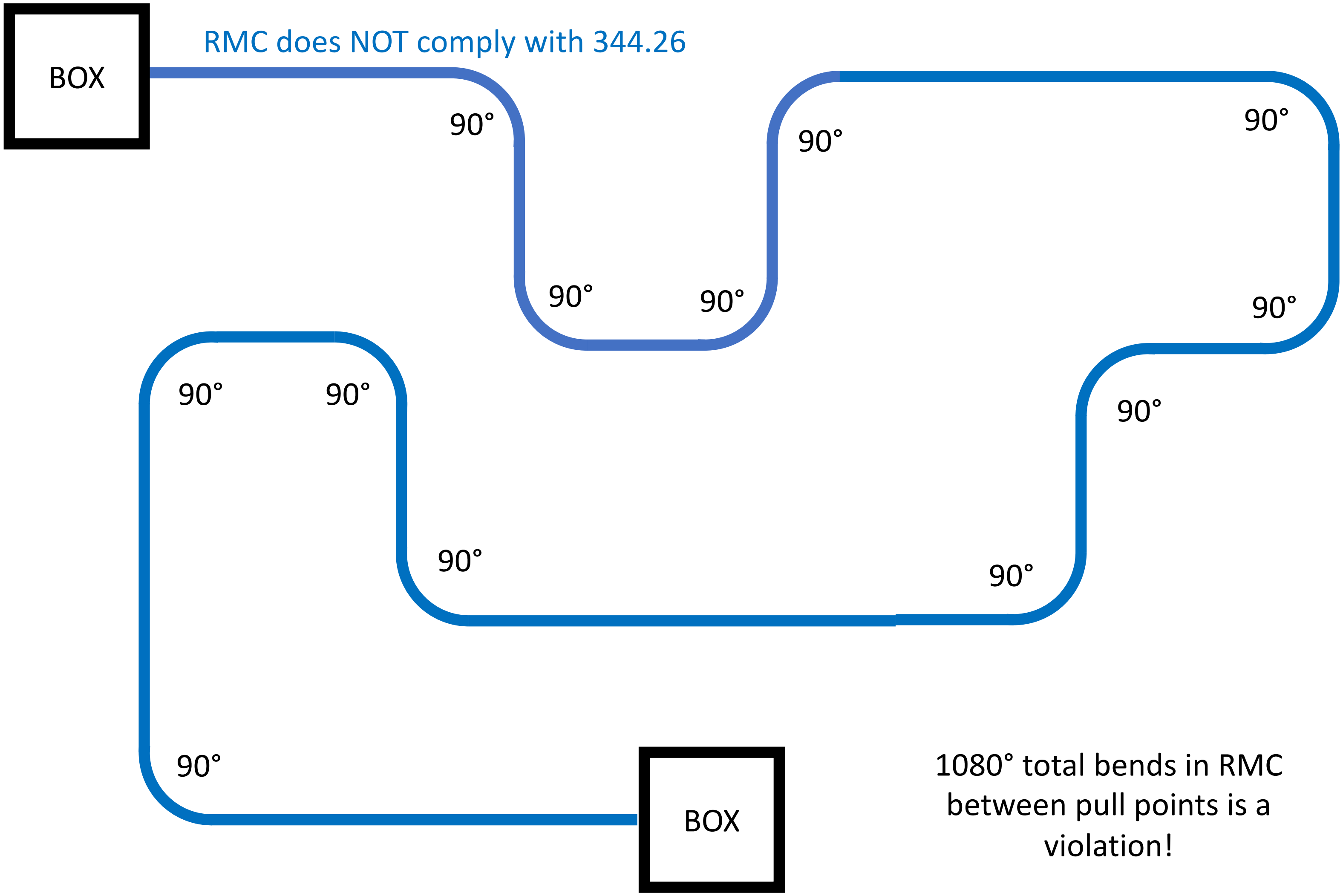
Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Feb 10 09:53:15 EST 2023
Committee: NEC-P03

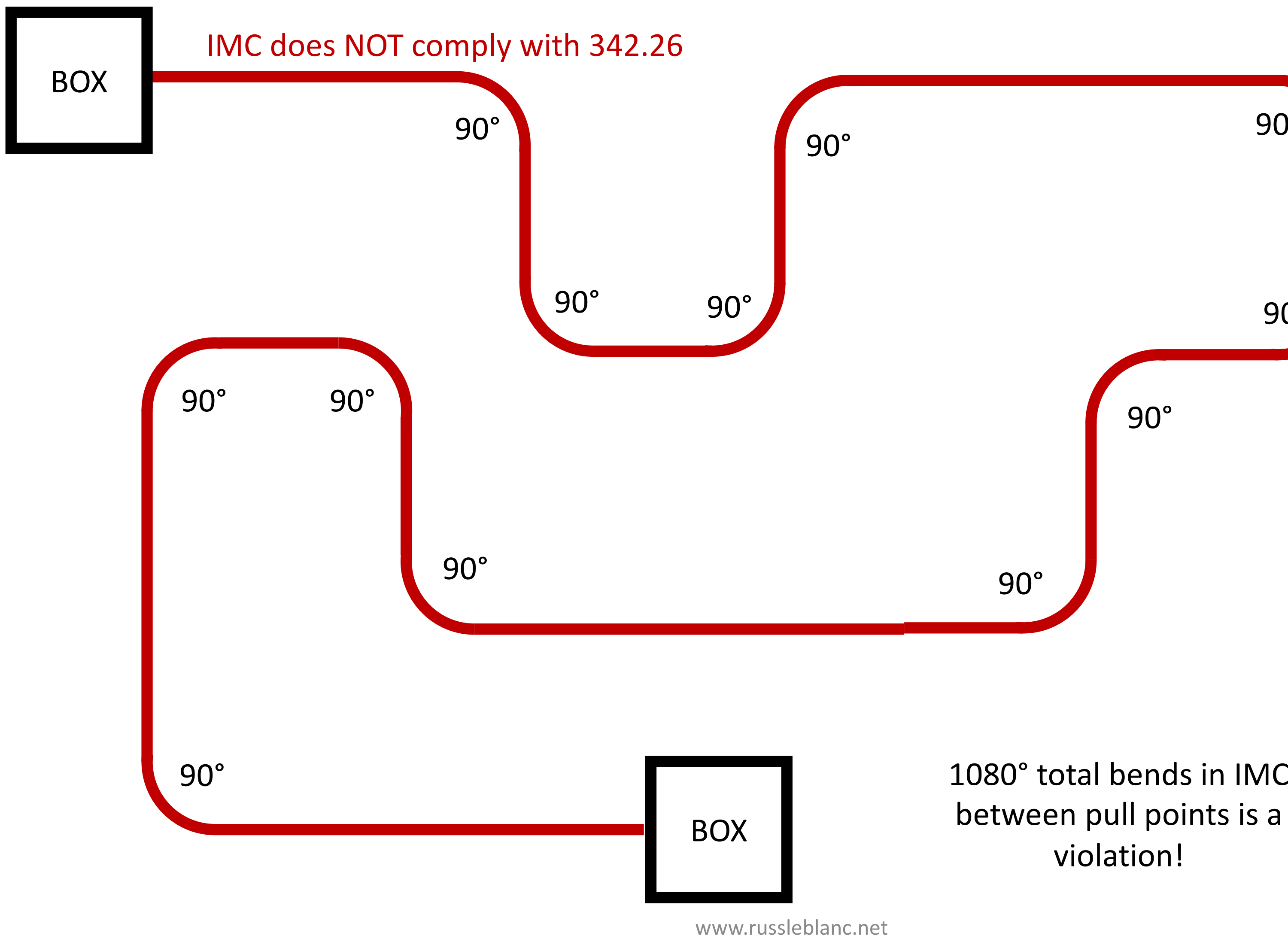
Committee Statement

Resolution: FR-8839-NFPA 70-2024

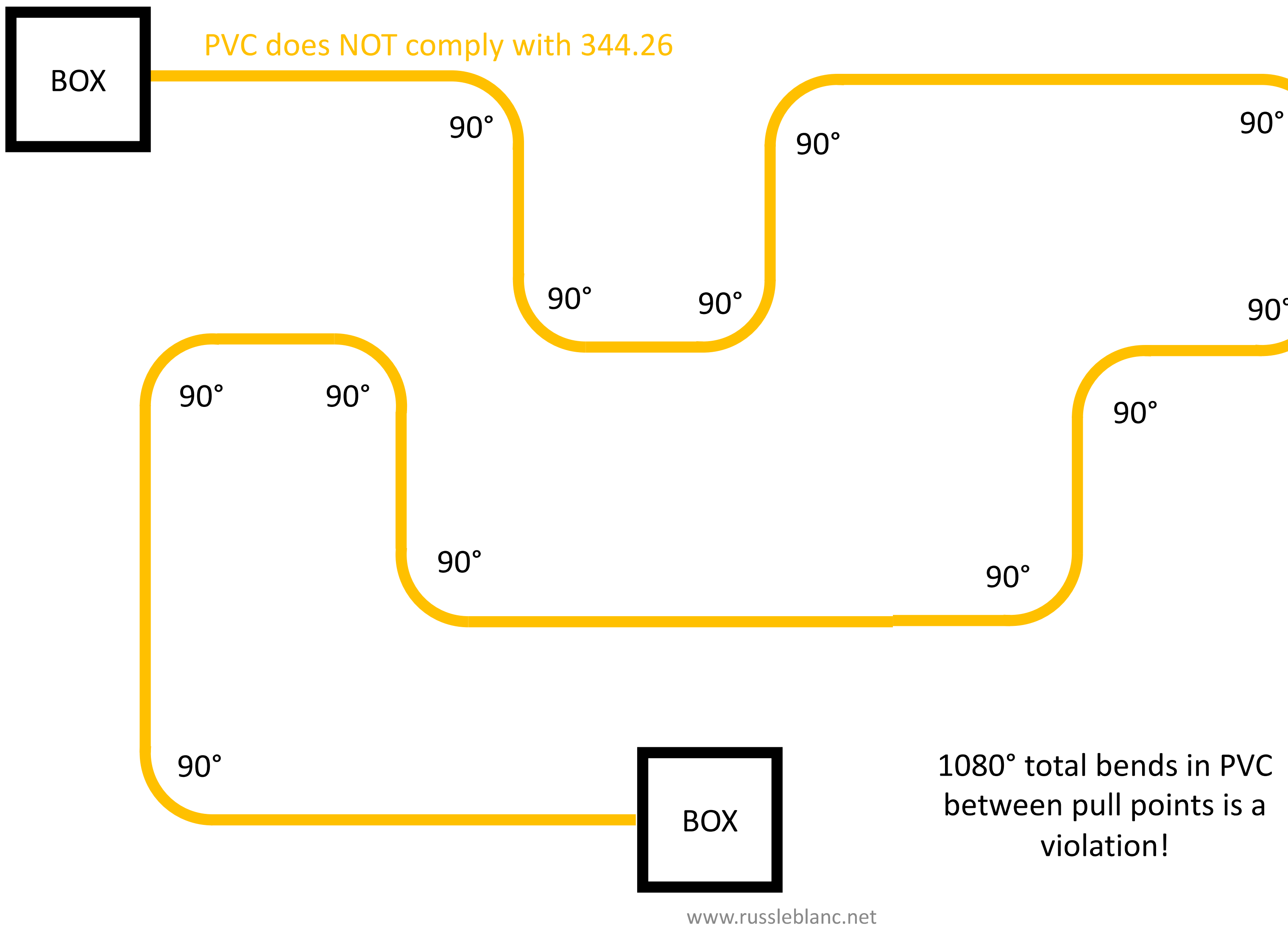
Statement: The added text will clarify the requirement to not exceed 360 degrees between pull points, even if you transition to another type of raceway. The text is located in 300.24 to be consistent with the 3xx.24 sections of other Chapter 3 requirements.



www.russleblanc.net



IMC does NOT comply with 342.26
BOX
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
BOX
1080° total bends in IMC between pull points is a violation!
www.russleblanc.net


BOX
PVC does NOT comply with 344.26
90°
90°
90°
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90°
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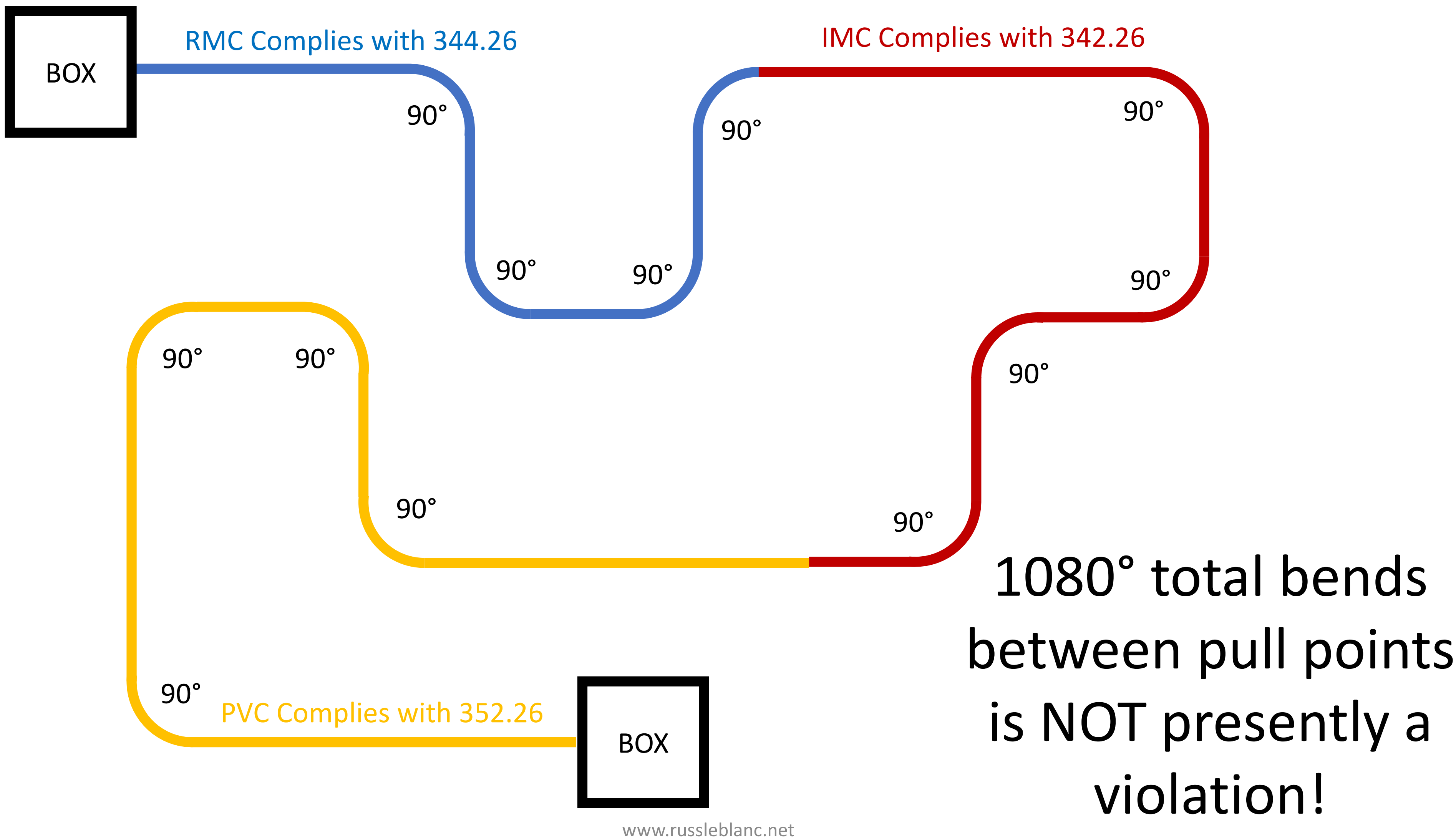
90°
90°
90°
90°
90°
90°
BOX
1080° total bends in PVC between pull points is a violation!
www.russleblanc.net


BOX
RMC Complies with 344.26
IMC Complies with 342.26
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
90°
PVC Complies with 352.26
BOX
1080° total bends between pull points is NOT presently a violation!
www.russleblanc.net

Public Input No. 3939-NFPA 70-2023 [Section No. 300.18(A)]

(A) Complete Runs.

(1) Complete Between Points. Raceways other than busways, listed manufactured assemblies in accordance with 604.100, or exposed raceways having hinged or removable covers shall be installed complete between outlet, junction, or splicing points prior to the installation of conductors or cables.

(2) Without Termination. Where required to facilitate the installation of utilization equipment, the raceway shall be permitted to be initially installed without a terminating connection at the equipment.

(3) Prewired Raceways. Prewired raceway assemblies shall be permitted only where specifically permitted in this *Code* for the applicable wiring method.

Exception: Short sections of raceways used to contain conductors or cable assemblies for protection from physical damage shall not be required to be installed complete between outlet, junction, or splicing points.

Statement of Problem and Substantiation for Public Input

Breaking up 300.18(A) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 10:55:35 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8840-NFPA 70-2024

Statement: The panel has separated section 300.18(A) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements. This revision will also allow the exception to be removed and written in positive code text in accordance with Section 2.1.9.1 of the NEC Style Manual. Additionally, there are no metallic raceways designed or listed for welding, so this language was removed.

Public Input No. 1360-NFPA 70-2023 [New Section after 300.18(B)]

TITLE OF NEW CONTENT

300.18C Nipples Securing and Supporting

Nipples connected between two enclosures shall not require added securing or support.

A nipple installed according to 300.15C requires at least one point of securement or support where the nipple has a length greater than 100 mm (4") protruding from the enclosure to which it is connected.

Statement of Problem and Substantiation for Public Input

This is a modified public input of my 300.18C proposal for the 2023 cycle. Whether the connections to the enclosure(s) is a threaded hub or not does not factor into this proposal. The added length of fittings, bushings, and the like installed on the free end of a nipple do not factor into this proposal. Tubing, raceways, and conduits are to be considered interchangeable words.

The .30s of the raceway articles fall short of addressing the securing and supporting of nipples. The .30s do not state either way on this. One could 'read between the lines' to determine if they do or don't require securing/supporting and in many cases, securing/supporting is impracticable. It should be clear in NEC text one way or the other.

Regarding the first sentence of this public input, it is often the practice in the field to not support nipples that connect two enclosures together. This new public input states that nipples installed in this manner shall not require added securing or support. According to the newly proposed Article 100 definition, a nipple is any tubing or raceway or conduit length 600mm (24") or less in length.

The second sentence of this public input is for a nipple installed to protect cables that exit the nipple free of an enclosure (300.15C). The proposed 4" limit without securing or supporting acknowledges a greater nipple length without securement or support adds leverage as the length increases. It would also matter if the nipple (being connected at one end to an enclosure) exited the enclosure vertically or horizontally.

Perhaps the CMP sees fit to other than a 4" maximum length before requiring securement or support for the 300.15C condition. If this new 300.18C becomes CMP approved, the maximum length nipple measurement allowed before mandating a point of securement or support would have to be written into NEC text. Without it, even a chase nipple would require being secured or supported.

Placing this new code in Article 300 prevents writing it each time in every raceway article. The new 300.18C covers nipples for all listed raceways.

Please see my new and related public input In Article 100 for a new definition: 'nipple'.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1357-NFPA 70-2023 [New Definition after Definition: Neutral Point.]	
Public Input No. 1357-NFPA 70-2023 [New Definition after Definition: Neutral Point.]	

Submitter Information Verification

Submitter Full Name: Norman Feck

Organization: State of Colorado

Affiliation: self

Street Address:

City:

State:

Zip:

Submittal Date: Mon Jul 10 18:18:14 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: The proposed wording is too broad and covers all types of raceways that have different securing and supporting requirements.

Public Input No. 2174-NFPA 70-2023 [New Section after 300.18(B)]

(C) Raceway Spacing

Spacing between raceways shall be maintained.

Statement of Problem and Substantiation for Public Input

Move 310.15 (C) (2) “Raceway Spacing” requirements to 300.18 “Raceway Installations”. Article 310.15 (C) is dedicated to adjustment factors Article 310.15 (C) (2) covers raceway spacing but offers no information on any associated adjustment factors. Moving 310.15 (C) (2) “Raceway Spacing” to 300.18 “Raceway Installations” is a more suitable article to cover raceway spacing.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 14 12:18:43 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Spacing between raceways is a requirement related to ampacity adjustment and therefore is appropriately located in 310.15, similar to the cable spacing requirements in the same section.

Public Input No. 2266-NFPA 70-2023 [Section No. 300.18(B)]

(B) Welding.

Metal raceways shall not be supported, terminated, or connected by welding to the raceway~~ unless specifically designed to be or otherwise specifically permitted to be in this~~ *Code* .

Statement of Problem and Substantiation for Public Input

The style manual prohibits references to complete aritcles, yet this section refers to the entire book. Certainly that goes against the intent of the style manual.

More importantly, however, is that people are welding raceways in the feild. This seems to mainly be an issue in food processing areas where stainless steel conduit is used. The existing language needs to be cleaned up to remove any doubt that a conduit system is not to be welded. The integrity of the raceway is easily compromised by this practice, and even the most perfect of welds will still result in rough edges in the raceway that can lead to damage to the contained conductors.

Submitter Information Verification

Submitter Full Name:	Ryan Jackson
Organization:	Self-employed
Affiliation:	Steel Tube Institute
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 15 14:27:34 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8797-NFPA 70-2024

Statement: Removing the verbiage clarifies that conduits shall not be welded. Welding has the possibility of damaging the interior of the raceway, which could damage the conductors. In addition, welding of raceways is not recognized by any certifying body and could result in changes to the characteristics of the raceway that have not been evaluated.

Public Input No. 2055-NFPA 70-2023 [Section No. 300.19(A)]

(A) Spacing Intervals — Maximum.

Conductors in vertical raceways shall be supported if the vertical rise exceeds the values in Table 300.19(A). At least one support method shall be provided for each conductor at the top of the vertical raceway or as close to the top as practical. Intermediate supports shall be provided as necessary to limit supported conductor lengths to not greater than those values specified in Table 300.19(A).

Exception: Steel wire armor cable shall be supported at the top of the riser with a cable support that clamps the steel wire armor. A safety device shall be permitted at the lower end of the riser to hold the cable in the event there is slippage of the cable in the wire-armored cable support. Additional wedge-type supports shall be permitted to relieve the strain on the equipment terminals caused by expansion of the cable under load.

Table 300.19(A) Spacings for Conductor Supports

		-	-	Conductors			
Conductor Size	**Support of Conductors in Vertical Raceways**	**(make this column copper) Aluminum or Copper-Clad Aluminum**		**-**	**~~Copper~~**		**(make this column Aluminum or Copper-Clad Aluminum) Copper**
		m	**ft**	**-**	**m**	**ft**	
18 AWG through 8 AWG	Not greater than	30	100	-	30	100	
6 AWG through 1/0 AWG	Not greater than	60	200	-	30	100	
2/0 AWG through 4/0 AWG	Not greater than	55	180	-	25	80	
Over 4/0 AWG through 350 kcmil	Not greater than	41	135	-	18	60	
Over 350 kcmil through 500 kcmil	Not greater than	36	120	-	15	50	
Over 500 kcmil through 750 kcmil	Not greater than	28	95	-	12	40	
Over 750 kcmil	Not greater than	26	85	-	11	35	

Statement of Problem and Substantiation for Public Input

T300.19 (A) - swap location of the aluminum or Copper-Clad Aluminum column with Copper column. Make copper the first column for ease of use.

Submitter Information Verification

Submitter Full Name: Gary Hein
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 12:52:09 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8845-NFPA 70-2024

Statement: The table columns are rearranged to be consistent with other tables in the code.

Public Input No. 3142-NFPA 70-2023 [Section No. 300.22(C)(1)]

(1) Wiring Methods.

The wiring methods for other spaces used for environmental air shall be limited to

~~totally~~
:

(1) Totally enclosed, nonventilated, insulated busway having no provisions for plug-in connections,

(2) Rigid metal conduit without an overall nonmetallic covering,

(3) Intermediate metal conduit without an overall nonmetallic covering,

(4) Electrical metallic conduit without an overall nonmetallic covering,

(5) Type MI cable without an overall nonmetallic covering,

(6) Type MC cable without an overall nonmetallic covering,

(7) Type AC cable, or other factory-assembled multiconductor control or power cable that is specifically listed for use within an air-handling space, or listed prefabricated cable assemblies of metallic manufactured wiring systems without nonmetallic sheath.

Other types of cables, conductors, and raceways shall be permitted to be installed in electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, rigid metal conduit, flexible metal conduit, (all without an overall nonmetallic covering~~, flexible metal conduit,~~) or, where accessible, surface metal raceway or metal wireway with metal covers.

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables shall be listed as having low smoke and heat release properties.

Informational Note: See UL 2043, *Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces*, for one method of testing low smoke and heat release properties for nonmetallic cable ties and other nonmetallic cable accessories to determine a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a peak heat release rate of 100 kW or less.

Statement of Problem and Substantiation for Public Input

The language currently does not recognize EMT, IRC, RMC, flexible metal tubing, or flexible metal conduit in the first sentence as acceptable, but does recognize those wiring methods to enclose various other conductors or cables. This is certainly not the intent or regular practice in the field and is confusing. Those wiring methods are added. The Section is revised into a list format for clarity. The second sentence is revised to clarify that identified metal wiring methods that are allowed to enclose other conductors or cables must all be without an overall nonmetallic covering. The current language says that only rigid metal conduit is prohibited from having an overall nonmetallic covering.

Submitter Information Verification

Submitter Full Name: Joseph Andre
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 16:07:42 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The proposed language does not provide clarity. EMT, IRC, RMC, flexible metal tubing, or flexible metal conduit are all acceptable wiring methods in the current text.

Public Input No. 2655-NFPA 70-2023 [Section No. 300.22 [Excluding any Sub-Sections]]

The requirements of this section shall apply to the installation and uses of electrical wiring and equipment in ducts used for dust, loose stock, or vapor removal; ducts specifically fabricated for environmental air; and other spaces used for environmental air (plenums).

Informational Note: See ~~Part VI of~~ Article 424 ~~for~~ , Part VI for requirements on duct heaters.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 08:00:24 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8855-NFPA 70-2024
Statement: The cross-reference is updated in accordance with 4.1.4 of the NEC Style Manual.

Public Input No. 1037-NFPA 70-2023 [Section No. 300.25]

300.25 Exit Enclosures (Stair Towers).

Where an exit enclosure is required to have a fire resistance rating, only electrical ~~wiring methods~~ raceways serving equipment permitted by the authority having jurisdiction in the exit enclosure shall be installed within the exit enclosure. Two source of power shall be required for stair tower lighting.

Exception: Where egress lighting is required on outside exterior doorways from the exit enclosure, luminaires shall be permitted to be supplied from the inside of the exit enclosure.

Informational Note: See NFPA *101*-2021, *Life Safety Code*, 7.1.3.2.1(10)(b), for more information.

Statement of Problem and Substantiation for Public Input

In stair towers the IBC code required a metal raceway in stair towers for all wiring .
The reason is that in the future fire alarm or branch circuit wiring can be replaced without damage to the fire rating of the stair tower.

Submitter Information Verification

Submitter Full Name: John Plourde
Organization: Portsmouth Nh City Of
Affiliation: Performance Electrical Training LLC
Street Address:
City:
State:
Zip:
Submittal Date: Mon Jun 12 14:11:53 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The requirements for emergency or legally required standby systems are under the purview of the adopted building code and other portions of the NEC.

Public Input No. 2465-NFPA 70-2023 [Section No. 300.25]

300.25 Exit Enclosures (Stair Towers).

Where an exit enclosure is required to have a fire resistance rating, only the following electrical wiring methods ~~serving equipment permitted by~~ approved by the authority having jurisdiction ~~in~~ are permitted within the exit enclosure ~~shall be installed within~~ :

(1) Raceway(s) for fire department communication

(2) Raceway(s) for security systems

(3) Raceway(s) serving equipment for the exit enclosure~~.~~

Exception: Where egress lighting is required on outside exterior doorways from the exit enclosure, luminaires shall be permitted to be supplied from the inside of the exit enclosure.

Informational Note: See NFPA *101*-2021, *Life Safety Code*, 7.1.3.2.1(10)(b), for more information.

Statement of Problem and Substantiation for Public Input

Revising language to give guidance for the wiring methods permitted in exit enclosures from NFPA 101, Life Safety Code, 7.1.3.2.1(10)(b). The authority having jurisdiction shouldn't be permitted to allow wiring methods as they desire, but they can approve wiring methods allowed in the building code and life safety code.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 17 13:55:38 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Not all jurisdictions adopt the IBC or incorporate the Life Safety Code. The language, as written, restricts general wiring from being installed in these locations but also allows for the AHJ to enforce other adopted rules like the IBC and Life Safety Code, if they apply to their jurisdiction.

Public Input No. 1584-NFPA 70-2023 [Section No. 300.26]

300.26 Remote-Control and Signaling Circuits Classification.

Remote-control and signaling circuits shall be classified as either power-limited or non-power-limited and comply with 300.26(A) through (C).

(A) Class 1 Power-Limited Remote-Control and Signaling Circuits.

Class 1 power-limited remote-control and signaling circuits shall comply with 724.3.

(B) Class 2 and Class 3 Power-Limited Remote-Control and Signaling Circuits.

Class 2 and Class 3 power-limited remote-control and signaling circuits shall comply with 725.3.

(C) Non-Power-Limited Remote-Control and Signaling Circuits.

Non-power-limited remote-control and signaling circuits shall be installed in accordance with 300.2 through 300.25 and comply with 300.26(C)(1) through (C)(3).

(1) Sizes and Use.

(a) Conductors that are 18 AWG and 16 AWG copper shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable.

(b) Conductors that are 14 AWG copper-clad aluminum shall be permitted to be used in Type MC cable and Type TC cable. The continuous load shall not exceed 8 amperes.

(c) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall not supply loads greater than the ampacities specified in 310.14.

(d) Flexible cords shall comply with the applicable general requirements, applications, and construction specifications for flexible cords and flexible cables in accordance with Article 400 Parts I and II.

(2) Insulation.

(a) Insulation on conductors shall be rated for the system voltage and not less than 600 volts.

(b) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall comply with the applicable general requirements for conductors rated up to and including 2000 volt for type designations, insulations, markings, ampacity ratings, and uses in accordance with 310.3, 310.4, 310.6, 310.8, 310.10, and 310.14.

(c) Conductors that are 18 AWG copper, 16 AWG copper, or 14 AWG copper-clad aluminum shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF.

(d) Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

(3) Overcurrent Protection.

(a) Overcurrent protection for conductors 14 AWG copper and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation.

(b) Overcurrent protection shall not exceed 7 amperes for 18 AWG copper conductors and 10 amperes for 16 AWG copper and 14 AWG copper-clad aluminum.

Exception: The overcurrent protection specified in 300.26(C)(3)(a) and 300.26(C)(3)(b) shall not be required where this Code requires or permits other overcurrent protection ratings.

Additional Proposed Changes

File Name	Description	Approved

TIA_1688_70_23_8.pdf NEC TIA 23-8 Log 1688

Statement of Problem and Substantiation for Public Input

NOTE: This public input originates from Tentative Interim Amendment No. 23-8 (Log 1688) issued by the Standards Council on March 21, 2023 and per the NFPA Regs., needs to be reconsidered by the Code-Making Panel for the next edition of the Document.

Substantiation: Changes to the location of code requirements for control conductors resulted in the omission of information required to determine the size and construction of non-power-limited conductors used in these applications. To provide clear direction to Code users, the language in 300.26(3) is revised to include directions on how to size conductors used for non-power-limited control conductors. This language is intended to mirror the requirements that were in the 2020 NEC, with no technical changes. There are also changes to the language to address style manual conflicts, improve clarity, and improve readability.

Emergency Nature: The standard contains an error or an omission that was overlooked during the regular revision process. The NFPA Standard contains a conflict within the NFPA Standards or within another NFPA Standard. The proposed TIA intends to correct a circumstance in which the revised NFPA Standard has resulted in an adverse impact on a product or method that was inadvertently overlooked in the total revision process or was without adequate technical (safety) justification of the action.

This information is essential to the correct sizing of non-power-limited control conductors. The misapplication due to lack of clarity of requirements can lead to installations with hazardous conditions, hence the emergency nature and the submission of this TIA.

Submitter Information Verification

Submitter Full Name:	CMP ON NEC-P03
Organization:	NFPA
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jul 26 12:09:00 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding “listing” of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not “listed” for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Tentative Interim Amendment

NFPA® 70®

National Electrical Code®

2023 Edition

Reference: 300.26
TIA 23-8
(SC 23-3-9 / TIA Log #1688)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 70®, *National Electrical Code®*, 2023 edition. The TIA was processed by the NEC Code-Making Panel 3 and the NEC Correlating Committee, and was issued by the Standards Council on March 21, 2023, with an effective date of April 10, 2023.

1. Revise paragraph 300.26 to read as follows:

300.26 Remote-Control and Signaling Circuits Classification.
Remote-control and signaling circuits shall be classified as either power-limited or non-power-limited and comply with ~~the following~~300.26(A) through (C).

(~~1~~A) **Class 1 Power-Limited Remote-Control and Signaling Circuits**. Class 1 power-limited remote-control and signaling circuits shall comply with 724.3.

(~~2~~B) **Class 2 and Class 3 Power-Limited Remote-Control and Signaling Circuits**. Class 2 and Class 3 power-limited remote-control and signaling circuits shall comply with 725.3.

(~~3~~C) **Non-Power-Limited Remote-Control and Signaling Circuits**. Non-power-limited remote-control and signaling circuits shall be installed in accordance with 300.2 through 300.25 and comply with 300.26(C)(1) through (C)(3).

(1) Sizes and Use.

(a) Conductors that are 18 AWG and 16 AWG copper shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable.

(b) Conductors that are 14 AWG copper-clad aluminum shall be permitted to be used in Type MC cable and Type TC cable. The continuous load shall not exceed 8 amperes.

(c) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall not supply loads greater than the ampacities specified in 310.14.

(d) Flexible cords shall comply with the applicable general requirements, applications, and construction specifications for flexible cords and flexible cables in accordance with Article 400 Parts I and II.

(2) Insulation.

(a) Insulation on conductors shall be rated for the system voltage and not less than 600 volts.

(b) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall comply with the applicable general requirements for conductors rated up to and including 2000 volt for type designations, insulations, markings, ampacity ratings, and uses in accordance with 310.3, 310.4, 310.6, 310.8, 310.10, and 310.14.

(c) Conductors that are 18 AWG copper, 16 AWG copper, or 14 AWG copper-clad aluminum shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF.

(d) Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

(3) Overcurrent Protection.

(a) Overcurrent protection for conductors 14 AWG copper and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation.

(b) Overcurrent protection shall not exceed 7 amperes for 18 AWG copper conductors and 10 amperes for 16 AWG copper and 14 AWG copper-clad aluminum.

Exception: The overcurrent protection specified in 300.26(C)(3)(1) and 300.26(C)(3)(2) shall not be required where this Code requires or permits other overcurrent protection ratings.

Issue Date: March 21, 2023

Effective Date: April 10, 2023

(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/docinfo**)**

Public Input No. 4257-NFPA 70-2023 [Section No. 300.26]

~~300.26~~ ARTICLE 205 Remote-Control and Signaling Circuits.

205.1 Scope.

This article provides the general requirements for remote-control and signaling circuits.

205.2 Circuit Classification.

Remote-control and signaling circuits shall be classified as either power-limited or non-power-limited and comply with ~~300~~ 205 . ~~26~~ 2 (A) through (C).

(A) Class 1 Power-Limited Remote-Control and Signaling Circuits.

Class 1 power-limited remote-control and signaling circuits shall comply with 724.3.

(B) Class 2 and Class 3 Power-Limited Remote-Control and Signaling Circuits.

Class 2 and Class 3 power-limited remote-control and signaling circuits shall comply with 725.3.

(C) Non-Power-Limited Remote-Control and Signaling Circuits.

Non-power-limited remote-control and signaling circuits shall be installed in accordance with 300.2 through 300.25 and comply with ~~300~~ 205 . ~~26~~ 2 (C)(1) through (C)(3).

(1) Sizes and Use.

(a) Conductors that are 18 AWG and 16 AWG copper shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable.

(b) Conductors that are 14 AWG copper-clad aluminum shall be permitted to be used in Type MC cable and Type TC cable. The continuous load shall not exceed 8 amperes.

(c) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall not supply loads greater than the ampacities specified in 310.14.

(d) Flexible cords shall comply with the applicable general requirements, applications, and construction specifications for flexible cords and flexible cables in accordance with Article 400 Parts I and II.

(2) Insulation.

(a) Insulation on conductors shall be rated for the system voltage and not less than 600 volts.

(b) Conductors larger than 16 AWG copper or 14 AWG copper-clad aluminum shall comply with the applicable general requirements for conductors rated up to and including 2000 volt for type designations, insulations, markings, ampacity ratings, and uses in accordance with 310.3, 310.4, 310.6, 310.8, 310.10, and 310.14.

(c) Conductors that are 18 AWG copper, 16 AWG copper, or 14 AWG copper-clad aluminum shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF.

(d) Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

(3) Overcurrent Protection.

(a) Overcurrent protection for conductors 14 AWG copper and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation.

(b) Overcurrent protection shall not exceed 7 amperes for 18 AWG copper conductors and 10 amperes for 16 AWG copper and 14 AWG copper-clad aluminum.

Exception: The overcurrent protection specified in ~~300~~ 205 . ~~26~~ 2 (C)(3)(a) and ~~300~~ 205 . ~~26~~ 2 (C)(3)(b) shall not be required where this Code requires or permits other overcurrent protection ratings.

Statement of Problem and Substantiation for Public Input

Article 300.26 was created in the 2023 cycle as a result of splitting up Article 725. Article 300.26 covers general requirements for all remote-control and signaling circuits. The problem is that Chapter 3 covers wiring methods and Article 300.26 outlines a type of circuit, not a wiring method. It is appropriate for the requirements of these circuits to be relocated to Chapter 2. These circuits are commonly used to interconnect functionally associated equipment which creates a distinction from branch circuits. Therefore, a new article is being created in Chapter 2 for these unique circuits.

Submitter Information Verification

Submitter Full Name: Curtis Flint
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Submittal Date: Thu Sep 07 08:28:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding "listing" of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not "listed" for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Public Input No. 1418-NFPA 70-2023 [Section No. 300.26(C)(1)]

(1) Sizes and Use.

(a) Conductors that are 18 ~~AWG~~ AWG copper and 16 AWG copper or copper-clad aluminum shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable.

(b) Conductors that are ~~14 AWG~~ 14 AWG copper-clad aluminum shall be permitted to be used in Type MC cable and Type TC cable. The continuous load shall not exceed 8 amperes.

(c) Conductors larger than 16 AWG copper ~~or 14 AWG copper~~ or copper -clad aluminum shall not supply loads greater than the ampacities specified in 310.14.

(d) Flexible cords shall comply with the applicable general requirements, applications, and construction specifications for flexible cords and flexible cables in accordance with Article 400 Parts I and II.

Additional Proposed Changes

File Name	Description	Approved
CW.NFPA_Submission_Copyright_Permission_Form.docx	Copperweld Copyright Release	
PGFinal.SW-2023-001_-_Electrical_Characteristic_Comparison_between_Copper_and_CCA_Thermostat_Wire_002_003_.pdf	Heat Rise Testing 16 AWG CCA vs 18 AWG Copper	
BW-2022-001_-_Environmental_Conditions_on_Thermostat_Wire.pdf	Enironmental Conditions Study: 16 AWG CCA vs 18 AWG Copper	

Statement of Problem and Substantiation for Public Input

Copper-clad aluminum (CCA) wire has long been used for signal wire in diameters of 24 AWG and larger. CCA is the primary conductor material used in coaxial cables due to its technical advantages. CCA is as equally as conductive as copper at frequency ranges typical of coaxial cable applications. In power applications at 60 Hz, when upsized 2 AWG sizes against copper wire as is traditional in the NEC, CCA wire has a lower DC resistance than copper by approximately 2.7%. There are other examples of small diameter CCA being standardized for use in the electrical industry. In the 2020 NEC cycle, 14 AWG CCA was accepted by CMP6 for use as a remote control & signal wire for MC and Tray cable (articles 330 and 336) up to 2000 volts. Note that Public Inputs are being presented in this cycle to permit 16 AWG CCA for application as remote control and signal wire in those wiring methods and others. 14 AWG and 16 AWG CCA are standardized in UL 13 for use in thermostat wire applications per UL 13.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1427-NFPA 70-2023 [Section No. 300.26(C)(2)]	
Public Input No. 1428-NFPA 70-2023 [Section No. 300.26(C)(3)]	
Public Input No. 1429-NFPA 70-2023 [Section No. 724.43]	

Submitter Information Verification

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Affiliation: American Bimetallic Association
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Submittal Date: Sat Jul 15 07:09:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

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The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

COPPERWELD

Electrical Test Laboratory Report SW-2023-002

Market:	Class 4 Conductors		
Subject:	Electrical Characteristic Comparison between 16 AWG CCA vs 18 AWG Cu		
Date:	8/29/23	Report No:	002

Analysis By:	Brandon Allen – Product Engineer
Authored By:	Brandon Allen– Product Engineer
Approved By:	Tom Sterling – Product Development Manager

Objective:

To perform electrical analysis to show the characteristic comparison of 16 AWG Copper Clad Aluminum (CCA) to 18 AWG Copper (Cu).

Samples/Equipment Provided:

Materials

- Test Samples: 16 AWG Copper Clad Aluminum (CCA)
- Test Samples: 18 AWG Copper (Cu)

Wire Tested:

- *500 ft. of 18 AWG Solid Copper, annealed*
- *500 ft. of 16 AWG solid CCA 10%, annealed*
- *Minimum of 6 mils of PVC insulation on both Cu and CCA wire*

Physical Attributes	Diameter (in)	Cross-Sectional Area (in^2)	Weight (lb/kft)	Copper Thickness (in)	DC Resistance (Ω/kft)
18 AWG Cu	0.0403	0.001276	4.917	0.04030	6.610
16 AWG CCA 10%	0.0508	0.002027	2.919	0.00127	6.524

Test Equipment / Calibration Requirements

- Data Acquisition System
- Thermocouple
- Power Source (24 VAC at 40VA)

Test Procedure 1: Temperature Readings with Incremental Current

1. Set the configuration for the AC power/current source to begin the test.
2. Using the 16 AWG Copper Clad Aluminum (CCA) samples, prepare the test samples by connecting the thermocouples to the test samples for the temperature readings.
3. With the thermocouples attached to the test samples, connect the opposite end of the thermocouple wire to the Data acquisition system.
4. Set the current source to the initial current of 3A then increment by 3A in 10-minute intervals for the duration of the test. Step up current to a final level of 24 amperes.
5. All testing conducted in open-air.
6. At the completion of the test, store the data and repeat each step for 18 AWG Copper (Cu).

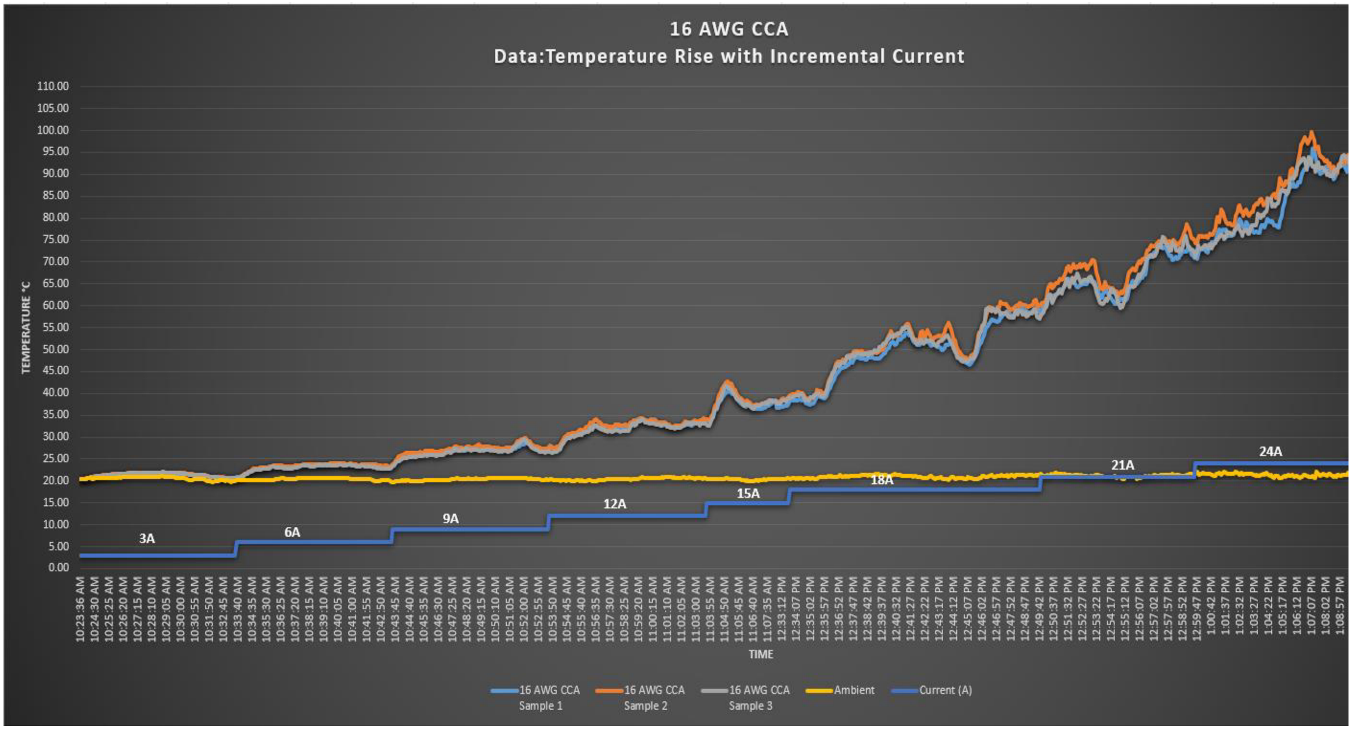
Test Results 1: Temperature Readings with Incremental Current

During testing, the data revealed that the increase in current was proportional to the increase in temperature. In comparison, the three samples of 16 AWG CCA ran slightly cooler than the three samples of 18 AWG Cu. Below Table 1 presents values stepped up from 3 amperes to 12 amperes. 16 AWG CCA for Class 4 circuits should never see 12 amperes of AC current in the real world.

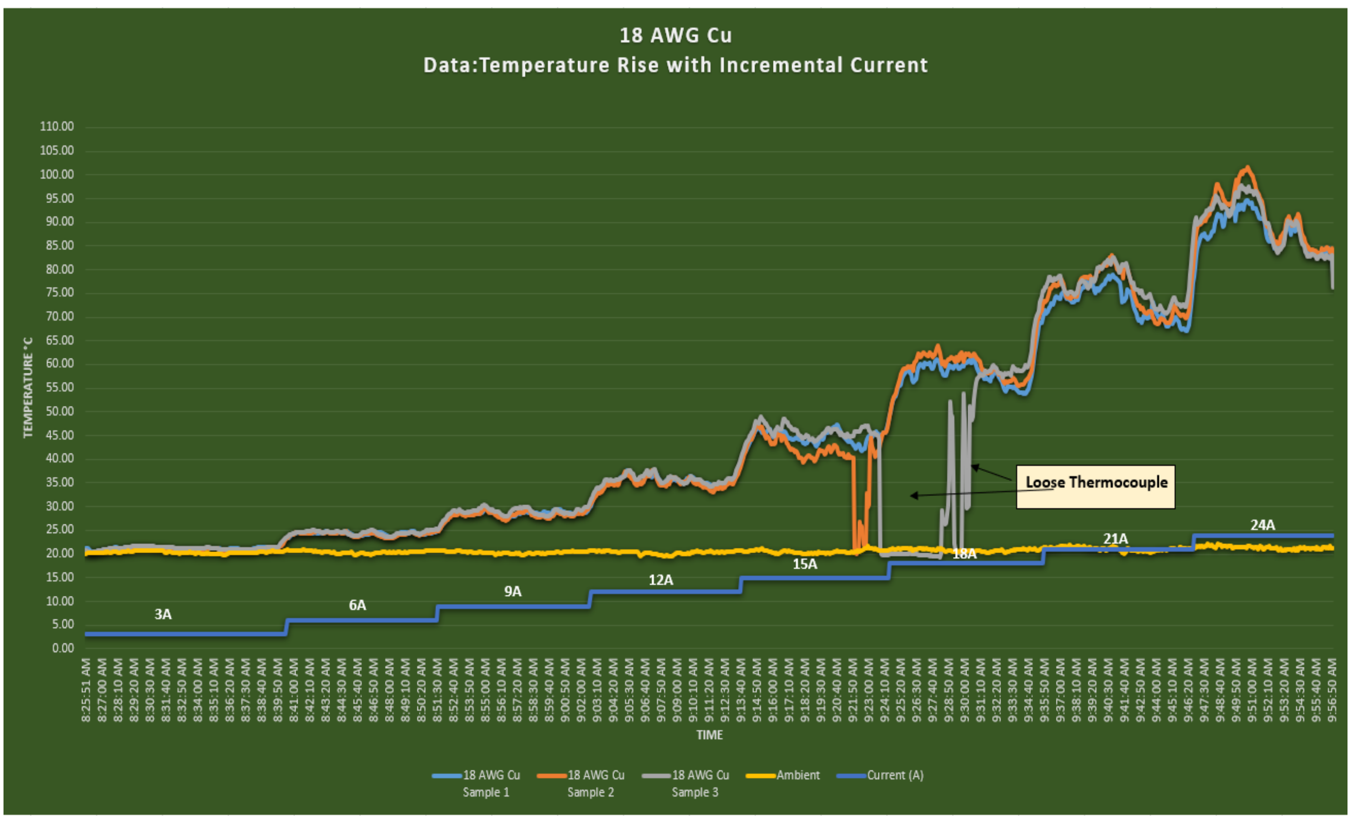
See Table 1 and graphs 1 & 2 below for more details:

TABLE 1:

16 AWG CCA				18 AWG Copper			
Amperes	Maximum Temp (C°)	AVG Ambient	Heat Rise	Amperes	Maximum Temp (C°)	AVG Ambient	Heat Rise
3	**21.96**	**20.58**	**1.38**	**3**	**23.38**	**20.38**	**3.00**
6	**24.13**	**20.43**	**3.70**	**6**	**25.3**	**20.43**	**4.87**
9	**29.79**	**20.38**	**9.41**	**9**	**30.46**	**20.34**	**10.12**
12	**34.28**	**20.44**	**13.84**	**12**	**39.75**	**20.33**	**19.42**



Graph 1: 16 AWG CCA



Graph 2: 18 AWG Cu

Test Results 2: Electrical Characteristic Measurements

The Voltage drop was calculated using the voltage drop calculator formula at 3 Amps.

VOLTAGE DROP CALCULATOR FORMULA

$$VD = (2 \cdot A \cdot L \cdot R) / 1000$$

Where:

VD = Voltage Drop (Volts) per unit circuit length

A = Full Load Current (Amps)

L = One-Way Circuit Length (ft)

R = Resistance (Ohms/Kft)

		Run Length (ft)			
Voltage Drop (Vac)	**VAC++**	**50**	**100**	**150**	**200**
18 AWG Cu	24.00	1.98	3.96	5.95	7.93
16 AWG CCA 10%	24.00	1.95	3.91	5.87	7.82

** With a supply voltage of 24 Vac, what is the Drop Voltage across the hot and common legs of circuit, at specified Lengths of wire?*

** Set Load Resistance to drawn 3.0 Amps*

Conclusion:

When comparing 16 AWG Copper Clad Aluminum to 18 AWG Copper, the electrical measurements of the 16 AWG Copper Clad Aluminum conductor measured at a slightly lower resistance than the 18 AWG Copper. The analysis of the thermal test also showed that when the same current is applied to both conductors for the same duration, 16 AWG Copper Clad Aluminum measured at slightly lower temperatures than 18 AWG Copper. Lower conductor temperatures generally support the notion that the connected equipment will last longer and run more efficiently. The lower Voltage Drop of 16 AWG CCA as compared to that of 18 AWG copper will also likely improve equipment performance. The heating profiles of both the 16 AWG CCA and 18 AWG copper are not expected to pose problems for class 4 circuits.

COPPERWELD

Electrical Test Laboratory Report SW-2022-001

Market:	**Building Wire**		
Subject:	**ENVIRONMENTAL CONDITIONS ON THERMOSTAT WIRE**		
Date:	**5/3/23**	**Report No:**	**001**

Analysis By:	**Brandon Allen – Product Engineer**
Authored By:	**Brandon Allen– Product Engineer**
Approved By:	**Tom Sterling – Product Development Manager**

Objective:

To determine the effects of 16 AWG CCA when exposed to natural environmental conditions over a 6-month duration time and analyze how it compares with 18 AWG Copper (Cu).

Samples/Equipment Provided:

Materials

- Three (3) - 16 AWG CCA pairs, 2 ft in length, spliced with standard wire splicing device.
- Three (3) - 16 AWG CCA pairs, 2 ft in length, spliced with weather-proof wire splicing device.
- Three (3) - 18 AWG copper pairs, 2 ft in length, spliced with standard wire splicing device.

Test Equipment / Calibration Requirements

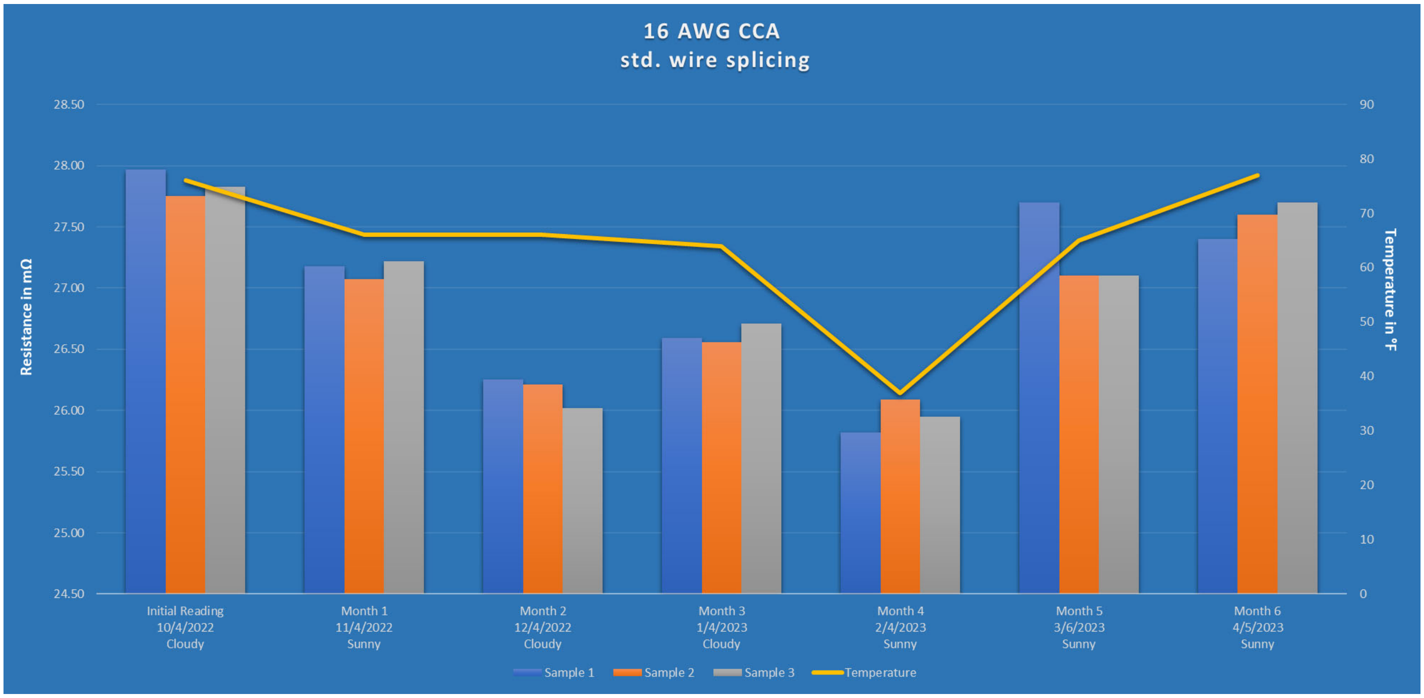
- Torque Wrench or torque screwdriver
- NEMA 3 or similar metal enclosure
- Weatherproof terminal box
- Multimeter

Test Procedure:

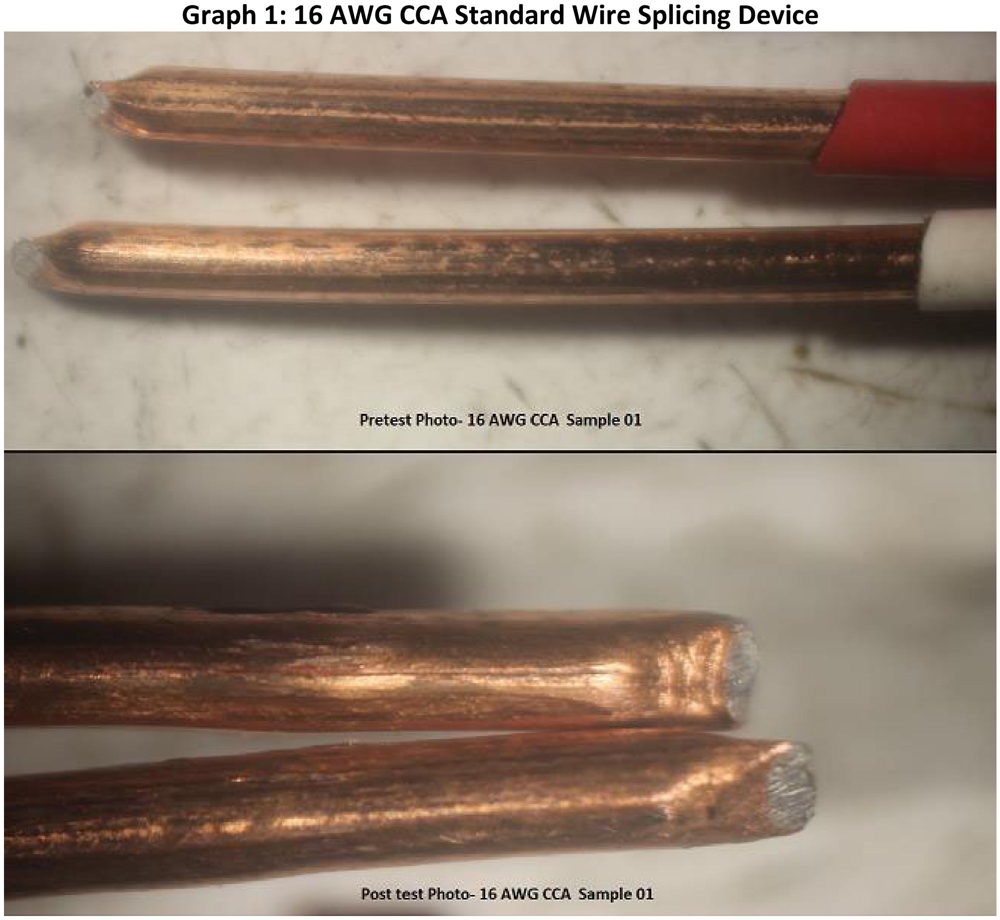
1. To begin the test, we prepared all samples by properly stripping the insulation from both ends. Prior to installation, the samples were reviewed under a microscope for corrosion, exposed aluminum, or damage to the conductor.
2. The pair of 16 AWG CCA conductors, spliced with standard wire splicing device were connected using the recommended manufacture specifications (7 twists or until wires twisted two times outside the wire nut. See twist specification photo in the appendix.) and then placed it into the metal enclosure. The metal enclosure was placed outside in the earth's natural environment and from there, allowed the test parts to remain in this condition for a 6-month duration.
3. Repeat step 1 + 2 for 16 AWG CCA pairs, spliced with weather-proof wire splicing device.
4. Repeat step 1 + 2 for 18 AWG Copper conductor, spliced with a standard wire splicing device.
5. The 16 AWG CCA and 18 AWG Cu conductors were then connected into a terminal bar located inside of a weatherproof metal enclosure.
6. After all the conductors were paired and placed in the metal enclosure, the initial resistance for both CCA and Cu conductors was recorded, and the data was logged onto an excel chart (See Appendix).
7. The resistance was recorded at monthly intervals after initial start for both CCA and Cu conductors up to a 6-month period.
8. After 6-months, the samples were then removed and the test items were evaluated under microscope to see if the parts retain their electrical and structural characteristics.

Test Results:

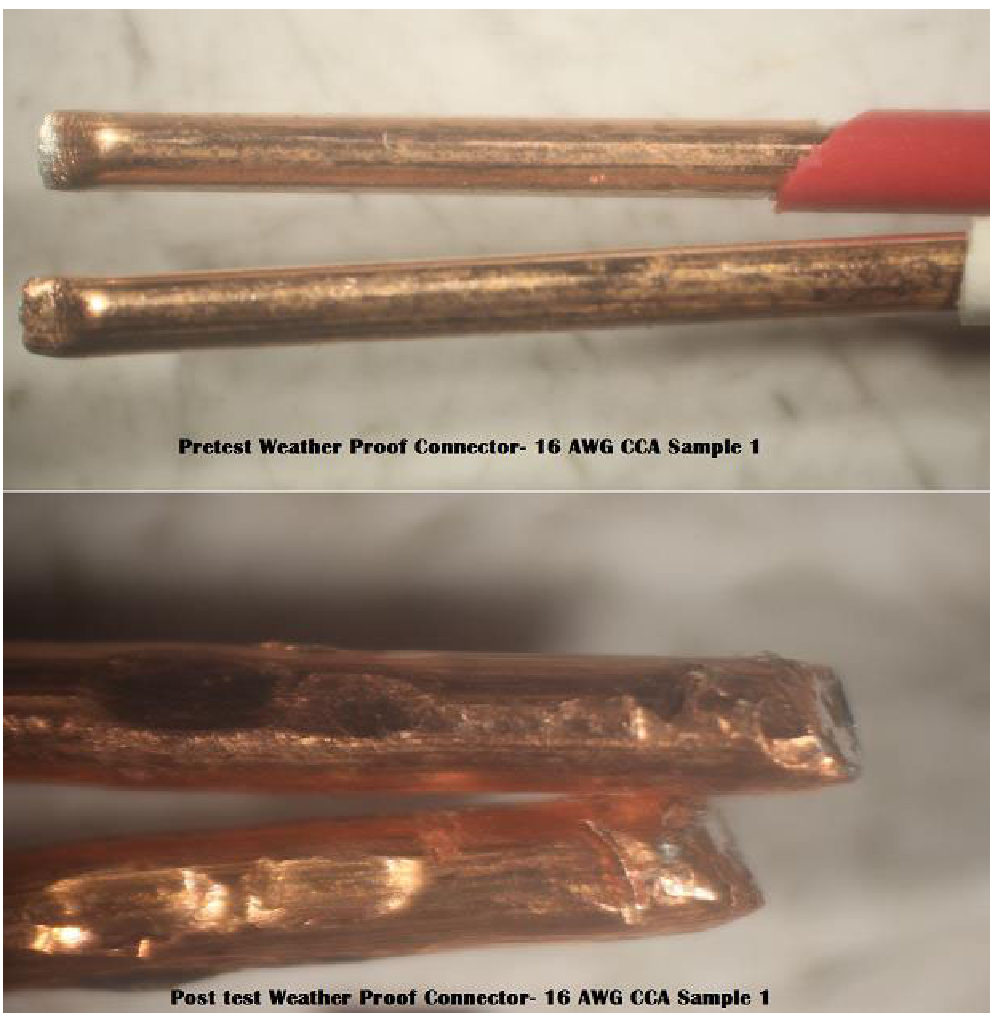
During the 6 months of testing, the data shows that the environmental conditions did not have a significant effect on the resistance of the thermostat wire. During the 6 months of testing, the resistance for the test samples of 18 AWG Cu and 16 AWG CCA ranged from 26mΩ to 29 mΩ. At the end of the test, microscopic images were taken of the samples, and it showed no signs of corrosion on the samples. Below, are the before and after photos of sample 1 from each group. The remaining photos are available upon request.

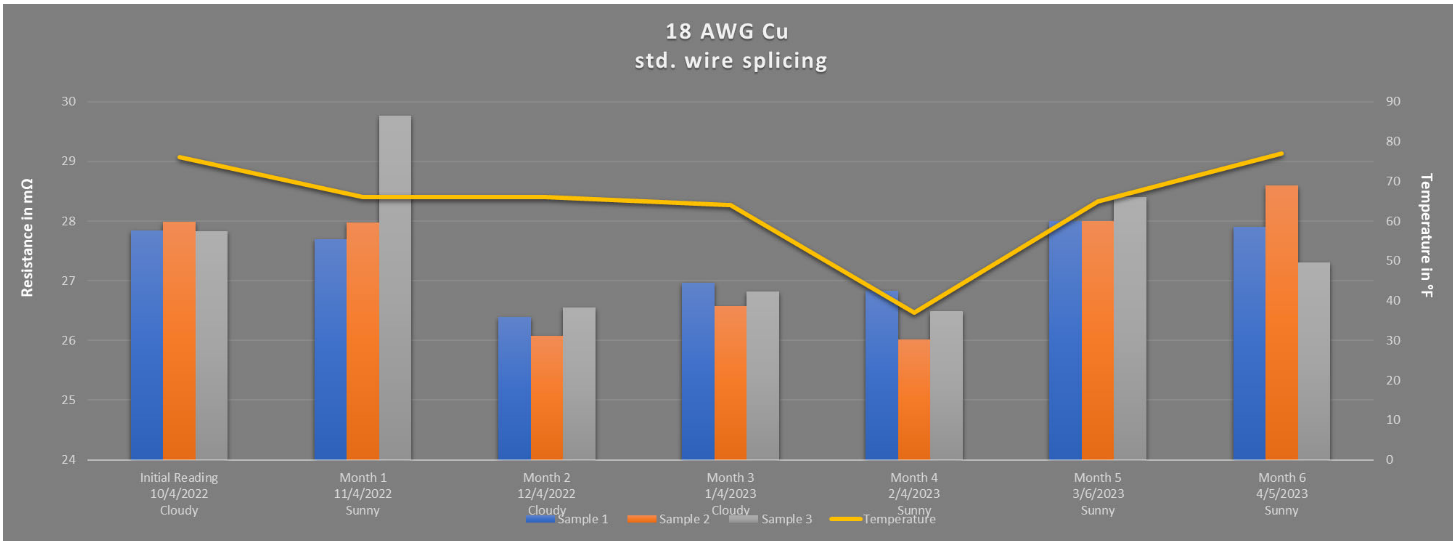


Graph 1: 16 AWG CCA Standard Wire Splicing Device



Graph 2: 16 AWG CCA Weather Proof Wire Splicing Device





Graph 3: 18 AWG Cu Standard Wire Splicing Device

Conclusion:

At the end of the six months of Environmental testing, there were no signs of corrosion on either 16 AWG CCA or 18 AWG Cu.

Appendix:

16 AWG CCA std. wire splicing							
Time	Initial Reading 10/4/2022 Cloudy	Month 1 11/4/2022 Sunny	Month 2 12/4/2022 Cloudy	Month 3 1/4/2023 Cloudy	Month 4 2/4/2023 Sunny	Month 5 3/6/2023 Sunny	Month 6 4/5/2023 Sunny
Resistance Measurement Sample 1	27.97	27.18	26.25	26.59	25.82	27.70	27.40
Resistance Measurement Sample 2	27.75	27.07	26.21	26.56	26.09	27.10	27.60
Resistance Measurement Sample 3	27.83	27.22	26.02	26.71	25.95	27.10	27.70
Temperature in ° F	76	66	66	64	37	65	77
Visual Inspection: Note any signs of corrosion or any other visual Defects as NOK. If there are no defects write Ok.	OK	OK	OK	OK	OK	OK	OK
Unit	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ

16 AWG CCA wp wire splicing							
Time	Initial Reading 10/4/2022 Cloudy	Month 1 11/4/2022 Sunny	Month 2 12/4/2022 Cloudy	Month 3 1/4/2023 Cloudy	Month 4 2/4/2023 Sunny	Month 5 3/6/2023 Sunny	Month 6 4/5/2023 Sunny
Resistance Measurement Sample 1	28.10	27.94	26.45	26.91	26.10	27.50	28.10
Resistance Measurement Sample 2	28.24	27.55	26.79	28.89	28.48	29.70	29.00
Resistance Measurement Sample 3	28.20	29.31	26.30	26.32	25.88	27.70	27.50
Temperature in ° F	76	66	66	64	37	65	77
Visual Inspection: Note any signs of corrosion or any other visual Defects as NOK. If there are no defects write Ok.	OK	OK	OK	OK	OK	OK	OK
Unit	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ

18 AWG Cu std. wire splicing							
Time	Initial Reading 10/4/2022 Cloudy	Month 1 11/4/2022 Sunny	Month 2 12/4/2022 Cloudy	Month 3 1/4/2023 Cloudy	Month 4 2/4/2023 Sunny	Month 5 3/6/2023 Sunny	Month 6 4/5/2023 Sunny
Resistance Measurement Sample 1	27.84	27.7	26.39	26.96	26.83	28.00	27.90
Resistance Measurement Sample 2	27.99	27.97	26.08	26.58	26.01	28.00	28.60
Resistance Measurement Sample 3	27.83	29.76	26.55	26.82	26.49	28.40	27.30
Temperature in ° F	76	66	66	64	37	65	77
Visual Inspection: Note any signs of corrosion or any other visual Defects as NOK. If there are no defects write Ok.	OK	OK	OK	OK	OK	OK	OK
Unit	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ	mΩ

Public Input No. 1427-NFPA 70-2023 [Section No. 300.26(C)(2)]

(2) Insulation.

(a) Insulation on conductors shall be rated for the system voltage and not less than 600 volts.

(b) Conductors larger than 16 AWG copper ~~or 14 AWG copper~~ or copper -clad aluminum shall comply with the applicable general requirements for conductors rated up to and including 2000 volt for type designations, insulations, markings, ampacity ratings, and uses in accordance with 310.3, 310.4, 310.6, 310.8, 310.10, and 310.14.

(c) Conductors that are 18 ~~AWG copper, 16 AWG copper, or 14 AWG~~ AWG or larger copper or copper-clad aluminum shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF.

(d) Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

Statement of Problem and Substantiation for Public Input

Please Review Technical Reports Attached to Public Input 1418.

Copper-clad aluminum (CCA) wire has long been used for signal wire in diameters of 24 AWG and larger. CCA is the primary conductor material used in coaxial cables due to its technical advantages. CCA is as equally as conductive as copper at frequency ranges typical of coaxial cable applications. In power applications at 60 Hz, when upsized 2 AWG sizes against copper wire as is traditional in the NEC, CCA wire has a lower DC resistance than copper by approximately 2.7%. There are other examples of small diameter CCA being standardized for use in the electrical industry. In the 2020 NEC cycle, 14 AWG CCA was accepted by CMP6 for use as a remote control & signal wire for MC and Tray cable (articles 330 and 336) up to 2000 volts. Note that Public Inputs are being presented in this cycle to permit 16 AWG CCA for application as remote control and signal wire in those wiring methods and others. 14 AWG and 16 AWG CCA are standardized in UL 13 for use in thermostat wire applications per UL 13.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1418-NFPA 70-2023 [Section No. 300.26(C)(1)]	
Public Input No. 1428-NFPA 70-2023 [Section No. 300.26(C)(3)]	
Public Input No. 1429-NFPA 70-2023 [Section No. 724.43]	

Submitter Information Verification

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Submittal Date: Sun Jul 16 07:54:32 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding "listing" of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not "listed" for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Public Input No. 1428-NFPA 70-2023 [Section No. 300.26(C)(3)]

(3) Overcurrent Protection.

(a) Overcurrent protection for conductors 14 AWG copper and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation.

(b) Overcurrent protection shall not exceed 7 amperes for 18 AWG copper and 16 AWG copper-clad aluminum conductors and 10 amperes for 16 AWG copper and 14 AWG copper-clad aluminum.

Exception: The overcurrent protection specified in 300.26(C)(3)(a) and 300.26(C)(3)(b) shall not be required where this Code requires or permits other overcurrent protection ratings.

Statement of Problem and Substantiation for Public Input

Please Review Technical Reports Attached to Public Input 1418.

Copper-clad aluminum (CCA) wire has long been used for signal wire in diameters of 24 AWG and larger. CCA is the primary conductor material used in coaxial cables due to its technical advantages. CCA is as equally as conductive as copper at frequency ranges typical of coaxial cable applications. In power applications at 60 Hz, when upsized 2 AWG sizes against copper wire as is traditional in the NEC, CCA wire has a lower DC resistance than copper by approximately 2.7%. There are other examples of small diameter CCA being standardized for use in the electrical industry. In the 2020 NEC cycle, 14 AWG CCA was accepted by CMP6 for use as a remote control & signal wire for MC and Tray cable (articles 330 and 336) up to 2000 volts. Note that Public Inputs are being presented in this cycle to permit 16 AWG CCA for application as remote control and signal wire in those wiring methods and others. 14 AWG and 16 AWG CCA are standardized in UL 13 for use in thermostat wire applications per UL 13.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1418-NFPA 70-2023 [Section No. 300.26(C)(1)]	
Public Input No. 1427-NFPA 70-2023 [Section No. 300.26(C)(2)]	
Public Input No. 1429-NFPA 70-2023 [Section No. 724.43]	

Submitter Information Verification

Submitter Full Name: Peter Graser

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Submittal Date: Sun Jul 16 08:00:21 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding "listing" of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not "listed" for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Public Input No. 3612-NFPA 70-2023 [Section No. 300.26(C)(3)]

~~(3) Overcurrent Protection.~~

(a) ~~Overcurrent protection for conductors 14 AWG copper and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation.~~

(b) ~~Overcurrent protection shall not exceed 7 amperes for 18 AWG copper conductors and 10 amperes for 16 AWG copper and 14 AWG copper-clad aluminum.~~

~~*Exception: The overcurrent protection specified in 300.26(C)(3)(a) and 300.26(C)(3)(b) shall not be required where this Code requires or permits other overcurrent protection ratings.*~~

Statement of Problem and Substantiation for Public Input

Overcurrent protection is outside the scope of Article 300 and is covered by Article 240. Article 300 requirements cannot modify Article 240 requirements and any conflicts would be covered by the requirements in Article 240. Section 300.26 (C) (3) (b) is already covered in 240.4 (D) (1) through (D)(8) and the exception to applying ampacity adjustment and correction factors has been submitted under an additional PI for 240.4 (D).

240.1 Scope.
Parts I through VII of this article provide the general requirements for overcurrent protection and overcurrent protective devices not more than 1000 volts, nominal. Part VIII covers overcurrent protection for those portions of supervised industrial installations operating at voltages of not more than 1000 volts, nominal.

300.1 Scope.
(A) All Wiring Installations.
This article covers general requirements for wiring methods and materials for all wiring installations unless modified by other articles in Chapter 3.
(B) Integral Parts of Equipment.
The requirements of this article are not intended to apply to the conductors that form an integral part of equipment, such as motors, controllers, motor control centers, or factory-assembled control equipment or listed utilization equipment.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3614-NFPA 70-2023 [Section No. 240.4 [Excluding any Sub-Sections]]	

Submitter Information Verification

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Submittal Date: Tue Sep 05 08:01:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8811-NFPA 70-2024

Statement: Article 206 was created to provide the general requirements for remote control and signaling circuits, particularly nonpower-limited remote-control and signaling circuits. It borrows heavily from Tentative Interim Amendment (TIA) 23-8, issued March 21, 2023.

During the 2023 NEC revision process, Article 725 was revised by removing Class 1 circuits and placing them in the new Article 724. Article 724's scope is limited to power-limited remote-control and signaling circuits because the technical requirements for a nonpower-limited remote-control or signaling circuit are nearly identical to those of circuits for electric light and power and including them in Article 724 seemed redundant.

Section 300.26 was also created as part of this revision. It points the Code user to Article 725 for Class 2 or Class 3 circuits, and to Article 724 for Class 1 power-limited remote-control and signaling circuits. For nonpower-limited remote-control and signaling circuits, it tells the Code user to use Article 300. Not all of the necessary requirements for nonpower-limited remote-control and signaling circuits can be found in Article 300, however, so a Tentative Interim Amendment was issued to correct the mistake by expanding 300.26. As a result of the TIA, provisions for conductor ampacity and overcurrent protection were added and the problem was solved, at least until the 2026 revision cycle.

For the 2026 cycle the text of the TIA was relocated to Chapter 2, as that is a more appropriate location for circuiting requirements. In addition to the relocations, the following changes were made to the TIA text:

Several editorial revisions were made to remove unnecessary language, to provide clarity, or to improve readability without changing the technical requirements.

Sections 206.4(A) and (B) now reference all of Article 724 and 725, respectively, as simply pointing to 724.3 and 725.3 without requiring compliance with the remainder of the article is not adequate.

The allowance for ignoring ampacity adjustment and temperature correction was relocated to 206.4(C)(1)(a) because ampacity adjustment and temperature correction are ampacity concerns, not overcurrent protection concerns.

Section 206.4(C)(1)(b) was revised by removing the language about continuous loads. The issue of continuous loads is an overcurrent protection concern and is better handled in 240.4(D).

The language regarding "listing" of conductors for Class 1 use in 206.4(C)(1)(d) was revised because conductors are not "listed" for Class 1 use like a Class 2 or Class 3 cable is.

The requirements for overcurrent protection formerly found in the TIA version of 300.26(C)(3) were deleted because Article 240 already covers the issue, and that is the correct article to do so.

206.4(C)(3) was added to address separation of nonpower-limited remote-control and signaling circuits from other nonpower-limited circuits, such those used for power and lighting.

The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided by public inputs 1418 and 1427.

Public Input No. 1628-NFPA 70-2023 [Article 335]

Article 335 Instrumentation Tray Cable: Type ITC

Part I. General

335.1 Scope.

This article covers the use, installation, and construction specifications of instrumentation tray cable (Type ITC) for application to instrumentation and control circuits operating at 150 volts or less and 5 amperes or less.

335.3 Other Articles.

In addition to the provisions of this article, installation of Type ITC cable shall comply with other applicable articles of this *Code*.

Part II. Installation

335.~~4~~ 10 Uses Permitted.

Type ITC cable shall be permitted to be used as follows in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation:

(1) In cable trays.

(2) In raceways.

(3) In hazardous locations as permitted in 501.10, 502.10, 503.10, 504.20, 504.30, 504.80, and 505.15.

(4) Enclosed in a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor applied over the nonmetallic sheath in accordance with 335.6. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

(5) Cable, without a metallic sheath or armor, that complies with the crush and impact requirements of Type MC cable and is identified for such use with the marking *ITC-ER* shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

Exception to (5): Where not subject to physical damage, Type ITC-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.

(6) As aerial cable on a messenger.

(7) Direct buried where identified for the use.

(8) Under raised floors in rooms containing industrial process control equipment and rack rooms where arranged to prevent damage to the cable.

(9) Under raised floors in information technology equipment rooms in accordance with 645.5(E)(2).

335.~~5~~ 12 Uses Not Permitted.

Type ITC cable shall not be installed on circuits operating at more than 150 volts or more than 5 amperes.

Installation of Type ITC cable with other cables shall be subject to the stated requirements of the specific articles for the other cables. Where the governing articles do not contain stated requirements for installation with Type ITC cable, the installation of Type ITC cable with the other cables shall not be permitted.

Type ITC cable shall not be installed with power, lighting, Class 1 circuits that are not power limited, or non–power-limited circuits.

Exception No. 1: Where terminated within equipment or junction boxes and separations are maintained by insulating barriers or other means.

Exception No. 2: Where a metallic sheath or armor is applied over the nonmetallic sheath of the Type ITC cable.

335. ~~6~~ ~~Construction.~~ **24 Bends.** Bends in Type ITC cables shall be made so as not to damage the cable.

335.80 Ampacity. The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.

335.90 Overcurrent Protection. Overcurrent Protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.

Part III. Construction Specifications

335.100 Construction .

The insulated conductors of Type ITC cable shall be in sizes 22 AWG through 12 AWG. The conductor material shall be copper or thermocouple alloy. Insulation on the conductors shall be rated for 300 volts. Shielding shall be permitted.

The cable shall be listed as being resistant to the spread of fire. The outer jacket shall be sunlight and moisture resistant.

Where a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor is applied over the nonmetallic sheath, an overall nonmetallic jacket shall not be required.

> Informational Note: One method of defining *resistant to the spread of fire* is that the cables do not spread fire to the top of the tray in the UL flame exposure, vertical tray flame test in ANSI/UL 1685-2010, *Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test method are not applicable.
>
> Another method of defining *resistant to the spread of fire* is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the CSA vertical flame test — cables in cable trays, as described in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.

335.~~7~~ 120 Marking.

The cable shall be marked in accordance with 310.8(A)(2) through (A)(5). Voltage ratings shall not be marked on the cable.

~~**335.8** Ampacity.~~

~~The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.~~

~~**335.9** Overcurrent Protection.~~

~~Overcurrent protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.~~

~~**335.10** Bends.~~

~~Bends in Type ITC cables shall be made so as not to damage the cable.~~

Statement of Problem and Substantiation for Public Input

Renumber Article 335 for consistency to support the parallel numbering clause in the NEC Style Manual -2023 Section 2.2.1.1:

Parallel Numbering Within Similar Articles. To the extent possible, technical committees shall use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

Submitter Information Verification

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Submittal Date:	Thu Jul 27 14:51:09 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8862-NFPA 70-2024

Statement: The Article is reorganized in accordance with 2.2.1.1 of the NEC Style Manual. The revised Informational Notes comply with the NEC Style Manual, 2.1.10.3.

Public Input No. 3132-NFPA 70-2023 [Article 335]

Article 335 Instrumentation Tray Cable: Type ITC

Part I General.

335.1 Scope.

This article covers the use, installation, and construction specifications of instrumentation tray cable (Type ITC) for application to instrumentation and control circuits operating at 150 volts or less and 5 amperes or less.

335.3 Other Articles.

In addition to the provisions of this article, installation of Type ITC cable shall comply with other applicable articles of this *Code*.

Part II Installation

335.~~4~~ 10 Uses Permitted.

Type ITC cable shall be permitted to be used as follows in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation:

(1) In cable trays.

(2) In raceways.

(3) In hazardous locations as permitted in 501.10, 502.10, 503.10, 504.20, 504.30, 504.80, and 505.15.

(4) Enclosed in a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor applied over the nonmetallic sheath in accordance with 335.6. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

(5) Cable, without a metallic sheath or armor, that complies with the crush and impact requirements of Type MC cable and is identified for such use with the marking *ITC-ER* shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

Exception to (5): Where not subject to physical damage, Type ITC-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.

(6) As aerial cable on a messenger.

(7) Direct buried where identified for the use.

(8) Under raised floors in rooms containing industrial process control equipment and rack rooms where arranged to prevent damage to the cable.

(9) Under raised floors in information technology equipment rooms in accordance with 645.5(E)(2).

335.~~5~~ 12 Uses Not Permitted.

Type ITC cable shall not be installed on circuits operating at more than 150 volts or more than 5 amperes.

Installation of Type ITC cable with other cables shall be subject to the stated requirements of the specific articles for the other cables. Where the governing articles do not contain stated requirements for installation with Type ITC cable, the installation of Type ITC cable with the other cables shall not be permitted.

Type ITC cable shall not be installed with power, lighting, Class 1 circuits that are not power limited, or non–power-limited circuits.

Exception No. 1: Where terminated within equipment or junction boxes and separations are maintained by insulating barriers or other means.

Exception No. 2: Where a metallic sheath or armor is applied over the nonmetallic sheath of the Type ITC cable.

335.

~~6 Construction.~~

~~***26*** *Bends.*~~

~~*Bends in Type ITC cables shall be made so as not to damage the cable.*~~

~~***335.80*** *Ampacity.*~~

~~*The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.*~~

~~***335.82*** *Overcurrent Protection.*~~

~~*Overcurrent protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.*~~

~~*Part III Construction Specifications.*~~

335.100 Construction.

The insulated conductors of Type ITC cable shall be in sizes 22 AWG through 12 AWG. The conductor material shall be copper or thermocouple alloy. Insulation on the conductors shall be rated for 300 volts. Shielding shall be permitted.

The cable shall be listed as being resistant to the spread of fire. The outer jacket shall be sunlight and moisture resistant.

Where a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor is applied over the nonmetallic sheath, an overall nonmetallic jacket shall not be required.

Informational Note: One method of defining *resistant to the spread of fire* is that the cables do not spread fire to the top of the tray in the UL flame exposure, vertical tray flame test in ANSI/UL 1685-2010, *Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test method are not applicable.

Another method of defining *resistant to the spread of fire* is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the CSA vertical flame test — cables in cable trays, as described in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.

335.~~7~~ 120 Marking.

The cable shall be marked in accordance with 310.8(A)(2) through (A)(5). Voltage ratings shall not be marked on the cable.

~~**335.8** Ampacity.~~

~~The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.~~

~~**335.9** Overcurrent Protection.~~

~~Overcurrent protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.~~

~~**335.10** Bends.~~

~~Bends in Type ITC cables shall be made so as not to damage the cable.~~

Statement of Problem and Substantiation for Public Input

Article 335 Instrumentation Tray Cable: Type ITC is revised to comply with the NEC Style Manual. The 2002 NEC revised all of the Chapter 3 wiring methods to have parallel numbering that complies with the current NEC Style Manual Section 2.2.1.1. This revision creates a Parts and renumbers a few sections to provide correlation among the wiring method articles to comply with the Style Manual.

Submitter Information Verification

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Submittal Date: Tue Aug 29 14:32:43 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8862-NFPA 70-2024
Statement: The Article is reorganized in accordance with 2.2.1.1 of the NEC Style Manual. The revised Informational Notes comply with the NEC Style Manual, 2.1.10.3.

Public Input No. 4236-NFPA 70-2023 [Article 335]

Article 335 Instrumentation Tray Cable: Type ITC

Part I. General

335.1 Scope.

This article covers the use, installation, and construction specifications of instrumentation tray cable (Type ITC) for application to instrumentation and control circuits operating at 150 volts or less and 5 amperes or less.

335.3 Other Articles.

In addition to the provisions of this article, installation of Type ITC cable shall comply with other applicable articles of this *Code*.

336.6 Listing Requirements. Type TC cables and associated fittings shall be listed.

Part II. Installation

335.~~4~~ 10 Uses Permitted.

Type ITC cable shall be permitted to be used as follows in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation:

(1) In cable trays.

(2) In raceways.

(3) In hazardous locations as permitted in 501.10, 502.10, 503.10, 504.20, 504.30, 504.80, and 505.15.

(4) Enclosed in a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor applied over the nonmetallic sheath in accordance with 335.~~6~~ 100 . The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft).

(5) Cable, without a metallic sheath or armor, that complies with the crush and impact requirements of Type MC cable and is identified for such use with the marking *ITC-ER* shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

Exception to (5): Where not subject to physical damage, Type ITC-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.

(6) As aerial cable on a messenger.

(7) Direct buried where identified for the use.

(8) Under raised floors in rooms containing industrial process control equipment and rack rooms where arranged to prevent damage to the cable.

(9) Under raised floors in information technology equipment rooms in accordance with 645.5(E)(2).

335.~~5~~ 12 Uses Not Permitted.

Type ITC cable shall not be installed on circuits operating at more than 150 volts or more than 5 amperes.

Installation of Type ITC cable with other cables shall be subject to the stated requirements of the specific articles for the other cables. Where the governing articles do not contain stated requirements for installation with Type ITC cable, the installation of Type ITC cable with the other cables shall not be permitted.

Type ITC cable shall not be installed with power, lighting, Class 1 circuits that are not power limited, or non–power-limited circuits.

Exception No. 1: Where terminated within equipment or junction boxes and separations are maintained by insulating barriers or other means.

Exception No. 2: Where a metallic sheath or armor is applied over the nonmetallic sheath of the Type ITC cable.

335.

~~6 Construction.~~

17 Overcurrent Protection.

Overcurrent protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.

335.24 Bends.

Bends in Type ITC cables shall be made so as not to damage the cable.

335.80 Ampacity. The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.

Part III. Construction Specifications

335.100 Construction.

The insulated conductors of Type ITC cable shall be in sizes 22 AWG through 12 AWG. The conductor material shall be copper or thermocouple alloy. Insulation on the conductors shall be rated for 300 volts. Shielding shall be permitted.

The cable shall be listed as being resistant to the spread of fire. The outer jacket shall be sunlight and moisture resistant.

Where a smooth metallic sheath, continuous corrugated metallic sheath, or interlocking tape armor is applied over the nonmetallic sheath, an overall nonmetallic jacket shall not be required.

> Informational Note: One method of defining *resistant to the spread of fire* is that the cables do not spread fire to the top of the tray in the UL flame exposure, vertical tray flame test in ANSI/UL 1685-2010, *Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*. The smoke measurements in the test method are not applicable.
>
> Another method of defining *resistant to the spread of fire* is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the CSA vertical flame test — cables in cable trays, as described in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.

335.~~7~~ 120 Marking.

The cable shall be marked in accordance with 310.8(A)(2) through (A)(5). Voltage ratings shall not be marked on the cable.

~~**335.8** Ampacity.~~

~~The ampacity of the conductors shall be 5 amperes, except for 22 AWG conductors, which shall have an ampacity of 3 amperes.~~

~~**335.9** Overcurrent Protection.~~

~~Overcurrent protection shall not exceed 5 amperes for 20 AWG and larger conductors, and 3 amperes for 22 AWG conductors.~~

~~**335.10** Bends.~~

~~Bends in Type ITC cables shall be made so as not to damage the cable.~~

Statement of Problem and Substantiation for Public Input

Formatted the Article in accordance with the style manual and to match the format and structure of the current NEC. Added section 335.6 Listing Requirements. The correlating changes in other Articles will be under separate PIs.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4409-NFPA 70-2023 [Section No. 501.10(A)(1)]	
Public Input No. 4411-NFPA 70-2023 [Section No. 501.10(B)(1)]	
Public Input No. 4414-NFPA 70-2023 [Section No. 501.30(B)(1)]	
Public Input No. 4416-NFPA 70-2023 [Section No. 502.10(A)(1)]	
Public Input No. 4417-NFPA 70-2023 [Section No. 502.30(B)(1)]	
Public Input No. 4420-NFPA 70-2023 [Section No. 503.30(B)(1)]	
Public Input No. 4422-NFPA 70-2023 [Section No. 505.15(B)(1)]	
Public Input No. 4423-NFPA 70-2023 [Section No. 505.15(C)(1)]	
Public Input No. 4425-NFPA 70-2023 [Section No. 505.30(B)(1)]	

Public Input No. 4426-NFPA 70-2023 [Section No. 506.15(A)]
Public Input No. 4429-NFPA 70-2023 [Section No. 506.15(C)]
Public Input No. 4432-NFPA 70-2023 [Section No. 506.30(B)(1)]
Public Input No. 4436-NFPA 70-2023 [Section No. 511.7(A)(1)]
Public Input No. 4438-NFPA 70-2023 [Section No. 514.7]
Public Input No. 4443-NFPA 70-2023 [Section No. 516.7(A)]
Public Input No. 4447-NFPA 70-2023 [Section No. 722.3(F)]
Public Input No. 4455-NFPA 70-2023 [Section No. 502.10(B)(1)]

Submitter Information Verification

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Submittal Date:	Thu Sep 07 03:18:42 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8862-NFPA 70-2024

Statement: The Article is reorganized in accordance with 2.2.1.1 of the NEC Style Manual. The revised Informational Notes comply with the NEC Style Manual, 2.1.10.3.

Public Input No. 4509-NFPA 70-2023 [New Section after 398.104]

ARTICLE 3XX Cables for Power-Limited Circuits and Fault-Managed Power Circuits.

Part I. General

3 XX .1 Scope.

This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits.

Through

Part II. Listing Requirements

3XX .179 Listing and Marking of Cables.

Cables installed in buildings shall be listed in accordance with 3XX .179(A) and marked in accordance with 3XX .179(B), and they shall be permitted to be marked in accordance with 3XX .179(C).

Additional Proposed Changes

File Name	Description	Approved
Article_3XX_Power_Limited_Cables.docx	Renumbering from Article 722.	

Statement of Problem and Substantiation for Public Input

7 is for special conditions, Article 722 is a wiring method and is more appropriately located in Chapter 3.

Submitter Information Verification

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Submittal Date: Thu Sep 07 16:42:47 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Global efforts are being made to relocate all limited energy requirements to a different location. Chapter 3 covers general wiring methods, covering non-power limited installations. These wiring requirements are for limited energy circuits and should have their own location in the code.

Article ~~722~~3XX Cables for Power-Limited Circuits and Fault-Managed Power Circuits

Part I. General

~~722~~ 3XX.1 Scope.
This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits.

~~722~~ 3XX.3 Other Articles.
In addition to the requirements of this article, installation of cables shall comply with the articles or sections listed in 722.3(A) through (O). Only those sections of Article 300 referenced in this article shall apply.

(A) Installation of Cables and Conductors in Raceway.
The number and size of conductors and cables, as well as raceway sizing, shall comply with 300.17.

(B) Spread of Fire or Products of Combustion.
Installation of power-limited circuits shall comply with 300.21.

(C) Ducts, Plenums, and Other Air-Handling Spaces.
Power-limited circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22.

Exception No. 1: Cables selected in accordance with Table ~~722~~ 3XX.135(B) and installed in accordance with 300.22(B), Exception shall be permitted to be installed in ducts specifically fabricated for environmental air.

Exception No. 2: Cables selected in accordance with Table ~~722~~ 3XX.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).

(D) Cables in Ducts for Dust, Loose Stock, or Vapor Removal.
Section 300.22(A) for wiring systems shall apply.

Exception: Nonconductive optical fiber cables shall be permitted in ducts used for dust, loose stock, or vapor removal.

(E) Cable Trays.
Cable tray installations shall comply with Parts I and II of Article 392.

(F) Instrumentation Tray Cable.
Circuits wired using instrumentation tray cable shall comply with 335.1 and 335.4 through 335.9.

(G) Raceways or Sleeves Exposed to Different Temperatures.
Section 300.7(A) shall apply.

(H) Vertical Support for Fire-Resistive Cables and Conductors.
Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems and fire resistive-cable systems shall be installed in accordance with 300.19.

(I) Installation of Cables with Other Systems.
Section 300.8 shall apply.

(J) Corrosive, Damp, or Wet Locations.
The installation of power-limited cables shall comply with the applicable requirements in 110.11, 300.5, 300.6, and 310.10(F) when installed in corrosive, damp, or wet locations.

(K) Cable Routing Assemblies.
Cables installed in cable routing assemblies shall be selected in accordance with Table 800.154(c), listed in accordance with 800.182, and installed in accordance with 800.110(C)(1), 800.110(C)(2), and 800.113.

(L) Communications Raceways.
Cables communications raceways shall be selected in accordance with Table 800.154(b), listed in accordance with 800.182, and installed in accordance with 800.113 and 362.24 through 362.56, where the requirements applicable to electrical nonmetallic tubing (ENT) apply.

(M) Temperature Limitation of Cables.
The requirements of 310.14(A)(3) on the temperature limitation of conductors shall apply to power-limited circuit cables and fault-managed power cables.

(N) Identification of Equipment Grounding Conductors.
Equipment grounding conductors shall be identified in accordance with 250.119.

Exception: Cables that do not contain an equipment grounding conductor shall be permitted to use a conductor with green insulation, or green insulation with one or more yellow stripes, for other than equipment grounding purposes.

(O) Specific Requirements.
As appropriate, the installation of wires and cables shall also comply with the following:
(1) Class 2 and Class 3 cables — Part II of Article 725
(2) Class 4 cables — Part IV of Article 726
(3) Fire alarm cables — Part III of Article 760
(4) Optical fiber cables — Part V of Article 3XX~~770~~

~~722~~ 3XX.10 Hazardous (Classified) Locations.
Class 4 cables shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles of this *Code*.

~~722~~ 3XX.12 Uses Not Permitted.
Class 4 cables shall not be permitted for any applications that are not part of a Class 4 system.

Exception: Use of Class 4 cable for other applications shall be permitted if the cable has been listed as suitable for the other applications.

~~722~~ 3XX.21 Access to Electrical Equipment Behind Panels Designed to Allow Access.
Access to electrical equipment shall not be denied by an accumulation of cables that prevents removal of panels, including suspended ceiling panels.

~~722~~ 3XX.24 Mechanical Execution of Work.

(A) General.
Cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

(B) Support of Cables.
Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

Exception No. 1: Class 2 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2).

Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.

(C) Circuit Integrity (CI) Cable.
Circuit integrity (CI) cable shall be supported at a distance not exceeding 610 mm (24 in.). Cable shall be secured to the noncombustible surface of the building structure. Cable supports and fasteners shall be steel.

~~722~~ 3XX.25 Abandoned Cables.
The accessible portion of abandoned cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.

~~722~~ 3XX.31 Safety-Control Equipment.
Where damage to power-limited circuits can result in a failure of safety-control equipment that would introduce a direct fire or life hazard, the power limited circuits shall be installed using Class 1 circuit wiring methods in accordance with 724.46. All conductors of such circuits shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, Type MI cable, or Type MC cable, or be otherwise suitably protected from physical damage.

~~722~~ 3XX.135 Installation of Cables.
The installation of cables shall comply with ~~722~~ 3XX.135(A) through (I), as applicable.

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(A) Listing.
Cables installed in buildings shall be listed.
(B) Cables in Buildings.
The installation of cables shall comply with Table ~~722~~ 3XX.135(B).

Table ~~722~~ 3XX.135(B) Installation of Listed Cables in Buildings

Applications		Cable Type [1]					
		Plenum	Riser	General-Purpose	Limited-Use	Under Carpet	PLTC
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function.	Y	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	N	Y
In spaces used for environmental air (plenums) as described in 300.22(C).	Cables in other spaces used for environmental air	Y	N	N	N	N	N

	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways	Y	N	N	N	N	N
	Cables in plenum cable routing assemblies	Y	N	N	N	N	N
	Cables supported by open metal cable trays	Y	N	N	N	N	N
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	N	Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft.	Y	Y	N	N	N	N
	Cables in metal raceways	Y	Y	Y	Y	N	Y
	Cables in fireproof shafts	Y	Y	Y	N	N	Y
	Cables in plenum communications raceways	Y	Y	N	N	N	N
	Cables in plenum cable routing assemblies	Y	Y	N	N	N	N
	Cables in riser communications raceways	Y	Y	N	N	N	N
	Cables in riser cable routing assemblies	Y	Y	N	N	N	N
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	N	Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in general-purpose communications raceways (innerduct)	Y	Y	Y	Y	N	Y
In fireproof riser shaft having firestops at each floor[2]	Cables	Y	Y	N	N	N	Y
	Cables in plenum communications raceways or plenum cable routing assemblies	Y	Y	N	N	N	Y
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	N	N	N	Y
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	N	N	N	Y
In cable trays	Outdoors	N	N	N	N	N	Y

	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	N	Y
In cross-connect arrays	Cables, and cable in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	N	Y
In one-, two, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	N	Y
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	N	Y
	Cable in non-concealed spaces	Y	Y	Y	Y[4]	Y	Y
	Under carpet, floor covering, modular flooring, and Planks	N	N	N	N	Y	N

[1]"N" indicates that the cable type shall not be installed in the application, "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in ~~722~~ 3XX.3(O).
[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.
[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).
[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

(C) Industrial Establishments.
In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either of the following:

(1) Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as Type PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Where not subject to physical damage, Type PLTC-ER cable 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.

(2) Type PLTC cable, with a metallic sheath or armor in accordance with ~~722~~ 3XX.179(A)(6), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

(D) In Hoistways.
In hoistways, cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21.

(E) Cable Substitutions.
The substitutions for cables listed in Table ~~722~~ 3XX.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in ~~722~~ 3XX.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See ~~722~~ 3XX.135(F).

Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.

Table ~~722~~ 3XX.135(E) Cable Substitutions

Cable Type	Permitted Substitutions
CL3P	CMP
CL2P	CMP, CL3P
CL3R	CMP, CL3P, CMR
CL2R	CMP, CL3P. CL2P, CMR, CL3R
PLTC	None
CL3	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC
CL2	CMP, CL3P, CL2P, CMR, CL3R, CL3R, CL2R, CMG, CM, PLTC, CL3
CL3X	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX
CL2X	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X
FPLP	CMP
FPLR	CMP, FPLP, CMR
FPL	CMP, FPLP, CMR, FPLR, CMG, CM
OFNP	None
OFCP	OFNP
OFNR	OFNP
OFCR	OFNP, OFCP, OFNR
OFNG, OFN	OFNP, OFNR
OFCG, OFC	OFNP, OFCP, OFNR, OFCR, OFNG, OFN
CMUC	None

(F) Industrial Establishments.
In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either of the following:

(3) Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as Type PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Where not subject to physical damage, Type PLTC-ER cable 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.

(4) Type PLTC cable, with a metallic sheath or armor in accordance with ~~722~~ 3XX.179(A)(6), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical

damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

(G) In Hoistways.
In hoistways, cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21.

(H) Cable Substitutions.
The substitutions for cables listed in Table ~~722~~ 3XX.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in ~~722~~ 3XX.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See ~~722~~ 3XX.135(F).

Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.

(I) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.
CI cable, a fire-resistive cable system, or a listed electrical circuit protective system shall be permitted for use in systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

(J) Thermocouple Circuits.
Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.

(K) Bundling of 4-Pair Cables Transmitting Power and Data.
Where 4-pair cables are used to transmit power and data to a powered device, 725.144 shall apply.

(L) Installation of Circuit Conductors Extending Beyond One Building.
Circuit conductors that extend beyond one building and are run such that they are subject to accidental contact with electric light or power conductors operating over 300 volts to ground, or are exposed to lightning on interbuilding circuits on the same premises, shall comply with the following:

(1) For other than coaxial conductors, 800.44, 800.53, 800.100, 805.50, 805.93, 805.170(A), and 805.170(B).
(2) For coaxial conductors, 800.44, 820.93, and 820.100.
(3) The installation requirements of Part I of Article 300.

Part II. Listing Requirements

~~722~~ 3XX.179 Listing and Marking of Cables.
Cables installed in buildings shall be listed in accordance with ~~722~~ 3XX.179(A) and marked in accordance with ~~722~~ 3XX.179(B), and they shall be permitted to be marked in accordance with ~~722~~ 3XX.179(C).

Exception: Optical fiber cables that are installed in compliance with ~~770~~ 3XX.48 shall not be required to be listed.

(A) Listing of Cables.
Cables installed as wiring methods within buildings shall be listed as resistant to the spread of fire and other criteria in accordance with ~~722~~ 3XX.179(A)(1) through (A)(16).

Informational Note No. 1: See UL 13, *Standard for Power-Limited Circuit Cables*, for applicable requirements for listing of Class 2 and Class 3 cable and power-limited tray cable (PLTC).

Informational Note No. 2: See UL 1424, *Cables for Power-Limited Fire-Alarm Circuits*, for applicable requirements for listing of power-limited fire alarm cable.

Informational Note No. 3: See UL 1651, *Optical Fiber Cable*, for applicable requirements for listing of optical fiber cable.

Informational Note No. 4: See UL 1400-2, *Outline for Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for applicable requirements for listing of Class 4 cable.

(1) Plenum Cable.
Plenum cable shall be listed as suitable for use in ducts, plenums, and other space for environmental air and shall be listed as having adequate fire-resistant and low-smoke producing characteristics. Refer to Table ~~722~~ 3XX.179(B) for plenum cable types.

Informational Note: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*, for the test method used to determine that a cable is low-smoke producing and fire resistant, exhibiting a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less.

(2) Riser Cable.
Riser cable shall be listed as suitable for use in a vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: See ANSI/UL 1666-2012, *Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*, for the cable requirements defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

(3) General-Purpose Cable.
General-purpose cable shall be listed as resistant to the spread of fire and as suitable for general-purpose use, except for use in risers, ducts, plenums, and other space used for environmental air.

Informational Note: See UL 2556, *Wire and Cable Test Methods*, for defining resistant to the spread of fire. One method is to demonstrate that the cables do not spread fire to the top of the tray in the UL Flame Exposure, Vertical Tray Flame Test. The smoke measurements in the test method are not applicable.

A method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the FT4 Vertical Flame Test.

(4) Alternative General-Purpose Cable.
Alternative general-purpose optical fiber cable shall be listed as suitable for general-purpose use, with the exception of risers and plenums, and shall also be resistant to the spread of fire.

Informational Note: See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays, that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(5) Limited-Use Cable.
Limited-use cable shall be listed as suitable for use in dwellings and raceways and shall be listed as resistant to flame spread.

Informational Note: See ANSI/UL 2556, *Standard for Wire and Cable Test Methods*, for one method of determining that cable is resistant to flame spread by testing the cable to the FV-2/VW-1 test.

(6) Type PLTC.
Type PLTC nonmetallic-sheathed, power-limited tray cable shall be listed as being suitable for cable trays, resistant to the spread of fire, and sunlight- and moisture-resistant. Type PLTC cable used in a wet location shall be listed for use in wet locations and marked “wet” or “wet location.”

Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.

See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(7) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

Cables that are used for survivability of critical circuits under fire conditions shall comply with either ~~722~~ 3XX.179(A)(7)(a), (A)(7)(b), or (A)(7)(c).

Informational Note: See *NFPA 72*, *National Fire Alarm and Signaling Code*, 12.4.3 and 12.4.4, for additional information on fire alarm CI cable, fire-resistive cable systems, or electrical circuit protective systems used for fire alarm circuits to comply with the survivability requirements to maintain the circuit's electrical function during fire conditions for a defined period of time.

(a) *CI Cables.* CI cables of the types specified in ~~722~~ 3XX.179(A)(1), (A)(2), (A)(3), (A)(4), and (A)(6) and used for survivability of critical circuits shall be marked with the additional classification using the suffix "CI." To maintain its listed fire-resistive rating CI cable shall only be installed in free air in accordance with ~~722~~ 3XX.24(C). CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of a fire-resistive cable system as covered in ~~722~~ 3XX.179(A)(7)(b).

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables and* UL 1425, *Cables for Non-Power-Limited Fire-Alarm Circuits*, for information on establishing a rating for CI cable. The *UL Guide Information for Nonpower-limited Fire Alarm Circuits* (HNHT) contains information to identify the cable and its installation limitations to maintain the fire-resistive rating.

(b) *Fire-Resistive Cables.* Fire-resistive cables of the types specified in ~~722~~ 3XX.179(A)(1), (A)(2), (A)(3), (A)(4), (A)(6), and (A)(7)(a) that are part of a fire-resistive cable system shall be identified with the system identifier and hourly rating marked on the protectant or smaller unit container and installed in accordance with the listing of the system.

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for information on establishing a rating for a fire-resistive cable system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the systems and its installation limitations to maintain a minimum fire-resistive rating.

(c) *Electrical Circuit Protective System*. Protectants for cables of the types specified in ~~722~~ 3XX.179(A)(1), (A)(2), (A)(3), (A)(4), and (A)(6) that are part of an electrical circuit protective system shall be identified with the protective system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the protective system.

Informational Note: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems,* for information on establishing a rating for an electrical circuit protective system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain the fire-resistive rating.

(8) Class 3 Single Conductors.
Class 3 single conductors used as other wiring within buildings shall be listed Type CL3 and shall not be smaller than 18 AWG.

Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*, for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.

See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*, for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).

(9) Limited Power (LP) Cable.
Class 2 and Class 3 LP cables shall be listed as suitable for carrying power and data up to a specified current limit for each conductor without exceeding the temperature rating of the cable. The cables shall be marked with the suffix "-LP (XXA)" where XXA designates the current limit in amperes per conductor.

Informational Note: An example of the marking on 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP (0.6A) 75°C 23 AWG 4-pair."

(10) Undercarpet Cables.

Undercarpet cable shall be listed as suitable for use under carpet, floor covering, modular tiles, and planks.

Informational Note: See UL 444, *Standard for Safety for Communications Cables*, for the compressive loading test used to determine the suitability of cable for undercarpet use.

(11) Wet Locations.
Cable used in a wet location shall be listed for use in wet locations and be marked “wet” or “wet location” or have a moisture-impervious metal sheath.

(12) Field-Assembled Optical Fiber Cables.
Field-assembled optical fiber cable shall comply with ~~722~~ 3XX.179(A)(12)(a) through (d).

(a) The specific combination of jacket and optical fibers intended to be installed as a field-assembled optical fiber cable shall be one of the types in ~~722~~ 3XX.179(A)(1), (A)(2), or (A)(3) and shall be marked in accordance with Table ~~722~~ 3XX.179(B)

(b) The jacket of a field-assembled optical fiber cable shall have a surface marking indicating the specific optical fibers with which it is identified for use.

(c) The optical fibers shall have a permanent marking, such as a marker tape, indicating the jacket with which they are identified for use.

(d) The jacket without fibers shall meet the listing requirements for communications raceways in 800.182(A), (B), or (C) in accordance with the cable marking.

(13) Cables Containing Optical Fibers.
Composite optical fiber cables shall be listed as electrical cables based on the type of electrical conductors.

(14) Class 2 and Class 3 Cable Voltage and Temperature Ratings.
Class 2 cables shall have a voltage rating of not less than 150 volts. Class 3 cables shall have a voltage rating of not less than 300 volts. Class 2 and Class 3 cables shall have a temperature rating of not less than 60°C (140°F).

(15) Power-Limited Fire Alarm (PLFA) Cables.
PFLA cables shall comply with ~~722~~ 3XX.179(A)(15)(a) through (A)(15)(d).

(a) Conductors for cables, other than coaxial cables, shall be solid or stranded copper. Coaxial cables shall be permitted to use 30 percent conductivity copper-covered steel center conductor wire.
(b) The size of the conductors in a multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG. Conductors of 26 AWG shall be permitted only where spliced with a connector listed as suitable for 26 AWG to 24 AWG or larger conductors that are terminated on equipment or where the 26 AWG conductors are terminated on equipment listed as suitable for 26 AWG conductors.

(c) Cables shall have a voltage rating of not less than 300 volts.

(d) Cables shall have a temperature rating of not less than 60ºC (140ºF).

(16) Class 4 Cable Construction.

(1) Sizes.
Conductors of sizes not smaller than 24 AWG shall be permitted to be used.

(2) Insulation.
Insulation on conductors shall be rated not less than 450 volts dc.

(3) Voltage Rating.
Cables shall have a voltage rating of not less than 450 volts dc. Voltage ratings shall not be marked on the cables.

(4) Temperature Rating.
Cables shall have a temperature rating of not less than 60°C (140°F).
(5) Cabling.
Cables shall comply with any requirements provided in the listing of the system.

Informational Note: See UL 1400-1, *Outline for Fault-Managed Power Distribution Technologies — Part 1: General Requirements*, for information on determining applicable requirements for the listing of Class 4 power systems. Excessive cable lengths can result in higher capacitance which could affect the safety of the circuit.

(B) Marking.
Cables shall be durably marked on the surface in accordance with the following:

(1) The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).

(2) All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).

(3) The proper type designation for the type of cable shall be marked in accordance with Table ~~722~~ 3XX.179(B).

(4) The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.

(5) The AWG size or circular mil area shall be marked.

Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.

(6) The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.

Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.

(7) Voltage ratings shall not be marked on the cables.

Exception: Voltage markings shall be permitted where the cable has multiple listings, and a voltage marking is required for one or more of the listings.

Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.

Table ~~722~~ 3XX.179(B) Cable Type Markings

Cable Type	Cable Marking
Class 4 plenum cable	CL4P
Class 3 plenum cable	CL3P
Class 2 plenum cable	CL2P
Power-limited fire alarm plenum cable	FPLP
Nonconductive optical fiber plenum cable	OFNP
Conductive optical fiber plenum cable	OFCP
Class 4 riser cable	CL4R
Class 3 riser cable	CL3R
Class 2 riser cable	CL2R
Power-limited fire alarm riser cable	FPLR

Nonconductive optical fiber riser cable	OFNR
Conductive optical fiber riser cable	OFCR
Class 4 general-purpose cable	CL4
Class 3 general-purpose cable	CL3
Class 2 general-purpose cable	CL2
Power-limited fire alarm cable	FPL
Nonconductive general-purpose optical fiber cable	OFN
Conductive general-purpose optical fiber cable	OFC
Alternative nonconductive general-purpose optical fiber cable	OFNG
Alternative conductive general-purpose optical fiber cable	OFCG
Class 3 cable – limited use	CL3X
Class 2 cable – limited use	CL2X
Undercarpet cable	CMUC
Note: All types of CL2, CL3, and FPL cables containing optical fibers are provided with the suffix "-OF."	

(C) Optional Markings.
Cables shall be permitted to be surface marked to indicate special characteristics of the cable materials.

Informational Note No. 1: Examples of these characteristics include, but are not limited to, limited smoke, halogen free, low smoke and halogen free, and sunlight resistant.

Informational Note No. 2: Some examples of optional markings are ST1 to indicate limited smoke characteristics. See UL 2556, *Wire and Cable Test Methods*; HF to indicate halogen free. See in UL 2885, *Outline of Investigation for Acid Gas, Acidity and Conductivity of Combusted Materials*; and LSHF to indicate halogen free and low-smoke characteristics. See IEC 61034-2, *Measurement of smoke density of cables burning under defined conditions — Part 2: Test procedure and requirements*.

Public Input No. 1639-NFPA 70-2023 [Article 590]

~~**Article 590** Temporary Installations~~

~~**590.1** Scope.~~

~~The provisions of this article apply to temporary electric power and lighting installations.~~

~~**590.2** All Wiring Installations.~~

~~**(A)** Other Articles.~~

~~Except as specifically modified in this article, all other requirements of this *Code* for permanent wiring shall apply to temporary wiring installations.~~

~~**(B)** Approval.~~

~~Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.~~

~~**590.3** Time Constraints.~~

~~**(A)** During the Period of Construction.~~

~~Temporary electric power and lighting installations shall be permitted during the period of construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities.~~

~~**(B)** 90 Days.~~

~~Temporary electric power and lighting installations shall be permitted for a period not to exceed 90 days for holiday decorative lighting and similar purposes.~~

~~**(C)** Emergencies and Tests.~~

~~Temporary electric power and lighting installations shall be permitted during emergencies and for tests, experiments, and developmental work.~~

~~**(D)** Removal.~~

~~Temporary wiring shall be removed immediately upon completion of construction or purpose for which the wiring was installed.~~

~~**590.4** General.~~

~~**(A)** Services.~~

~~Services shall be installed in conformance with Parts I through VIII of Article 230 , as applicable.~~

~~**(B)** Feeders.~~

~~Overcurrent protection shall be provided in accordance with 240.4 , 240.5 , 245.26 , 445.12 , and 445.13 . Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, the following wiring methods shall be permitted:~~

(1) ~~Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.~~

(2) ~~Type SE cable shall be permitted to be installed in a raceway in an underground installation.~~

~~*Exception: Single insulated conductors shall be permitted where installed for the purpose(s) specified in 590.3(C) and accessible only to qualified persons.*~~

~~**(C)** Branch Circuits.~~

~~All branch circuits shall originate in an approved power outlet, switchgear, switchboard or panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4 , 240.5 , and 245.26 . For the purposes of this section, the following wiring methods shall be permitted:~~

(1) ~~Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.~~

(2) ~~Type SE cable shall be permitted to be installed in a raceway in an underground installation.~~

~~*Exception: Branch circuits installed for the purposes specified in 590.3(B) or 590.3(C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 590.3(B) , the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.*~~

~~**(D)** Receptacles.~~

~~**(1)** All Receptacles.~~

~~All receptacles shall be of the grounding type. Unless installed in a continuous metal raceway that qualifies as an equipment grounding conductor in accordance with 250.118 or a continuous metal-covered cable that qualifies as an equipment grounding conductor in accordance with 250.118 , all branch circuits shall include a separate equipment grounding conductor, and all receptacles shall be electrically connected to the equipment grounding conductor(s). Receptacles on construction sites shall not be installed on any branch circuit that supplies temporary lighting.~~

~~**(2)** Receptacles in Wet Locations.~~

~~All 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall comply with 406.9(B)(1) .~~

~~**(E)** Disconnecting Means.~~

~~Suitable disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit. Multiwire branch circuits shall be provided with a means to disconnect simultaneously all ungrounded conductors at the power outlet or panelboard where the branch circuit originated. Identified handle ties shall be permitted.~~

~~**(F)** Lamp Protection.~~

~~All lamps for general illumination shall be protected from accidental contact or breakage by a suitable luminaire or lampholder with a guard.~~

~~Metal guarded sockets shall not be used unless the metal guard is connected to the circuit equipment grounding conductor.~~

~~**(G)** Splices.~~

~~A box, conduit body, or other enclosure, with a cover installed, shall be required for all splices.~~

~~*Exception No. 1: On construction sites, a box, conduit body, or other enclosure shall not be required for either of the following conditions:*~~

(1) ~~*The circuit conductors being spliced are all from nonmetallic multiconductor cord or cable assemblies, provided that the equipment grounding continuity is maintained with or without the box.*~~

(2) ~~*The circuit conductors being spliced are all from metal-sheathed cable assemblies terminated in listed fittings that mechanically secure the cable sheath to maintain effective electrical continuity.*~~

~~*Exception No. 2: On construction sites, branch-circuits that are permanently installed in framed walls and ceilings and are used to supply temporary power or lighting,and that are GFCI protected, the following shall be permitted:*~~

(1) ~~*A box cover shall not be required for splices installed completely inside of junction boxes with plaster rings.*~~

(2) ~~*Listed pigtail-type lampholders shall be permitted to be installed in ceiling-mounted junction boxes with plaster rings.*~~

(3) ~~*Finger safe devices shall be permitted for supplying and connection of devices.*~~

~~**(H)** Protection from Accidental Damage.~~

~~Flexible cords and cables shall be protected from accidental damage. Sharp corners and projections shall be avoided. Where passing through doorways or other pinch points, protection shall be provided to avoid damage.~~

~~**(I)** Termination(s) at Devices.~~

~~Flexible cords and cables entering enclosures containing devices requiring termination shall be secured to the box with fittings listed for connecting flexible cords and cables to boxes designed for the purpose.~~

~~**(J)** Support.~~

~~Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage. Cable assemblies and flexible cords and cables installed as branch circuits or feeders shall not be installed on the floor or on the ground. Extension cords shall not be required to comply with 590.4(J). Vegetation shall not be used for support of overhead spans of branch circuits or feeders.~~

~~*Exception: For holiday lighting in accordance with 590.3(B), where the conductors or cables are arranged with strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch-circuit conductors or cables.*~~

~~**590.5** Listing of Decorative Lighting.~~

~~Decorative lighting used for holiday lighting and similar purposes, in accordance with 590.3(B), shall be listed and shall be labeled on the product.~~

~~**590.6** Ground-Fault Protection for Personnel.~~

~~Ground-fault protection for personnel for all temporary wiring installations shall be provided to comply with 590.6(A) and (B). This section shall apply only to temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This section shall apply to power derived from an electric utility company or from an on-site-generated power source.~~

~~**(A)** Receptacle Outlets.~~

~~Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 590.6(A)(1) through (A)(3), as applicable.~~

~~*Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.*~~

~~**(1)** Receptacle Outlets Not Part of Permanent Wiring.~~

~~All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel. In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.~~

~~**(2)** Receptacle Outlets Existing or Installed as Permanent Wiring.~~

~~Ground-fault circuit-interrupter protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.~~

~~**(3)** Receptacles on 15-kW or less Portable Generators.~~

~~All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.~~

~~**(B)** Other Receptacle Outlets.~~

~~For temporary wiring installations, receptacles, other than those covered by 590.6(A)(1) through (A)(3) used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, or similar activities, shall have protection in accordance with 590.6(B)(1) or the assured equipment grounding conductor program in accordance with 590.6(B)(2) .~~

~~**(1)** GFCI Protection.~~

~~Ground-fault circuit-interrupter protection for personnel.~~

~~**(2)** Assured Equipment Grounding Conductor Program.~~

~~A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114 , 250.138 , 406.4(C) , and 590.4(D) .~~

(1) ~~The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord-and-plug-connected equipment required to be connected to an equipment grounding conductor:~~

  (2) ~~All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.~~

  (3) ~~Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.~~

  (4) ~~All required tests shall be performed as follows:~~

    (5) ~~Before first use on site~~

    (6) ~~When there is evidence of damage~~

    (7) ~~Before equipment is returned to service following any repairs~~

    (8) ~~At intervals not exceeding 3 months~~

(9) ~~The tests required in 590.6(B)(2) (a) shall be recorded and made available to the authority having jurisdiction.~~

~~The assured equipment grounding conductor program shall be documented and made available to the authority having jurisdiction.~~

> ~~Informational Note: See OSHA 29 CFR 1910 and 1926 for requirements for assured equipment grounding conductor programs. See NFPA *70E* -2018, *Standard for Electrical Safety in the Workplace* , for additional information.~~

~~**590.7** Guarding.~~

~~For wiring over 600 volts, nominal, suitable fencing, barriers, or other effective means shall be provided to limit access only to authorized and qualified personnel.~~

~~**590.8** Overcurrent Protective Devices.~~

~~**(A)** Where Reused.~~

~~Overcurrent protective devices that have been previously used and are installed in a temporary installation shall be examined to ensure they have been properly installedand properly maintained, and there is no evidence of impending failure.~~

~~Informational Note: See the following standards for further information for properly maintained equipment:~~

(1) ~~NEMA AB 4, *Guidelines for Inspection and Preventive Maintenance of Molded-Case Circuit Breakers Used in Commercial and Industrial Applications*~~

(2) ~~NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*~~

(3) ~~NEMA GD 1, *Evaluating Water-Damaged Electrical Equipment*~~

(4) ~~IEEE 1458, *IEEE Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded-Case Circuit Breakers for Industrial Applications*~~

~~**(B)** Service Overcurrent Protective Devices.~~

~~Overcurrent protective devices for solidly grounded wye electrical services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase, available fault current greater than 10,000 amperes, shall be current limiting.~~

Statement of Problem and Substantiation for Public Input

Temporary wiring is not a “Special Occupancy” as such it more appropriately belongs in Chapter 2 ”Wiring and Protection” as it involves wiring and protection when under temporary conditions. Temp wiring can be related to any type of occupancies or electrical systems and as such should be in the generally applied code chapters.

See companion PI to add these requirements in Chapter 2.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4389-NFPA 70-2023 [New Section after 250.194(B)]	
Public Input No. 4389-NFPA 70-2023 [New Section after 250.194(B)]	

Submitter Information Verification

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Submittal Date:	Thu Jul 27 15:32:27 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: "Temporary Wiring" first appeared in the 1971 NEC as Article 305. It remained as Article 305 until the 2002 NEC, when it was moved to Article 527 and renamed "Temporary Installations". The 2005 NEC relocated "Temporary Installations" to Article 590. One of the reasons "Temporary Wiring" was relocated to Chapter 5 was that having the requirements for temporary wiring in Chapter 3 was a violation of 90.3 because it does not apply generally to wiring methods. The new structuring of the NEC for the 2029 edition will find an appropriate location for temporary wiring.

Public Input No. 1642-NFPA 70-2023 [Article 590]

Article 590 Temporary Installations

590.1 Scope.

The provisions of this article apply to temporary electric power and lighting installations.

590.

~~2~~

2 Reconditioned Equipment for Temporary Use. Reconditioned electrical equipment that is normally not considered suitable for use in a permanent installation, shall be permitted to be installed and used in a temporary arrangement if all of the following conditions are met:

(1) The installation complies with other applicable Sections of this Article.

(2) The installation is approved by the AHJ.

590.3 All Wiring Installations.

(A) Other Articles.

Except as specifically modified in this article, all other requirements of this *Code* for permanent wiring shall apply to temporary wiring installations.

(B) Approval.

Temporary wiring methods shall be acceptable only if approved based on the conditions of use and any special requirements of the temporary installation.

590.~~3~~ 4 Time Constraints.

(A) During the Period of Construction.

Temporary electric power and lighting installations shall be permitted during the period of construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities.

(B) 90 Days.

Temporary electric power and lighting installations shall be permitted for a period not to exceed 90 days for holiday decorative lighting and similar purposes.

(C) Emergencies and Tests.

Temporary electric power and lighting installations shall be permitted during emergencies and for tests, experiments, and developmental work.

(D) Removal.

Temporary wiring shall be removed immediately upon completion of construction or purpose for which the wiring was installed.

590.~~4~~ 5 General.

(A) Services.

Services shall be installed in conformance with Parts I through VIII of Article 230, as applicable.

(B) Feeders.

Overcurrent protection shall be provided in accordance with 240.4, 240.5, 245.26, 445.12, and 445.13. Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Single insulated conductors shall be permitted where installed for the purpose(s) specified in 590.~~3~~ 4 (C) and accessible only to qualified persons.

(C) Branch Circuits.

All branch circuits shall originate in an approved power outlet, switchgear, switchboard or panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4, 240.5, and 245.26. For the purposes of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Branch circuits installed for the purposes specified in 590.~~3~~ 4 (B) or 590.~~3~~ 4 (C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 590.~~3~~ 4 (B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.

(D) Receptacles.

(1) All Receptacles.

All receptacles shall be of the grounding type. Unless installed in a continuous metal raceway that qualifies as an equipment grounding conductor in accordance with 250.118 or a continuous metal-covered cable that qualifies as an equipment grounding conductor in accordance with 250.118, all branch circuits shall include a separate equipment grounding conductor, and all receptacles shall be electrically connected to the equipment grounding conductor(s). Receptacles on construction sites shall not be installed on any branch circuit that supplies temporary lighting.

(2) Receptacles in Wet Locations.

All 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall comply with 406.9(B)(1).

(E) Disconnecting Means.

Suitable disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit. Multiwire branch circuits shall be provided with a means to disconnect simultaneously all ungrounded conductors at the power outlet or panelboard where the branch circuit originated. Identified handle ties shall be permitted.

(F) Lamp Protection.

All lamps for general illumination shall be protected from accidental contact or breakage by a suitable luminaire or lampholder with a guard.

Metal guarded sockets shall not be used unless the metal guard is connected to the circuit equipment grounding conductor.

(G) Splices.

A box, conduit body, or other enclosure, with a cover installed, shall be required for all splices.

Exception No. 1: On construction sites, a box, conduit body, or other enclosure shall not be required for either of the following conditions:

(1) The circuit conductors being spliced are all from nonmetallic multiconductor cord or cable assemblies, provided that the equipment grounding continuity is maintained with or without the box.

(2) The circuit conductors being spliced are all from metal-sheathed cable assemblies terminated in listed fittings that mechanically secure the cable sheath to maintain effective electrical continuity.

Exception No. 2: On construction sites, branch-circuits that are permanently installed in framed walls and ceilings and are used to supply temporary power or lighting,and that are GFCI protected, the following shall be permitted:

(1) A box cover shall not be required for splices installed completely inside of junction boxes with plaster rings.

(2) Listed pigtail-type lampholders shall be permitted to be installed in ceiling-mounted junction boxes with plaster rings.

(3) Finger safe devices shall be permitted for supplying and connection of devices.

(H) Protection from Accidental Damage.

Flexible cords and cables shall be protected from accidental damage. Sharp corners and projections shall be avoided. Where passing through doorways or other pinch points, protection shall be provided to avoid damage.

(I) Termination(s) at Devices.

Flexible cords and cables entering enclosures containing devices requiring termination shall be secured to the box with fittings listed for connecting flexible cords and cables to boxes designed for the purpose.

(J) Support.

Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage. Cable assemblies and flexible cords and cables installed as branch circuits or feeders shall not be installed on the floor or on the ground. Extension cords shall not be required to comply with 590.~~4~~ 5 (J). Vegetation shall not be used for support of overhead spans of branch circuits or feeders.

Exception: For holiday lighting in accordance with 590.~~3~~ 4 (B), where the conductors or cables are arranged with strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch-circuit conductors or cables.

590.~~5~~ 6 Listing of Decorative Lighting.

Decorative lighting used for holiday lighting and similar purposes, in accordance with 590.~~3~~ 4 (B), shall be listed and shall be labeled on the product.

590.~~6~~ 7 Ground-Fault Protection for Personnel.

Ground-fault protection for personnel for all temporary wiring installations shall be provided to comply with 590.~~6~~ 7 (A) and (B). This section shall apply only to temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This section shall apply to power derived from an electric utility company or from an on-site-generated power source.

(A) Receptacle Outlets.

Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 590.~~6~~ 7 (A)(1) through (A)(3), as applicable.

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.~~6~~ 7 (B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

(1) Receptacle Outlets Not Part of Permanent Wiring.

All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel. In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(2) Receptacle Outlets Existing or Installed as Permanent Wiring.

Ground-fault circuit-interrupter protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(3) Receptacles on 15-kW or less Portable Generators.

All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.

(B) Other Receptacle Outlets.

For temporary wiring installations, receptacles, other than those covered by 590.~~6~~ 7 (A)(1) through (A)(3) used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, or similar activities, shall have protection in accordance with 590.~~6~~ 7 (B)(1) or the assured equipment grounding conductor program in accordance with 590.~~6~~ 7 (B)(2).

(1) GFCI Protection.

Ground-fault circuit-interrupter protection for personnel.

(2) Assured Equipment Grounding Conductor Program.

A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114, 250.138, 406.4(C), and 590.~~4~~ 5 (D).

(a) The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord-and-plug-connected equipment required to be connected to an equipment grounding conductor:

(2) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(3) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(4) All required tests shall be performed as follows:

- (5) Before first use on site
- (6) When there is evidence of damage
- (7) Before equipment is returned to service following any repairs
- (8) At intervals not exceeding 3 months

(i) The tests required in 590.6(B)(2)(a) shall be recorded and made available to the authority having jurisdiction.

The assured equipment grounding conductor program shall be documented and made available to the authority having jurisdiction.

> Informational Note: See OSHA 29 CFR 1910 and 1926 for requirements for assured equipment grounding conductor programs. See NFPA *70E*-~~2018~~ 2024 , *Standard for Electrical Safety in the Workplace*, for additional information.

590.~~7~~ 8 Guarding.

For wiring over 600 volts, nominal, suitable fencing, barriers, or other effective means shall be provided to limit access only to authorized and qualified personnel.

590.~~8~~ 9 Overcurrent Protective Devices.

(A) Where Reused.

Overcurrent protective devices that have been previously used and are installed in a temporary installation shall be examined to ensure they have been properly installedand properly maintained, and there is no evidence of impending failure.

> Informational Note: See the following standards for further information for properly maintained equipment:
>
> (1) NEMA AB 4, *Guidelines for Inspection and Preventive Maintenance of Molded-Case Circuit Breakers Used in Commercial and Industrial Applications*
>
> (2) NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*
>
> (3) NEMA GD 1, *Evaluating Water-Damaged Electrical Equipment*
>
> (4) IEEE 1458, *IEEE Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded-Case Circuit Breakers for Industrial Applications*

(B) Service Overcurrent Protective Devices.

Overcurrent protective devices for solidly grounded wye electrical services of more than 150 volts to ground but not exceeding 1000 volts phase-to-phase, available fault current greater than 10,000 amperes, shall be current limiting.

Statement of Problem and Substantiation for Public Input

With the supply chain disruption causing extended lead times for equipment, and no sign of this changing anytime soon, there needs to be some temporary rules established for the use of refurbished equipment. The use of refurbished equipment in a temporary setting is going to be necessary at times to keep projects moving. This would provide latitude for AHJ and installers to use refurbished equipment in temporary settings while waiting on for permanent equipment. See companion PIs relocating Article 590 to Chapter 3.

XXX.2 has been reserved for the Reconditioning requirements for each Article so as such, this proposal included renumbering all of the Sections following 590.2 as well as the references throughout the Article.

Submitter Information Verification

Submitter Full Name:	Kyle Krueger
Organization:	NECA
Affiliation:	NECA
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Jul 27 15:45:48 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The proposed text provides a broad interpretation of what reconditioned equipment can be used. Reconditioned equipment can be used as permitted by the appropriate article(s).

Public Input No. 165-NFPA 70-2023 [Section No. 590.4(A)]

(A) Services.

~~Services shall~~ Services not over 1000 volts ac or 1500 volts dc, nominal shall be installed in conformance ~~with Parts I through VIII of Article 230, as applicable.~~ with Article 230. Services over 1000 volts ac or 1500 volts dc, nominal shall be installed in conformance with Article 235 Part V.

Statement of Problem and Substantiation for Public Input

Article 230 no longer has part VIII. It contains Parts I through VII now.
Article 230 no longer applies to services exceeding 1000VAC or 1500VDC nominal.

Article 235 Part V now applies to services exceeding 1000VAC or 1500VDC nominal

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jan 15 15:07:46 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8875-NFPA 70-2024

Statement: This section was deleted to comply with 4.1.1 of the NEC Style Manual. The requirements of Article 230 already apply via 90.3, so referencing them here is not needed.

Public Input No. 2769-NFPA 70-2023 [Section No. 590.4(A)]

(A) Services.

Services shall be installed in conformance with Article 230, Parts I through VIII- ~~of Article 230~~ , as applicable.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.

4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.

The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Thu Aug 24 20:24:27 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8875-NFPA 70-2024

Statement: This section was deleted to comply with 4.1.1 of the NEC Style Manual. The requirements of Article 230 already apply via 90.3, so referencing them here is not needed.

Public Input No. 2977-NFPA 70-2023 [Section No. 590.4(A)]

(A) Services.

Services shall be installed in conformance with ~~Parts I through VIII of Article 230 , as applicable~~ other articles of this Code .

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article, except Article 100 or where required for Context. In addition, this section currently points to 8 parts of Article 230, which was revised in the last cycle to now only contain 7 parts. The MV services were moved to Article 235. Referencing generically here to "other articles of this Code" avoids referencing the particular articles in their entirety. Otherwise, the panel could chose which part to reference, though referencing all the parts is prohibited under 4.1.4.

Submitter Information Verification

Submitter Full Name:	Richard Holub
Organization:	The DuPont Company, Inc.
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Mon Aug 28 14:05:22 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8875-NFPA 70-2024

Statement: This section was deleted to comply with 4.1.1 of the NEC Style Manual. The requirements of Article 230 already apply via 90.3, so referencing them here is not needed.

Public Input No. 667-NFPA 70-2023 [Section No. 590.4(A)]

~~**(A)** Services.~~

~~Services shall be installed in conformance with Parts I through VIII of Article 230 , as applicable.~~

Statement of Problem and Substantiation for Public Input

This subsection is nothing more than a reference to the entire contents of Article 230, which is neither helpful nor needed. See 90.3 and 4.1 of the Style Manual.

Submitter Information Verification

Submitter Full Name:	Ryan Jackson
Organization:	Self-employed
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu Apr 20 13:16:42 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8875-NFPA 70-2024

Statement: This section was deleted to comply with 4.1.1 of the NEC Style Manual. The requirements of Article 230 already apply via 90.3, so referencing them here is not needed.

Public Input No. 166-NFPA 70-2023 [Section No. 590.4(B)]

(B) Feeders.

Overcurrent protection shall be provided in accordance with 240.4, 240.5, 245.26, 445.12, and 445.13 as applicable . ~~Conductors~~ Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Single insulated conductors shall be permitted where installed for the purpose(s) specified in 590.3(C) and accessible only to qualified persons.

Statement of Problem and Substantiation for Public Input

The words “as applicable” need to be added here to clarify that only the overcurrent protection requirements APPLICABLE shall apply rather than ALL of those rules applying to EVERY installation.
Article 240 only applies up to 1000VAC, 1500VDC nominal.
Article 245 only applies over 1000VAC, 1500VDC nominal.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 167-NFPA 70-2023 [Section No. 590.4(C)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jan 15 15:27:04 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8876-NFPA 70-2024

Statement: The words “as applicable” are added to clarify that only specific overcurrent protection requirements shall apply to specific installations, rather than all of those rules applying to every installation. The words "height limitation" in 590.4(B)(1) are deleted because there is not a building or structure height limitation for Type NM, Type NMC, and Type SE cables.

Public Input No. 2404-NFPA 70-2023 [Section No. 590.4(B)]

(B) Feeders.

Overcurrent protection shall be provided in accordance with 240.4, 240.5, 245.26, 445.12, and 445.13. Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any ~~height~~ limitation ~~or limitation~~ by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Single insulated conductors shall be permitted where installed for the purpose(s) specified in 590.3(C) and accessible only to qualified persons.

Statement of Problem and Substantiation for Public Input

In 334.10(1), (2), (3), and (5) there is no limitation by height only by construction type. Deleting this language will make this requirement technically correct. This proposed revision will bring clarity for Code users.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 16:55:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8876-NFPA 70-2024

Statement: The words “as applicable” are added to clarify that only specific overcurrent protection requirements shall apply to specific installations, rather than all of those rules applying to every installation. The words "height limitation" in 590.4(B)(1) are deleted because there is not a building or structure height limitation for Type NM, Type NMC, and Type SE cables.

Public Input No. 167-NFPA 70-2023 [Section No. 590.4(C)]

(C) Branch Circuits.

All branch circuits shall originate in an approved power outlet, switchgear, switchboard or panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4, 240.5, and 245.26 as applicable . ~~For~~ For the purposes of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Branch circuits installed for the purposes specified in 590.3(B) or 590.3(C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 590.3(B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.

Statement of Problem and Substantiation for Public Input

The words “as applicable” need to be added here to clarify that only the overcurrent protection requirements APPLICABLE shall apply rather than ALL of those rules applying to EVERY installation.
Article 240 only applies up to 1000VAC, 1500VDC nominal.
Article 245 only applies over 1000VAC, 1500VDC nominal.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 166-NFPA 70-2023 [Section No. 590.4(B)]	“as applicable” needs to be specified

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jan 15 15:31:19 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8879-NFPA 70-2024

Statement: "Panelboard" was changed to "enclosed panelboard" to make the text technically correct.

The words “as applicable” are added to clarify that only specific overcurrent protection requirements shall apply to specific installations, rather than all of those rules applying to every installation.

The words "height limitation" in 590.4(B)(1) are deleted because there is not a building or structure height limitation for Type NM, Type NMC, and Type SE cables.

Public Input No. 2080-NFPA 70-2023 [Section No. 590.4(C)]

(C) Branch Circuits.

All branch circuits shall originate in an approved power outlet, switchgear, switchboard or enclosed panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4, 240.5, and 245.26. For the purposes of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Branch circuits installed for the purposes specified in 590.3(B) or 590.3(C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 590.3(B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.

Statement of Problem and Substantiation for Public Input

The term ‘panelboard’ and ‘enclosed panelboard’ are defined terms. Adding the word ‘enclosed panelboard’ makes the text technically correct. Note: The term ‘Enclosed Panelboard’ was added to NEC Article 100 during the 2023 Code cycle.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 11 15:30:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8879-NFPA 70-2024

Statement: "Panelboard" was changed to "enclosed panelboard" to make the text technically correct.

The words “as applicable” are added to clarify that only specific overcurrent protection requirements shall apply to specific installations, rather than all of those rules applying to every installation.

The words "height limitation" in 590.4(B)(1) are deleted because there is not a building or structure height limitation for Type NM, Type NMC, and Type SE cables.

Public Input No. 2405-NFPA 70-2023 [Section No. 590.4(C)]

(C) Branch Circuits.

All branch circuits shall originate in an approved power outlet, switchgear, switchboard or panelboard, motor control center, or fused switch enclosure. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. Conductors shall be protected from overcurrent as provided in 240.4, 240.5, and 245.26. For the purposes of this section, the following wiring methods shall be permitted:

(1) Type NM, Type NMC, and Type SE cables shall be permitted to be used in any dwelling, building, or structure without any ~~height~~ limitation ~~or limitation~~ by building construction type and without concealment within walls, floors, or ceilings.

(2) Type SE cable shall be permitted to be installed in a raceway in an underground installation.

Exception: Branch circuits installed for the purposes specified in 590.3(B) or 590.3(C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 590.3(B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft); or, for festoon lighting, the conductors shall be so arranged that excessive strain is not transmitted to the lampholders.

Statement of Problem and Substantiation for Public Input

In 334.10(1), (2), (3), and (5) there is no limitation by height only by construction type. Deleting this language will make this requirement technically correct. This proposed revision will bring clarity for Code users.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 16 16:56:27 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8879-NFPA 70-2024

Statement: "Panelboard" was changed to "enclosed panelboard" to make the text technically correct.

The words “as applicable” are added to clarify that only specific overcurrent protection requirements shall apply to specific installations, rather than all of those rules applying to every installation.

The words "height limitation" in 590.4(B)(1) are deleted because there is not a building or structure height limitation for Type NM, Type NMC, and Type SE cables.

Public Input No. 2406-NFPA 70-2023 [Section No. 590.4(D)]

(D) Receptacles.

~~**(1)**~~ All ~~Receptacles.~~

~~All~~

receptacles shall be of the grounding type. Unless installed in a continuous metal raceway that qualifies as an equipment grounding conductor in accordance with 250.118 or a continuous metal-covered cable that qualifies as an equipment grounding conductor in accordance with 250.118 , all branch circuits shall include a separate equipment grounding conductor, and all receptacles shall be electrically connected to the equipment grounding conductor(s). Receptacles on construction sites shall not be installed on any branch circuit that supplies temporary lighting.

~~**(2)** Receptacles in Wet Locations.~~

~~All 15- and 20-ampere, 125- and 250-volt receptacles installed in a wet location shall comply with 406.9(B)(1) .~~

Statement of Problem and Substantiation for Public Input

Deleting 590.4(D)(2) because it's a redundant requirement that is already in 406.9(B)(1). In accordance with the NEC Style Manual section 4.1.1. general requirements in Chapters 1 through 4 shall not be repeated in other articles of the document.

Submitter Information Verification

Submitter Full Name: Mike Holt

Organization: Mike Holt Enterprises Inc

Street Address:

City:

State:

Zip:

Submittal Date: Wed Aug 16 16:57:29 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8882-NFPA 70-2024

Statement: Receptacles in wet locations are required to comply with 406.9(B). Article 590 does not modify this requirement. In accordance with the NEC Style Manual, section 4.1.1, general requirements in Chapters 1 through 4 shall not be repeated in other articles of the document.

Public Input No. 1499-NFPA 70-2023 [Section No. 590.4(D)(2)]

(2) Receptacles in Damp and Wet Locations.

All ~~15- and 20-ampere,~~ 125- and 250-volt receptacles installed in a damp or wet location shall comply with 406. 9A or 406. 9(B)~~(1)~~ , respectively .

Statement of Problem and Substantiation for Public Input

All damp or wet located receptacles, whether for permanent or temporary installations, should be afforded the same code expectations. Current NEC text limits 590.4D2 to 15a and 20 amp receptacles in wet locations. Larger than 20 amp receptacles are installed and used at temporary job installations. The temporary installation may be in a damp or wet location. All the requirements of 406.9A and 406.9B could be applied to temporary installation receptacles.

Submitter Information Verification

Submitter Full Name: Norman Feck
Organization: State of Colorado
Affiliation: self
Street Address:
City:
State:
Zip:

Submittal Date: Fri Jul 21 18:16:23 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8882-NFPA 70-2024

Statement: Receptacles in wet locations are required to comply with 406.9(B). Article 590 does not modify this requirement. In accordance with the NEC Style Manual, section 4.1.1, general requirements in Chapters 1 through 4 shall not be repeated in other articles of the document.

Public Input No. 2302-NFPA 70-2023 [Section No. 590.4(F)]

(F) Lamp Protection.

All lamps for general illumination shall be protected from accidental contact or breakage by a ~~suitable luminaire or lampholder with a~~ guard.~~Metal~~

~~guarded sockets shall not be used unless the metal guard is~~ Exception: A guard is not required for non-replaceable LED lamps integral to a listed temporary lighting string.

Metal guarded sockets and metal guards secured to conductive enclosure parts shall be connected to the circuit equipment grounding conductor.

Statement of Problem and Substantiation for Public Input

The product standard used for listing of temporary lighting strings (UL 1088) now allows unguarded, non-replaceable (LED) lamps when the lighting string is tested for crush and impact resistance, and when no exposed surfaces exceed 90 C (clause 9.3). This revision was adopted by the UL 1088 Technical Committee in December 2013, with unanimous support. It recognizes that the mechanical and thermal safeguards needed to prevent damage to glass incandescent lamps and contact with their very hot surfaces are integral to the design and operation of newer LED lamps. Eliminating reliance on the size of guard openings, and on the guard being replaced after lamp replacement, improves overall equipment safety. This proposed revision encourages the use of these more state-of-the-art products.

The proposed revisions to the second paragraph of 590.4(F) reflect the bonding requirement of UL 1088 (clause 18.1.4) which should be applied whether the lighting string is listed or not. An editorial revision also removes the double negative ("shall not … unless") for easier reading.

Submitter Information Verification

Submitter Full Name:	Michael Shulman
Organization:	UL Solutions
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Tue Aug 15 18:18:16 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8883-NFPA 70-2024

Statement: An exception has been added for not requiring a guard for non-replaceable LED listed temporary lighting strings. The product standard for listing this temporary lighting string is UL 1088. Clarification has been made for metal guards.

Public Input No. 637-NFPA 70-2023 [Section No. 590.4(F)]

(F) Lamp Protection.

All lamps for general illumination shall be protected from accidental contact or breakage by a suitable luminaire or lampholder with a guard.

Metal ~~guarded sockets~~ guards of lampholders shall ~~not~~ be ~~used unless the metal guard is~~ connected to the circuit equipment grounding conductor.

Statement of Problem and Substantiation for Public Input

This editorial revision simplifies the second sentence by using correct terminology (what is a "socket") and changing negative text to positive text.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 17 11:45:19 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8883-NFPA 70-2024

Statement: An exception has been added for not requiring a guard for non-replaceable LED listed temporary lighting strings. The product standard for listing this temporary lighting string is UL 1088. Clarification has been made for metal guards.

Public Input No. 1816-NFPA 70-2023 [Section No. 590.4(G)]

(G) Splices.

A box, conduit body, or other enclosure, with a cover installed, shall be required for all splices.

Exception No. 1: On construction sites, a box, conduit body, or other enclosure shall not be required for either of the following conditions:

(1) The circuit conductors being spliced are all from nonmetallic multiconductor cord or cable assemblies, provided that the equipment grounding continuity is maintained with or without the box.

(2) The circuit conductors being spliced are all from metal-sheathed cable assemblies terminated in listed fittings that mechanically secure the cable sheath to maintain effective electrical continuity.

Exception No. 2: On construction sites, branch-circuits that are permanently installed in framed walls and ceilings and are used to supply temporary power or lighting,and that are GFCI protected, the following shall be permitted:

(1) A box cover shall not be required for splices installed completely inside of junction boxes~~ with plaster rings~~ , outlet boxes, or device boxes .

(2) Listed pigtail-type lampholders shall be permitted to be installed in ceiling-mounted junction boxes ~~with plaster rings~~ , outlet boxes, or device boxes .

(3) Finger safe devices shall be permitted for supplying and connection of devices.

Additional Proposed Changes

File Name	Description	Approved
590.4_G_.pdf	Splices on construction sites	

Statement of Problem and Substantiation for Public Input

Exception 1 presently allows for: (1) splices not in a junction box on construction where nonmetallic multiconductor cord or cable assemblies are used provided that the equipment grounding continuity is maintained with or without the box. (2) splices not in a junction box on construction sites for metal sheathed cable assemblies terminated in listed fittings that mechanically secure the cable sheath to maintain effective electrical continuity. This public input to revise exception 2 seeks to permit splices that are completely contained inside a junction box, outlet box, or device box with or without a plaster ring! These wires can be energized as safely as, and even safer than some other temporary power wiring.

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Sat Aug 05 08:35:56 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8889-NFPA 70-2024

Statement: Exception 2 is revised to permit splices that are completely contained inside a junction box, outlet box, or device box with or without a plaster ring.

590.4(G) *exception 2* permits these permanent wires to be energized for temporary power

LeBlanc Consulting Services

590.4(G) *exception 2* permits these permanent wires to be energized for temporary power

590.4(G) *exception 2 presently DOES NOT* permit these permanent wires to be energized for temporary power unless covered because this box does not have a plaster ring!

These wires should be permitted to be energized to provide temporary power too!

Public Input No. 2089-NFPA 70-2023 [Section No. 590.4(J)]

(J) Support.

Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage. Cable assemblies and flexible cords and cables installed as branch circuits or feeders shall not be installed on the floor or on the ground. ~~Extension cords~~ Cord sets shall not be required to comply with 590.4(J). Vegetation shall not be used for support of overhead spans of branch circuits or feeders.

Exception: For holiday lighting in accordance with 590.3(B), where the conductors or cables are arranged with strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch-circuit conductors or cables.

Statement of Problem and Substantiation for Public Input

The term ‘extension cords’ is not defined. Adding the word ‘cord sets’ to make the text technically correct. The term ‘cord set’ is an NEC Article 100 defined term.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 15:52:53 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Extension cord is a common term that is used by most people. An extension cord is a cord set, but not every cord set is an extension cord.

Public Input No. 4194-NFPA 70-2023 [Section No. 590.4(J)]

(J) Support.

(1) Protection from Physical Damage. Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage.

(2) Cords and Cables. Cable assemblies and flexible cords and cables installed as branch circuits or feeders shall not be installed on the floor or on the ground. Extension cords shall not be required to comply with 590.4(J).

(3) Vegetation Not Used for Support. Vegetation shall not be used for support of overhead spans of branch circuits or feeders.

Exception: For holiday lighting in accordance with 590.3(B), where the conductors or cables are arranged with strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch-circuit conductors or cables.

Statement of Problem and Substantiation for Public Input

Breaking up 590.4(J) into a list item format to facilitate understanding for Code users. In accordance with NFPA Style Manual section 3.5.1.2 additional subdivisions shall be used where multiple requirements can be broken into independent requirements.

Submitter Information Verification

Submitter Full Name: Mike Holt
Organization: Mike Holt Enterprises Inc
Street Address:
City:
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Zip:
Submittal Date: Wed Sep 06 20:40:24 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8894-NFPA 70-2024
Statement: In accordance with NFPA Style Manual, section 3.5.1.2, breaking up 590.4(J) into a list item format facilitates more user-friendly text.

Public Input No. 2048-NFPA 70-2023 [Section No. 590.6]

590.6 Ground-Fault Protection for Personnel.

Ground-fault protection for personnel for all temporary wiring installations shall be provided to comply with 590.6(A) and (B). This section shall apply only to temporary ~~wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This section shall apply to power derived~~ or permanently installed receptacle outlets supplied from an electric utility company or from an on-site ~~-generated~~ power source ~~.~~

~~**(A)** Receptacle Outlets.~~

~~Temporary receptacle installations~~ that is used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities ~~shall~~ . Temporary receptacle outlets shall comply with ~~the requirements of~~ 590.6(A) ~~(1) through (A)(3), as applicable.~~

~~Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in~~

and receptacles on generators 15KW or less must comply with 590.6(B)

~~(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.~~

~~(1~~

.

(A) Receptacle Outlets

~~Not Part of Permanent Wiring~~

~~.~~

All

~~125-volt, single-phase, 15-, 20-, and 30-ampere~~

receptacle outlets that are

~~not a part of the permanent wiring of the building or structure and that are in use~~

used by personnel shall have ground-fault circuit-interrupter protection for personnel. In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

Exception No.1: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6 (B)(2)

~~– Receptacle Outlets Existing or Installed as Permanent Wiring. Ground-fault circuit-interrupter protection for personnel~~

shall be

~~provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.~~

~~**(3)** Receptacles on 15-kW or less Portable Generators.~~

~~All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.~~

~~**(B)** Other Receptacle Outlets.~~

~~For temporary wiring installations, receptacles, other than those covered by 590.6(A)(1) through (A)(3) used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, or similar activities, shall have protection in accordance with 590.6(B)(1) or the assured equipment grounding conductor program in accordance with 590.6(B)(2) .~~

~~**(1)** GFCI Protection.~~

~~Ground-fault circuit-interrupter protection for personnel.~~

~~**(2)** Assured Equipment Grounding Conductor Program.~~

~~A~~

permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

Exception No. 2: For other than 125 volt, single phase, 15, 20 and 30 ampere receptacles, a written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114 , 250.138 , 406.4(C) , and 590.4(D) .

(a) The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord-and-plug-connected equipment required to be connected to an equipment grounding conductor:

(1) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(2) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(3) All required tests shall be performed as follows:

a. Before first use on site

b. When there is evidence of damage

c. Before equipment is returned to service following any repairs

d. At intervals not exceeding

~~3 months~~

3 months

(b) The tests required in 590.6(B)(2) (a) shall be recorded and made available to the authority having jurisdiction.

The assured equipment grounding conductor program shall be documented and made available to the authority having jurisdiction.

Informational Note:

See OSHA

~~29 CFR~~

29 CFR 1910 and 1926 for requirements for assured equipment grounding conductor programs. See

~~NFPA~~

NFPA 70E -2018, Standard for Electrical Safety in the Workplace , for additional information.

(B) Receptacles on 15KW or Less Portable Generators

All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.

Exception: Receptacles supplied from a portable gnerator in accordance with 545.20(A) Exception

Statement of Problem and Substantiation for Public Input

This public input is being submitted on behalf of the Minnesota Department of Labor and Industry. Currently, the Department's inspection staff includes 14-office/field staff, 12-state field inspectors, 2-virtual inspectors and 50 plus contract electrical inspectors that complete over 170,000 electrical inspections annually.

The proposed text is rewritten for clarity and usability. The text will clarify that all receptacles, regardless of amperage or voltage, that are used for temporary wiring during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities be GFCI protected. The rewritten text removes the redundant language, and technically, does not change the existing text. By including all receptacles in one location, it will draw attention to the requirement for "other receptacles" to have GFCI protection. The language in 590.6(B)(2) will still exist but will be relocated as exception No. 2 under (A).

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 11:50:30 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The submitter did not provide technical substantiation for requiring GFCI protection for all receptacles. The Panel disagrees that the proposed text would provide additional clarity.

Public Input No. 93-NFPA 70-2023 [Section No. 590.6]

590.6 Ground-Fault Protection for Personnel.

Ground-fault protection for personnel for all temporary wiring installations shall be provided to comply with 590.6(A) and (B). This section shall apply only to temporary wiring installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This section shall apply to power derived from an electric utility company or from an on-site-generated power source.

(A) Receptacle Outlets.

Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 590.6(A)(1) through (A)(3), as applicable.

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

(1) Receptacle Outlets Not Part of Permanent Wiring.

All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel. In addition to this required ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel, listed cord sets or devices incorporating listed ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel identified for portable use shall be permitted.

(2) Receptacle Outlets Existing or Installed as Permanent Wiring.

~~Ground-fault circuit-interrupter protection~~ GFCI protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel identified for portable use shall be permitted.

(3) Receptacles on 15-kW or less Portable Generators.

All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ~~ground-fault circuit-interrupter protection~~ GFCI protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.

(B) Other Receptacle Outlets.

For temporary wiring installations, receptacles, other than those covered by 590.6(A)(1) through (A)(3) used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, or similar activities, shall ~~have protection~~ have protection in accordance with 590.6(B)(1) or the assured equipment grounding conductor program in accordance with 590.6(B)(2).

(1) GFCI Protection.

~~Ground-fault circuit-interrupter protection for personnel.~~

(2) Assured Equipment Grounding Conductor Program.

A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114, 250.138, 406.4(C), and 590.4(D).

(a) The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord-and-plug-connected equipment required to be connected to an equipment grounding conductor:

(2) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(3) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(4) All required tests shall be performed as follows:

- (5) Before first use on site
- (6) When there is evidence of damage
- (7) Before equipment is returned to service following any repairs
- (8) At intervals not exceeding 3 months

(i) The tests required in 590.6(B)(2)(a) shall be recorded and made available to the authority having jurisdiction.

The assured equipment grounding conductor program shall be documented and made available to the authority having jurisdiction.

Informational Note: See OSHA 29 CFR 1910 and 1926 for requirements for assured equipment grounding conductor programs. See NFPA *70E*-2018, *Standard for Electrical Safety in the Workplace*, for additional information.

Statement of Problem and Substantiation for Public Input

Only editorial changes here. No technical changes here. This revision merely seeks to mimic the language being used throughout the Code when it comes to GFCI protection.

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 11 10:10:47 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8896-NFPA 70-2024

Statement: Clarifications were made to the requirements by changing permissive text to exceptions. The acronym "GFCI" has also been used, as it is previously defined in the section.

Public Input No. 3084-NFPA 70-2023 [Section No. 590.6(A)]

(A) Receptacle Outlets.

Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 590.6(A)(1) through (A)(3), as applicable.

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

(1) Receptacle Outlets Not Part of Permanent Wiring.

All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel. ~~In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.~~

(2) Receptacle Outlets Existing or Installed as Permanent Wiring.

Ground-fault circuit-interrupter protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. ~~Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.~~

(3) Receptacles on 15-kW or less Portable Generators.

All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). ~~Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.~~

Statement of Problem and Substantiation for Public Input

Delete this sentence in 590.6(A)(1), (2), and (3) because it gives the impression that GFCI protection is not required if you use a listed cord set with GFCI protection. Also, there is no reason to what is permitted in a rule.

Submitter Information Verification

Submitter Full Name: Mike Holt
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Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 11:14:31 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8896-NFPA 70-2024

Statement: Clarifications were made to the requirements by changing permissive text to exceptions. The acronym "GFCI" has also been used, as it is previously defined in the section.

Public Input No. 95-NFPA 70-2023 [Section No. 590.6(A)]

(A) Receptacle Outlets.

Temporary receptacle installations used to supply temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities shall comply with the requirements of 590.6(A)(1) through (A)(3), as applicable.

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power were interrupted or having a design that is not compatible with GFCI protection.

(1) Receptacle Outlets Not Part of Permanent Wiring.

All 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel. In addition to this required ground-fault circuit-interrupter protection for personnel, listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(2) Receptacle Outlets Existing or Installed as Permanent Wiring.

Ground-fault circuit-interrupter protection for personnel shall be provided for all 125-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets installed or existing as part of the permanent wiring of the building or structure and used for temporary electric power. Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted.

(3) Receptacles on 15-kW or less Portable Generators.

All 125-volt and 125/250-volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a 15-kW or smaller portable generator shall have listed ground-fault circuit-interrupter protection for personnel. All 15- and 20-ampere, 125- and 250-volt receptacles, including those that are part of a portable generator, used in a damp or wet location shall comply with 406.9(A) and (B). Listed cord sets or devices incorporating listed ground-fault circuit-interrupter protection for personnel identified for portable use shall be permitted for use with 15-kW or less portable generators manufactured or remanufactured prior to January 1, 2015.

Exception to (1),(2), and (3): GFCI protection shall not be required for receptacles on circuits having ratings below the low-voltage contact limit

Statement of Problem and Substantiation for Public Input

The revision seeks to add an exception to provide relief from the GFCI protection requirements for low-voltage receptacles. Similar provisions exist throughout Article 680 for low voltage swimming pool equipment. The same provisions should be applied here.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 94-NFPA 70-2023 [Section No. 590.6(B)(1)]	GFCI protection
Public Input No. 94-NFPA 70-2023 [Section No. 590.6(B)(1)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 11 10:40:10 EST 2023

Committee: NEC-P03

Committee Statement

Resolution: Submitter has not offered any technical reasons or substantiation for the proposed exception. This section is for temporary wiring at 120 V, not low voltage applications.

Public Input No. 94-NFPA 70-2023 [Section No. 590.6(B)(1)]

(1) GFCI Protection ~~.~~

~~Ground-fault circuit-interrupter protection for personnel.~~

and SPGFCI Protection

(a) 150 Volts or Less to Ground.

Receptacles on circuits rated 150 volts or less to ground and 60 amperes or less, single- or 3-phase, shall be provided with a Class A GFCI.

Exception : GFCI protection shall not be required for receptacles on circuits having ratings below the low-voltage contact limit

(b) Above 150 Volts to Ground.

Receptacles on circuits operating at voltages above 150 volts to ground, not exceeding 480 volts phase-to-phase, single- or 3-phase, shall be provided with SPGFCI protection not to exceed 20-mA ground-fault trip current.

Statement of Problem and Substantiation for Public Input

This revision seeks to allow low-voltage receptacles without GFCI protection and seeks to permit SPGFCI protection for receptacles on circuits above 150 volts to ground. This will be very similar to the GFCI and SPGCI protection requirements specified in Section 680.5 for swimming pool equipment. Similar provisions should be permitted here for temporary power.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 95-NFPA 70-2023 [Section No. 590.6(A)]	GFCI / SPGFCI protection
Public Input No. 95-NFPA 70-2023 [Section No. 590.6(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
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Zip:
Submittal Date: Wed Jan 11 10:25:47 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Submitter has not offered any technical reasons or substantiation, such as electrocution data for these voltage ranges on temporary systems.

Public Input No. 1512-NFPA 70-2023 [Section No. 590.8(A)]

(A) Where Reused.

Overcurrent protective devices that have been previously used and are installed in a temporary installation shall be examined to ensure they have been properly ~~installedand~~ installed and properly maintained, and there is no evidence of impending failure.

Informational Note: See the following standards for further information for properly maintained equipment:

(1) NEMA AB 4, *Guidelines for Inspection and Preventive Maintenance of Molded-Case Circuit Breakers Used in Commercial and Industrial Applications*

(2) NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*

(3) NEMA GD 1, *Evaluating Water-Damaged Electrical Equipment*

(4) IEEE 1458, *IEEE Recommended Practice for the Selection, Field Testing, and Life Expectancy of Molded-Case Circuit Breakers for Industrial Applications*

Statement of Problem and Substantiation for Public Input

a space was needed between 'installed' and 'and'

Submitter Information Verification

Submitter Full Name: IEC National
Organization: IEC
Affiliation: Jake Gray
Street Address:
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State:
Zip:
Submittal Date: Sat Jul 22 14:35:53 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8919-NFPA 70-2024
Statement: A space is added between "installed" and "and".

Public Input No. 3673-NFPA 70-2023 [Article 722]

Article 722 Cables for Power-Limited Circuits and Fault-Managed Power Circuits

Part I. General

722.1 Scope.

This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits.

722.3 Other Articles.

In addition to the requirements of this article, installation of cables shall comply with the articles or sections listed in 722.3(A) through (O). Only those sections of Article 300 referenced in this article shall apply.

(A) Installation of Cables and Conductors in Raceway.

The number and size of conductors and cables, as well as raceway sizing, shall comply with 300.17.

~~**(**~~

~~B) Spread of Fire or Products of Combustion.~~

~~Installation of power-limited circuits shall comply with 300.21 .~~

~~**(C)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Power-limited circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22 .~~

~~*Exception No. 1: Cables selected in accordance with Table 722.135(B) and installed in accordance with 300.22(B) , Exception shall be permitted to be installed in ducts specifically fabricated for environmental air.*~~

~~*Exception No. 2: Cables selected in accordance with Table 722.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).*~~

~~**(D)** Cables in Ducts for Dust, Loose Stock, or Vapor Removal.~~

~~Section 300.22(A) for wiring systems shall apply.~~

~~*Exception: Nonconductive optical fiber cables shall be permitted in ducts used for dust, loose stock, or vapor removal.*~~

(

E) Cable Trays.

Cable tray installations shall comply with Parts I and II of Article 392 .

(F) Instrumentation Tray Cable.

Circuits wired using instrumentation tray cable shall comply with 335.1 and 335.4 through 335.9 .

(G) Raceways or Sleeves Exposed to Different Temperatures.

Section 300.7(A) shall apply.

(H) Vertical Support for Fire-Resistive Cables and Conductors.

Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems and fire resistive-cable systems shall be installed in accordance with 300.19 .

(

~~I) Installation of Cables with Other Systems.~~

~~Section 300.8 shall apply.~~

~~**J)** Corrosive, Damp, or Wet Locations.~~

~~The installation of power-limited cables shall comply with the applicable requirements in 110.11 , 300.5(B) , 300.6 , 300.9 , and 310.10(F) when installed in corrosive, damp, or wet locations.~~

~~**(K)** Cable Routing Assemblies.~~

~~Cables installed in cable routing assemblies shall be selected in accordance with Table 800.154(c) , listed in accordance with 800.182 , and installed in accordance with 800.110(C)(1)), 800.110(C)(2) , and 800.113 .~~

~~**(L)** Communications Raceways.~~

~~Cables communications raceways shall be selected in accordance with Table 800.154(b) , listed in accordance with 800.182, and installed in accordance with 800.113 and 362.24 through 362.56 , where the requirements applicable to electrical nonmetallic tubing (ENT) apply.~~

~~**(M)** Temperature Limitation of Cables.~~

~~The requirements of 310.14(A)(3) on the temperature limitation of conductors shall apply to power-limited circuit cables and fault-managed power cables.~~

~~**(N)** Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

~~*Exception: Cables that do not contain an equipment grounding conductor shall be permitted to use a conductor with green insulation, or green insulation with one or more yellow stripes, for other than equipment grounding purposes.*~~

~~**(O)** Specific Requirements.~~

~~As appropriate, the installation of wires and cables shall also comply with the following:~~

(1) ~~Class 2 and Class 3 cables — Part II of Article 725~~

(2) ~~Class 4 cables — Part IV of Article 726~~

(3) ~~Fire alarm cables — Part III of Article 760~~

(4) ~~Optical fiber cables — Part V of Article 770~~

~~***722.***~~

~~10 Hazardous (Classified) Locations.~~

~~Class 4 cables shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles of this *Code* .~~

~~722.~~

~~**12** Uses Not Permitted.~~

~~Class 4 cables shall not be permitted for any applications that are not part of a Class 4 system.~~

~~*Exception: Use of Class 4 cable for other applications shall be permitted if the cable has been listed as suitable for the other applications.*~~

~~***722.***~~

~~21 Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of cables that prevents removal of panels, including suspended ceiling panels.~~

~~722.~~

~~**24** Mechanical Execution of Work.~~

~~(~~

~~A) General.~~

~~Cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11 .~~

~~A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C) .~~

~~Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C) .~~

~~Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems* , for discrete combustible components.~~

~~Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.~~

~~(~~

~~**B)** Support of Cables.~~

~~Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.~~

~~*Exception No. 1: Class 2 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2) .*~~

~~*Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.*~~

~~**(C)** Circuit Integrity (CI) Cable.~~

~~Circuit integrity (CI) cable shall be supported at a distance not exceeding 610 mm (24 in.). Cable shall be secured to the noncombustible surface of the building structure. Cable supports and fasteners shall be steel.~~

~~*722.*~~

~~25 Abandoned Cables.~~

~~The accessible portion of abandoned cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.~~

~~722.~~

~~**31** Safety-Control Equipment.~~

~~Where damage to power-limited circuits can result in a failure of safety-control equipment that would introduce a direct fire or life hazard, the power limited circuits shall be installed using Class 1 circuit wiring methods in accordance with 724.46 . All conductors of such circuits shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, Type MI cable, or Type MC cable, or be otherwise suitably protected from physical damage.~~

~~**722.135** Installation of Cables.~~

~~The installation of cables shall comply with 722.135(A) through (I), as applicable.~~

~~**(A)** Listing.~~

~~Cables installed in buildings shall be listed.~~

~~**(B)** Cables in Buildings.~~

~~The installation of cables shall comply with Table 722.135(B) .~~

~~Table 722.135(B) Installation of Listed Cables in Buildings~~

- -

~~Applications~~		~~Cable Type~~ [1]					
		~~Plenum~~	~~Riser~~	~~General-Purpose~~	~~Limited-Use~~	~~Under Carpet~~	~~PLTC~~
~~In ducts specifically fabricated for environmental air as described in 300.22(B)~~ [2]	~~Cables in lengths as short as practicable to perform the required function~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~In metal raceway that complies with 300.22(B)~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
~~In other spaces used for environmental air (plenums) as described in 300.22(C)~~	~~Cables in other spaces used for environmental air~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in metal raceway that complies with 300.22(C)~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
	~~Cables in plenum communications raceways~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in plenum cable routing assemblies~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables supported by open metal cable trays~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
~~In risers and vertical runs~~	~~Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in metal raceways~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
	~~Cables in fireproof shafts~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
	~~Cables in plenum communications raceways~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in plenum cable routing assemblies~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in riser communications raceways~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in riser cable routing assemblies~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~N~~	~~N~~
	~~Cables in one- and two-family dwellings~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~ [3]	~~N~~	~~Y~~
~~Cables and innerducts installed in metal raceways in a riser having~~	~~Cables~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
	~~Cables in plenum communications raceways (innerduct)~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~

		~~Cable Type~~ [1]					
~~Applications~~		~~Plenum~~	~~Riser~~	~~General-Purpose~~	~~Limited-Use~~	~~Under Carpet~~	~~PLTC~~
~~firestops at each floor~~ [2]	~~Cables in riser communications raceways (innerduct)~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
	~~Cables in general-purpose communications raceways (innerduct)~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
~~In fireproof riser shafts having firestops at each floor~~ [2]	~~Cables~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
	~~Cables in plenum communications raceways or plenum cable routing assemblies~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
	~~Cables in riser communications raceways or riser cable routing assemblies~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
	~~Cables in general-purpose communications raceways or general-purpose cable routing assemblies~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
~~In cable trays~~	~~Outdoors~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~Y~~
	~~Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
~~In cross-connect arrays~~	~~Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~N~~	~~Y~~
~~In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above~~	~~Cables~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~ [3]	~~N~~	~~Y~~
	~~Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~N~~	~~Y~~
	~~Cables in nonconcealed spaces~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~ [4]	~~Y~~	~~Y~~

-

~~Under carpet, floor covering, modular flooring, and planks~~	~~N~~	~~N~~	~~N~~	~~N~~	~~Y~~	~~N~~

~~[1] "N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).~~

~~[2] In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.~~

~~[3] Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).~~

~~[4] The exposed length of cable shall not exceed 3.05 m (10 ft).~~

> ~~Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems* , 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).~~
>
> ~~Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.~~
>
> ~~Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.~~
>
> ~~Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways* , for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.~~

~~**(C)** Industrial Establishments.~~

~~In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either of the following:~~

(1) ~~Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as Type PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Where not subject to physical damage, Type PLTC-ER cable 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.~~

(2) ~~Type PLTC cable, with a metallic sheath or armor in accordance with 722.179(A)(6) , shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).~~

~~**(D)** In Hoistways.~~

~~In hoistways, cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21 .~~

~~**(E)** Cable Substitutions.~~

~~The substitutions for cables listed in Table 722.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in 722.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See 722.135(F) .~~

~~Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.~~

~~Table 722.135(E) Cable Substitutions~~

~~**Cable Type**~~	~~**Permitted Substitutions**~~
~~CL3P~~	~~CMP~~
~~CL2P~~	~~CMP, CL3P~~
~~CL3R~~	~~CMP, CL3P, CMR~~
~~CL2R~~	~~CMP, CL3P, CL2P, CMR, CL3R~~
~~PLTC~~	~~None~~
~~CL3~~	~~CMP, CL3P, CMR, CL3R, CMG, CM, PLTC~~
~~CL2~~	~~CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3~~
~~CL3X~~	~~CMP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX~~
~~CL2X~~	~~CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X~~
~~FPLP~~	~~CMP~~
~~FPLR~~	~~CMP, FPLP, CMR~~
~~FPL~~	~~CMP, FPLP, CMR, FPLR, CMG, CM~~
~~OFNP~~	~~None~~
~~OFCP~~	~~OFNP~~
~~OFNR~~	~~OFNP~~
~~OFCR~~	~~OFNP, OFCP, OFNR~~
~~OFNG, OFN~~	~~OFNP, OFNR~~
~~OFCG, OFC~~	~~OFNP, OFCP, OFNR, OFCR, OFNG, OFN~~
~~CMUC~~	~~None~~

~~**(F)** Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.~~

~~CI cable, a fire-resistive cable system, or a listed electrical circuit protective system shall be permitted for use in systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.~~

~~**(G)** Thermocouple Circuits.~~

~~Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.~~

~~**(H)** Bundling of 4-Pair Cables Transmitting Power and Data.~~

~~Where 4-pair cables are used to transmit power and data to a powered device, 725.144 shall apply.~~

~~**(I)** Installation of Circuit Conductors Extending Beyond One Building.~~

~~Circuit conductors that extend beyond one building and are run such that they are subject to accidental contact with electric light or power conductors operating over 300 volts to ground, or are exposed to lightning on interbuilding circuits on the same premises, shall comply with the following:~~

(1) ~~For other than coaxial conductors, 800.44 , 800.53 , 800.100 , 805.50 , 805.93 , 805.170(A) , and 805.170(B)~~

(2) ~~For coaxial conductors, 800.44 , 820.93 , and 820.100~~

(3) ~~The installation requirements of Part I of Article 300~~

~~**Part II.** Listing Requirements~~

~~**722.179** Listing and Marking of Cables.~~

~~Cables installed in buildings shall be listed in accordance with 722.179(A) and marked in accordance with 722.179(B) , and they shall be permitted to be marked in accordance with 722.179(C) .~~

~~*Exception: Optical fiber cables that are installed in compliance with 770.48 shall not be required to be listed.*~~

~~**(A)** Listing of Cables.~~

~~Cables installed as wiring methods within buildings shall be listed as resistant to the spread of fire and other criteria in accordance with 722.179(A)(1) through (A)(16).~~

> ~~Informational Note No. 1: See UL 13, *Standard for Power-Limited Circuit Cables* , for applicable requirements for listing of Class 2 and Class 3 cable and power-limited tray cable (PLTC).~~
>
> ~~Informational Note No. 2: See UL 1424, *Cables for Power-Limited Fire-Alarm Circuits* , for applicable requirements for listing of power-limited fire alarm cable.~~
>
> ~~Informational Note No. 3: See UL 1651, *Optical Fiber Cable* , for applicable requirements for listing of optical fiber cable.~~
>
> ~~Informational Note No. 4: See UL 1400-2, *Outline for Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables* , for applicable requirements for listing of Class 4 cable.~~

~~**(1)** Plenum Cable.~~

~~Plenum cable shall be listed as suitable for use in ducts, plenums, and other space for environmental air and shall be listed as having adequate fire-resistant and low-smoke producing characteristics. Refer to Table 722.179(B) for plenum cable types.~~

> ~~Informational Note: See NFPA 262-2019, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces* , for the test method used to determine that a cable is low-smoke producing and fire resistant, exhibiting a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less.~~

~~**(2)** Riser Cable.~~

~~Riser cable shall be listed as suitable for use in a vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.~~

> ~~Informational Note: See ANSI/UL 1666-2012, *Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts* , for the cable requirements defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.~~

~~**(3)** General-Purpose Cable.~~

~~General-purpose cable shall be listed as resistant to the spread of fire and as suitable for general-purpose use, except for use in risers, ducts, plenums, and other space used for environmental air.~~

> ~~Informational Note: See UL 2556, *Wire and Cable Test Methods* , for defining resistant to the spread of fire. One method is to demonstrate that the cables do not spread fire to the top of the tray in the UL Flame Exposure, Vertical Tray Flame Test. The smoke measurements in the test method are not applicable.~~
>
> ~~A method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the FT4 Vertical Flame Test.~~

~~**(4)** Alternative General-Purpose Cable.~~

~~Alternative general-purpose optical fiber cable shall be listed as suitable for general-purpose use, with the exception of risers and plenums, and shall also be resistant to the spread of fire.~~

> ~~Informational Note: See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables* , for the CSA vertical flame test — cables in cable trays, that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).~~

~~**(5)** Limited-Use Cable.~~

~~Limited-use cable shall be listed as suitable for use in dwellings and raceways and shall be listed as resistant to flame spread.~~

~~Informational Note: See ANSI/UL 2556, *Standard for Wire and Cable Test Methods,* for one method of determining that cable is resistant to flame spread by testing the cable to the FV-2/VW-1 test.~~

~~**(6)** Type PLTC.~~

~~Type PLTC nonmetallic-sheathed, power-limited tray cable shall be listed as being suitable for cable trays, resistant to the spread of fire, and sunlight- and moisture-resistant. Type PLTC cable used in a wet location shall be listed for use in wet locations and marked “wet” or “wet location.”~~

~~Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables* , for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.~~

~~See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables* , for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).~~

~~**(7)** Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.~~

~~Cables that are used for survivability of critical circuits under fire conditions shall comply with either 722.179(A)(7)(a) , (A)(7)(b), or (A)(7)(c).~~

~~Informational Note: See *NFPA 72* , *National Fire Alarm and Signaling Code* , 12.4.3 and 12.4.4, for additional information on fire alarm CI cable, fire-resistive cable systems, or electrical circuit protective systems used for fire alarm circuits to comply with the survivability requirements to maintain the circuit's electrical function during fire conditions for a defined period of time.~~

(a) ~~*CI Cables* . CI cables of the types specified in 722.179(A)(1) , (A)(2), (A)(3), (A)(4), and (A)(6) and used for survivability of critical circuits shall be marked with the additional classification using the suffix "CI." To maintain its listed fire-resistive rating, CI cable shall only be installed in free air in accordance with 722.24(C) . CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of a fire-resistive cable system as covered in 722.179(A)(7)(b) .~~

~~Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables,* and UL 1425, *Cables for Non–Power-Limited Fire-Alarm Circuits* , for information on establishing a rating for CI cable. The *UL Guide Information for Nonpower-limited Fire Alarm Circuits* (HNHT) contains information to identify the cable and its installation limitations to maintain the fire-resistive rating.~~

(b) ~~*Fire-Resistive Cables* . Fire-resistive cables of the types specified in 722.179(A)(1) , (A)(2), (A)(3), (A)(4), (A)(6), and (A)(7)(a) that are part of a fire-resistive cable system shall be identified with the system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the system.~~

~~Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables* , for information on establishing a rating for a fire-resistive cable system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain a minimum fire-resistive rating.~~

(c) ~~*Electrical Circuit Protective System* . Protectants for cables of the types specified in 722.179(A)(1) , (A)(2), (A)(3), (A)(4), and (A)(6) that are part of an electrical circuit protective system shall be identified with the protective system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the protective system.~~

~~Informational Note: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems,* for information on establishing a rating for an electrical circuit protective system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information to identify the system and its installation limitations to maintain the fire-resistive rating.~~

~~**(8)** Class 3 Single Conductors.~~

~~Class 3 single conductors used as other wiring within buildings shall be listed Type CL3 and shall not be smaller than 18 AWG.~~

~~Informational Note: See ANSI/UL 1685-2010, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables* , for the UL flame exposure, vertical tray flame test that is used to determine resistance to the spread of fire when cables do not spread fire to the top of the tray. The smoke measurements in the test method are not applicable.~~

~~See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables* , for the CSA vertical flame test — cables in cable trays that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).~~

~~(9) Limited Power (LP) Cable.~~

~~Class 2 and Class 3 LP cables shall be listed as suitable for carrying power and data up to a specified current limit for each conductor without exceeding the temperature rating of the cable. The cables shall be marked with the suffix "-LP (XXA)" where XXA designates the current limit in amperes per conductor.~~

~~Informational Note: An example of the marking on 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP (0.6A) 75°C 23 AWG 4-pair."~~

~~(10) Undercarpet Cables.~~

~~Undercarpet cable shall be listed as suitable for use under carpet, floor covering, modular tiles, and planks.~~

~~Informational Note: See UL 444, *Standard for Safety for Communications Cables* , for the compressive loading test used to determine the suitability of cable for undercarpet use.~~

~~(11) Wet Locations.~~

~~Cable used in a wet location shall be listed for use in wet locations and be marked "wet" or "wet location" or have a moisture-impervious metal sheath.~~

~~(12) Field-Assembled Optical Fiber Cables.~~

~~Field-assembled optical fiber cable shall comply with 722.179(A)(12)(a) through (d).~~

(a) ~~The specific combination of jacket and optical fibers intended to be installed as a field-assembled optical fiber cable shall be one of the types in 722.179(A)(1) , (A)(2), or (A)(3) and shall be marked in accordance with Table 179(B).~~

(b) ~~The jacket of a field-assembled optical fiber cable shall have a surface marking indicating the specific optical fibers with which it is identified for use.~~

(c) ~~The optical fibers shall have a permanent marking, such as a marker tape, indicating the jacket with which they are identified for use.~~

(d) ~~The jacket without fibers shall meet the listing requirements for communications raceways in 800.182(A) , (B), or (C) in accordance with the cable marking.~~

~~(13) Cables Containing Optical Fibers.~~

~~Composite optical fiber cables shall be listed as electrical cables based on the type of electrical conductors.~~

~~(14) Class 2 and Class 3 Cable Voltage and Temperature Ratings.~~

~~Class 2 cables shall have a voltage rating of not less than 150 volts. Class 3 cables shall have a voltage rating of not less than 300 volts. Class 2 and Class 3 cables shall have a temperature rating of not less than 60°C (140°F).~~

~~(15) Power-Limited Fire Alarm (PLFA) Cables.~~

~~PFLA cables shall comply with 722.179(A)(15)(a) through (A)(15)(d).~~

(1) ~~Conductors for cables, other than coaxial cables, shall be solid or stranded copper. Coaxial cables shall be permitted to use 30 percent conductivity copper-covered steel center conductor wire.~~
(2) ~~The size of conductors in a multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG. Conductors of 26 AWG shall be permitted only where spliced with a connector listed as suitable for 26 AWG to 24 AWG or larger conductors that are terminated on equipment or where the 26 AWG conductors are terminated on equipment listed as suitable for 26 AWG conductors.~~
(3) ~~Cables shall have a voltage rating of not less than 300 volts.~~
(4) ~~Cables shall have a temperature rating of not less than 60°C (140°F).~~

~~(16) Class 4 Cable Construction.~~

~~(1) Sizes.~~

~~Conductors of sizes not smaller than 24 AWG shall be permitted to be used.~~

~~**(2)** Insulation.~~

~~Insulation on conductors shall be rated not less than 450 volts dc.~~

~~**(3)** Voltage Rating.~~

~~Cables shall have a voltage rating of not less than 450 volts dc. Voltage ratings shall not be marked on the cables.~~

~~**(4)** Temperature Rating.~~

~~Cables shall have a temperature rating of not less than 60°C (140°F).~~

~~**(5)** Cabling.~~

~~Cables shall comply with any requirements provided in the listing of the system.~~

> ~~Informational Note: See UL 1400-1, *Outline for Fault-Managed Power Distribution Technologies — Part 1: General Requirements*, for information on determining applicable requirements for the listing of Class 4 power systems. Excessive cable lengths can result in higher capacitance which could affect the safety of the circuit.~~

~~**(B)** Marking.~~

~~Cables shall be durably marked on the surface in accordance with the following:~~

(1) ~~The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).~~

(2) ~~All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).~~

(3) ~~The proper type designation for the type of cable shall be marked in accordance with Table 722.179(B) .~~

(4) ~~The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.~~

(5) ~~The AWG size or circular mil area shall be marked.~~

~~Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.~~

(6) ~~The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.~~

~~Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.~~

(7) ~~Voltage ratings shall not be marked on the cables.~~

~~*Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.*~~

~~Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.~~

~~Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.~~

~~Table 722.179(B) Cable Type Markings~~

~~**Cable Type**~~	~~**Cable Marking**~~
~~Class 4 plenum cable~~	~~CL4P~~
~~Class 3 plenum cable~~	~~CL3P~~
~~Class 2 plenum cable~~	~~CL2P~~
~~Power-limited fire alarm plenum cable~~	~~FPLP~~
~~Nonconductive optical fiber plenum cable~~	~~OFNP~~
~~Conductive optical fiber plenum cable~~	~~OFCP~~
~~Class 4 riser cable~~	~~CL4R~~
~~Class 3 riser cable~~	~~CL3R~~
~~Class 2 riser cable~~	~~CL2R~~
~~Power-limited fire alarm riser cable~~	~~FPLR~~
~~Nonconductive optical fiber riser cable~~	~~OFNR~~
~~Conductive optical fiber riser cable~~	~~OFCR~~
~~Class 4 general-purpose cable~~	~~CL4~~
~~Class 3 general-purpose cable~~	~~CL3~~
~~Class 2 general-purpose cable~~	~~CL2~~
~~Power-limited fire alarm cable~~	~~FPL~~
~~Nonconductive general-purpose optical fiber cable~~	~~OFN~~
~~Conductive general-purpose optical fiber cable~~	~~OFC~~
~~Alternative nonconductive general-purpose optical fiber cable~~	~~OFNG~~
~~Alternative conductive general-purpose optical fiber cable~~	~~OFCG~~
~~Class 3 cable — limited use~~	~~CL3X~~
~~Class 2 cable — limited use~~	~~CL2X~~

~~Cable Type~~	~~Cable Marking~~
~~Undercarpet cable~~	~~CMUC~~

~~Note: All types of CL2, CL3, and FPL cables containing optical fibers are provided with the suffix "-OF."~~

~~**(C)** Optional Markings.~~

~~Cables shall be permitted to be surface marked to indicate special characteristics of the cable materials.~~

~~Informational Note No. 1: Examples of these characteristics include, but are not limited to, limited smoke, halogen free, low smoke and halogen free, and sunlight resistant.~~

~~Informational Note No. 2: Some examples of optional markings are ST1 to indicate limited smoke characteristics. See UL 2556, *Wire and Cable Test Methods* ; HF to indicate halogen free. See in UL 2885, *Outline of Investigation for Acid Gas, Acidity and Conductivity of Combusted Materials* ; and LSHF to indicate halogen free and low-smoke characteristics. See IEC 61034-2, *Measurement of smoke density of cables burning under defined conditions — Part 2: Test procedure and requirements* .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx	Substantiation	

Statement of Problem and Substantiation for Public Input

This PI is submitted as part of the work of the 722 Limited Energy Task group. It deletes text that was relocated by the TG. See the attachment for the substantiation from the overall TG.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3674-NFPA 70-2023 [Article 724]	
Public Input No. 3684-NFPA 70-2023 [Article 725]	
Public Input No. 3686-NFPA 70-2023 [Article 726]	
Public Input No. 3687-NFPA 70-2023 [Article 760]	
Public Input No. 3690-NFPA 70-2023 [Article 770]	
Public Input No. 3694-NFPA 70-2023 [Chapter 8]	

Submitter Information Verification

Submitter Full Name: Chad Jones
Organization: Cisco Systems
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Submittal Date: Tue Sep 05 13:29:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8611-NFPA 70-2024

Statement: A new article was created to relocate all cable requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

The revision incorporates cabling requirements from Article 770 and Chapter 8.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

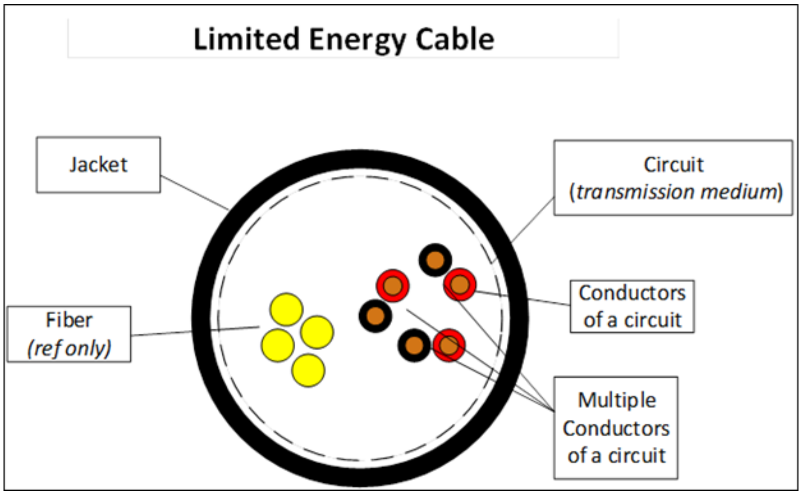
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

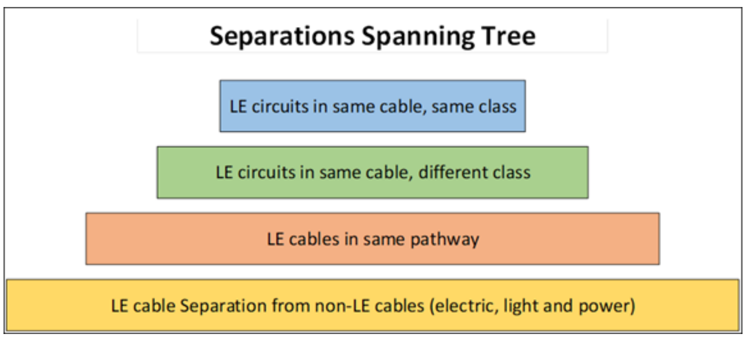
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]

722.9 Qualified Persons.

Cables of power-limited systems and fault-managed power systems covered by this Article shall be installed by Qualified Persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Technology in the limited energy and communications system segments of the electrical industry is rapidly evolving and expanding and is becoming more complicated. These systems require far more training and experience. These systems are often part of essential electrical systems and critical operations power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. ANSI standards such as NFPA 72, NECA 301 and others, address these systems and include requirements that qualified persons perform installations of these systems and equipment, so these new NEC requirements are proposed to correlate and align with those ANSI-accredited industry standards and codes. See companion PIs.

Licensing and regulatory agencies are developing new examinations and will be updating existing exams for state and other licensing to increase qualification credentials related to growth and advancement in this segment of the electrical industry. Certification organizations have indicated they anticipate following the same course of action. Qualified contractors and installers are a crucial element of safety related to these installations and systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

Submitter Information Verification

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Submittal Date: Fri Jul 28 19:26:47 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Due to the breadth and diversity of systems within the scope of Article 722, including power-limited and fault-managed systems, the proposed text would apply too broadly.

Public Input No. 2945-NFPA 70-2023 [Section No. 722.3]

722.3 Other Articles.

In addition to the requirements of this article, installation of cables shall comply with the articles or sections listed in 722.3(A) through (O). Only those sections of Article 300 referenced in this article shall apply.

(A) Installation of Cables and Conductors in Raceway.

The number and size of conductors and cables, as well as raceway sizing, shall comply with 300.17.

(B) Spread of Fire or Products of Combustion.

Installation of power-limited circuits shall comply with 300.21.

(C) Ducts, Plenums, and Other Air-Handling Spaces.

Power-limited circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22.

Exception No. 1: Cables selected in accordance with Table 722.135(B) and installed in accordance with 300.22(B), Exception shall be permitted to be installed in ducts specifically fabricated for environmental air.

Exception No. 2: Cables selected in accordance with Table 722.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).

(D) Cables in Ducts for Dust, Loose Stock, or Vapor Removal.

Section 300.22(A) for wiring systems shall apply.

Exception: Nonconductive optical fiber cables shall be permitted in ducts used for dust, loose stock, or vapor removal.

(E) Cable Trays.

Cable tray installations shall comply with Article 392, Parts I and II ~~of Article 392~~ .

(F) Instrumentation Tray Cable.

Circuits wired using instrumentation tray cable shall comply with 335.1 and 335.4 through 335.9.

(G) Raceways or Sleeves Exposed to Different Temperatures.

Section 300.7(A) shall apply.

(H) Vertical Support for Fire-Resistive Cables and Conductors.

Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems and fire resistive-cable systems shall be installed in accordance with 300.19.

(I) Installation of Cables with Other Systems.

Section 300.8 shall apply.

(J) Corrosive, Damp, or Wet Locations.

The installation of power-limited cables shall comply with the applicable requirements in 110.11, 300.5(B), 300.6, 300.9, and 310.10(F) when installed in corrosive, damp, or wet locations.

(K) Cable Routing Assemblies.

Cables installed in cable routing assemblies shall be selected in accordance with Table 800.154(c), listed in accordance with 800.182, and installed in accordance with 800.110(C)(1)), 800.110(C)(2), and 800.113.

(L) Communications Raceways.

Cables communications raceways shall be selected in accordance with Table 800.154(b), listed in accordance with 800.182, and installed in accordance with 800.113 and 362.24 through 362.56, where the requirements applicable to electrical nonmetallic tubing (ENT) apply.

(M) Temperature Limitation of Cables.

The requirements of 310.14(A)(3) on the temperature limitation of conductors shall apply to power-limited circuit cables and fault-managed power cables.

(N) Identification of Equipment Grounding Conductors.

Equipment grounding conductors shall be identified in accordance with 250.119.

Exception: Cables that do not contain an equipment grounding conductor shall be permitted to use a conductor with green insulation, or green insulation with one or more yellow stripes, for other than equipment grounding purposes.

(O) Specific Requirements.

As appropriate, the installation of wires and cables shall also comply with the following:

(1) Class 2 and Class 3 cables — ~~Part II of~~ Article 725, Part II

(2) Class 4 cables — ~~Part IV of~~ Article 726 , Part IV

(3) Fire alarm cables — ~~Part III of~~ Article 760 , Part III

(4) Optical fiber cables — ~~Part V of~~ Article 770 , Part V

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date:	Mon Aug 28 12:58:37 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8282-NFPA 70-2024 - See also the revision on 722.3(O).

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3454-NFPA 70-2023 [Sections 722.3(B), 722.3(C), 722.3(D)]

~~**Sections 722.3(B), 722.3(C), 722.3(D)**~~

~~**(B)** Spread of Fire or Products of Combustion.~~

~~Installation of power-limited circuits shall comply with 300.21 .~~

~~**(C)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Power-limited circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22 .~~

~~*Exception No. 1: Cables selected in accordance with Table 722.135(B) and installed in accordance with 300.22(B) , Exception shall be permitted to be installed in ducts specifically fabricated for environmental air.*~~

~~*Exception No. 2: Cables selected in accordance with Table 722.135(B) shall be permitted to be installed in other spaces used for environmental air (plenums).*~~

~~**(D)** Cables in Ducts for Dust, Loose Stock, or Vapor Removal.~~

~~Section 300.22(A) for wiring systems shall apply.~~

~~*Exception: Nonconductive optical fiber cables shall be permitted in ducts used for dust, loose stock, or vapor removal.*~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
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Street Address:
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Zip:
Submittal Date: Sun Sep 03 06:34:31 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

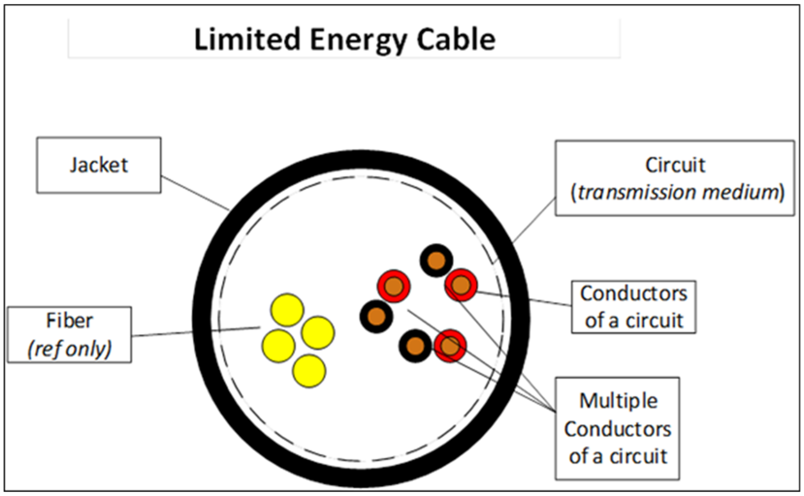
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

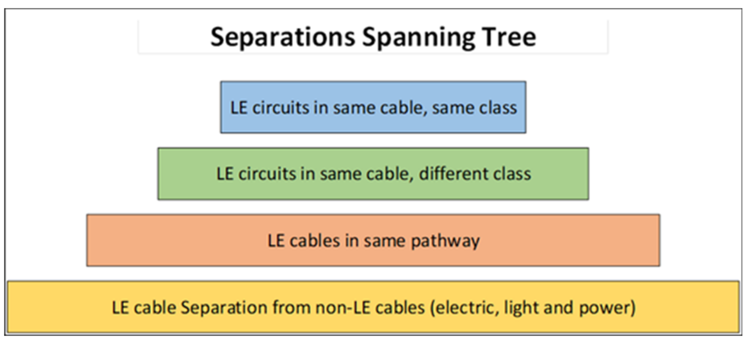
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]

(D) Cables in Ducts for Dust, Loose Stock, or Vapor Removal.

Section 300.22(A) for wiring systems shall apply.

~~*Exception: Nonconductive optical fiber cables shall be permitted in ducts used for dust, loose stock, or vapor removal.*~~

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article

Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]

Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Submittal Date:	Wed Jan 04 13:22:07 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8337-NFPA 70-2024

Statement: The exception to 722.3(D) to specifically allow nonconductive optical fiber cables was deleted to align with 300.22(A). The specific exception had been inadvertently added during the 2023 reorganization that produced Article 722.

Public Input No. 4447-NFPA 70-2023 [Section No. 722.3(F)]

(F) Instrumentation Tray Cable.

Circuits wired using instrumentation tray cable shall comply with 335.1 and 335.~~4 through~~ 10 through 335.~~9~~ 160 .

Statement of Problem and Substantiation for Public Input

Updated section number to correlate with Article 335 renumbering

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4236-NFPA 70-2023 [Article 335]	Reference update

Submitter Information Verification

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Submittal Date: Thu Sep 07 15:30:50 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8338-NFPA 70-2024
Statement: The cross-references were updated to reflect the new arrangement in Article 335.

Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]

TITLE OF NEW CONTENT

(M) Undercarpet Cables. Type CMUC undercarpet communications wire and cables listed in accordance with 800.179(G), and installed in accordance with 800.154 and 800.113(J)(1)(8), shall be permitted to be used for Class 2 and Class 3 circuits installed under carpet, modular flooring and planks.

RE-LETTER EXISTING 722.3(M), (N) AND (0)

Statement of Problem and Substantiation for Public Input

This is companion PI to a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Since Type CMUC is a communications cable, the installation and listing of this cable is outside the scope of this Article. A new subsection 722.3(M) Undercarpet Cables is recommended to cover the use of CMUC cables for Class 2 and Class 3 applications. It is parallel to the existing 722.3(K) Cable Routing Assemblies and 722.3(L) Communications Raceways.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	

Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Submittal Date:	Sat Jan 14 09:53:34 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: Types CL2UC and CL3UC cables do not exist. Therefore, the proposed text is not needed.

Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]

(O) Specific Requirements.

As appropriate, the installation of wires and cables shall also comply with the following:

(1) Class 2 and Class 3 cables — ~~Part II of~~ Article 725, Part II

(2) Class 4 cables — ~~Part IV of~~ Article 726, Part IV

(3) Fire alarm cables — ~~Part III of~~ Article 760

(4) ~~Optical fiber cables — Part V of Article 770~~

(5) , Part III

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, "The article number shall precede the part number."

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	

Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Submittal Date:	Wed Jan 04 13:15:51 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8289-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3455-NFPA 70-2023 [Section No. 722.10]

~~**722.10** Hazardous (Classified) Locations.~~

~~Class 4 cables shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles of this *Code* .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
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Zip:
Submittal Date: Sun Sep 03 06:36:43 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to

improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

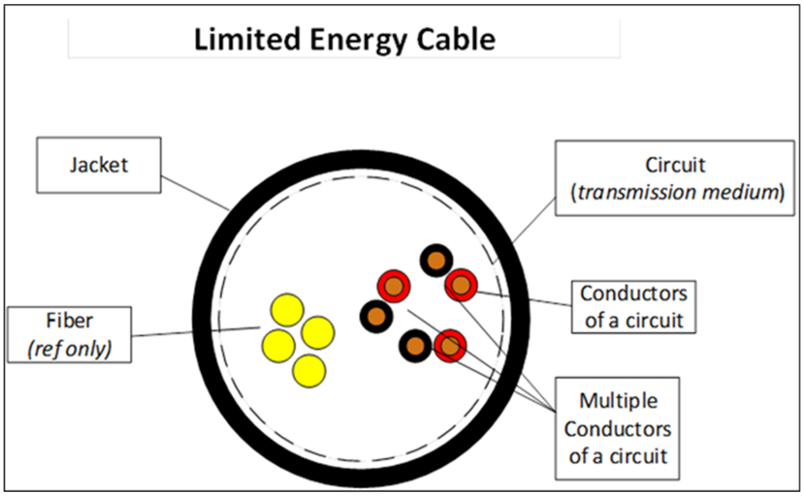
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

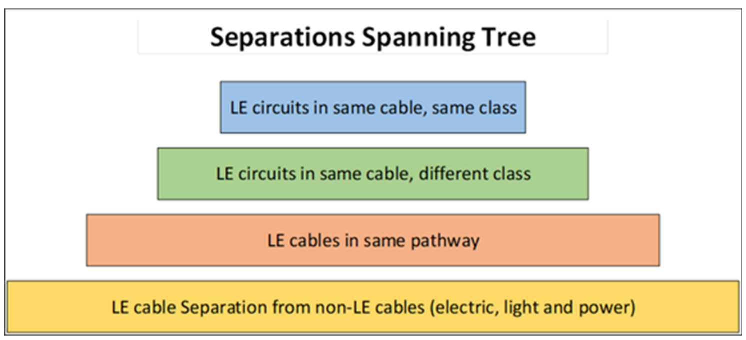
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 3456-NFPA 70-2023 [Section No. 722.21]

~~**722.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of cables that prevents removal of panels, including suspended ceiling panels.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 03 06:38:12 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

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Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

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Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

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3. Restructuring of Articles as follows:
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    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
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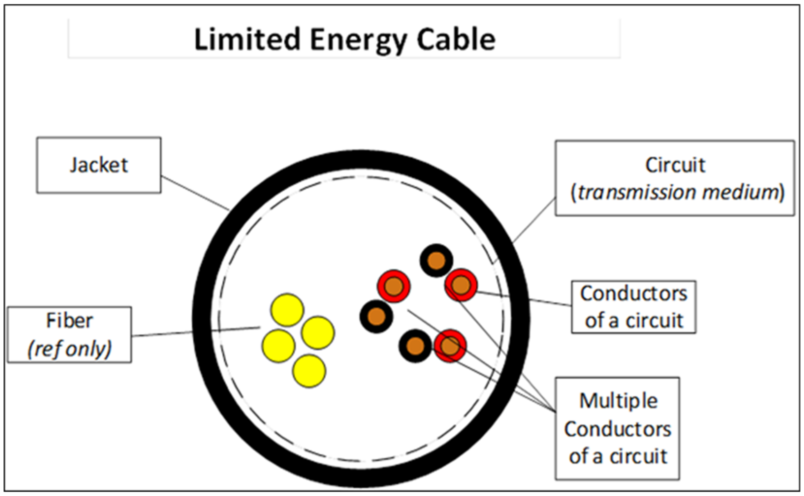
This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

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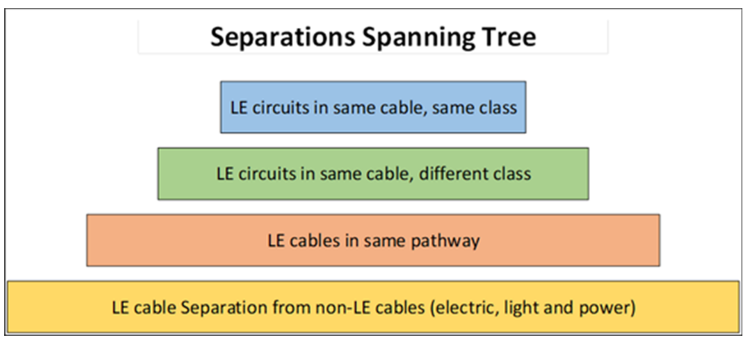
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]

722.24 Mechanical Execution of Work.

(A) General.

Cables ~~shall be~~ installed ~~in a neat and workmanlike manner. Cables installed~~ exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

(B)– Workmanship.

Cables covered by this Article shall be mechanically executed and installed in a manner consistent with acceptable industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

(C) Support of Cables.

Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

Exception No. 1: Class 2 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2).

Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.

(~~C~~ D) Circuit Integrity (CI) Cable.

Circuit integrity (CI) cable shall be supported at a distance not exceeding 610 mm (24 in.). Cable shall be secured to the noncombustible surface of the building structure. Cable supports and fasteners shall be steel.

Statement of Problem and Substantiation for Public Input

Workmanship is an egalitarian term, that focuses on evaluating the craftsmanship of any individual or group, the overall standard of work, precision, and dedication put forth in achieving a desirable outcome regardless of gender.

These revisions provide clarity that the focus of Section 722.24 is on the General Cable Installation rules and by adding a separate subsection on “Workmanship” it emphasizes the need for Workmanship in these installations, as well as creating consistency with other parts of this Code where Workmanship is either XXX.24 or XXX.24(X).

See Companion PIs pertaining to Sections:
- Article 100 Definition of “Workmanship”
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 724.22
- 724.24
- 725.24
- 726.24

- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	

Submitter Information Verification

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Zip:	
Submittal Date:	Fri Jul 28 18:40:44 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 1383-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

To more closely correlate with wording in 110.12

Submitter Information Verification

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Submittal Date: Wed Jul 12 11:20:16 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 17-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A~~-2021~~ , *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 8.5.5.6 for listing requirements for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

The edition date for NFPA 90A has been deleted because it is not needed. Section 90.5(C) in the 2023 NEC states “Unless the standard reference includes a date, the reference is to be considered as the latest edition of the standard.”

The requirements for discrete products in 4.3.11.2.6.5 in NFPA 90A-2021 will be moved to 8.5.5.6 in the next (2024) edition of NFPA 90A.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 14-NFPA 70-2023 [Section No. 640.3(B)]	Revise NFPA 90A reference
Public Input No. 15-NFPA 70-2023 [Section No. 110.12(C)]	Revise NFPA 90A reference
Public Input No. 18-NFPA 70-2023 [Section No. 722.135(B)]	Revise NFPA 90A reference
Public Input No. 19-NFPA 70-2023 [Section No. 770.24(A)]	Revise NFPA 90A reference
Public Input No. 20-NFPA 70-2023 [Section No. 770.113(B)(2)]	Revise NFPA 90A reference
Public Input No. 21-NFPA 70-2023 [Section No. 770.113(C)(2)]	Revise NFPA 90A reference
Public Input No. 22-NFPA 70-2023 [Section No. 800.24(A)]	Revise NFPA 90A reference
Public Input No. 24-NFPA 70-2023 [Section No. 800.113(B)(2)]	Revise NFPA 90A reference
Public Input No. 25-NFPA 70-2023 [Section No. 800.113(C)(2)]	Revise NFPA 90A reference
Public Input No. 26-NFPA 70-2023 [Section No. 800.170]	Revise NFPA 90A reference
Public Input No. 27-NFPA 70-2023 [Section No. 800.182(A)]	Revise NFPA 90A reference
Public Input No. 14-NFPA 70-2023 [Section No. 640.3(B)]	
Public Input No. 15-NFPA 70-2023 [Section No. 110.12(C)]	
Public Input No. 18-NFPA 70-2023 [Section No. 722.135(B)]	
Public Input No. 19-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 20-NFPA 70-2023 [Section No. 770.113(B)(2)]	
Public Input No. 21-NFPA 70-2023 [Section No. 770.113(C)(2)]	
Public Input No. 22-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 24-NFPA 70-2023 [Section No. 800.113(B)(2)]	
Public Input No. 25-NFPA 70-2023 [Section No. 800.113(C)(2)]	
Public Input No. 26-NFPA 70-2023 [Section No. 800.170]	

Public Input No. 27-NFPA 70-2023 [Section No. 800.182(A)]

Submitter Information Verification

Submitter Full Name: Stanley Kaufman
Organization: CableSafe, Inc./OFS
Affiliation: Plastics Industry Association (PLASTICS)
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Zip:
Submittal Date: Wed Jan 04 10:49:28 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 06:30:11 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

Changing the wording matches what is in 110.12. Keeping the wording the same promotes consistency throughout the code. Additional inputs will be done for other code articles. 724.24, 725.24, 726.24
760.24 (A), 770.24(A), 800.24(A).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	

Submitter Information Verification

Submitter Full Name: Lowell Reith
Organization: Interstates Construction Servi
Affiliation: IEC
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 18 12:19:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 283-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 ~~and~~ , 300.11 and 334 . 30 .

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

Since the makeup of small conductor cables is about the same as NMB then supports should not exceed that as required for NMB. This would also make for a more "workmanlike manner"

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 284-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 285-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 286-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 287-NFPA 70-2023 [Section No. 770.24(A)]	

Submitter Information Verification

Submitter Full Name: Robert Nakamichi
Organization: City of Seattle
Street Address:
City:
State:
Zip:
Submittal Date: Sat Feb 04 09:23:13 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 722 has many varied cable types, not just ones similar to NM cable. The article also includes securing and supporting requirements and it’s likely they don’t all match 334.30. Therefore, adding this text would create correlation issues.

Public Input No. 3457-NFPA 70-2023 [Section No. 722.24(A)]

~~(A) General.~~

~~Cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11 .~~

~~A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C) .~~

~~Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C) .~~

~~Informational Note No. 1: See NFPA 90A-2021,~~ ~~*Standard for the Installation of Air-Conditioning and Ventilating Systems*~~ ~~, for discrete combustible components.~~

~~Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 03 06:39:16 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E).

Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

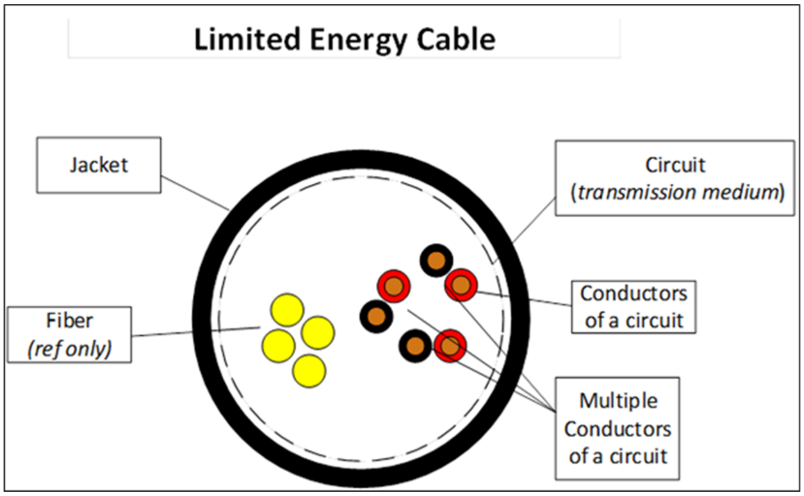
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

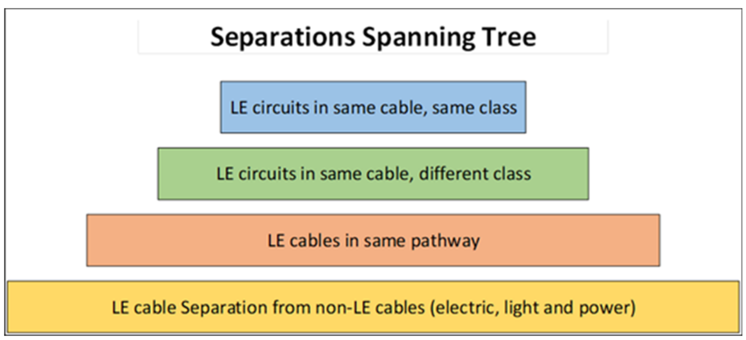
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 3796-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

This change is being submitted to update the language used to reflect the change made in 110.12 in the 2023 version.

Submitter Information Verification

Submitter Full Name: Brandon Nelson
Organization: Minnesota Statewide LEA JATC
Street Address:
City:
State:
Zip:
Submittal Date: Tue Sep 05 16:57:29 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 52-NFPA 70-2023 [Section No. 722.24(A)]

(A) General.

Cables ~~shall be~~ installed ~~in a neat and workmanlike manner. Cables installed~~ exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings, designed and installed so as not to damage the cable. The installation shall conform to 300.4 and 300.11.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C).

Nonmetallic cable ties and other nonmetallic cable accessories used to secure and support cables in other spaces used for environmental air (plenums) shall be listed as having low smoke and heat release properties in accordance with 300.22(C).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, for discrete combustible components.

Informational Note No. 2: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants could result in an undetermined alteration of cable properties.

Statement of Problem and Substantiation for Public Input

Note that this recommendation is to delete the first sentence of 722.24(A). However, for some reason, Terra shows a revision to the first and second sentences. Article 722 is not exempt from 90.3 or Article 110. Therefore, the requirements of Article 110 apply to Chapter 7 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 722 that "cables shall be installed in a professional and skillful manner. Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual whereby it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful" in 110.12. In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 06 17:10:42 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 1004-NFPA 70-2023 [Section No. 722.24(B)]

(B) Support of Cables.

Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

Exception No. 1: Class 2 or Class 3 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2).

Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.

Statement of Problem and Substantiation for Public Input

This revision is needed to fix the conflict with 300.11(C)(2) which allows Class 3 conductors or cables to be supported to the exterior of raceways.

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jun 09 07:15:38 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The text has been deleted.

Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]

(B) Support of Cables.

Cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

~~Exception No. 1~~ Exception : Class 2 circuit conductors or cables shall be permitted to be installed as permitted by 300.11(C)(2).

~~Exception No. 2: Overhead (aerial) spans of optical fiber cables shall be permitted to be attached to the exterior of a raceway-type mast intended for the attachment and support of such cables.~~

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	

[Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]](#)
[Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]](#)
[Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]](#)
[Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]](#)
[Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]](#)

Submitter Information Verification

Submitter Full Name:	David Kiddoo
Organization:	CCCA
Affiliation:	Communications Cable & Connectivity Association
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Wed Jan 04 13:23:59 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: The text has been deleted.

Public Input No. 3458-NFPA 70-2023 [Section No. 722.25]

~~**722.25** Abandoned Cables.~~

~~The accessible portion of abandoned cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:

Submittal Date: Sun Sep 03 06:42:16 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to

improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

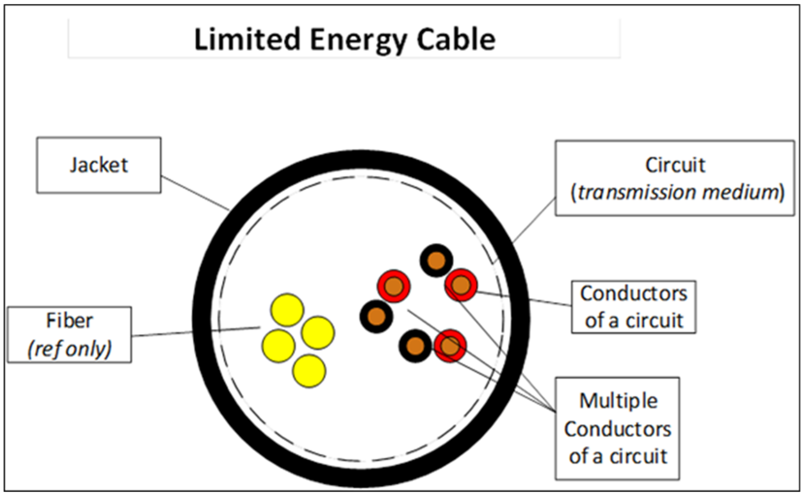
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

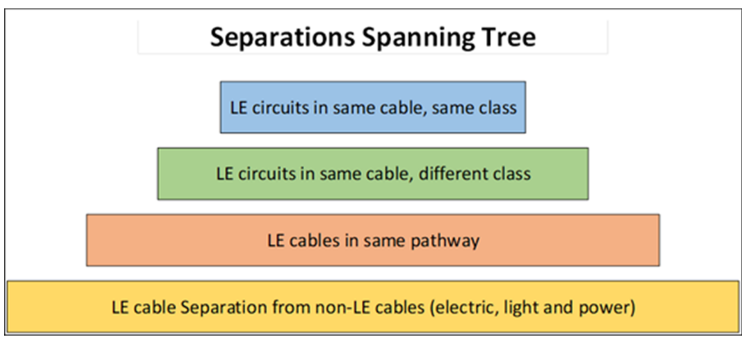
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 4391-NFPA 70-2023 [Section No. 722.135]

722.135 Installation of Cables.

The installation of cables shall comply with 722.135(A) through (~~I~~ J), as applicable.

(A) Listing.

Cables installed in buildings shall be listed.

(B) Cables in Buildings.

The installation of cables shall comply with Table 722.135(B).

Table 722.135(B) Installation of Listed Cables in Buildings

		-	-	Cable Type[1]			
Applications		**Plenum**	**Riser**	**General-Purpose**	**Limited-Use**	**Under Carpet**	**PLTC**
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function	Y	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	N	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	Cables in other spaces used for environmental air	Y	N	N	N	N	N
	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways	Y	N	N	N	N	N
	Cables in plenum cable routing assemblies	Y	N	N	N	N	N
	Cables supported by open metal cable trays	Y	N	N	N	N	N
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	N	Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft	Y	Y	N	N	N	N
	Cables in metal raceways	Y	Y	Y	Y	N	Y
	Cables in fireproof shafts	Y	Y	Y	N	N	Y
	Cables in plenum communications raceways	Y	Y	N	N	N	N
	Cables in plenum cable routing assemblies	Y	Y	N	N	N	N
	Cables in riser communications raceways	Y	Y	N	N	N	N
	Cables in riser cable routing assemblies	Y	Y	N	N	N	N
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	N	Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in general-purpose communications	Y	Y	Y	Y	N	Y

Applications		Plenum	Riser	Cable Type[1] General-Purpose	Limited-Use	Under Carpet	PLTC	
	raceways (innerduct)							
In fireproof riser shafts having firestops at each floor[2]	Cables	Y	Y	Y	N	N	Y	
	Cables in plenum communications raceways or plenum cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	Y	N	N	Y	
In cable trays	Outdoors	N	N	N	N	N	Y	
	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	N	Y	
In cross-connect arrays	Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	N	Y	
In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	N	Y	
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	N	Y	
	Cables in nonconcealed spaces	Y	Y	Y	Y[4]	Y	Y	
	-	Under carpet, floor covering, modular flooring, and planks	N	N	N	N	Y	N

[1]“N” indicates that the cable type shall not be installed in the application. “Y” indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).

[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

(C) Industrial Establishments.

In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, Type PLTC cable shall be permitted in accordance with either of the following:

(1) Where the cable is not subject to physical damage, Type PLTC cable that complies with the crush and impact requirements of Type MC cable and is identified as Type PLTC-ER for such use shall be permitted to be exposed between the cable tray and the utilization equipment or device. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be supported and secured at intervals not exceeding 1.8 m (6 ft). Where not subject to physical damage, Type PLTC-ER cable 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.

(2) Type PLTC cable, with a metallic sheath or armor in accordance with 722.179(A)(6), shall be permitted to be installed exposed. The cable shall be continuously supported and protected against physical damage using mechanical protection such as dedicated struts, angles, or channels. The cable shall be secured at intervals not exceeding 1.8 m (6 ft).

(D) In Hoistways.

In hoistways, cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21.

(E) Cable Substitutions.

The substitutions for cables listed in Table 722.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in 722.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See 722.135(F).

Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.

Table 722.135(E) Cable Substitutions

Cable Type	Permitted Substitutions
CL3P	CMP
CL2P	CMP, CL3P
CL3R	CMP, CL3P, CMR
CL2R	CMP, CL3P, CL2P, CMR, CL3R
PLTC	None
CL3	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC
CL2	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3
CL3X	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX
CL2X	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X
FPLP	CMP
FPLR	CMP, FPLP, CMR
FPL	CMP, FPLP, CMR, FPLR, CMG, CM
OFNP	None
OFCP	OFNP
OFNR	OFNP
OFCR	OFNP, OFCP, OFNR
OFNG, OFN	OFNP, OFNR
OFCG, OFC	OFNP, OFCP, OFNR, OFCR, OFNG, OFN
CMUC	None

(F) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

CI cable, a fire-resistive cable system, or a listed electrical circuit protective system shall be permitted for use in systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

(G) Thermocouple Circuits.

Conductors in Type PLTC cables used for Class 2 thermocouple circuits shall be permitted to be any of the materials used for thermocouple extension wire.

(H) Bundling of 4-Pair Cables Transmitting Power and Data.

Where 4-pair cables are used to transmit power and data to a powered device, 725.144 shall apply.

(I) Installation of Circuit Conductors Extending Beyond One Building.

Circuit conductors that extend beyond one building and are run such that they are subject to accidental contact with electric light or power conductors operating over 300 volts to ground, or are exposed to lightning on interbuilding circuits on the same premises, shall comply with the following:

(1) For other than coaxial conductors, 800.44, 800.53, 800.100, 805.50, 805.93, 805.170(A), and 805.170(B)

(2) For coaxial conductors, 800.44, 820.93, and 820.100

(3) The installation requirements of Part I of Article 300

(J) Where class 4 cables are used in a dwelling unit, 726.144 shall apply.

Statement of Problem and Substantiation for Public Input

This public input is a companion to two others, which delete 726.12 and adds new text to 726.144 limiting the number of class 4 cables which may be bundled in a dwelling unit application to limit any possibility of heating. See related public input (4385) to 726.144 for substantiation.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4385-NFPA 70-2023 [Section No. 726.144]	Requirements text
Public Input No. 4377-NFPA 70-2023 [Section No. 726.12]	Allows usage

Submitter Information Verification

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Submittal Date: Thu Sep 07 13:49:52 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8452-NFPA 70-2024

Statement: The dwelling unit restriction on Class 4 circuits has been removed in Article 726. This adds an installation requirement to ensure limited heating.

Public Input No. 2842-NFPA 70-2023 [Section No. 722.135(A)]

~~**(A)** Listing.~~

~~Cables installed in buildings shall be listed.~~

Statement of Problem and Substantiation for Public Input

This section can be deleted as the listing requirements are already covered more in-depth in section 722.179.

Submitter Information Verification

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Submittal Date:	Fri Aug 25 14:32:36 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8344-NFPA 70-2024

Statement: This text is redundant to 722.179 and has been deleted.

Public Input No. 18-NFPA 70-2023 [Section No. 722.135(B)]

(B) Cables in Buildings.

The installation of cables shall comply with Table 722.135(B).

Table 722.135(B) Installation of Listed Cables in Buildings

Applications		-	-	Cable Type[1]			
		Plenum	Riser	General-Purpose	Limited-Use	Under Carpet	PLTC
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function	Y	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	N	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	Cables in other spaces used for environmental air	Y	N	N	N	N	N
	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways	Y	N	N	N	N	N
	Cables in plenum cable routing assemblies	Y	N	N	N	N	N
	Cables supported by open metal cable trays	Y	N	N	N	N	N
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	N	Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft	Y	Y	N	N	N	N
	Cables in metal raceways	Y	Y	Y	Y	N	Y
	Cables in fireproof shafts	Y	Y	Y	N	N	Y
	Cables in plenum communications raceways	Y	Y	N	N	N	N
	Cables in plenum cable routing assemblies	Y	Y	N	N	N	N
	Cables in riser communications raceways	Y	Y	N	N	N	N
	Cables in riser cable routing assemblies	Y	Y	N	N	N	N
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	N	Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in general-purpose communications	Y	Y	Y	Y	N	Y

Applications		-	-	Cable Type[1]				
		Plenum	Riser	General-Purpose	Limited-Use	Under Carpet	PLTC	
	raceways (innerduct)							
In fireproof riser shafts having firestops at each floor[2]	Cables	Y	Y	Y	N	N	Y	
	Cables in plenum communications raceways or plenum cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	Y	N	N	Y	
In cable trays	Outdoors	N	N	N	N	N	Y	
	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	N	Y	
In cross-connect arrays	Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	N	Y	
In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	N	Y	
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	N	Y	
	Cables in nonconcealed spaces	Y	Y	Y	Y[4]	Y	Y	
	-	Under carpet, floor covering, modular flooring, and planks	N	N	N	N	Y	N

[1]"N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).

[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A ~~2021~~ , *Standard for the Installation of Air-Conditioning and Ventilating Systems*, ~~4.3.4 and 4.3.11.3.3,~~ Chapter 10, Electrical and Optical Fiber Wiring and Equipment in Plenums and Ducts for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

Statement of Problem and Substantiation for Public Input

The edition date for NFPA 90A has been deleted because it is not needed. Section 90.5(C) in the 2023 NEC states “Unless the standard reference includes a date, the reference is to be considered as the latest edition of the standard.”

The current edition of NFPA 90A, the 2024 edition, has been significantly reorganized. In previous editions, electrical requirements for installation in ducts and plenums were in Chapter 4, HVAC Systems. The 2024 edition has a new Chapter 10, Electrical and Optical Fiber Wiring and Equipment in Plenums and Ducts. Consequently, Informational Notes referencing electrical requirements in NFPA 90A need to be revised.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 14-NFPA 70-2023 [Section No. 640.3(B)]	Revise NFPA 90A reference
Public Input No. 15-NFPA 70-2023 [Section No. 110.12(C)]	Revise NFPA 90A reference
Public Input No. 17-NFPA 70-2023 [Section No. 722.24(A)]	Revise NFPA 90A reference
Public Input No. 19-NFPA 70-2023 [Section No. 770.24(A)]	Revise NFPA 90A reference
Public Input No. 20-NFPA 70-2023 [Section No. 770.113(B)(2)]	Revise NFPA 90A reference
Public Input No. 21-NFPA 70-2023 [Section No. 770.113(C)(2)]	Revise NFPA 90A reference
Public Input No. 22-NFPA 70-2023 [Section No. 800.24(A)]	Revise NFPA 90A reference
Public Input No. 24-NFPA 70-2023 [Section No. 800.113(B)(2)]	Revise NFPA 90A reference
Public Input No. 25-NFPA 70-2023 [Section No. 800.113(C)(2)]	Revise NFPA 90A reference
Public Input No. 26-NFPA 70-2023 [Section No. 800.170]	Revise NFPA 90A reference
Public Input No. 27-NFPA 70-2023 [Section No. 800.182(A)]	Revise NFPA 90A reference
Public Input No. 14-NFPA 70-2023 [Section No. 640.3(B)]	
Public Input No. 15-NFPA 70-2023 [Section No. 110.12(C)]	
Public Input No. 17-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 19-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 20-NFPA 70-2023 [Section No. 770.113(B)(2)]	
Public Input No. 21-NFPA 70-2023 [Section No. 770.113(C)(2)]	
Public Input No. 22-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 24-NFPA 70-2023 [Section No. 800.113(B)(2)]	
Public Input No. 25-NFPA 70-2023 [Section No. 800.113(C)(2)]	
Public Input No. 26-NFPA 70-2023 [Section No. 800.170]	
Public Input No. 27-NFPA 70-2023 [Section No. 800.182(A)]	

Submitter Information Verification

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Submittal Date: Wed Jan 04 10:52:39 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8345-NFPA 70-2024

Statement: The Regulations Governing the Development of NFPA Standards, Section 3.3.6.2, requires that edition dates be included, so the dated reference remains and is updated to the current revision. The referred section is deleted as it is a burden to ensure this doesn’t change in the referenced standard each code cycle.

Public Input No. 374-NFPA 70-2023 [Section No. 722.135(B)]

(B) Cables in Buildings.

The installation of cables shall comply with Table 722.135(B).

Table 722.135(B) Installation of Listed Cables in Buildings

Applications		-	-	Cable Type[1]			
		Plenum	**Riser**	**General-Purpose**	**Limited-Use**	**Under Carpet**	**PLTC**
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function, but not exceeding .2 m (4 ft).	Y	N	N	N	N	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	N	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	Cables in other spaces used for environmental air	Y	N	N	N	N	N
	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways	Y	N	N	N	N	N
	Cables in plenum cable routing assemblies	Y	N	N	N	N	N
	Cables supported by open metal cable trays	Y	N	N	N	N	N
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	N	Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft	Y	Y	N	N	N	N
	Cables in metal raceways	Y	Y	Y	Y	N	Y
	Cables in fireproof shafts	Y	Y	Y	N	N	Y
	Cables in plenum communications raceways	Y	Y	N	N	N	N
	Cables in plenum cable routing assemblies	Y	Y	N	N	N	N
	Cables in riser communications raceways	Y	Y	N	N	N	N
	Cables in riser cable routing assemblies	Y	Y	N	N	N	N
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	N	Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	N	Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	N	Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	N	Y

Applications		Plenum	Riser	Cable Type[1] General-Purpose	Limited-Use	Under Carpet	PLTC	
	Cables in general-purpose communications raceways (innerduct)	Y	Y	Y	Y	N	Y	
In fireproof riser shafts having firestops at each floor[2]	Cables	Y	Y	Y	N	N	Y	
	Cables in plenum communications raceways or plenum cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	Y	N	N	Y	
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	Y	N	N	Y	
In cable trays	Outdoors	N	N	N	N	N	Y	
	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	N	Y	
In cross-connect arrays	Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	N	Y	
In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	N	Y	
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	N	Y	
	Cables in nonconcealed spaces	Y	Y	Y	Y[4]	Y	Y	
	-	Under carpet, floor covering, modular flooring, and planks	N	N	N	N	Y	N

[1]“N” indicates that the cable type shall not be installed in the application. “Y” indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).

[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

Statement of Problem and Substantiation for Public Input

722.3 references the requirements of 300.22. 300.22 limits the length of this type of cable in a duct to a maximum of four feet. The language here can be read as permitting a longer length. This change needs to be made to prevent conflicts between code sections.

Submitter Information Verification

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Submittal Date:	Fri Feb 24 13:29:14 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: The requirement is stated in 300.22(B). The charging text says “installation … SHALL comply” with the table, and the table states as described in 300.22(B). Therefore, it is covered. Additionally, 722.3(C), exception 1 points directly to the text referred in the substantiation.

Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]

(B) Cables in Buildings.

The installation of cables shall comply with Table 722.135(B).

Table 722.135(B) Installation of Listed Cables in Buildings

		-	-	Cable Type[1]				
Applications		**Plenum**	**Riser**	**General-Purpose**	**Limited-Use**	~~Under Carpet~~		**PLTC**
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function	Y	N	N	N		N	~~N~~
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	~~N~~		Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	Cables in other spaces used for environmental air	Y	N	N	N		N	~~N~~
	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	~~N~~		Y
	Cables in plenum communications raceways	Y	N	N	N		N	~~N~~
	Cables in plenum cable routing assemblies	Y	N	N	N		N	~~N~~
	Cables supported by open metal cable trays	Y	N	N	N		N	~~N~~
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	~~N~~		Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft	Y	Y	N	N		N	~~N~~
	Cables in metal raceways	Y	Y	Y	Y	~~N~~		Y
	Cables in fireproof shafts	Y	Y	Y	N	~~N~~		Y
	Cables in plenum communications raceways	Y	Y	N	N		N	~~N~~
	Cables in plenum cable routing assemblies	Y	Y	N	N		N	~~N~~
	Cables in riser communications raceways	Y	Y	N	N		N	~~N~~
	Cables in riser cable routing assemblies	Y	Y	N	N		N	~~N~~
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	~~N~~		Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	~~N~~		Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	~~N~~		Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	~~N~~		Y

Applications		- Plenum	- Riser	Cable Type[1] General-Purpose	Limited-Use	~~Under Carpet~~		PLTC	
	Cables in general-purpose communications raceways (innerduct)	Y	Y	Y	Y	~~N~~		Y	
In fireproof riser shafts having firestops at each floor[2]	Cables	Y	Y	Y	N	~~N~~		Y	
	Cables in plenum communications raceways or plenum cable routing assemblies	Y	Y	Y	N	~~N~~		Y	
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	Y	N	~~N~~		Y	
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	Y	N	~~N~~		Y	
In cable trays	Outdoors	N	N	N	N	~~N~~		Y	
	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	~~N~~		Y	
In cross-connect arrays	Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	~~N~~		Y	
In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	~~N~~		Y	
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	~~N~~		Y	
	Cables in nonconcealed spaces	Y	Y	Y	Y[4]		Y	~~Y~~	
	-	Under carpet, floor covering, modular flooring, and planks	N	N	N	N	~~Y~~		N

[1]"N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).

[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.

[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).

[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).

Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.

Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.

Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

Additional Proposed Changes

File Name	Description	Approved
Table_722.135B_revisions.pdf	Table 722.135B revisions	

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is “This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits.”

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Type CMUC (a communications cable) is outside the scope of Article 722 and must be removed from the Article.

See the attached file which clearly shows the recommended revisions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	

Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Affiliation: Communications Cable & Connectivity Association
Street Address:
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Submittal Date: Wed Jan 04 13:46:50 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable.

(B) Cables in Buildings.

The installation of cables shall comply with Table 722.135(B).

Table 722.135(B) Installation of Listed Cables in Buildings

Applications		Cable Type[1]					
		Plenum	Riser	General-Purpose	Limited-Use	~~Under Carpet~~	PLTC
In ducts specifically fabricated for environmental air as described in 300.22(B)[2]	Cables in lengths as short as practicable to perform the required function	Y	N	N	N	~~N~~	N
	In metal raceway that complies with 300.22(B)	Y	Y	Y	Y	~~N~~	Y
In other spaces used for environmental air (plenums) as described in 300.22(C)	Cables in other spaces used for environmental air	Y	N	N	N	~~N~~	N
	Cables in metal raceway that complies with 300.22(C)	Y	Y	Y	Y	~~N~~	Y
	Cables in plenum communications raceways	Y	N	N	N	~~N~~	N
	Cables in plenum cable routing assemblies	Y	N	N	N	~~N~~	N
	Cables supported by open metal cable trays	Y	N	N	N	~~N~~	N
	Cables or cables installed in raceways or cable routing assemblies supported by solid bottom metal cable trays with solid metal covers	Y	Y	Y	Y	~~N~~	Y
In risers and vertical runs	Cables in vertical runs penetrating one or more floors and in vertical runs in a shaft	Y	Y	N	N	~~N~~	N
	Cables in metal raceways	Y	Y	Y	Y	~~N~~	Y
	Cables in fireproof shafts	Y	Y	Y	N	~~N~~	Y
	Cables in plenum communications raceways	Y	Y	N	N	~~N~~	N
	Cables in plenum cable routing assemblies	Y	Y	N	N	~~N~~	N
	Cables in riser communications raceways	Y	Y	N	N	~~N~~	N
	Cables in riser cable routing assemblies	Y	Y	N	N	~~N~~	N
	Cables in one- and two-family dwellings	Y	Y	Y	Y[3]	~~N~~	Y
Cables and innerducts installed in metal raceways in a riser having firestops at each floor[2]	Cables	Y	Y	Y	Y	~~N~~	Y
	Cables in plenum communications raceways (innerduct)	Y	Y	Y	Y	~~N~~	Y
	Cables in riser communications raceways (innerduct)	Y	Y	Y	Y	~~N~~	Y
	Cables in general-purpose communications raceways (innerduct)	Y	Y	Y	Y	~~N~~	Y
In fireproof riser shafts having firestops at each floor[2]	Cables	Y	Y	Y	N	~~N~~	Y
	Cables in plenum communications raceways or plenum cable routing	Y	Y	Y	N	~~N~~	Y

Applications		Cable Type[1]					
		Plenum	Riser	General-Purpose	Limited-Use	~~Under Carpet~~	PLTC
	assemblies						
	Cables in riser communications raceways or riser cable routing assemblies	Y	Y	Y	N	~~N~~	Y
	Cables in general-purpose communications raceways or general-purpose cable routing assemblies	Y	Y	Y	N	~~N~~	Y
In cable trays	Outdoors	N	N	N	N	~~N~~	Y
	Cables, or cables in plenum, riser, or general-purpose communications raceways, installed indoors	Y	Y	Y	N	~~N~~	Y
In cross-connect arrays	Cables, and cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies	Y	Y	Y	N	~~N~~	Y
In one-, two-, and multifamily dwellings, and in building locations other than the locations covered above	Cables	Y	Y	Y	Y[3]	~~N~~	Y
	Cables in plenum, riser, or general-purpose communications raceways or cable routing assemblies, or raceways recognized in Chapter 3	Y	Y	Y	Y	~~N~~	Y
	Cables in nonconcealed spaces	Y	Y	Y	Y[4]	~~Y~~	Y
	Under carpet, floor covering, modular flooring, and planks	N	N	N	N	~~Y~~	N

[1]"N" indicates that the cable type shall not be installed in the application. "Y" indicates that the cable type shall be permitted to be installed in the application, subject to any limitations described in this article or the articles described in 722.3(O).
[2]In 300.22(B), cables shall be permitted in ducts specifically fabricated for environmental air only if directly associated with the air distribution system.
[3]Limited-use cable shall be permitted to be installed only in one-, two-, and multifamily dwellings and only if the cable is smaller in diameter than 6.35 mm (0.25 in.).
[4]The exposed length of cable shall not exceed 3.05 m (10 ft).

Informational Note No. 1: See NFPA 90A-2021, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 4.3.4 and 4.3.11.3.3, for information on fire protection of wiring installed in ducts specifically fabricated for environmental air and other spaces used for environmental air (plenums).
Informational Note No. 2: See 300.21 for firestop requirements for floor penetrations.
Informational Note No. 3: See Chapter 3 for the installation requirements for PLTC cables installed outdoors in cable trays.
Informational Note No. 4: See UL 2024, *Cable Routing Assemblies and Communications Raceways*, for applicable requirements for plenum, riser, and general-purpose cable routing assemblies and raceways.

Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

(E) Cable Substitutions.

The substitutions for cables listed in Table 722.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in 722.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See 722.135(F).

Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.

Table 722.135(E) Cable Substitutions

Cable Type	Permitted Substitutions
CL3P	CMP
CL2P	CMP, CL3P
CL3R	CMP, CL3P, CMR
CL2R	CMP, CL3P, CL2P, CMR, CL3R
PLTC	None
CL3	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC
CL2	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3
CL3X	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX
CL2X	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X
FPLP	CMP
FPLR	CMP, FPLP, CMR
FPL	CMP, FPLP, CMR, FPLR, CMG, CM
~~OFNP~~	~~None~~
~~OFCP~~	~~OFNP~~
~~OFNR~~	~~OFNP~~
~~OFCR~~	~~OFNP, OFCP, OFNR~~
~~OFNG, OFN~~	~~OFNP, OFNR~~
~~OFCG, OFC~~	~~OFNP, OFCP, OFNR, OFCR, OFNG, OFN~~
~~CMUC~~	~~None~~

Statement of Problem and Substantiation for Public Input

Optical fiber cables and undercarpet cablesare outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article

Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article

Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]

Submitter Information Verification

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Submittal Date:	Tue May 16 06:59:59 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable.

Public Input No. 208-NFPA 70-2023 [Sections 722.135(E), 722.135(F)]

Sections 722.135(E), 722.135(F)

(E) Cable Substitutions.

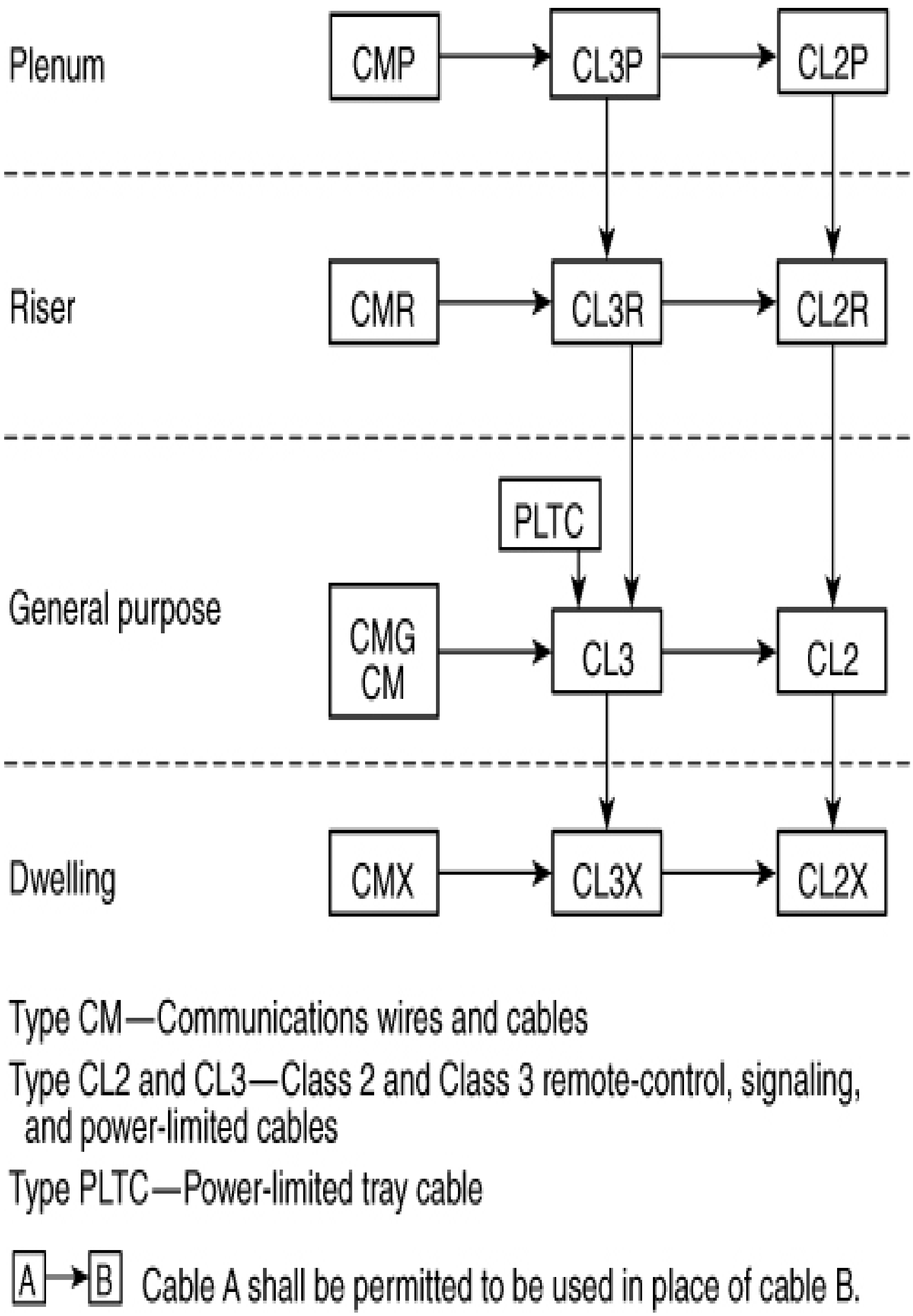
The substitutions for cables listed in Table 722.135(E) ~~shall~~ and illustrated in Figure 722.135(E) shall be permitted. Where substitute cables are installed, the installation requirements of the articles described in 722.3(O) shall also apply. CI cables shall be permitted to be installed to provide 2-hour circuit integrity. See 722.135(F).

Informational Note: See 800.179 for information on Types CMP, CMR, CM, and CMX.

Table 722.135(E) Cable Substitutions

Cable Type	Permitted Substitutions
CL3P	CMP
CL2P	CMP, CL3P
CL3R	CMP, CL3P, CMR
CL2R	CMP, CL3P, CL2P, CMR, CL3R
PLTC	None
CL3	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC
CL2	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3
CL3X	CMP, CL3P, CMR, CL3R, CMG, CM, PLTC, CL3, CMX
CL2X	CMP, CL3P, CL2P, CMR, CL3R, CL2R, CMG, CM, PLTC, CL3, CL2, CMX, CL3X
FPLP	CMP
FPLR	CMP, FPLP, CMR
FPL	CMP, FPLP, CMR, FPLR, CMG, CM
OFNP	None
OFCP	OFNP
OFNR	OFNP
OFCR	OFNP, OFCP, OFNR
OFNG, OFN	OFNP, OFNR
OFCG, OFC	OFNP, OFCP, OFNR, OFCR, OFNG, OFN
CMUC	None

Figure 722.135 (E) Cable Substitution Hierarchy.



(F) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

CI cable, a fire-resistive cable system, or a listed electrical circuit protective system shall be permitted for use in systems that supply critical circuits to ensure survivability for continued circuit operation for a specified time under fire conditions.

Additional Proposed Changes

File Name	Description	Approved
Figure_722.135E_Cable_Substitution_Hierarchy.docx	Figure 722.135E Cable Substitution Hierarchy	

Statement of Problem and Substantiation for Public Input

Including an illustration of the cable substitution hierarchy improves usability.

Figure 722.135(E) was Figure 725.154(A) in the 2020 NEC.

Submitter Information Verification

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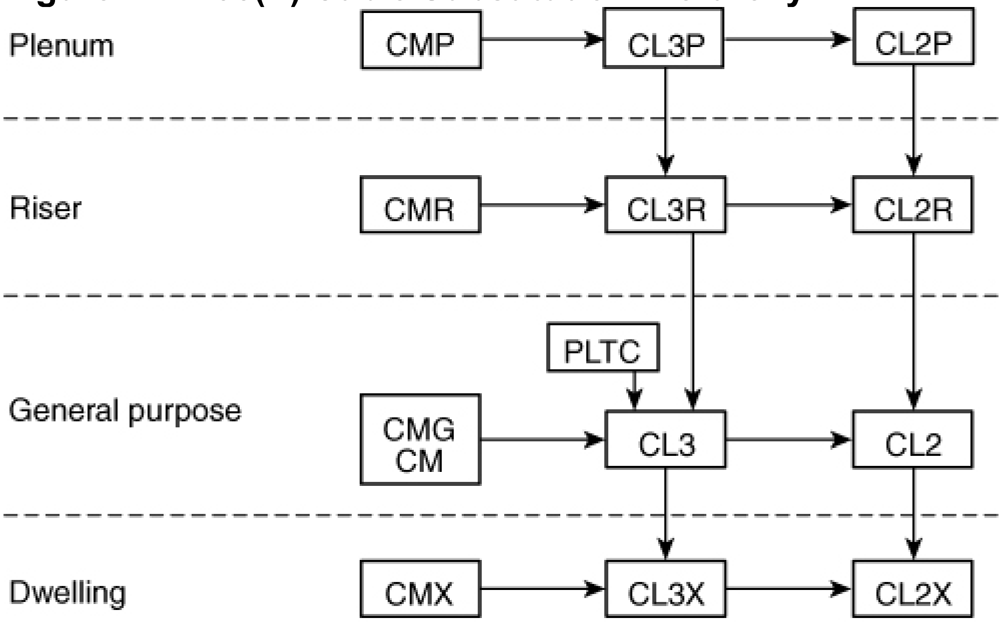
Submittal Date: Sat Jan 21 09:43:20 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8379-NFPA 70-2024
Statement: An illustration that was lost in the relocation of cable requirements from Article 725 to Article 722 in the 2023 cycle is restored.

Figure 722.135(E) Cable Substitution Hierarchy.



Type CM—Communications wires and cables

Type CL2 and CL3—Class 2 and Class 3 remote-control, signaling, and power-limited cables

Type PLTC—Power-limited tray cable

A → B Cable A shall be permitted to be used in place of cable B.

Public Input No. 2946-NFPA 70-2023 [Section No. 722.135(I)]

(I) Installation of Circuit Conductors Extending Beyond One Building.

Circuit conductors that extend beyond one building and are run such that they are subject to accidental contact with electric light or power conductors operating over 300 volts to ground, or are exposed to lightning on interbuilding circuits on the same premises, shall comply with the following:

(1) For other than coaxial conductors, 800.44, 800.53, 800.100, 805.50, 805.93, 805.170(A), and 805.170(B)

(2) For coaxial conductors, 800.44, 820.93, and 820.100

(3) The installation requirements of ~~Part I of~~ Article 300 , Part I

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date:	Mon Aug 28 13:00:45 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8290-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]

~~**(4)** Alternative General-Purpose Cable.~~

~~Alternative general-purpose optical fiber cable shall be listed as suitable for general-purpose use, with the exception of risers and plenums, and shall also be resistant to the spread of fire.~~

> ~~Informational Note: See CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables* , for the CSA vertical flame test — cables in cable trays, that can also be used to define resistance to the spread of fire when the damage (char length) does not exceed 1.5 m (4 ft 11 in.).~~

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	

Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Submittal Date:	Wed Jan 04 13:28:53 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable.

Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]

~~**(10)** Undercarpet Cables.~~

~~Undercarpet cable shall be listed as suitable for use under carpet, floor covering, modular tiles, and planks.~~

~~Informational Note: See UL 444, *Standard for Safety for Communications Cables* , for the compressive loading test used to determine the suitability of cable for undercarpet use.~~

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Type CMUC (a communications cable) is outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	

[Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]]
[Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]]

Submitter Information Verification

Submitter Full Name:	David Kiddoo
Organization:	CCCA
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Submittal Date:	Wed Jan 04 13:50:31 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable and optical fiber.

Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]

~~**(12)** Field-Assembled Optical Fiber Cables.~~

~~Field-assembled optical fiber cable shall comply with 722.179(A)(12)(a) through (d).~~

(a) ~~The specific combination of jacket and optical fibers intended to be installed as a field-assembled optical fiber cable shall be one of the types in 722.179(A)(1) , (A)(2), or (A)(3) and shall be marked in accordance with Table 179(B).~~

(b) ~~The jacket of a field-assembled optical fiber cable shall have a surface marking indicating the specific optical fibers with which it is identified for use.~~

(c) ~~The optical fibers shall have a permanent marking, such as a marker tape, indicating the jacket with which they are identified for use.~~

(d) ~~The jacket without fibers shall meet the listing requirements for communications raceways in 800.182(A) , (B), or (C) in accordance with the cable marking.~~

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	

Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]

Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]

Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]

Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]

Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]

Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]

Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]

Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]

Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

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Submittal Date:	Wed Jan 04 13:30:38 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable and optical fiber.

Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]

(13) Cables Containing Optical Fibers.

~~Composite optical fiber cables shall be listed as electrical cables based on the type of electrical conductors~~

Class 2 and Class 3 power-limited cables, power-limited fire alarm (PLFA) cables, and Class 4 fault-managed power cables shall be permitted to contain optical fibers .

Statement of Problem and Substantiation for Public Input

The revised text clarifies that the requirement deals with Class 2 and Class 3 power-limited cables, power-limited fire alarm (PLFA) cables, and Class 4 fault-managed power cables (which are within the scope of Article 722) and not optical fiber cables (which are not within the scope of Article 722). The revised text adds clarity.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article

Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

Submitter Information Verification

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Submittal Date: Wed Jan 04 13:31:48 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8350-NFPA 70-2024

Statement: The text is revised to use the defined term for a cable containing optical fibers and current-carrying electrical conductors.

Public Input No. 2971-NFPA 70-2023 [Section No. 722.179(A)(15)]

(15) Power-Limited Fire Alarm (PLFA) Cables.

~~PFLA~~ PLFA cables shall comply with 722.179(A)(15)(a) through (A)(15)(d).

(a) Conductors for cables, other than coaxial cables, shall be solid or stranded copper. Coaxial cables shall be permitted to use 30 percent conductivity copper-covered steel center conductor wire.

(b) The size of conductors in a multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG. Conductors of 26 AWG shall be permitted only where spliced with a connector listed as suitable for 26 AWG to 24 AWG or larger conductors that are terminated on equipment or where the 26 AWG conductors are terminated on equipment listed as suitable for 26 AWG conductors.

(c) Cables shall have a voltage rating of not less than 300 volts.

(d) Cables shall have a temperature rating of not less than 60°C (140°F).

Statement of Problem and Substantiation for Public Input

The edit fixes the typographical error in the sentence

Submitter Information Verification

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Submittal Date: Mon Aug 28 13:44:10 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8352-NFPA 70-2024
Statement: The edit fixes the typographical error in the sentence.

Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]

Cables installed as wiring methods within buildings shall be listed as resistant to the spread of fire and other criteria in accordance with 722.179(A)(1) through (A)(16).

Informational Note No. 1: See UL 13, *Standard for Power-Limited Circuit Cables*, for applicable requirements for listing of Class 2 and Class 3 cable and power-limited tray cable (PLTC).

Informational Note No. 2: See UL 1424, *Cables for Power-Limited Fire-Alarm Circuits*, for applicable requirements for listing of power-limited fire alarm cable.

Informational Note No. ~~3~~ 3 : See ~~UL 1651, *Optical Fiber Cable* , for applicable requirements for listing of optical fiber cable. Informational Note No. 4: See~~ UL 1400-2, *Outline for Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for applicable requirements for listing of Class 4 cable.

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is “This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits.”

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	Remove text outside of scope of Article
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	
Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]	
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	

Submitter Information Verification

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Affiliation: Communications Cable & Connectivity Association
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Submittal Date: Wed Jan 04 13:26:08 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, including communication cable and optical fiber.

Public Input No. 2974-NFPA 70-2023 [Section No. 722.179(B)]

(B) Marking.

Cables shall be durably marked on the surface in accordance with the following:

(1) The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).

(2) All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).

(3) The proper type designation for the type of cable shall be marked in accordance with Table 722.179(B).

(4) The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.

(5) The AWG size or circular mil area shall be marked.

Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.

(6) The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.

Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.

(7) Voltage ratings shall not be marked on the cables.

Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.

Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.

Table 722.179(B) Cable Type Markings

<u>Cable Type</u>	<u>Cable Marking</u>
Class 4 plenum cable	CL4P
Class 3 plenum cable	CL3P
Class 2 plenum cable	CL2P
Power-limited fire alarm plenum cable	FPLP
Nonconductive optical fiber plenum cable	OFNP
Conductive optical fiber plenum cable	OFCP
Class 4 riser cable	CL4R
Class 3 riser cable	CL3R
Class 2 riser cable	CL2R
Power-limited fire alarm riser cable	FPLR
Nonconductive optical fiber riser cable	OFNR
Conductive optical fiber riser cable	OFCR
Class 4 general-purpose cable	CL4
Class 3 general-purpose cable	CL3
Class 2 general-purpose cable	CL2
<u>Class 4 Outdoor Only Use Cable</u>	<u>CL4Z</u>
<u>Power-limited fire alarm cable</u>	<u>FPL</u>
Nonconductive general-purpose optical fiber cable	OFN
Conductive general-purpose optical fiber cable	OFC
Alternative nonconductive general-purpose optical fiber cable	OFNG
Alternative conductive general-purpose optical fiber cable	OFCG
Class 3 cable — limited use	CL3X
Class 2 cable — limited use	CL2X
Undercarpet cable	CMUC

Note: All types of CL2, CL3, and FPL cables containing optical fibers are provided with the suffix "-OF."

Statement of Problem and Substantiation for Public Input

Adding Cable Type CL4Z which is an Outdoor Use Only Cable intended for installation in a Fault Managed Power (CL4) circuit.

Submitter Information Verification

Submitter Full Name: Anthony Tassone
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City:
State:
Zip:
Submittal Date: Mon Aug 28 13:52:30 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8354-NFPA 70-2024 - The deletions in the table were not made as Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, to include optical fiber cables.

Statement: The exception in item (7) was rewritten in mandatory text rather than permissive.

Item (8) is added as it inadvertently wasn’t brought forward in the 2023 creation of Article 722.

CL4Z is a new addition to UL 1400-2 and is added to Table 722.179(B).

CL4 is added to the table note as CL4 cables can also contain optical fiber.

Public Input No. 38-NFPA 70-2023 [Section No. 722.179(B)]

(B) Marking.

Cables shall be durably marked on the surface in accordance with the following:

(1) The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).

(2) All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).

(3) The proper type designation for the type of cable shall be marked in accordance with Table 722.179(B).

(4) The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.

(5) The AWG size or circular mil area shall be marked.

Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.

(6) The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.

Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.

(7) Voltage ratings shall not be marked on the cables.

Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.

Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.

(8) Metallic conductor cables containing optical fibers shall be marked with the suffix "-OF"

Table 722.179(B) Cable Type Markings

Cable Type	Cable Marking
Class 4 plenum cable	CL4P
Class 3 plenum cable	CL3P
Class 2 plenum cable	CL2P
Power-limited fire alarm plenum cable	FPLP
~~Nonconductive optical fiber plenum cable~~	~~OFNP~~
~~Conductive optical fiber plenum cable~~	~~OFCP~~
Class 4 riser cable	CL4R
Class 3 riser cable	CL3R
Class 2 riser cable	CL2R
Power-limited fire alarm riser cable	FPLR
~~Nonconductive optical fiber riser cable~~	~~OFNR~~
~~Conductive optical fiber riser cable~~	~~OFCR~~
Class 4 general-purpose cable	CL4
Class 3 general-purpose cable	CL3
Class 2 general-purpose cable	CL2
Power-limited fire alarm cable	FPL
~~Nonconductive general-purpose optical fiber cable~~	~~OFN~~
~~Conductive general-purpose optical fiber cable~~	~~OFC~~
~~Alternative nonconductive general-purpose optical fiber cable~~	~~OFNG~~
~~Alternative conductive general-purpose optical fiber cable~~	~~OFCG~~
Class 3 cable — limited use	CL3X
Class 2 cable — limited use	CL2X
~~Undercarpet cable~~	~~CMUC~~

Note: All types of CL2, CL3, CL4 and FPL cables containing optical fibers are provided with the suffix "-OF."

Additional Proposed Changes

File Name	Description	Approved
Table_722.179_B_Cable_Type_Markings_revisions.pdf	Table 722.179(B) Cable Type Markings revisions	

Statement of Problem and Substantiation for Public Input

The scope of Article 722 is "This article covers the general requirements for the installation of single- and multiple-conductor cables used in Class 2 and Class 3 power-limited circuits, power-limited fire alarm (PLFA) circuits, and Class 4 fault-managed power circuits."

This Public Input is one of a group of PIs that recommend revising the text of Article 722 to remove all requirements that are outside of the scope.

Optical fiber cables are outside the scope of Article 722 and must be removed from the Article. Type CMUC has been deleted also because it is outside the scope of Article 722.

Marking metallic conductor cables with the suffix -OF aligns the NEC with UL .

Marking with the suffix -OF aligns the NEC with UL

CL4 cables were added to the Note at the bottom of the table to correct an inadvertent omission.

See the attached file which clearly shows the recommended revisions.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]	Remove text outside of scope of Article
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]	Remove text outside of scope of Article,
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	Remove text outside of scope of Article
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	Remove text outside of scope of Article
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	Remove text outside of scope of Article
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	Remove text outside of scope of Article
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	Remove text outside of scope of Article
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	Remove text outside of scope of Article
Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]	Remove text outside of scope of Article
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]	Remove text outside of scope of Article
Public Input No. 31-NFPA 70-2023 [Section No. 722.3(O)]	
Public Input No. 32-NFPA 70-2023 [Section No. 722.3(D)]	
Public Input No. 33-NFPA 70-2023 [Section No. 722.24(B)]	
Public Input No. 34-NFPA 70-2023 [Section No. 722.179(A) [Excluding any Sub-Sections]]	
Public Input No. 35-NFPA 70-2023 [Section No. 722.179(A)(4)]	
Public Input No. 36-NFPA 70-2023 [Section No. 722.179(A)(12)]	

Public Input No. 37-NFPA 70-2023 [Section No. 722.179(A)(13)]
Public Input No. 39-NFPA 70-2023 [Section No. 722.135(B)]
Public Input No. 40-NFPA 70-2023 [Section No. 722.179(A)(10)]
Public Input No. 156-NFPA 70-2023 [New Section after 722.3(L)]
Public Input No. 831-NFPA 70-2023 [Section No. 722.135(E)]

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Submittal Date: Wed Jan 04 13:37:45 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8354-NFPA 70-2024 - The deletions in the table were not made as Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, to include optical fiber cables.

Statement: The exception in item (7) was rewritten in mandatory text rather than permissive.

Item (8) is added as it inadvertently wasn't brought forward in the 2023 creation of Article 722.

CL4Z is a new addition to UL 1400-2 and is added to Table 722.179(B).

CL4 is added to the table note as CL4 cables can also contain optical fiber.

Table 722.179(B) Cable Type Markings

Cable Type	Cable Marking
Class 4 plenum cable	CL4P
Class 3 plenum cable	CL3P
Class 2 plenum cable	CL2P
Power-limited fire alarm plenum cable	FPLP
~~Nonconductive optical fiber plenum cable~~	~~OFNP~~
~~Conductive optical fiber plenum cable~~	~~OFCP~~
Class 4 riser cable	CL4R
Class 3 riser cable	CL3R
Class 2 riser cable	CL2R
Power-limited fire alarm riser cable	FPLR
~~Nonconductive optical fiber riser cable~~	~~OFNR~~
~~Conductive optical fiber riser cable~~	~~OFCR~~
Class 4 general-purpose cable	CL4
Class 3 general-purpose cable	CL3
Class 2 general-purpose cable	CL2
Power-limited fire alarm cable	FPL
~~Nonconductive general-purpose optical fiber cable~~	~~OFN~~
~~Conductive general-purpose optical fiber cable~~	~~OFC~~
~~Alternative nonconductive general-purpose optical fiber cable~~	~~OFNG~~
~~Alternative conductive general-purpose optical fiber cable~~	~~OFCG~~
Class 3 cable — limited use	CL3X
Class 2 cable — limited use	CL2X
~~Undercarpet cable~~	~~CMUC~~

Note: All types of CL2, CL3, CL4 and FPL cables containing optical fibers are provided with the suffix “-OF.”

Public Input No. 566-NFPA 70-2023 [Section No. 722.179(B)]

(B) Marking.

Cables shall be durably marked on the surface in accordance with the following:

(1) The AWG size or circular mil area shall be repeated at intervals not exceeding 610 mm (24 in.).

(2) All other markings shall be repeated at intervals not exceeding 1.0 m (40 in.).

(3) The proper type designation for the type of cable shall be marked in accordance with Table 722.179(B).

(4) The manufacturer's name, trademark, or other distinctive marking by which the organization responsible for the product can be readily identified shall be marked.

(5) The AWG size or circular mil area shall be marked.

Informational Note No. 1: See Chapter 9, Table 8, for conductor area expressed in SI units for conductor sizes specified in AWG or circular mil area.

(6) The temperature rating for a temperature rating exceeding 60°C (140°F) shall be marked.

Informational Note No. 2: A minimum temperature rating of 60°C is assumed for cables not marked with a temperature rating.

(7) Voltage ratings shall not be marked on the cables.

Exception: Voltage markings shall be ~~permitted where~~ included if the cable has multiple listings and a voltage marking is required for one or more of the listings.

Informational Note No. 3: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Informational Note No. 4: Cable types are listed in descending order of fire resistance rating.

Table 722.179(B) Cable Type Markings

Cable Type	Cable Marking
Class 4 plenum cable	CL4P
Class 3 plenum cable	CL3P
Class 2 plenum cable	CL2P
Power-limited fire alarm plenum cable	FPLP
Nonconductive optical fiber plenum cable	OFNP
Conductive optical fiber plenum cable	OFCP
Class 4 riser cable	CL4R
Class 3 riser cable	CL3R
Class 2 riser cable	CL2R
Power-limited fire alarm riser cable	FPLR
Nonconductive optical fiber riser cable	OFNR
Conductive optical fiber riser cable	OFCR
Class 4 general-purpose cable	CL4
Class 3 general-purpose cable	CL3
Class 2 general-purpose cable	CL2
Power-limited fire alarm cable	FPL
Nonconductive general-purpose optical fiber cable	OFN
Conductive general-purpose optical fiber cable	OFC
Alternative nonconductive general-purpose optical fiber cable	OFNG
Alternative conductive general-purpose optical fiber cable	OFCG
Class 3 cable — limited use	CL3X
Class 2 cable — limited use	CL2X
Undercarpet cable	CMUC

Note: All types of CL2, CL3, and FPL cables containing optical fibers are provided with the suffix "-OF."

Statement of Problem and Substantiation for Public Input

This exception needs to include mandatory text, not permissive text. It also changes "where" to "if" because "where" is a function of location.

Submitter Information Verification

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Committee: NEC-P03

Committee Statement

Resolution: FR-8354-NFPA 70-2024 - The deletions in the table were not made as Article 722 is being expanded to cover all cabling in Chapter 7 and Chapter 8, to include optical fiber cables.

Statement: The exception in item (7) was rewritten in mandatory text rather than permissive.

Item (8) is added as it inadvertently wasn't brought forward in the 2023 creation of Article 722.

CL4Z is a new addition to UL 1400-2 and is added to Table 722.179(B).

CL4 is added to the table note as CL4 cables can also contain optical fiber.

Public Input No. 3674-NFPA 70-2023 [Article 724]

Article 724 Class 1 Power-Limited Circuits and Class 1 Power-Limited Remote-Control and Signaling Circuits

724.1 Scope.

This article covers Class 1 circuits, including power-limited Class 1 remote-control and signaling circuits, that are not an integral part of a device or utilization equipment.

Informational Note: See 300.26 for classifications of remote-control and signaling circuits.

724.3 Other Articles.

In addition to the requirements of this article, circuits and equipment shall comply with 724.3(A) through (J).

~~(~~

~~A) Number and Size of Conductors in Raceway.~~

~~The number and size of conductors shall comply with 300.17 .~~

~~(B) Spread of Fire or Products of Combustion.~~

~~Installation of Class 1 circuits shall comply with 300.21 .~~

~~(C) Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Class 1 circuits installed in ducts, plenums, and other spaces used for environmental air shall comply with 300.22 .~~

~~(D) Hazardous (Classified) Locations.~~

~~Class 1 circuits shall not be installed in any hazardous (classified) locations except as permitted by other articles of this *Code* .~~

~~(E) Cable Trays.~~

~~Cable tray installations shall comply with Parts I and II of Article 392 .~~

~~(F) Raceways Exposed to Different Temperatures.~~

~~Installation of raceways shall comply with 300.7(A) .~~

~~(G) Vertical Support for Fire-Rated Cables and Conductors.~~

~~Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems shall comply with 300.19 .~~

~~(~~

H) Bushings.

Bushings shall be installed where cables emerge from raceways used for mechanical support or protection in accordance with 300.15(C) .

~~(I) Installation of Conductors With Other Systems.~~

~~Installation of conductors with other systems shall comply with 300.8 .~~

~~(J) Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

724.

~~21 Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of wires and cables preventing the removal of panels, including suspended ceiling panels.~~

~~**724.24** Mechanical Execution of Work.~~

~~Class 1 circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11 .~~

> ~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.~~

~~724.~~

30 Class 1 Circuit Identification.

Class 1 circuits shall be identified at terminal and junction locations in a manner that prevents unintentional interference with other circuits during testing and servicing.

724.31 Safety-Control Equipment.

If controlling safety-control equipment, Class 1 circuits shall be provided with physical protection if the failure of such equipment to operate introduces a direct fire or life hazard. All conductors of such circuits shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, Type MI cable, or Type MC cable, or be otherwise suitably protected from physical damage.

724.40 Class 1 Circuits.

Class 1 circuits shall be supplied from a source with a rated output of not more than 30 volts and 1000 volt-amperes.

(A) Class 1 Transformers.

Transformers shall be permitted to supply Class 1 circuits.

Informational Note: See Parts I and II of Article 450 for information on transformers used to supply a Class 1 circuit.

(B) Other Class 1 Power Sources.

Power sources other than transformers shall be protected by overcurrent devices rated at not more than 167 percent of the volt-ampere rating of the source divided by the rated voltage. The overcurrent devices shall not be interchangeable with overcurrent devices of higher ratings. The overcurrent device shall be permitted to be an integral part of the power supply.

To comply with the 1000 volt-ampere limitation of 724.40 , the maximum output (VA_{max}) of power sources other than transformers shall be limited to 2500 volt-amperes, and the product of the maximum current (I_{max}) and maximum voltage (V_{max}) shall not exceed 10,000 volt-amperes. These ratings shall be determined with any overcurrent-protective device bypassed.

VA_{max} is the maximum volt-ampere output after one minute of operation regardless of load and with overcurrent protection bypassed, if used. Current-limiting impedance shall not be bypassed when determining VA_{max} .

I_{max} is the maximum output current under any noncapacitive load, including short circuit, and with overcurrent protection bypassed, if used. Current-limiting impedance should not be bypassed when determining I_{max} . Where a current-limiting impedance listed for the purpose or as part of a listed product is used in combination with a stored energy source, such as a storage battery, to limit the output current, I_{max} limits apply after 5 seconds.

V_{max} is the maximum output voltage regardless of load with rated input applied.

724.43 Class 1 Circuit Overcurrent Protection.

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG.

Exception: Where other articles of this Code permit or require other overcurrent protection.

724.45 Class 1 Circuit Overcurrent Device Location.

Overcurrent devices shall be located as specified in 724.45(A) through (E).

(A) Point of Supply.

Overcurrent devices shall be located at the point where the conductor to be protected receives its supply.

(B) Feeder Taps.

Class 1 circuit conductors shall be permitted to be tapped, without overcurrent protection at the tap, where the overcurrent device protecting the circuit conductor is sized to protect the tap conductor.

(C) Branch-Circuit Taps.

Class 1 circuit conductors 14 AWG and larger that are tapped from the load side of the overcurrent protective device(s) of a controlled light and power circuit shall require only short-circuit and ground-fault protection and shall be permitted to be protected by the branch-circuit overcurrent protective device(s) where the rating of the protective device(s) is not more than 300 percent of the ampacity of the Class 1 circuit conductor.

(D) Primary Side of Transformer.

Class 1 circuit conductors supplied by the secondary of a single-phase transformer having only a 2-wire (single-voltage) secondary shall be permitted to be protected by overcurrent protection provided on the primary side of the transformer if the protection is in accordance with 450.3 and does not exceed the value determined by multiplying the secondary conductor ampacity by the secondary-to-primary transformer voltage ratio. Transformer secondary conductors other than 2-wire shall not be considered to be protected by the primary overcurrent protection.

(E) Input Side of Electronic Power Source.

Class 1 circuit conductors supplied by the output of a single-phase, listed electronic power source other than a transformer having only a 2-wire (single-voltage) output for connection to Class 1 circuits shall be permitted to be protected by overcurrent protection provided on the input side of the electronic power source if the protection does not exceed the value determined by multiplying the Class 1 circuit conductor ampacity by the output-to-input voltage ratio. Electronic power source outputs other than 2-wire (single voltage) shall not be considered to be protected by the primary overcurrent protection.

724.46 Class 1 Circuit Wiring Methods.

Class 1 circuits shall be installed in accordance with 300.2 through 300.26 .

Exception No. 1: The requirements of 724.48 through 724.51 shall be permitted to apply in installations of Class 1 circuits.

Exception No. 2: Methods permitted or required by other articles of this Code shall apply to installations of Class 1 circuits.

724.48 Conductors of Different Circuits in the Same Cable, Cable Tray, Enclosure, or Raceway.

Class 1 circuits shall be permitted to be installed with other circuits as specified in 724.48(A) and (B).

(A) Two or More Class 1 Circuits.

Class 1 circuits shall be permitted to occupy the same cable, cable tray, enclosure, or raceway regardless of whether the individual circuits are alternating current or direct current if all conductors are insulated for the maximum voltage of any conductor in the cable, cable tray, enclosure, or raceway.

(B) Class 1 Circuits with Power-Supply Circuits.

Class 1 circuits shall be permitted to be installed with power-supply conductors as specified in 724.48(B)(1) through (B)(4).

(1) In Cables, Enclosures, or Raceways.

Class 1 circuits and power-supply circuits shall be permitted to occupy the same cable, enclosure, or raceway without a barrier only where the equipment powered is functionally associated. Class 1 circuits shall be permitted to be installed together with the conductors of electric light, power, non-power-limited fire alarm systems, and medium-power network-powered broadband communications circuits where separated by a barrier.

(2) In Factory- or Field-Assembled Control Centers.

Class 1 circuits and power-supply circuits shall be permitted to be installed in factory- or field-assembled control centers.

(3) In Manholes.

Class 1 circuits and power-supply circuits shall be permitted to be installed as underground conductors in manholes in accordance with one of the following:

(1) The power-supply or Class 1 circuit conductors are in metal-enclosed cable or Type UF cable.

(2) The conductors are permanently separated from power-supply conductors by continuous firmly fixed nonconductors, such as flexible tubing, in addition to insulation on the wire.

(3) The conductors are permanently and effectively separated from power-supply conductors and securely fastened to racks, insulators, or other approved supports.

(4) In Cable Trays.

Installations in cable trays shall comply with the requirements of one of the following:

(1) Class 1 circuit conductors and power-supply conductors not functionally associated with the Class 1 circuit conductors shall be separated by a solid fixed barrier of a material compatible with the cable tray.

(2) Class 1 circuit conductors and power-supply conductors not functionally associated with the Class 1 circuit conductors shall be permitted to be installed in a cable tray without barriers where all of the conductors are installed with separate multiconductor Type AC, Type MC, Type MI, or Type TC cables and all the conductors in the cables are insulated at 600 volts or greater.

724.49 Class 1 Circuit Conductors.

(A) Sizes and Use.

Conductors that are 18 AWG and 16 AWG shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable. Conductors larger than 16 AWG shall not supply loads greater than the ampacities specified in 310.14 . Flexible cords shall comply with the requirements of Article 400 .

(B) Insulation.

Insulation on conductors shall be rated for the system voltage and not less than 600 volts. Conductors larger than 16 AWG shall comply with the requirements of Article 310. Conductors that are 18 AWG and 16 AWG shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF. Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

724.51 Number of Conductors in Cable Trays and Raceways, and Ampacity Adjustment.

(A) Class 1 Circuit Conductors.

Where only Class 1 circuit conductors are in a raceway, the number of conductors shall be determined in accordance with 300.17 . The ampacity adjustment factors specified in 310.15(C)(1) shall apply only if such conductors carry continuous loads in excess of 10 percent of the ampacity of each conductor.

(B) Power-Supply Conductors and Class 1 Circuit Conductors.

Where power-supply conductors and Class 1 circuit conductors are permitted in a raceway in accordance with 724.48 , the number of conductors shall be determined in accordance with 300.17 . The ampacity adjustment factors specified in 310.15(C)(1) shall apply as follows:

(1) To all conductors where the Class 1 circuit conductors carry continuous loads in excess of 10 percent of the ampacity of each conductor and where the total number of conductors is more than three

(2) To the power-supply conductors only, where the Class 1 circuit conductors do not carry continuous loads in excess of 10 percent of the ampacity of each conductor and where the number of power-supply conductors is more than three

(C) Class 1 Circuit Conductors in Cable Trays.

Where Class 1 circuit conductors are installed in cable trays, they shall comply with the requirements of 392.22 and 392.80(A) .

724.52 Circuits Extending Beyond One Building.

Class 1 circuits that extend aerially beyond one building shall also meet the requirements of Part I of Article 225.

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx	Substantiation	

Statement of Problem and Substantiation for Public Input

This PI is submitted as part of the work of the 722 Limited Energy Task group. It deletes text that was relocated by the TG. See the attachment for the substantiation from the overall TG.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3673-NFPA 70-2023 [Article 722]	same TG effort
Public Input No. 3684-NFPA 70-2023 [Article 725]	
Public Input No. 3686-NFPA 70-2023 [Article 726]	
Public Input No. 3687-NFPA 70-2023 [Article 760]	
Public Input No. 3690-NFPA 70-2023 [Article 770]	
Public Input No. 3694-NFPA 70-2023 [Chapter 8]	

Submitter Information Verification

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Committee:	NEC-P03

Committee Statement

Resolution: Article 724 doesn’t fit into the definition of Limited Energy, so this text will not be moved into the new Article.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

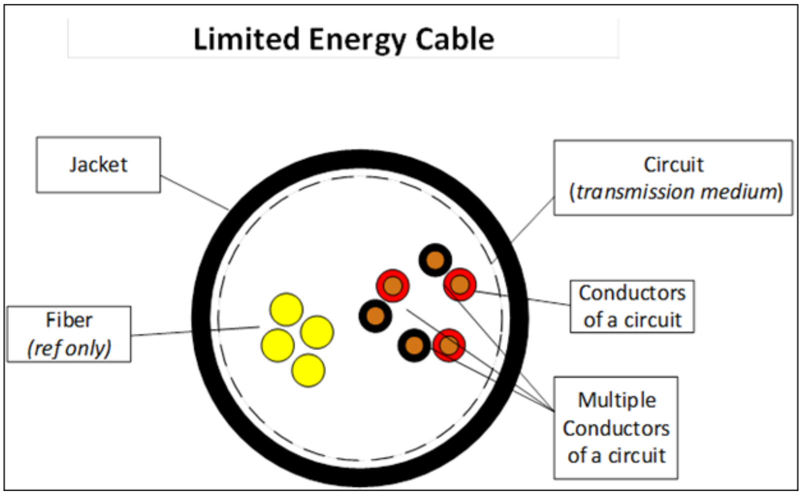
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

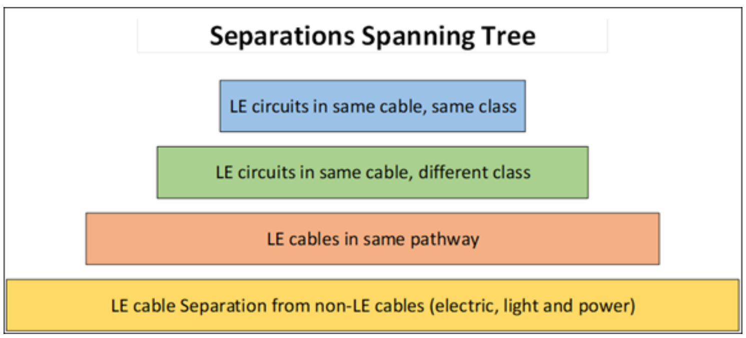
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]

724.9 Qualified Persons.

Class 1 power-limited circuits covered by this Article shall be installed by Qualified Persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Technology in the limited energy and communications system segments of the electrical industry is rapidly evolving and expanding and is becoming more complicated. These systems require far more training and experience. These systems are often part of essential electrical systems and critical operations power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. ANSI standards such as NFPA 72, NECA 301 and others, address these systems and include requirements that qualified persons perform installations of these systems and equipment, so these new NEC requirements are proposed to correlate and align with those ANSI-accredited industry standards and codes. Licensing and regulatory agencies are developing new examinations and will be updating existing exams for state and other licensing to increase qualification credentials related to growth and advancement in this segment of the electrical industry. Certification organizations have indicated they anticipate following the same course of action. Qualified contractors and installers are a crucial element of safety related to these installations and systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

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Submittal Date:	Fri Jul 28 19:47:13 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The proposed requirement would be better suited for location in Chapter 1.

Public Input No. 1489-NFPA 70-2023 [Sections 724.3, 724.21, 724.24]

~~**Sections 724.3, 724.21, 724.24**~~

~~**724.3** Other Articles.~~

~~In addition to the requirements of this article, circuits and equipment shall comply with 724.3(A) through (J).~~

~~**(A)** Number and Size of Conductors in Raceway.~~

~~The number and size of conductors shall comply with 300.17 .~~

~~**(B)** Spread of Fire or Products of Combustion.~~

~~Installation of Class 1 circuits shall comply with 300.21 .~~

~~**(C)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Class 1 circuits installed in ducts, plenums, and other spaces used for environmental air shall comply with 300.22 .~~

~~**(D)** Hazardous (Classified) Locations.~~

~~Class 1 circuits shall not be installed in any hazardous (classified) locations except as permitted by other articles of this *Code* .~~

~~**(E)** Cable Trays.~~

~~Cable tray installations shall comply with Parts I and II of Article 392 .~~

~~**(F)** Raceways Exposed to Different Temperatures.~~

~~Installation of raceways shall comply with 300.7(A) .~~

~~**(G)** Vertical Support for Fire-Rated Cables and Conductors.~~

~~Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of electrical circuit protective systems shall comply with 300.19 .~~

~~**(H)** Bushings.~~

~~Bushings shall be installed where cables emerge from raceways used for mechanical support or protection in accordance with 300.15(C) .~~

~~**(I)** Installation of Conductors With Other Systems.~~

~~Installation of conductors with other systems shall comply with 300.8 .~~

~~**(J)** Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

~~**724.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of wires and cables preventing the removal of panels, including suspended ceiling panels.~~

~~**724.24** Mechanical Execution of Work.~~

~~Class 1 circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11 .~~

> ~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.~~

Statement of Problem and Substantiation for Public Input

All of this is covered by 724.46 and 90.3..

Submitter Information Verification

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Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 2947-NFPA 70-2023 [Section No. 724.3(E)]

(E) Cable Trays.

Cable tray installations shall comply with Article 392, Parts I and II ~~of Article 392~~ .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Committee:	NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]

724.22 Installation.

Cables and conductors insalled exposed on the surface of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

This new Section 724.22 is to accommodate the revision of Section 724.24 moving the Installation requirements here and leaving the Workmanship requirements in 724.24 to maintain consistency with other parts of this Code and emphasize the need for workmanship.

See Companion PIs pertaining to Sections:

- Article 100 Definition of "Workmanship"
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 722.24(A)
- 725.22
- 725.24
- 726.24
- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	

Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name:	Kyle Krueger
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State:	
Zip:	
Submittal Date:	Fri Jul 28 19:35:30 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 1384-NFPA 70-2023 [Section No. 724.24]

724.24 Mechanical Execution of Work.

Class 1 circuits shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

To more closely correlate with wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 203-NFPA 70-2023 [Global Input]	

Submitter Information Verification

Submitter Full Name: Kelly Wofford
Organization: EIG
Street Address:
City:
State:
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Submittal Date: Wed Jul 12 11:23:15 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]

724.24 ~~Mechanical Execution of Work~~ **Workmanship .**

Class 1 circuits shall be ~~installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11 .~~

~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.~~

mechanically executed and installed in a manner consistent with industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more informartion on Workmanship.

Statement of Problem and Substantiation for Public Input

Workmanship is an egalitarian term, that focuses on evaluating the craftsmanship of any individual or group, the overall standard of work, precision, and dedication put forth in achieving a desirable outcome regardless of gender.

These revisions provide clarity that the focus of Section 724.24 is on “Workmanship” creating consistency with other parts of this Code where Workmanship is either XXX.24 or XXX.24(X).

See Companion PIs pertaining to Sections:

- Article 100 Definition of “Workmanship”
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 722.24(A)
- 725.22
- 725.24
- 726.24
- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	

Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

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Submittal Date: Fri Jul 28 19:30:11 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]

724.24 Mechanical Execution of Work.

Class 1 circuits shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	Professional and Skillful instead of neat and workmanlike
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
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City:
State:
Zip:
Submittal Date: Fri Aug 11 06:32:22 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]

724.24 Mechanical Execution of Work.

Class 1 circuits shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

Changing the wording matches what is in 110.12. Keeping the wording the same promotes consistency throughout the code. Additional inputs will be done for other code articles. 722 (A).24, 725.24, 726.24
760.24 (A), 770.24(A), 800.24(A).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	

Submitter Information Verification

Submitter Full Name: Lowell Reith
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Affiliation: IEC
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 18 12:24:18 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 284-NFPA 70-2023 [Section No. 724.24]

724.24 Mechanical Execution of Work.

Class 1 circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 ~~and~~ , 300.11 and 334 . 30 .

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

Since the makeup of small conductor cables is about the same as NMB then supports should not exceed that as required for NMB. This would also make for a more "workmanlike manner",

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 283-NFPA 70-2023 [Section No. 722.24(A)]	Same support requirements
Public Input No. 285-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 286-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 287-NFPA 70-2023 [Section No. 770.24(A)]	

Submitter Information Verification

Submitter Full Name: Robert Nakamichi
Organization: City of Seattle
Street Address:
City:
State:
Zip:
Submittal Date: Sat Feb 04 09:31:14 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Article 724 has many varied cable types, not just ones similar to NM cable. The article also includes securing and supporting requirements and it’s likely they don’t all match 334.30. Therefore, adding this text would create correlation issues. Section 724.24 has been deleted.

Public Input No. 53-NFPA 70-2023 [Section No. 724.24]

724.24 Mechanical Execution of Work.

~~Class 1 circuits shall be installed in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.

Statement of Problem and Substantiation for Public Input

Article 724 is not exempt from 90.3 or Article 110. Therefore, the requirements of Article 110 apply to Chapter 7 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 724 that "Class 1 circuits shall be installed in a professional and skillful manner." Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual whereby it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful" in 110.12. In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

Submitter Full Name: Palmer Hickman
Organization: Electrical Training Alliance
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jan 06 17:24:31 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024

Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 565-NFPA 70-2023 [Section No. 724.24]

~~**724.24** Mechanical Execution of Work.~~

~~Class 1 circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surfaces of ceilings and sidewalls shall be supported by the building structure such that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings that are designed and installed to not damage the cable. The installation shall also comply with the requirements of 300.4 and 300.11 .~~

~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants can result in an undetermined alteration of Class 1 cable properties.~~

Statement of Problem and Substantiation for Public Input

This is already required by 110.12 and therefore violates 4.1.1 of the Style Manual.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 10 13:36:18 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8361-NFPA 70-2024
Statement: In the 2023 code cycle, when Class 1 was separated out from Article 725, this text was created. Because Article 724 is not independent of Article 300, this is redundant to 724.46 and 90.3.

Public Input No. 2948-NFPA 70-2023 [Section No. 724.40(A)]

(A) Class 1 Transformers.

Transformers shall be permitted to supply Class 1 circuits.

Informational Note: See Article 450, Parts I and ~~II of Article 450 for~~ II for information on transformers used to supply a Class 1 circuit.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:02:32 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8291-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 1429-NFPA 70-2023 [Section No. 724.43]

724.43 Class 1 Circuit Overcurrent Protection.

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity, without applying the ampacity adjustment and correction factors specified in 310.15 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for ~~18 AWG conductors and~~ 18 AWG copper and 16 AWG copper-clad aluminum conductors and 10 amperes for ~~16 AWG~~ 16 AWG copper and 14 AWG copper-clad aluminum conductors .

Exception: Where other articles of this Code permit or require other overcurrent protection.

Statement of Problem and Substantiation for Public Input

Please see test reports submitted in Public Input 1418. 14 AWG copper-clad aluminum conductors are currently permitted for use by the NEC as a remote control and signaling wire for tray and MC cable. The size 16 AWG copper-clad aluminum is being introduced in the this cycle.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1418-NFPA 70-2023 [Section No. 300.26(C)(1)]	
Public Input No. 1427-NFPA 70-2023 [Section No. 300.26(C)(2)]	
Public Input No. 1428-NFPA 70-2023 [Section No. 300.26(C)(3)]	

Submitter Information Verification

Submitter Full Name: Peter Graser
Organization: Copperweld
Affiliation: American Bimetallic Association
Street Address:
City:
State:
Zip:
Submittal Date: Sun Jul 16 08:04:52 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8367-NFPA 70-2024

Statement: The minimum size permitted for copper-clad remote-control and signaling conductors has been expanded as a result of the technical substantiation provided with public inputs 1418 and 1427.

Public Input No. 564-NFPA 70-2023 [Section No. 724.45(B)]

~~**(B)** Feeder Taps.~~

~~Class 1 circuit conductors shall be permitted to be tapped, without overcurrent protection at the tap, where the overcurrent device protecting the circuit conductor is sized to protect the tap conductor.~~

Statement of Problem and Substantiation for Public Input

If the overcurrent device protects the conductor at its ampacity then it is not a tap. See the Article 100 definition.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 10 13:33:54 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The statement of problem and substantiation did not provide technical justification to delete this text. The feeder tap section can provide protection for a tap at lower than the full-rated ampacity if the tap rules are followed.

Public Input No. 3365-NFPA 70-2023 [Section No. 724.49]

724.49 Class 1 Circuit Conductors.

(A) Sizes and Use.

Conductors that are 18 AWG and 16 AWG shall be permitted to be used if they supply loads that do not exceed the ampacities specified in 402.5 and are installed in a raceway, an approved enclosure, or a listed cable. Conductors larger than 16 AWG shall not supply loads greater than the ampacities specified in 310.14. Flexible cords shall comply with the requirements of ~~Article~~ Table 400. 4 .

(B) Insulation.

Insulation on conductors shall be rated for the system voltage and not less than 600 volts. Conductors larger than 16 AWG shall comply with the requirements of ~~Article~~ Table 310.4(1) or Table 310.4(2) as applicable. Conductors that are 18 AWG and 16 AWG shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF. Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article with the exception of Article 100 or where required for context. For part A, I've proposed that we point the user to Table 400.4 since that table lists the construction specifications for flexible cords or cables and for Part B, I've suggested we point the user to Table 310.4(1) or Table 310.4(2) as applicable.

Submitter Information Verification

Submitter Full Name: Richard Holub
Organization: The DuPont Company, Inc.
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City:
State:
Zip:
Submittal Date: Fri Sep 01 14:46:25 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8376-NFPA 70-2024 - Table 310.4(2) was not included because it applies to conductors rated at 2000 V.

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 2521-NFPA 70-2023 [Section No. 724.49(B)]

(B) Insulation.

Insulation on conductors shall be rated for the system voltage~~ and not less than 600 volts~~ . Conductors larger than 16 AWG shall comply with the requirements of Article 310. Conductors that are 18 AWG and 16 AWG shall be Type FFH-2, Type KF-2, Type KFF-2, Type PAF, Type PAFF, Type PF, Type PFF, Type PGF, Type PGFF, Type PTF, Type PTFF, Type RFH-2, Type RFHH-2, Type RFHH-3, Type SF-2, SFF-2, Type TF, Type TFF, Type TFFN, Type TFN, Type ZF, or Type ZFF. Conductors with other types and thicknesses of insulation shall be permitted if listed for Class 1 circuit use.

Statement of Problem and Substantiation for Public Input

It does not make sense to require 600 volt insulation for Class 1 circuit conductors that are restricted to 30 volts. This requirement may have been necessary to allow Class 1 conductors to be installed with power wiring but it should apply when Class 1 conductors are installed separate from power-supply conductors. Section 724.48(A) requires all conductors to be insulated for the maximum voltage of any conductor in the cable, cable tray, enclosure, or raceway when Class 1 conductors are installed with power-supply conductors.

Submitter Information Verification

Submitter Full Name: Robert Jones
Organization: Independent Electrical Contrac
Street Address:
City:
State:
Zip:
Submittal Date: Sat Aug 19 13:19:57 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Making this change could create unintended consequences that could require other changes to be made through the document.

Public Input No. 2949-NFPA 70-2023 [Section No. 724.52]

724.52 Circuits Extending Beyond One Building.

Class 1 circuits that extend aerially beyond one building shall also meet the requirements of ~~Part I of~~ Article 225, Part I .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.

4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.

The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams

Organization: Delta Charter Township

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City:

State:

Zip:

Submittal Date: Mon Aug 28 13:03:21 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8292-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3684-NFPA 70-2023 [Article 725]

Article 725 Class 2 and Class 3 Power-Limited Circuits

Part I. General

725.1 Scope.

This article covers power-limited circuits, including power-limited remote-control and signaling circuits, that are not an integral part of a device or of utilization equipment.

Informational Note No. 1: The circuits described herein are characterized by usage and electrical power limitations that differentiate them from electric light and power circuits; therefore, alternative requirements are given regarding minimum wire sizes, ampacity adjustment and correction factors, overcurrent protection, insulation requirements, and wiring methods and materials.

Informational Note No. 2: See 300.26 for classifications of remote-control and signaling circuits.

725.3 Other Articles.

In addition to the requirements of this article, circuits and equipment shall comply with the articles or sections listed in 725.3(A) through (E). Only those sections of Article 300 referenced in this article shall apply to Class 2 and Class 3 circuits.

~~**(A)** Spread of Fire or Products of Combustion.~~

~~Installation of Class 2 and Class 3 circuits shall comply with 300.21 .~~

~~**(B)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Class 2 and Class 3 circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22 .~~

~~(~~

C) Motor Control Circuits.

Motor control circuits tapped from the load side of the motor branch-circuit protective device(s) as specified in 430.72(A) shall comply with Part IV of Article 430.

(

~~D) Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

~~(~~

~~**E)** Cables for Class 2 and Class 3 Circuits.~~

~~The listing and installation of cables for Class 2 and Class 3 circuits shall comply with Part I and Part II of Article 722.~~

~~**725.10** Hazardous (Classified) Locations.~~

~~Cables and equipment shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

~~**725.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of wires and cables that prevents removal of panels, including suspended ceiling panels.~~

~~**725.24** Mechanical Execution of Work.~~

Class 2 and Class 3

~~equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~

~~**725.30** Class 2 and Class 3 Circuit Identification.~~

~~Class 2 and Class 3~~

circuits shall be identified at terminal and junction locations in a manner that prevents unintentional interference with other circuits during testing and servicing.

725.31 Safety-Control Equipment.

Where damage to power-limited circuits can result in a failure of safety-control equipment that would introduce a direct fire or life hazard, the power-limited circuits shall be installed in accordance with 724.31 . Room thermostats, water temperature regulating devices, and similar controls used in conjunction with electrically controlled household heating and air conditioning shall not be considered safety-control equipment.

Part II. Class 2 and Class 3 Circuits

725.60 Power Sources for Class 2 and Class 3 Circuits.

(A) Power Source.

The power source for a Class 2 or a Class 3 circuit shall be as follows:

Informational Note No. 1: Informational Note Figure 725.60 illustrates the relationships between Class 2 or Class 3 power sources, their supply, and the Class 2 or Class 3 circuits.

Informational Note No. 2: See Chapter 9 , Table 11(A) and Table 11(B), for requirements for listed Class 2 and Class 3 power sources.

(1) A listed Class 2 or Class 3 transformer

(2) A listed Class 2 or Class 3 power supply

(3) Other listed equipment marked to identify the Class 2 or Class 3 power source

Exception No. 1 to (3): Thermocouples shall not require listing as a Class 2 power source.

Exception No. 2 to (3): Limited power circuits of listed equipment where these circuits have energy levels rated at or below the limits established in Chapter 9 , Table 11(A) and Table 11(B).

Informational Note No. 3: Examples of other listed equipment are as follows:

(4) A circuit card listed for use as a Class 2 or Class 3 power source where used as part of a listed assembly

(5) A current-limiting impedance, listed for the purpose, or part of a listed product, used in conjunction with a non-power-limited transformer or a stored energy source, for example, storage battery, to limit the output current

(6) A thermocouple

(7) Limited voltage/current or limited impedance secondary communications circuits of listed industrial control equipment

(8) Listed audio/video, information technology (computer), communications, and industrial equipment limited-power circuits

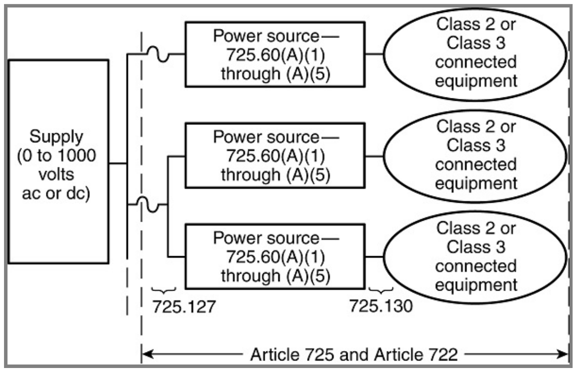
Informational Note No. 4: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, *Standard for Safety of Information Technology Equipment* . Another way to determine applicable requirements for listing of audio/video, information technology, and communications equipment is to refer to UL 62368-1-2014, *Safety of audio/video, information and communication technology equipment* . Typically such circuits are used to interconnect data circuits for the purpose of exchanging information data. One way to determine applicable requirements for listing of industrial equipment is to refer to UL 61010-2-201, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-201: Particular requirements for control equipment* , and/or UL 61800-5-1, *Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy.*

(9) A battery source or battery source system that is listed and identified as Class 2

(B) Interconnection of Power Sources.

Class 2 or Class 3 power sources shall not have the output connections paralleled or otherwise interconnected unless listed for such interconnection.

Figure Informational Note Figure 725.60 Class 2 and Class 3 Circuits.



(C) Marking.

The equipment supplying the circuits shall be durably marked where plainly visible to indicate each circuit that is a Class 2 or Class 3 circuit. The power sources for limited power circuits in 725.60(A)(3) , limited power circuits for listed audio/video equipment, listed information technology equipment, listed communications equipment, and listed industrial equipment in 725.60(A)(4) shall have a label indicating the maximum voltage and rated current output per conductor for each connection point on the power source. Where multiple connection points have the same rating, a single label shall be permitted to be used.

Informational Note No. 1: Rated current for power sources covered in 725.144 is the output current per conductor the power source is designed to deliver to an operational load at normal operating conditions, as declared by the manufacturer.

Informational Note No. 2: An example of a label is “52V @ 0.433A, 57V MAX” for an IEEE 802.3 compliant Class 8 power source.

725.127 Wiring Methods on Supply Side of the Class 2 or Class 3 Power Source.

Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Chapters 1 through 4 .

Exception: The input leads of a transformer or other power source supplying Class 2 and Class 3 circuits shall be permitted to be smaller than 14 AWG but not smaller than 18 AWG if they are protected by an overcurrent device rated not over 20 amperes, are not over 305 mm (12 in.) long, and have insulation that complies with 724.49(B) .

725.

~~130 Wiring Methods and Materials on Load Side of the Class 2 or Class 3 Power Source.~~

~~Class 2 and Class 3 circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 725.130(A) , (B), or a combination of both. Parts I and II of Article 722 shall apply.~~

~~**(A)** Class 1 Wiring Methods and Materials.~~

~~Use of Class 1 wiring methods for Class 2 and Class 3 circuits shall be permitted. Separation from electric light, power, Class 1, non-power-limited fire alarm circuit conductors, and medium-power network-powered broadband communications cables shall comply with 725.136 .~~

~~*Exception: The ampacity adjustment factors given in 310.15(C)(1) shall not apply.*~~

~~**(B)** Class 2 and Class 3 Wiring Methods and Materials.~~

~~Conductors on the load side of the power source shall be insulated in accordance with 722.179 and be installed in accordance with 722.135 and 725.136 through 725.144 .~~

~~*Exception No. 1: As provided for in 620.21 for elevators and similar equipment.*~~

~~*Exception No. 2: Other wiring methods and materials installed in accordance with 725.3 shall be permitted to extend or replace the conductors and cables described in 722.179(A) and permitted by 725.130(B) .*~~

~~*Exception No. 3: Bare Class 2 conductors shall be permitted as part of a listed intrusion protection system where installed in accordance with the listing instructions for the system.*~~

~~725.~~

~~(B)~~ ~~Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.~~

~~Type CL3P-LP, Type CL2P-LP, Type CL3R-LP, Type CL2R-LP, Type CL3-LP, or Type CL2-LP cables shall be permitted to supply power to equipment from a power source with a rated current per conductor up to the marked current limit located immediately following the suffix "-LP" and shall be permitted to transmit data to the equipment. Where the number of bundled LP cables is 192 or less and the selected ampacity of the cables in accordance with Table 725.144 exceeds the marked current limit of the cable, the ampacity determined from the table shall be permitted to be used. For ambient temperatures above 30°C (86°F), the correction factors of Table 310.15(B)(1)(1) or Equation 310.15(B) shall apply. The Class 2-LP and Class 3-LP cables shall comply with the following, as applicable:~~

(1) ~~Cables with the suffix "-LP" shall be permitted to be installed in bundles, raceways, cable trays, communications raceways, and cable routing assemblies.~~

(2) ~~Cables with the suffix "-LP" and a marked current limit shall follow the substitution hierarchy of 722.135(E) for the cable type without the suffix "-LP" and without the marked current limit.~~

(3) ~~System design shall be permitted by qualified persons under engineering supervision.~~

> ~~Informational Note: An example of the marking on a 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP(0.6A) 75°C 23 AWG 4-pair". See 722.179(A)(9).~~

~~Table 725.144 Ampacities of Each Conductor in Amperes in 4-Pair Class 2 or Class 3 Balanced Twisted-Pair Cables Based on Copper Conductors at an Ambient Temperature of 30°C (86°F) with All Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F), and 90°C (194°F) Rated Cables~~

~~- Number of 4-Pair Cables in a Bundle - 1–7 8–19 20–37 38–61 62–91 92–192 - Temperature Rating Temperature Rating Temperature Rating Temperature Rating Temperature Rating Temperature Rating AWG 60°C 75°C 90°C 60°C 75°C 90°C 60°C 75°C 90°C 60°C 75°C 90°C 60°C 75°C 90°C 60°C 75°C 90°C~~

~~Notes:~~

~~1. For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision.~~

~~2. Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor of 1.4.~~

~~Informational Note No. 1: Elevated cable temperatures can reduce a cable's data transmission performance. For information on practices for 4-pair balanced twisted pair cabling, see TIA-TSB-184-A and 6.4.7, 6.6.3, and Annex G of ANSI/TIA-568-C.2, which provide guidance on adjustments for operating temperatures between 20°C and 60°C.~~

~~Informational Note No. 2: The per-contact current rating of connectors can limit the maximum allowable current below the ampacity shown in Table 725.144 .~~

136 Separation from Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm Circuit Conductors, and Medium-Power Network-Powered Broadband Communications Cables.

(A) General.

Cables and conductors of Class 2 and Class 3 circuits shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non-power-limited fire alarm circuits, and medium-power network-powered broadband communications circuits unless permitted by 725.136(B) through (I).

(B) Separated by Barriers.

Class 2 and Class 3 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.

(C) Raceways Within Enclosures.

In enclosures, Class 2 and Class 3 circuits shall be permitted to be installed in a raceway to separate them from Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits.

(D) Associated Systems Within Enclosures.

Class 2 and Class 3 circuit conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 2 and Class 3 circuits, and where one of the following applies:

(1) The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm (0.25 in.) separation from the conductors and cables of Class 2 and Class 3 circuits.

(2) The circuit conductors operate at 150 volts or less to ground and comply with one of the following:

  (3) The Class 2 and Class 3 circuits are installed using Type CL3, Type CL3R, or Type CL3P or permitted substitute cables if these Class 3 cable conductors extending beyond the jacket are separated by a minimum of 6 mm (0.25 in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.

  (4) The Class 2 and Class 3 circuit conductors are installed as a Class 1 circuit in accordance with 724.40 .

(E) Enclosures with Single Opening.

Class 2 and Class 3 circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 2 and Class 3 circuits. Where Class 2 and Class 3 circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee) if the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.

(F) Manholes.

Underground Class 2 and Class 3 circuit conductors in a manhole shall be permitted to be installed with Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where one of the following conditions is met:

(1) The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are in a metal-enclosed cable or Type UF cable.

(2) The Class 2 and Class 3 circuit conductors are permanently and effectively separated from the conductors of other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing, in addition to the insulation or covering on the wire.

(3) The Class 2 and Class 3 circuit conductors are permanently and effectively separated from conductors of the other circuits and securely fastened to racks, insulators, or other approved supports.

(G) Cable Trays.

Class 2 and Class 3 circuit conductors shall be permitted to be installed in cable trays where the conductors of the electric light, Class 1, and non-power-limited fire alarm circuits are separated by a solid fixed barrier of a material compatible with the cable tray or where the Class 2 or Class 3 circuits are installed in Type MC cable.

(H) Where Protected.

Class 2 and Class 3 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are installed using Class 1 wiring methods in accordance with 724.46 and where they are protected by an approved raceway.

(I) Other Applications.

For other applications, conductors of Class 2 and Class 3 circuits shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:

(1) Either all of the electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or all of the Class 2 and Class 3 circuit conductors are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, Type TC, or Type UF cables.

(2) All of the electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the Class 2 and Class 3 circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors.

725.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 2 Circuits.

Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.

(B) Two or More Class 3 Circuits.

Conductors of two or more Class 3 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.

(C) Class 2 Circuits with Class 3 Circuits.

Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly with conductors of Class 3 circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required for Class 3 circuits.

(D) Class 2 and Class 3 Circuits with Communications Circuits.

(1) Communications Cables.

Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits if the cable is a listed communications cable installed in accordance with Part V of Article 800 . The cables shall be listed as communications cables.

(2) Composite Cables.

Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

(E) Class 2 or Class 3 Cables with Other Circuit Cables.

Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(2) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(3) Communications circuits in compliance with Parts I and IV of Article 805

(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(5) Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830

(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables.

~~**725.144** Bundling of Cables Transmitting Power and Data.~~

~~Sections 725.144(A) and (B) shall apply to Class 2 and Class 3 circuits that transmit power and data to a powered device over listed cabling. Section 300.11 and Parts I and III of Article 725 shall apply to Class 2 and Class 3 circuits that transmit power and data. The conductors that carry power for the data circuits shall be copper. The current in the power circuit shall not exceed the current limitation of the connectors.~~

~~Informational Note No. 1: One example of the use of cables that transmit power and data is the connection of closed-circuit TV cameras (CCTV).~~

~~Informational Note No. 2: The 8P8C connector is in widespread use with powered communications systems. IEC 60603-7-2008, *Connectors for electronic equipment — Part 7-1: Detail specification for 8-way, unshielded, free and fixed connectors,* specifies these connectors to have a current-carrying capacity per contact of 1.0 amperes maximum at 60°C (149°F). See IEC 60603-7 for more information on current-carrying capacity at higher and lower temperatures.~~

~~Informational Note No. 3: The requirements of Table 725.144 were derived for carrying power and data over 4-pair copper balanced twisted pair cabling. This type of cabling is described in ANSI/TIA 568-C.2-2009, *Commercial Building Telecommunications Cabling Standard — Part 2: Balanced Twisted-Pair Telecommunications Cabling and Components* .~~

~~Informational Note No. 4: See TIA-TSB-184-A-2017, *Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling* , for information on installation and management of balanced twisted pair cabling supporting power delivery.~~

~~Informational Note No. 5: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems* , for information on installation of cables for PoE lighting systems.~~

~~Informational Note No. 6: Rated current for power sources covered in 725.144 is the output current per conductor the power source is designed to deliver to an operational load at normal operating conditions, as declared by the manufacturer. In the design of these systems, the actual current in a given conductor might vary from the rated current per conductor by as much as 20 percent. An increase in current in one conductor is offset by a corresponding decrease in current in one or more conductors of the same cable.~~

~~**(A)** Use of 4-Pair Class 2 or Class 3 Cables to Transmit Power and Data.~~

~~Where Type CL3P, Type CL2P, Type CL3R, Type CL2R, Type CL3, or Type CL2 4-pair cables transmit power and data, the rated current per conductor of the power source shall not exceed the ampacities in Table 725.144 at an ambient temperature of 30°C (86°F). For ambient temperatures above 30°C (86°F), the correction factors in Table 310.15(B)(1)(1) or in Equation 310.15(B) shall apply.~~

~~*Exception: Compliance with Table 725.144 shall not be required for installations where conductors are 24 AWG or larger and the rated current per conductor of the power source does not exceed 0.3 amperes.*~~

~~Informational Note: One example of the use of Class 2 cables is a network of closed-circuit TV cameras using 24 AWG, 60°C rated, Type CL2R, Category 5e balanced twisted-pair cabling.~~

Part III. Listing Requirements

725.160 Listing and Marking of Equipment for Power and Data Transmission.

The listed power source for circuits intended to provide power and data over Class 2 cables to remote equipment shall be as specified in 725.60(A)(1) , (A)(2), (A)(3), or (A)(4). In accordance with 725.60(B) , the power sources shall not have the output connections paralleled or otherwise interconnected, unless listed for such interconnection. Powered devices connected to a circuit supplying data and power shall be listed. Marking of equipment output connections shall be in accordance with 725.60(C) .

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx	Substantiation	

Statement of Problem and Substantiation for Public Input

This PI is submitted as part of the work of the 722 Limited Energy Task group. It deletes text that was relocated by the TG. See the attachment for the substantiation from the overall TG.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3673-NFPA 70-2023 [Article 722]	same TG effort
Public Input No. 3674-NFPA 70-2023 [Article 724]	same TG effort
Public Input No. 3686-NFPA 70-2023 [Article 726]	
Public Input No. 3687-NFPA 70-2023 [Article 760]	
Public Input No. 3690-NFPA 70-2023 [Article 770]	
Public Input No. 3694-NFPA 70-2023 [Chapter 8]	

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Submittal Date: Tue Sep 05 13:54:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8611-NFPA 70-2024

Statement: A new article was created to relocate all cable requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

The revision incorporates cabling requirements from Article 770 and Chapter 8.

Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]

725.9 Qualified Persons.

Class 2 and Class 3 power-limited circuits covered by this Article shall be installed by qualified persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Technology in the limited energy and communications system segments of the electrical industry is rapidly evolving and expanding and is becoming more complicated. These systems require far more training and experience. These systems are often part of essential electrical systems and critical operations power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. ANSI standards such as NFPA 72, NECA 301 and others, address these systems and include requirements that qualified persons perform installations of these systems and equipment, so these new NEC requirements are proposed to correlate and align with those ANSI-accredited industry standards and codes. Licensing and regulatory agencies are developing new examinations and will be updating existing exams for state and other licensing to increase qualification credentials related to growth and advancement in this segment of the electrical industry. Certification organizations have indicated they anticipate following the same course of action. Qualified contractors and installers are a crucial element of safety related to these installations and systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

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Committee: NEC-P03

Committee Statement

Resolution: The proposed requirement would be better suited for location in Chapter 1. Due to the breadth and diversity of systems within the scope of Article 725, the proposed text would apply too broadly.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

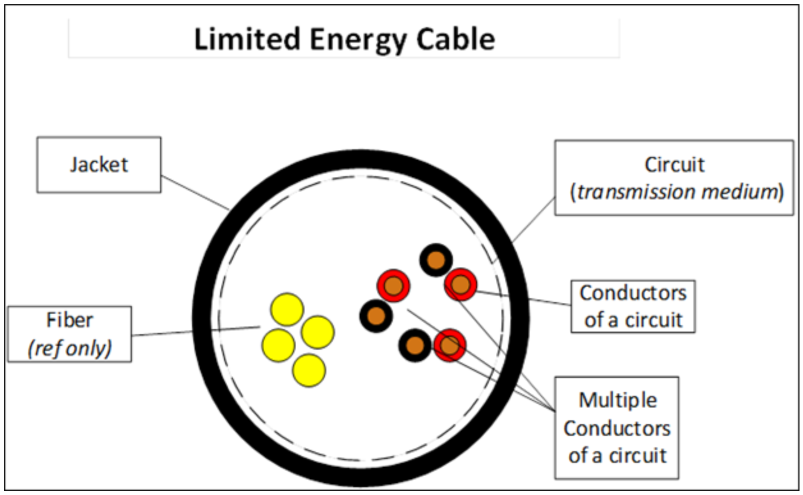
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

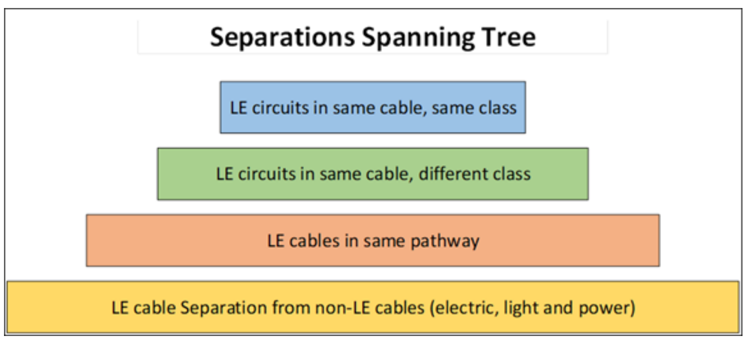
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 2950-NFPA 70-2023 [Section No. 725.3]

725.3 Other Articles.

In addition to the requirements of this article, circuits and equipment shall comply with the articles or sections listed in 725.3(A) through (E). Only those sections of Article 300 referenced in this article shall apply to Class 2 and Class 3 circuits.

(A) Spread of Fire or Products of Combustion.

Installation of Class 2 and Class 3 circuits shall comply with 300.21.

(B) Ducts, Plenums, and Other Air-Handling Spaces.

Class 2 and Class 3 circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22.

(C) Motor Control Circuits.

Motor control circuits tapped from the load side of the motor branch-circuit protective device(s) as specified in 430.72(A) shall comply with ~~Part IV of~~ Article 430, Part IV .

(D) Identification of Equipment Grounding Conductors.

Equipment grounding conductors shall be identified in accordance with 250.119.

(E) Cables for Class 2 and Class 3 Circuits.

The listing and installation of cables for Class 2 and Class 3 circuits shall comply with Article 722, Part I and Part II ~~of Article 722~~ .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

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Committee:	NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 815-NFPA 70-2023 [Section No. 725.3]

725.3 Other Articles.

In addition to the requirements of this article, circuits and equipment shall comply with the articles or sections listed in 725.3(A) through (~~E~~ D). Only those sections of Article 300 referenced in this article shall apply to Class 2 and Class 3 circuits.

(A) Spread of Fire or Products of Combustion.

Installation of Class 2 and Class 3 circuits shall comply with 300.21.

(B) Ducts, Plenums, and Other Air-Handling Spaces.

Class 2 and Class 3 circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22.

(C) Motor Control Circuits.

Motor control circuits tapped from the load side of the motor branch-circuit protective device(s) as specified in 430.72(A) shall comply with ~~Part IV of~~ Article 430, Part IV .

(D)

~~– Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119~~ .

~~**(E)**~~ - ~~Cables for Class 2 and Class 3 Circuits.~~

The listing and installation of cables for Class 2 and Class 3 circuits shall comply with ~~Part I and Part II of~~ Article 722, Parts I and II .

Statement of Problem and Substantiation for Public Input

Deletion of 725.3(D) will remove a conflict with 722.3(N). Section 722.3(N) has an exception to compliance with 250.119 that is not included in 725.3(D); furthermore 725.3(E) requires compliance with Part 1 of Article 722 so 725.3(D) would not be needed even if it didn't conflict with 722.3(N).

The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, "The article number shall precede the part number."

Submitter Information Verification

Submitter Full Name: David Kiddoo
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Affiliation: Communications Cable & Connectivity Association
Street Address:
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Submittal Date: Fri May 12 23:55:53 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 2506-NFPA 70-2023 [Sections 725.3, 725.10, 725.21, 725.24, 725.30, 725.31]

Sections 725.3, 725.10, 725.21, 725.24, 725.30, 725.31

~~**725.3** Other Articles.~~

~~In addition to the requirements of this article, circuits and equipment shall comply with the articles or sections listed in 725.3(A) through (E). Only those sections of Article 300 referenced in this article shall apply to Class 2 and Class 3 circuits.~~

~~**(A)** Spread of Fire or Products of Combustion.~~

~~Installation of Class 2 and Class 3 circuits shall comply with 300.21 .~~

~~**(B)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Class 2 and Class 3 circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22 .~~

~~**(C)** Motor Control Circuits.~~

~~Motor control circuits tapped from the load side of the motor branch-circuit protective device(s) as specified in 430.72(A) shall comply with Part IV of Article 430.~~

~~**(D)** Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

~~**(E)** Cables for Class 2 and Class 3 Circuits.~~

~~The listing and installation of cables for Class 2 and Class 3 circuits shall comply with Part I and Part II of Article 722.~~

~~**725.10** Hazardous (Classified) Locations.~~

~~Cables and equipment shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

~~**725.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of wires and cables that prevents removal of panels, including suspended ceiling panels.~~

~~**725.24** Mechanical Execution of Work.~~

~~Class 2 and Class 3 equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~

~~**725.30** Class 2 and Class 3 Circuit Identification.~~

~~Class 2 and Class 3 circuits shall be identified at terminal and junction locations in a manner that prevents unintentional interference with other circuits during testing and servicing.~~

~~**725.31** Safety-Control Equipment.~~

~~Where damage to power-limited circuits can result in a failure of safety-control equipment that would introduce a direct fire or life hazard, the power-limited circuits shall be installed in accordance with 724.31 . Room thermostats, water temperature regulating devices, and similar controls used in conjunction with electrically controlled household heating and air conditioning shall not be considered safety-control equipment.~~

Statement of Problem and Substantiation for Public Input

These requirements are all in Article 722 now, there is no reason to have them here anymore.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed

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Submittal Date: Fri Aug 18 13:28:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 3395-NFPA 70-2023 [Sections 725.3(A), 725.3(B)]

~~**Sections 725.3(A), 725.3(B)**~~

~~**(A)** Spread of Fire or Products of Combustion.~~

~~Installation of Class 2 and Class 3 circuits shall comply with 300.21 .~~

~~**(B)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Class 2 and Class 3 circuits installed in ducts, plenums, or other space used for environmental air shall comply with 300.22 .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	Deleted text substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. and Training
Street Address:
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Zip:
Submittal Date: Sat Sep 02 07:54:39 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

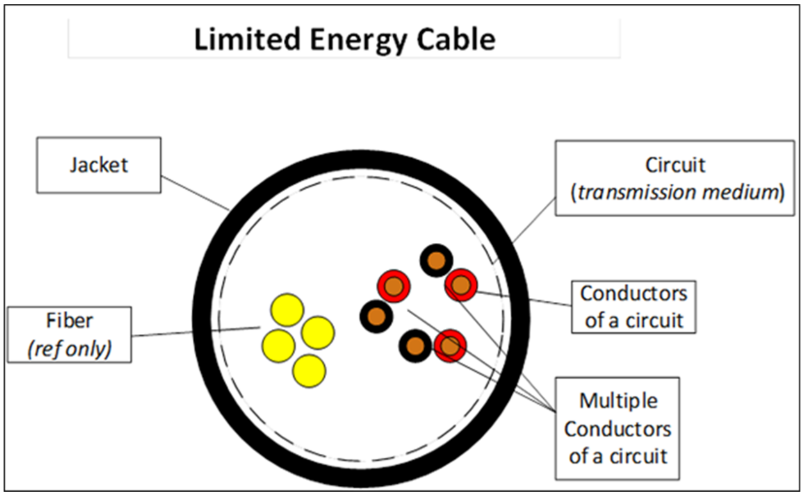
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

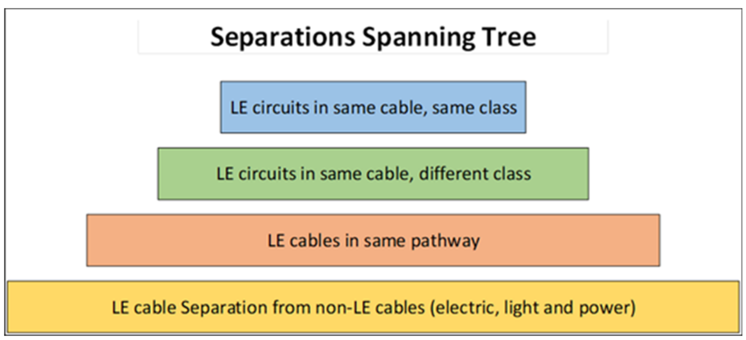
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 3396-NFPA 70-2023 [Sections 725.10, 725.21, 725.24]

~~**Sections 725.10, 725.21, 725.24**~~

~~**725.10** Hazardous (Classified) Locations.~~

~~Cables and equipment shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

~~**725.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of wires and cables that prevents removal of panels, including suspended ceiling panels.~~

~~**725.24** Mechanical Execution of Work.~~

~~Class 2 and Class 3 equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	Deleted text substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Inspections & Training
Street Address:
City:
State:
Zip:
Submittal Date: Sat Sep 02 08:01:50 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

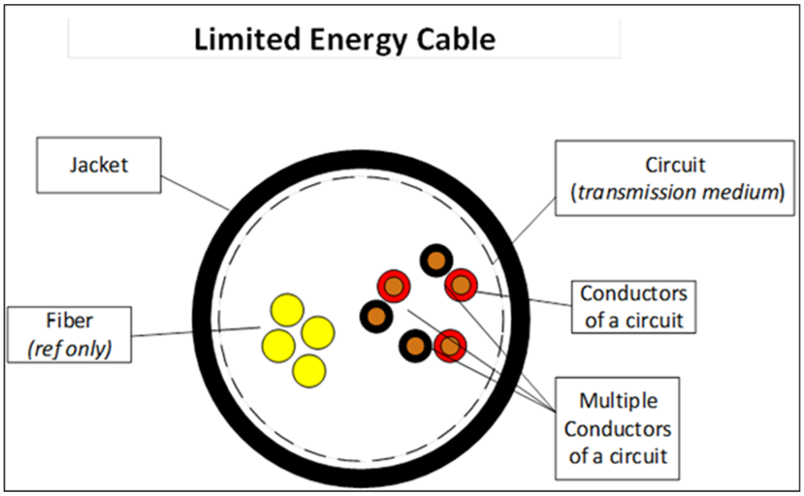
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

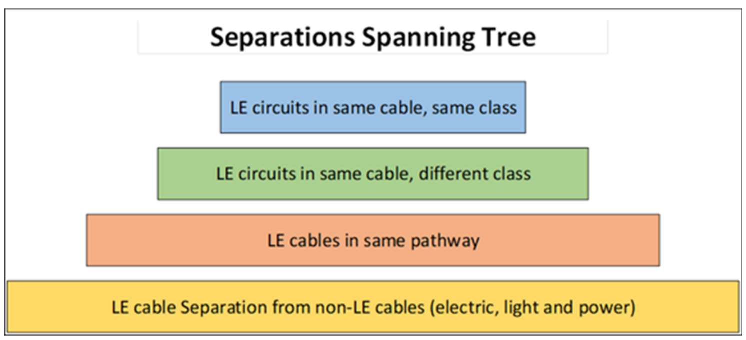
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]

725.22 Installation.
Installation of Class 2 and Class 3 circuits shall comply with Section 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

This new Section 725.22 is to accommodate the revision of Section 725.24 moving the Installation requirements here and leaving the Workmanship requirements in 725.24 to maintain consistency with other parts of this Code and emphasize the need for workmanship.

See Companion PIs pertaining to Sections:

- Article 100 Definition of "Workmanship"
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 724.24(A)
  - NEW 724.22
- 724.24
- NEW 726.22
- 726.24
- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	

Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

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Submittal Date:	Fri Jul 28 19:53:15 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 1390-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

To correlate more closely with article 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1382-NFPA 70-2023 [Section No. 600.33(B)]	

Submitter Information Verification

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Submittal Date:	Wed Jul 12 16:10:18 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]

725.~~24~~ ~~Mechanical Execution of Work~~ 24 Workmanship .

Class 2 and Class 3 equipment shall be mechanicallt executed and installed in ~~a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~ a manner consistant with industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

Statement of Problem and Substantiation for Public Input

Workmanship is an egalitarian term, that focuses on evaluating the craftsmanship of any individual or group, the overall standard of work, precision, and dedication put forth in achieving a desirable outcome regardless of gender.

These revisions provide clarity that the focus of Section 725.24 is on "Workmanship" creating consistency with other parts of this Code where Workmanship is either XXX.24 or XXX.24(X).
See Companion PIs pertaining to Sections:

- Article 100 Definition of "Workmanship"
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 722.24(A) • NEW 724.22
- 724.24
- NEW 726.22
- 726.24
- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	

Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name:	Kyle Krueger
Organization:	NECA
Affiliation:	NECA
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Zip:	
Submittal Date:	Fri Jul 28 19:55:53 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
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Submittal Date: Fri Aug 11 06:34:32 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

Changing the wording matches what is in 110.12. Keeping the wording the same promotes consistency throughout the code. Additional inputs will be done for other code articles. 722.24, 724.24, 726.24
760.24 (A), 770.24(A), 800.24(A).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	

Submitter Information Verification

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Submittal Date: Fri Aug 18 12:26:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 285-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 ~~and~~ , 300.11 and 334 . 30. .

Statement of Problem and Substantiation for Public Input

Since the makeup of small conductor cables is about the same as NMB then supports should not exceed that as required for NMB. This would also make for a more "workmanlike manner"

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 283-NFPA 70-2023 [Section No. 722.24(A)]	Required support means
Public Input No. 284-NFPA 70-2023 [Section No. 724.24]	Required support means
Public Input No. 286-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 287-NFPA 70-2023 [Section No. 770.24(A)]	

Submitter Information Verification

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Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 3798-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

This change is being submitted to update the language used to reflect the change made in 110.12 in the 2023 version.

Submitter Information Verification

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Submittal Date: Tue Sep 05 17:01:47 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 4239-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed in a neat and workmanlike manner.~~ The installation shall also comply with 300.4 and 300.11 .~~

Statement of Problem and Substantiation for Public Input

In the 2023 NEC, Section 725.24 was revised and now only applies to Class 2 and Class 3 equipment since the mechanical execution of work for the associated cables is now located in 722.24. The revised language requires Class 2 and Class 3 "equipment" to be installed in a neat and workmanlike manner and also comply with 300.4 and 300.11.

Being required to install the actual equipment in a neat and workmanlike manner is fine, but the additional reference for compliance with Section 300.4 is unenforceable since this section provides protection requirements for conductors, raceways, and cables subject to physical damage but remains silent on "equipment". Equipment is defined in Article 100 as a general term, including fittings, devices, appliances, luminaires, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation.

Similarly, Section 300.11 pertains to wiring methods and materials but not "equipment".

Submitter Information Verification

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Submittal Date: Thu Sep 07 03:49:24 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 54-NFPA 70-2023 [Section No. 725.24]

725.24 Mechanical Execution of Work.

Class 2 and Class 3 equipment shall be installed ~~in a neat and workmanlike manner. The installation shall also comply~~ to comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

Article 725 is not exempt from 90.3 or Article 110. Therefore, the requirements of Article 110 apply to Chapter 7 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 725 that "Class 2 and Class 3 equipment shall be installed in a professional and skillful manner." Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual where it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful" in 110.12. In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

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Submittal Date: Fri Jan 06 17:31:01 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8393-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.1.

Public Input No. 4051-NFPA 70-2023 [Section No. 725.60(A)]

(A) Power Source.

The power source for a Class 2 or a Class 3 circuit shall be as follows:

Informational Note No. 1: Informational Note Figure 725.60 illustrates the relationships between Class 2 or Class 3 power sources, their supply, and the Class 2 or Class 3 circuits.

Informational Note No. 2: See Chapter 9, Table 11(A) and Table 11(B), for requirements for listed Class 2 and Class 3 power sources.

(1) A listed Class 2 or Class 3 transformer

(2) A listed Class 2 or Class 3 power supply

(3) Other listed equipment marked to identify the Class 2 or Class 3 power source

Exception No. 1 to (3): Thermocouples shall not require listing as a Class 2 power source.

Exception No. 2 to (3): Limited power circuits of listed equipment where these circuits have energy levels rated at or below the limits established in Chapter 9, Table 11(A) and Table 11(B).

Informational Note No. 3: Examples of other listed equipment are as follows:

(1) A circuit card listed for use as a Class 2 or Class 3 power source where used as part of a listed assembly

(2) A current-limiting impedance, listed for the purpose, or part of a listed product, used in conjunction with a non-power-limited transformer or a stored energy source, for example, storage battery, to limit the output current

(3) A thermocouple

(4) Limited voltage/current or limited impedance secondary communications circuits of listed industrial control equipment

(4) Listed audio/video,~~ information technology (computer), communications, ~~ communications, and industrial equipment limited-power circuits

Informational Note No. 4: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, *Standard for Safety of Information Technology Equipment*. Another way to determine applicable requirements for listing of audio/video, information technology, and communications equipment is to refer to UL 62368-1-2014, *Safety of audio/video, information and communication technology equipment*. Typically such circuits are used to interconnect data circuits for the purpose of exchanging information data. One way to determine applicable requirements for listing of industrial equipment is to refer to UL 61010-2-201, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-201: Particular requirements for control equipment*, and/or UL 61800-5-1, *Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy.*

(5) A battery source or battery source system that is listed and identified as Class 2

Statement of Problem and Substantiation for Public Input

“information technology (computer)” is not a defined term within the NEC. For the closest defined term, "information technology equipment (ITE)", ITE is used for creation and manipulation of data, voice, video, and similar signals, and therefore cannot serve as a power source for a Class 2 or Class 3 circuit as defined.

Submitter Information Verification

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Submittal Date: Wed Sep 06 14:59:13 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8604-NFPA 70-2024

Statement: "Computer" is deleted in item (4) to align with the title of the listing standard and other

usage in the NEC, including Article 645.

"Circuits" is changed to "sources" in item (4) to align with the title of the section.

References are updated in Informational Note No. 4, and the note is revised comply with the NEC Style Manual, 2.1.10.3.

The Informational Note Figure is moved from 725.60(B) to 725.60(A) where it is referenced in Informational Note No. 1.

Public Input No. 4285-NFPA 70-2023 [Section No. 725.60(A)]

(A) Power Source.

The power source for a Class 2 or a Class 3 circuit shall be as follows:

Informational Note No. 1: Informational Note Figure 725.60 illustrates the relationships between Class 2 or Class 3 power sources, their supply, and the Class 2 or Class 3 circuits.

Informational Note No. 2: See Chapter 9, Table 11(A) and Table 11(B), for requirements for listed Class 2 and Class 3 power sources.

(1) A listed Class 2 or Class 3 transformer

(2) A listed Class 2 or Class 3 power supply

(3) Other listed equipment marked to identify the Class 2 or Class 3 power source

Exception No. 1 to (3): Thermocouples shall not require listing as a Class 2 power source.

Exception No. 2 to (3): Limited power circuits of listed equipment where these circuits have energy levels rated at or below the limits established in Chapter 9, Table 11(A) and Table 11(B).

Informational Note No. 3: Examples of other listed equipment are as follows:

(1) A circuit card listed for use as a Class 2 or Class 3 power source where used as part of a listed assembly

(2) A current-limiting impedance, listed for the purpose, or part of a listed product, used in conjunction with a non-power-limited transformer or a stored energy source, for example, storage battery, to limit the output current

(3) A thermocouple

(4) Limited voltage/current or limited impedance secondary communications circuits of listed industrial control equipment

(4) Listed audio/video, ~~information technology (computer),~~ communications, and industrial equipment limited-power circuits

Informational Note No. 4: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, *Standard for Safety of Information Technology Equipment*. Another way to determine applicable requirements for listing of audio/video, information technology, and communications equipment is to refer to UL 62368-1-2014, *Safety of audio/video, information and communication technology equipment*. Typically such circuits are used to interconnect data circuits for the purpose of exchanging information data. One way to determine applicable requirements for listing of industrial equipment is to refer to UL 61010-2-201, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-201: Particular requirements for control equipment*, and/or UL 61800-5-1, *Adjustable speed electrical power drive systems — Part 5-1: Safety requirements — Electrical, thermal and energy.*

(5) A battery source or battery source system that is listed and identified as Class 2

Statement of Problem and Substantiation for Public Input

“information technology (computer)” is not a defined term within the NEC, but such items can be classified as “information technology equipment (ITE)”. Per the definition of ITE, ITE is not communications equipment nor process communication circuits and are commonly are utilized in data communications. Removal here and with the addition of data communications into Article 800 improves usability of the Code since most Code users assume data communications it’s already in Article 800.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4278-NFPA 70-2023 [New Definition after Definition: Communications Circuit, Pr...]	Defines data communictions

[Public Input No. 4281-NFPA 70-2023 [Section No. 800.1]]	Adds data communications to scope

Submitter Information Verification

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City:	
State:	
Zip:	
Submittal Date:	Thu Sep 07 09:25:52 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8604-NFPA 70-2024

Statement: "Computer" is deleted in item (4) to align with the title of the listing standard and other

usage in the NEC, including Article 645.

"Circuits" is changed to "sources" in item (4) to align with the title of the section.

References are updated in Informational Note No. 4, and the note is revised comply with the NEC Style Manual, 2.1.10.3.

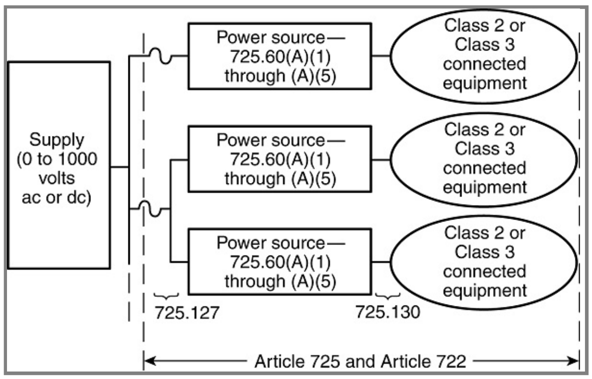
The Informational Note Figure is moved from 725.60(B) to 725.60(A) where it is referenced in Informational Note No. 1.

Public Input No. 563-NFPA 70-2023 [Section No. 725.60(B)]

(B) Interconnection of Power Sources.

Class 2 or Class 3 power sources shall not have the output connections paralleled or otherwise interconnected unless listed for such interconnection.

~~**Figure Informational Note Figure 725.60 Class 2 and Class 3 Circuits.**~~



Statement of Problem and Substantiation for Public Input

This drawing is not needed at all, and there is certainly no need to draw the same thing three times.

Submitter Information Verification

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Submittal Date: Mon Apr 10 13:29:20 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The statement of problem and substantiation do not provide technical justification to delete this text.

Public Input No. 428-NFPA 70-2023 [New Section after 725.127]

Working Space Requirements

The working space dimensions detailed in 110.26(A) shall not be required for Class 2 or Class 3 equipment.

Statement of Problem and Substantiation for Public Input

The working space requirements of 110.26(A) currently apply to all equipment (when energized). The first line of table 110.26(A)(1) is "0 - 150" volts. This includes 24volts ac or dc. It would even include a 5 volt power supply. There is an exception, 110.26(A)(1)(b), that allows the relaxation of working spaces for low voltage systems, but this is by special permission and it is only in the Depth section. Relaxation of the working space distances should not require special permission for class 2 equipment. The general requirements of 110.26, enough space for safe operation and maintenance, would still be in force.
110.26(A) is for the safety of the worker. There is no shock hazard with Class 2 equipment and there is no arc flash hazard. NFPA70E consistently uses 50 volts as the hazard threshold for voltages.

Submitter Information Verification

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Submittal Date: Sat Mar 04 22:56:57 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: The justification only speaks to Class 2 equipment. Class 3 voltage can be as high as 150V and deliver 100W and therefore would require adhering to the working space requirements. As indicated in the substantiation, 110.26(A)(1)(b) already exists to allow relaxation of requirements for low voltages.

Public Input No. 2951-NFPA 70-2023 [Section No. 725.130 [Excluding any Sub-Sections]]

Class 2 and Class 3 circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 725.130(A), (B), or a combination of both. Article 722, Parts I and ~~II of Article 722 shall~~ II shall apply.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.

4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.

The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

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Submittal Date:	Mon Aug 28 13:05:25 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8294-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3397-NFPA 70-2023 [Sections 725.136, 725.139]

~~**Sections 725.136, 725.139**~~

~~**725.136** Separation from Electric Light, Power, Class 1, Non-Power-Limited Fire Alarm Circuit Conductors, and Medium-Power Network-Powered Broadband Communications Cables.~~

~~**(A)** General.~~

~~Cables and conductors of Class 2 and Class 3 circuits shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non-power-limited fire alarm circuits, and medium-power network-powered broadband communications circuits unless permitted by 725.136(B) through (I).~~

~~**(B)** Separated by Barriers.~~

~~Class 2 and Class 3 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.~~

~~**(C)** Raceways Within Enclosures.~~

~~In enclosures, Class 2 and Class 3 circuits shall be permitted to be installed in a raceway to separate them from Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits.~~

~~**(D)** Associated Systems Within Enclosures.~~

~~Class 2 and Class 3 circuit conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 2 and Class 3 circuits, and where one of the following applies:~~

(1) ~~The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm (0.25 in.) separation from the conductors and cables of Class 2 and Class 3 circuits.~~

(2) ~~The circuit conductors operate at 150 volts or less to ground and comply with one of the following:~~

    (3) ~~The Class 2 and Class 3 circuits are installed using Type CL3, Type CL3R, or Type CL3P or permitted substitute cables if these Class 3 cable conductors extending beyond the jacket are separated by a minimum of 6 mm (0.25 in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.~~

    (4) ~~The Class 2 and Class 3 circuit conductors are installed as a Class 1 circuit in accordance with 724.40 .~~

~~**(E)** Enclosures with Single Opening.~~

~~Class 2 and Class 3 circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 2 and Class 3 circuits. Where Class 2 and Class 3 circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee) if the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.~~

~~**(F)** Manholes.~~

~~Underground Class 2 and Class 3 circuit conductors in a manhole shall be permitted to be installed with Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where one of the following conditions is met:~~

(1) ~~The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are in a metal-enclosed cable or Type UF cable.~~

(2) ~~The Class 2 and Class 3 circuit conductors are permanently and effectively separated from the conductors of other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing, in addition to the insulation or covering on the wire.~~

(3) ~~The Class 2 and Class 3 circuit conductors are permanently and effectively separated from conductors of the other circuits and securely fastened to racks, insulators, or other approved supports.~~

~~**(G)** Cable Trays.~~

~~Class 2 and Class 3 circuit conductors shall be permitted to be installed in cable trays where the conductors of the electric light, Class 1, and non-power-limited fire alarm circuits are separated by a solid fixed barrier of a material compatible with the cable tray or where the Class 2 or Class 3 circuits are installed in Type MC cable.~~

~~**(H)** Where Protected.~~

~~Class 2 and Class 3 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are installed using Class 1 wiring methods in accordance with 724.46 and where they are protected by an approved raceway.~~

~~**(I)** Other Applications.~~

~~For other applications, conductors of Class 2 and Class 3 circuits shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non-power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:~~

(1) ~~Either all of the electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or all of the Class 2 and Class 3 circuit conductors are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, Type TC, or Type UF cables.~~

(2) ~~All of the electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the Class 2 and Class 3 circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors.~~

~~**725.139** Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.~~

~~**(A)** Two or More Class 2 Circuits.~~

~~Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.~~

~~**(B)** Two or More Class 3 Circuits.~~

~~Conductors of two or more Class 3 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.~~

~~**(C)** Class 2 Circuits with Class 3 Circuits.~~

~~Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly with conductors of Class 3 circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required for Class 3 circuits.~~

~~**(D)** Class 2 and Class 3 Circuits with Communications Circuits.~~

~~**(1)** Communications Cables.~~

~~Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits if the cable is a listed communications cable installed in accordance with Part V of Article 800 . The cables shall be listed as communications cables.~~

~~(2) Composite Cables.~~

~~Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.~~

~~(E) Class 2 or Class 3 Cables with Other Circuit Cables.~~

~~Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:~~

(1) ~~Power-limited fire alarm systems in compliance with Parts I and III of Article 760~~

(2) ~~Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770~~

(3) ~~Communications circuits in compliance with Parts I and IV of Article 805~~

(4) ~~Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820~~

(5) ~~Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830~~

~~(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits.~~

~~Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	Deleted text substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
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Submittal Date: Sat Sep 02 08:06:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the

insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

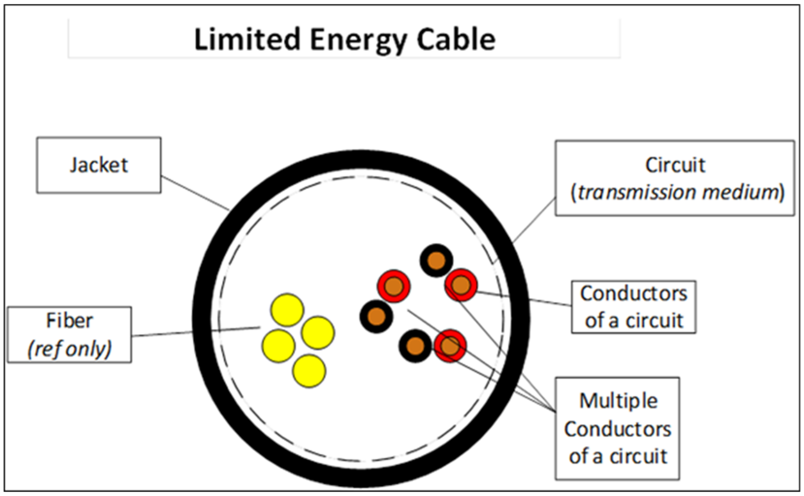
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

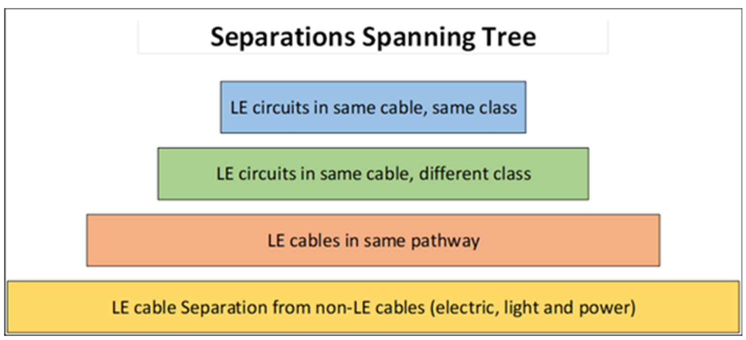
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1491-NFPA 70-2023 [Section No. 725.136(H)]

(H) Where Protected.

Class 2 and Class 3 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits ~~where they are~~ if they are functionally associated and are installed using Class 1 wiring methods in accordance with 724.46~~ and where they are protected by an approved raceway~~ .

Statement of Problem and Substantiation for Public Input

Previous versions of the Code only allowed this practice if the circuits were functionally associated. The revisison in 2023 removed this requirement, which means any circuit can now be installed in the same raceway as the limited energy circuit. Compare this to the requirements in 724.48(B)(1), which retained the requirement.
This PI also changes "where" to "if" for style manual compliance and removes unneccesary langauge.

Submitter Information Verification

Submitter Full Name:	Ryan Jackson
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State:	
Zip:	
Submittal Date:	Fri Jul 21 15:25:40 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8539-NFPA 70-2024

Statement: Previous versions of the Code allowed this practice only if the circuits were functionally associated. The revision in 2023 unintentionally removed this requirement, which meant that any circuit could be installed in the same raceway as the limited energy circuit. The restriction is restored by this revision.

Public Input No. 2952-NFPA 70-2023 [Section No. 725.139]

725.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 2 Circuits.

Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.

(B) Two or More Class 3 Circuits.

Conductors of two or more Class 3 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.

(C) Class 2 Circuits with Class 3 Circuits.

Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly with conductors of Class 3 circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required for Class 3 circuits.

(D) Class 2 and Class 3 Circuits with Communications Circuits.

(1) Communications Cables.

Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits if the cable is a listed communications cable installed in accordance with ~~Part V of~~ Article 800 , Part V . The cables shall be listed as communications cables.

(2) Composite Cables.

Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

(E) Class 2 or Class 3 Cables with Other Circuit Cables.

Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Article 760, Parts I and III ~~of Article 760~~

(2) Nonconductive and conductive optical fiber cables in compliance with Article 770, Parts I and IV ~~of Article 770~~

(3) Communications circuits in compliance with Article 805, Parts I and IV ~~of Article 805~~

(4) Community antenna television and radio distribution systems in compliance with Article 820, Parts I and IV ~~of Article 820~~

(5) Low-power, network-powered broadband communications in compliance with Article 830, Parts I and IV ~~of Article 830~~

(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:06:28 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 817-NFPA 70-2023 [Section No. 725.139]

725.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 2 Circuits in the Same Cable .

Conductors of two or more Class 2 circuits shall be permitted within the same ~~cable, enclosure, raceway, or cable routing assembly~~ listed Class 2 cable .

(B) Two or More Class 3 Circuits in the Same Cable .

Conductors of two or more Class 3 circuits shall be permitted within the same ~~cable, enclosure, raceway, or cable routing assembly~~ listed Class 3 cable .

(C) ~~Class 2 Circuits with Class 3 Circuits.~~

~~Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly with conductors of Class 3 circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required for Class 3 circuits~~

Class 2, Class 3 and Class 4 Circuits in the Same Cable.

(1) Listed Class 3 Cables. Class 2 and Class 3 circuits shall be permitted in listed Class 3 cables.

(2) Dual-Listed Class 2/Class 3 Cables **.** Class 2 and Class 3 circuits shall be permitted in dual-listed Class 2/Class 3 cables.

(3) Dual-Listed Class 2/Class 4 Cables. Class 2 and Class 4 circuits shall be permitted in dual-listed Class 2/Class 4 cables.

(4) Dual-Listed Class 3/Class 4 Cables. Class 2, Class 3 and Class 4 circuits shall be permitted in dual-listed Class 3/Class 4 cables .

(D) Class 2 and Class 3 Circuits with Communications Circuits.

(1) Communications Cables.

Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits if the cable is a listed communications cable installed in accordance with

~~Part V of~~

Article 800

~~. The cables shall be listed as communications cables.~~

, Parts I and IV.

(2) Composite Cables.

~~Cables~~

Composite cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified and listed as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

(E) Class 2 or Class 3 Cables with Other

~~Circuit Cables.~~

~~Jacketed cables of Class 2 or Class 3 circuits~~

Cables in the Same Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

Listed Class 2 and Class 3 cables shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with

~~jacketed cables~~

of any of the following:

~~Power~~

(1) Other listed Class 2 and Class 3 cables installed in compliance with 645.5(E)(2); or Article 722, Part I, and Article725, Parts I and II

(2) Listed Class 4 cables installed in compliance with Article 726, Part II

(3) Listed power -limited fire alarm

~~systems~~

cables installed in compliance with Article 760, Parts I and III

~~of Article 760Nonconductive~~

(4) L isted nonconductive and conductive optical fiber cables installed in compliance with Article 770, Parts I and

~~IV of Article 770Communications circuits~~

V

(5) Listed communications cables installed in compliance with Article 800, Parts I and IV

~~of Article 805Community~~

(6) Listed community antenna television and radio distribution

~~systems~~

coaxial cables installed in compliance with Article 800, Parts I and IV

~~of~~

, and Article 820

~~Low~~

, Parts I and V

(7) Listed low -power, network-powered broadband communications cables installed in compliance with Article 830, Parts I and

~~IV of Article 830~~

V

(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables.

Statement of Problem and Substantiation for Public Input

One of the primary purposes of this PI is to remove an inconsistency between 725.139(C) and 725.139(E). Section 725.139(C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Section 725.139(E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

The other primary purpose of the PI is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be run in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be run in a Class 4 cable if the cable is dual-listed. A companion PI has been submitted to revise 726.139(B) to require dual listing. The current requirement in 726.139(B) for upgraded insulation is problematical.

Minor editorial changes were made clarify that “the installation” needs to be in compliance with the installation rules, not the “circuit”. “Circuits” was changed to “cables” to clarify which cables are permitted to be run together in the same pathway. The subsection headings were expanded to improve usability.

A few other minor editorial changes are recommended to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be run together are listed cables. This clarification is need to avoid any interpretation that unlisted outside-plant communications and optical fiber cables are permitted to be run with the Class 2, Class 3 and Class 4 cables, which are always listed.

The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 818-NFPA 70-2023 [Section No. 726.139]	Provide for dual listing.
Public Input No. 826-NFPA 70-2023 [Section No. 830.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 895-NFPA 70-2023 [Section No. 760.139]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 899-NFPA 70-2023 [Section No. 800.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 818-NFPA 70-2023 [Section No. 726.139]	
Public Input No. 895-NFPA 70-2023 [Section No. 760.139]	
Public Input No. 899-NFPA 70-2023 [Section No. 800.133(A)(1)]	
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	

Submitter Information Verification

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Submittal Date: Sat May 13 06:08:44 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing

assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 4033-NFPA 70-2023 [Section No. 725.139(E)]

(E) Class 2 or Class 3 Cables with Other Circuit Cables.

~~Jacketed cables of~~
Listed Class 2

~~or~~
and Class 3

~~circuits~~
cables shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with

~~jacketed cables of~~
any of the following:

(1) Listed Class 4 cables

(2) Listed Power-limited fire alarm
~~systems in compliance with Parts I and III of Article 760~~

(3) cables

(3) Listed Nonconductive and conductive optical fiber cables

~~in compliance with Parts I and IV of Article 770~~

- ~~Communications circuits in compliance with Parts I and IV of Article 805~~

(4) Listed Communications cables

(5) Listed Community antenna television and radio distribution

~~systems in compliance with Parts I and IV of Article 820~~
system coaxial cables

(6) Listed Low-power, network-powered broadband communications

~~in compliance with Parts I and IV of Article 830~~
cables

Statement of Problem and Substantiation for Public Input

- Changes to reflect these are listed cables and other readability improvements (e.g., no need to state in compliance with the installation rules of the Article, as already required for cabling under that Article)

Submitter Information Verification

Submitter Full Name: Jeff Silveira
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Submittal Date: Wed Sep 06 14:36:58 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 1196-NFPA 70-2023 [Section No. 725.139(F)]

(F) ~~Class 2 or Class 3 Conductors or Cables and~~ Audio System Circuits and PLFA Circuits .

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, raceway, or cable routing assembly with ~~Class 2 or Class 3 conductors or~~ PLFA circuits or cables.

Additional Proposed Changes

File Name	Description	Approved
ROP_2004.pdf	Report on Proposals - 2004	
ROP_2013.pdf	Report on Proposals - 2013	

Statement of Problem and Substantiation for Public Input

1. The original intent of this clause was to keep PLFA circuits separate from Audio System circuits. See Report on Proposals from May 2004, 3-162a Log #CP305 NEC-P03.
2. Audio circuits described in 640.9 (C) are considered equivalent to Class 2 or Class 3 circuits, causing this clause (as written) to be in conflict with itself.
3. Actions captured in Report on Proposals 2013, 3-118 Log #1625 NEC-P03 changed the intent of the original substantiation of adding this clause.
4. Acceptance of this change will re-align 725.139(F) with 760.139(E), both having the same original intent.

Submitter Information Verification

Submitter Full Name: Ronald Tellas
Organization: Belden
Affiliation: CCCA
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City:
State:
Zip:
Submittal Date: Fri Jun 23 10:32:53 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8412-NFPA 70-2024

Statement: This change corrects an error in 725.139(F) that was inadvertently introduced in previous revisions of the Code, which deleted PLFA circuits from this requirement. The revised text now aligns with 760.139(E), which does not permit audio systems to be installed with PLFA circuits.

3-162a Log #CP305 NEC-P03 **Final Action: Accept**
(725.56(F) New)

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 12 for comment.

Submitter: Code-Making Panel 3

Recommendation:

Add new text:

"725.56(F). Class 2 or Class 3 Conductors or Cables and Audio System Circuits." Audio system circuits described in Section 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with Sections 725.54 and 725.61 shall not be permitted to be installed in the same cable or raceway with Class 2 or Class 3 conductors or cables.

Substantiation:

Alarm systems and remote control circuits for safety control equipment where the failure of the equipment to operate introduces a direct fire or life safety hazard may be affected by these audio system circuits. Depending upon the voltage and amperage of the audio amplifier circuits, a fault between audio amplifier circuits and these Class 2 and Class 3 circuits has the potential to create a serious hazard, by disrupting system operation.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

CASPARRO: Information provided in the Panel's substantiation is incomplete. Discussions held at the Panel meeting on Proposals revealed the need for further technical documentation to address a potential shock hazard, associated with extending the current and voltage limitations of Class II and Class III wiring, that would exist if this proposal were accepted.

3-118 Log #1625 NEC-P03 **Final Action: Accept in Principle in Part**
(725.2. Cable Routing Assembly, 725.48, 725.133, 725.139, 725.154, 725.179)

TCC Action: The Correlating Committee directs this proposal be forwarded to Code-Making Panel 16 for correlation with Proposals 3-171 and 16-23.

The Correlating Committee directs that the Chairs of Code-Making Panels 3 and 16 form a Task Group to locate the definition of Cable Routing Assembly into a single Article of Chapter 8. This definition shall be correlated by the Task Group for use in Articles 725, 760, 770 and Chapter 8.

Submitter: Marcelo M. Hirschler, GBH International

Recommendation: Revise text to read as follows:

725.2 Definitions

Cable Routing Assembly. A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support, route and protect high densities of wires and cables, typically communications wires and cables, optical fiber and data (Class 2 and Class 3) cables associated with information technology and communications equipment.

(No change to other definitions)

725.48 Conductors of Different Circuits in the Same Cable, Cable Tray, Enclosure, ~~or~~ Raceway or Cable Routing Assembly. Class 1 circuits shall be permitted to be installed with other circuits as specified in 725.48(A) and (B).

(A) Two or More Class 1 Circuits. Class 1 circuits shall be permitted to occupy the same cable, cable tray, enclosure, ~~or~~ raceway or cable routing assembly without regard to whether the individual circuits are alternating current or direct current, provided all conductors are insulated for the maximum voltage of any conductor in the cable, cable tray, enclosure, ~~or~~ raceway or cable routing assembly.

(B) Class 1 Circuits with Power-Supply Circuits. Class 1 circuits shall be permitted to be installed with power-supply conductors as specified in 725.48(B)(1) through (B)(4).

(1) In a Cable, Enclosure, or Raceway. Class 1 circuits and power-supply circuits shall be permitted to occupy the same cable, enclosure, ~~or~~ raceway or cable routing assembly only where the equipment powered is functionally associated.

(2) through (4) ***(No change)***

725.133 Installation of Conductors and Equipment in Cables, Compartments, Cable Trays, Enclosures, Manholes, Outlet Boxes, Device Boxes, ~~and~~ Raceways, and Cable Routing Assemblies for Class 2 and Class 3 Circuits. Conductors and equipment for Class 2 and Class 3 circuits shall be installed in accordance with 725.136 through 725.143.

725.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, ~~or~~ Raceway, or Cable Routing Assembly.

(A) Two or More Class 2 Circuits. Conductors of two or more Class 2 circuits shall be permitted within the same cable, enclosure, ~~or~~ raceway, or cable routing assembly.

(B) Two or More Class 3 Circuits. Conductors of two or more Class 3 circuits shall be permitted within the same cable, enclosure, or raceway, or cable routing assembly.

(C) Class 2 Circuits with Class 3 Circuits. Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, ~~or~~ raceway, or cable routing assembly with conductors of Class 3 circuits, provided the insulation of the Class 2 circuit conductors in the cable, enclosure, ~~or~~ raceway, or cable routing assembly is at least that required for Class 3 circuits.

(D) ***(No change)***

(E) Class 2 or Class 3 Cables with Other Circuit Cables. Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure, cable tray, ~~or~~ raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(2) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(3) Communications circuits in compliance with Parts I and IV of Article 800

(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(5) Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830

(F) Class 2 or Class 3 Conductors or Cables and Audio System Circuits. Audio system circuits described in 640.9(C), and installed using Class 2 or Class 3 wiring methods in compliance with 725.133 and 725.154, shall not be permitted to be installed in the same cable, ~~or~~ raceway, or cable routing assembly with Class 2 or Class 3 conductors or cables.

725.154 Applications of Listed Class 2, Class 3, and PLTC Cables. Class 2, Class 3, and PLTC cables shall comply with any of the requirements described in 725.154(A) through (H).

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CL2P or CL3P. Listed wires and cables installed in compliance with 300.22 shall be permitted. Listed plenum signaling raceways shall be permitted to be installed in other spaces used for environmental air as described in 300.22(C). Only Type CL2P or CL3P cable shall be permitted to be installed in these raceways.

(B) Riser. Cables installed in risers shall be as described in any of (B)(1), (B)(2), or (B)(3):

(1) Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type CL2R or CL3R. Floor penetrations requiring Type CL2R or CL3R shall contain only cables suitable for riser or plenum use. Listed riser signaling raceways, ~~and~~ listed plenum signaling raceways, listed riser cable routing assemblies and listed plenum cable routing assemblies shall be permitted to be installed in vertical riser runs in a shaft from floor to floor. Only Type CL2R, CL3R, CL2P, or CL3P cables shall be permitted to be installed in these raceways or routing assemblies.

(2) Other cables as covered in Table 725.154(G) and other listed wiring methods as covered in Chapter 3 shall be installed in metal raceways, or located in a fireproof shaft having firestops at each floor.

(3) Type CL2, CL3, CL2X, and CL3X cables shall be permitted in one- and two-family dwellings. Listed general purpose signaling raceways shall be permitted for use with Type CL2, CL3, CL2X, and CL3X cables.

Informational Note: See 300.21 for firestop requirements for floor penetrations.

(C) Cable Trays. Cables installed in cable trays outdoors shall be Type PLTC. Cables installed in cable trays indoors shall be Types PLTC, CL3P, CL3R, CL3, CL2P, CL2R, and CL2.

Listed general-purpose signaling raceways, listed riser signaling raceways, ~~and~~ listed plenum signaling raceways, listed general-use cable routing assemblies, listed riser cable routing assemblies and listed plenum cable routing assemblies shall be permitted for use with cable trays.

Informational Note: See 800.154 for cables permitted in cable trays.

(D) through (H) ***(No change)***

725.179 Listing and Marking of Class 2, Class 3, ~~and~~ Type PLTC Cables, Signaling Raceways, and Cable Routing Assemblies. Class 2, Class 3, and Type PLTC cables, ~~and~~ nonmetallic signaling raceways, and cable routing assemblies installed as wiring methods within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 725.179(A) through (K) (M) and shall be marked in accordance with 725.179 (~~L~~) (O) .

(A)Through K) ***(No change)***

725.179(L) Plenum Cable Routing Assemblies. Plenum cable routing assemblies shall be listed as having fire-resistant and low-smoke-producing characteristics.

Informational Note: One method of defining that a cable routing assembly is a low smoke producing cable routing assembly and a fire-resistant cable routing assembly is that the cable routing assemblies exhibit a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with the plenum test in *Subject 2024A, UL Outline of Investigation for Cable Routing Assemblies.*

725.179(M) Riser Cable Routing Assemblies. Riser cable routing assemblies shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Informational Note: One method of defining fire resistant characteristics capable of preventing the carrying of fire from floor to floor is that the cable routing assemblies pass the requirements of the test for flame propagation (riser) in *Subject 2024A, UL Outline of Investigation for Cable Routing Assemblies.*

725.179(N) General-Use Cable Routing Assemblies. General-use cable routing assemblies shall be listed as being resistant to the spread of fire.

Informational Note: One method of defining resistance to the spread of fire is that the cable routing assemblies pass the requirements of the vertical tray flame test (general use) in *Subject 2024A, UL Outline of Investigation for Cable Routing Assemblies.*

725.179 (L) to become 725.179 (O) without change

Substantiation: Cable routing assemblies are different from raceways in that they may or may not enclose the associated cables. These products are often open and are thus not covered by the concept of raceways. However, they are covered by UL Subject 2024A, entitled “Cable Routing Assemblies”. This proposal includes cable routing assemblies in risers and cable trays. It does not address cable routing assemblies in plenums because NFPA 90A has not permitted them. However it does permit listed plenum cable routing assemblies (which it defines) into risers and cable trays. Note also that UL 2024A lists “general use cable routing assemblies” instead of “general purpose cable routing assemblies”.

This proposal also adds a definition of “cable routing assembly”, as presently found in article 770.

Panel Meeting Action: Accept in Principle in Part

In the proposed wording revise the definition as follows:

Cable Routing Assembly. A single channel or connected multiple channels, as well as associated fittings, forming a structural system that is used to support~~,~~ and route ~~and protect high densities of wires~~ conductors and cables.” ~~, typically communications wires and cables, optical fiber and data (Class 2 and Class 3) cables associated with information technology and communications equipment.~~

In addition, the panel “Accepts” the portions of this proposal submitted for the following Sections without Informational Notes:

1. 725.139
2. 725.179 (Introduction)
3. 725.179(L)
4. 725.179(M)
5. 725.179(N)

6. 725.179(O)

The panel "Rejects" the remainder of the proposal.

Panel Statement: The panel requests that the Technical Correlating Committee refer this proposal to Code-Making Panel 16 for comment on the definition.

The UL Subject 2024A has been changed to UL 2024 as a full standard with the title changed to Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies.

Cable routing assemblies are not listed for Class 1 circuits, therefore, the insertion of cable routing assemblies into 725.48 is not accepted.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

EASTER, L.: NEMA is voting negative on the proposal because it includes requirements for a plenum rated cable routing assembly where there is no corresponding application for the product. While it is permitted as a substitute for the riser and lower rated Cable Routing assemblies, its use in plenums is not permitted by the NEC or by NFPA 90A that has jurisdiction over wiring in air handling plenum spaces.

An Informational Note after the requirements for Riser cable routing assemblies would be appropriate in place of the proposed requirement. The Informational note would indicate that "Cable routing assemblies that exhibit a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with the plenum test in UL 2024 Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies are considered suitable wherever cable routing assemblies that pass the requirements of the test for flame propagation (riser) in UL 2024 Signaling, Optical Fiber and Communications Raceways and Cable Routing Assemblies are required."

Public Input No. 1145-NFPA 70-2023 [Section No. 725.144(B)]

(B) Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

Type CL3P-LP, Type CL2P-LP, Type CL3R-LP, Type CL2R-LP, Type CL3-LP, or Type CL2-LP cables shall be permitted to supply power to equipment from a power source with a rated current per conductor up to the marked current limit located immediately following the suffix "-LP" and shall be permitted to transmit data to the equipment. Where the number of bundled LP cables is 192 or less and the selected ampacity of the cables in accordance with Table 725.144 exceeds the marked current limit of the cable, the ampacity determined from the table shall be permitted to be used. For ambient temperatures above 30°C (86°F), the correction factors of Table 310.15(B)(1)(1) or Equation 310.15(B) shall apply. The Class 2-LP and Class 3-LP cables shall comply with the following, as applicable:

(1) Cables with the suffix "-LP" shall be permitted to be installed in bundles, raceways, cable trays, communications raceways, and cable routing assemblies.

(2) Cables with the suffix "-LP" and a marked current limit shall follow the substitution hierarchy of 722.135(E) for the cable type without the suffix "-LP" and without the marked current limit.

(3) System design shall be permitted by qualified persons under engineering supervision.

Informational Note: An example of the marking on a 23 AWG, 4-pair, Class 2 cable rated 75°C with an LP current rating of 0.6 amperes per conductor is "CL2-LP(0.6A) 75°C 23 AWG 4-pair". See 722.179(A)(9).

Table 725.144 Ampacities of Each Conductor in Amperes in 4-Pair Class 2 or Class 3 Balanced Twisted-Pair Cables Based on Copper Conductors at an Ambient Temperature of 30°C (86°F) with All Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F), and 90°C (194°F) Rated Cables

-

	-	Maximum Number of 4-Pair Cables in a Bundle															
	7 ~~1–7~~			19 ~~8–19~~			37 ~~20–37~~			61 ~~38–61~~			91 ~~62–91~~			1	
	- Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating				
AWG	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	7
26	1.00	1.23	1.42	0.71	0.87	1.02	0.55	0.68	0.78	0.46	0.57	0.67	0.45	0.55	0.64	NA	N
24	1.19	1.46	1.69	0.81	1.01	1.17	0.63	0.78	0.91	0.55	0.67	0.78	0.46	0.56	0.65	0.40	0.4
23	1.24	1.53	1.78	0.89	1.11	1.28	0.77	0.95	1.10	0.66	0.80	0.93	0.58	0.71	0.82	0.45	0.5
22	1.50	1.86	2.16	1.04	1.28	1.49	0.77	0.95	1.11	0.66	0.82	0.96	0.62	0.77	0.89	0.53	0.6

Notes:

1. For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision.

2. Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor of 1.4.

Informational Note No. 1: Elevated cable temperatures can reduce a cable's data transmission performance. For information on practices for 4-pair balanced twisted pair cabling, see TIA-TSB-184-A and 6.4.7, 6.6.3, and Annex G of ANSI/TIA-568-C.2, which provide guidance on adjustments for operating temperatures between 20°C and 60°C.

Informational Note No. 2: The per-contact current rating of connectors can limit the maximum allowable current below the ampacity shown in Table 725.144.

Statement of Problem and Substantiation for Public Input

The inclusion of a range on this table has always made the table unnecessarily complex. As the intent of the table is to define the maximum allowable current per conductor in a bundle of a specific size, only the maximum bundle size is required. As it is written, someone may be confused and believe that cable bundles may have a minimum size for a given current per conductor, which is of course not the case.

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Committee Statement

Resolution: Removing the range adds a new complexity where a bundle of 7 can be interpreted to also be covered by a bundle of 19, or 37, or 192. The range makes it explicitly clear where a bundle falls with relation to the table. The title is Maximum Number of 4-Pair Cables in a Bundle. There is no mention of minimum size.

Public Input No. 2953-NFPA 70-2023 [Section No. 725.144 [Excluding any Sub-Sections]]

Sections 725.144(A) and (B) shall apply to Class 2 and Class 3 circuits that transmit power and data to a powered device over listed cabling. Section 300.11 and Article 725, Parts I and ~~III of Article 725 shall~~ III shall apply to Class 2 and Class 3 circuits that transmit power and data. The conductors that carry power for the data circuits shall be copper. The current in the power circuit shall not exceed the current limitation of the connectors.

Informational Note No. 1: One example of the use of cables that transmit power and data is the connection of closed-circuit TV cameras (CCTV).

Informational Note No. 2: The 8P8C connector is in widespread use with powered communications systems. IEC 60603-7-2008, *Connectors for electronic equipment — Part 7-1: Detail specification for 8-way, unshielded, free and fixed connectors,* specifies these connectors to have a current-carrying capacity per contact of 1.0 amperes maximum at 60°C (149°F). See IEC 60603-7 for more information on current-carrying capacity at higher and lower temperatures.

Informational Note No. 3: The requirements of Table 725.144 were derived for carrying power and data over 4-pair copper balanced twisted pair cabling. This type of cabling is described in ANSI/TIA 568-C.2-2009, *Commercial Building Telecommunications Cabling Standard — Part 2: Balanced Twisted-Pair Telecommunications Cabling and Components.*

Informational Note No. 4: See TIA-TSB-184-A-2017, *Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling*, for information on installation and management of balanced twisted pair cabling supporting power delivery.

Informational Note No. 5: See ANSI/NEMA C137.3-2017, *American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems*, for information on installation of cables for PoE lighting systems.

Informational Note No. 6: Rated current for power sources covered in 725.144 is the output current per conductor the power source is designed to deliver to an operational load at normal operating conditions, as declared by the manufacturer. In the design of these systems, the actual current in a given conductor might vary from the rated current per conductor by as much as 20 percent. An increase in current in one conductor is offset by a corresponding decrease in current in one or more conductors of the same cable.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

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Committee Statement

Resolution: FR-8296-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3686-NFPA 70-2023 [Article 726]

Article 726 Class 4 Fault-Managed Power Systems

Part I. General

726.1 Scope.

This article covers the installation of wiring systems and equipment, including utilization equipment, of Class 4 fault-managed power (FMP) systems.

Informational Note No. 1: Class 4 fault-managed power systems consist of a Class 4 power transmitter and a Class 4 power receiver connected by a Class 4 cabling system. These systems are characterized by monitoring the circuit for faults and controlling the source current to ensure the energy delivered into any fault is limited. Class 4 systems differ from Class 1, Class 2, and Class 3 systems in that they are not limited for power delivered to an appropriate load. They are current limited for faults between the Class 4 transmitter and Class 4 receiver.

Informational Note No. 2: The circuits described in this article are characterized by monitoring and control systems that differentiate them from electric light and power circuits; therefore, alternative requirements to those of Chapters 1 through 4 are given.

726.3 Other Articles.

The listing and installation of cables for Class 4 circuits shall comply with Article 722. Only those sections of Article 300 referenced in Article 722 shall apply to Class 4 circuits.

~~726.~~

726.~~10~~ ~~Hazardous (Classified) Locations.~~

~~Class 4 power systems shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

12 Uses Not Permitted.

Class 4 power systems shall not be permitted in dwelling units.

~~**726.24** Mechanical Execution of Work.~~

~~Class 4 equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~

Part II. Class 4 Circuits

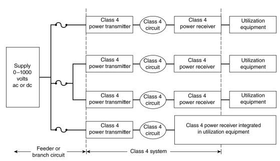
726.121 Power Sources for Class 4 Circuits.

The power source shall be a listed Class 4 power transmitter or a listed Class 4 power transmitter as part of a transmitter/receiver system and shall provide the protections in accordance with 726.121(A) . Class 4 circuits shall be supplied from a power source (transmitter) that has a voltage output of not more than 450 volts peak or dc.

Informational Note No. 1: Informational Note Figure 726.121 illustrates the relationships between Class 4 power transmitters (power sources), Class 4 circuits, Class 4 power receivers, and utilization equipment.

Informational Note No. 2: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part 1: General Requirements* , for information on determining applicable requirements for the listing of Class 4 power systems.

Figure Informational Note Figure 726.121 Class 4 Circuits.



(A) Fault Management.

For listing purposes, a transmitter shall interrupt an energized circuit when any of the following conditions occur on the circuit between the transmitter and receiver:

(1) A short circuit

(2) A line-to-line fault condition that presents an unacceptable risk of fire or electric shock

(3) A ground-fault condition that presents an unacceptable risk of fire or electric shock

(4) An overcurrent condition

(5) A malfunction of the monitoring or control system that presents an unacceptable risk of fire or electric shock

(6) Any other condition that presents an unacceptable risk of fire or electric shock

Informational Note: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part 1: General Requirements* , for information on determining applicable requirements for the listing of Class 4 power systems, including safe operation and limiting the risk of fire and electric shock.

726.122 Class 4 Loads.

Outputs of a Class 4 receiver and power outputs of Class 4 utilization equipment shall be considered a separately derived system if the outputs are used as a supply for a feeder or branch circuit.

Informational Note: Class 4 utilization equipment that does not provide power outputs is not subject to these requirements.

Exception: A Class 4 receiver with limited-power circuit outputs shall be permitted to meet the requirements of Part II of Article 725.

726.124 Class 4 Marking.

(A) Class 4 Transmitter Marking.

The equipment supplying the Class 4 circuits shall be durably marked where plainly visible to indicate each circuit that is a Class 4 circuit. The marking shall also include the maximum voltage and current output for each connection point. Where multiple connection points have the same rating, a single label shall be permitted to be used.

Informational Note: An example of marking is “Class 4: +/–190V, 5A” for a Class 4 transmitter capable of delivering 1.9 kW from 380 volts line to line.

(B) Class 4 Receiver Marking.

(1) Class 4 Circuits.

A Class 4 receiver or Class 4 utilization equipment shall be durably marked where plainly visible to indicate each circuit that is a Class 4 circuit. The marking shall include the maximum input voltage and current for each connection point.

(2) Output Terminals and Socket Outlets.

Where the Class 4 receiver or Class 4 utilization equipment has outputs, terminals, or socket outlets for providing power to other equipment, each output shall be durably marked where plainly visible. The marking shall include the maximum output voltage and current for each connection point. Where multiple connection points have the same rating, a single label shall be permitted to be used. Class 1, Class 2, and Class 3 circuits shall be identified in accordance with 724.30 or Part II of Article 725 .

726.130 Terminals and Connectors.

(A) Listing.

Connecting hardware used on Class 4 distribution systems shall be listed.

(B) Noninterchangeability.

Connectors for Class 4 circuits shall be designed such that they are not interchangeable with non-power-limited sources located on the same premises.

(C) Guarding.

Any junctions and mating connectors shall be constructed and installed to guard against inadvertent contact with live parts by persons.

726.136 Separation from Electric Light, Power, Class 1, Non–Power-Limited Fire Alarm Circuit, and Medium-Power Network-Powered Broadband Communications Cables.

(A) General.

Cables and conductors of Class 4 circuits shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits unless permitted by 726.136(B) through (H).

(B) Separated by Barriers.

Class 4 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.

(C) Raceways Within Enclosures.

In enclosures, Class 4 circuits shall be permitted to be installed in a raceway to separate them from Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits.

(D) Associated Systems Within Enclosures.

Class 4 circuit conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 4 circuits, and where either of the following applies:

(1) The electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm (0.25 in.) separation from the conductors and cables of Class 4 circuits.

(2) The non–Class 4 circuit conductors operate at 150 volts or less to ground and the Class 4 circuits are installed using Type CL4, Type CL4R, or Type CL4P cables if any CL4 cable conductors extending beyond the jacket are separated by a minimum of 6 mm (0.25 in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.

(E) Enclosures with Single Openings.

Class 4 circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 4 circuits. Where Class 4 circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee) if the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.

(F) Manholes.

Underground Class 4 circuit conductors in a manhole shall be permitted to be installed with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where one of the following conditions is met:

(1) The electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are in a metal-enclosed cable or Type UF cable.

(2) The Class 4 circuit conductors are permanently and effectively separated from the conductors of other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing, in addition to the insulation or covering on the wire.

(3) The Class 4 circuit conductors are permanently and effectively separated from conductors of the other circuits and securely fastened to racks, insulators, or other approved supports.

(G) Cable Trays.

Class 4 circuit conductors shall be permitted to be installed in cable trays where the conductors of the electric light, Class 1, and non–power-limited fire alarm circuits are separated by a solid fixed barrier of a material compatible with the cable tray or where the Class 4 circuits are installed in Type MC cable.

(H) Other Applications.

For other applications, conductors of Class 4 circuits shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non–power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:

(1) Either all of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or all of the Class 4 circuit conductors are in a raceway or in metal-sheathed, metal-clad, non–metallic-sheathed, Type TC, or Type UF cables

(2) All of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the Class 4 circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors

726.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 4 Circuits.

Conductors of two or more Class 4 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.

(B) Class 4 Circuits With Class 2, Class 3, or Communications Circuits.

Conductors of one or more Class 4 circuits shall be permitted within the same cable assembly as conductors of Class 2, Class 3, or communications circuits if the insulation of the Class 2, Class 3, or communications circuit conductors in the cable is at least that required for Class 4 circuits. Class 4 cables shall be permitted within the same enclosure, raceway, or cable routing assembly as Class 2, Class 3, or communications circuits.

(C) Class 4 Cables With Other Circuit Cables.

Jacketed cables of Class 4 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(2) Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770

(3) Communications circuits in compliance with Parts I and IV of Article 805

(4) Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820

(5) Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830

~~**726.144** Ampacity.~~

~~The ampacity of Class 4 cables shall comply with 300.15 based on the temperature rating of the Class 4 cable for conductors sized 16 AWG to 6 AWG. For conductors sized 24 AWG to 17 AWG, the Class 4 cable shall be rated for the intended ampacity as evidenced by the marking FMP-XXA, where XX is the maximum allowable ampacity permitted.~~

> ~~Informational Note No. 1: See 722.179(A)(16) for additional Class 4 cable requirements.~~
>
> ~~Informational Note No. 2: See UL 1400-1, *Outline of Investigation for Fault-Managed Power Systems — Part 1: General Requirements* , and UL 1400-2, *Outline of Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables* , for information on determining maximum allowable ampacities.~~

Part III. Listing Requirements

726.170 Listing of Equipment for Class 4 Systems.

The active components of a Class 4 system shall be listed as a Class 4 device. The listing information shall include compatible devices if a listed Class 4 device depends on specific system devices for interoperability, monitoring, or control.

> Informational Note No. 1: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part I: General Requirements* , for information on determining applicable requirements for the listing of Class 4 power systems.
>
> Informational Note No. 2: An example of a dependent active device in a Class 4 system is a transmitter that relies on a particular receiver or receivers as part of the monitoring and control system.

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx	Substantiation	

Statement of Problem and Substantiation for Public Input

This PI is submitted as part of the work of the 722 Limited Energy Task group. It deletes text that was relocated by the TG. See the attachment for the substantiation from the overall TG.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3673-NFPA 70-2023 [Article 722]	same TG effort
Public Input No. 3674-NFPA 70-2023 [Article 724]	same TG effort
Public Input No. 3684-NFPA 70-2023 [Article 725]	same TG effort
Public Input No. 3687-NFPA 70-2023 [Article 760]	
Public Input No. 3690-NFPA 70-2023 [Article 770]	
Public Input No. 3694-NFPA 70-2023 [Chapter 8]	

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Committee: NEC-P03

Committee Statement

Resolution: FR-8611-NFPA 70-2024

Statement: A new article was created to relocate all cable requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

The revision incorporates cabling requirements from Article 770 and Chapter 8.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

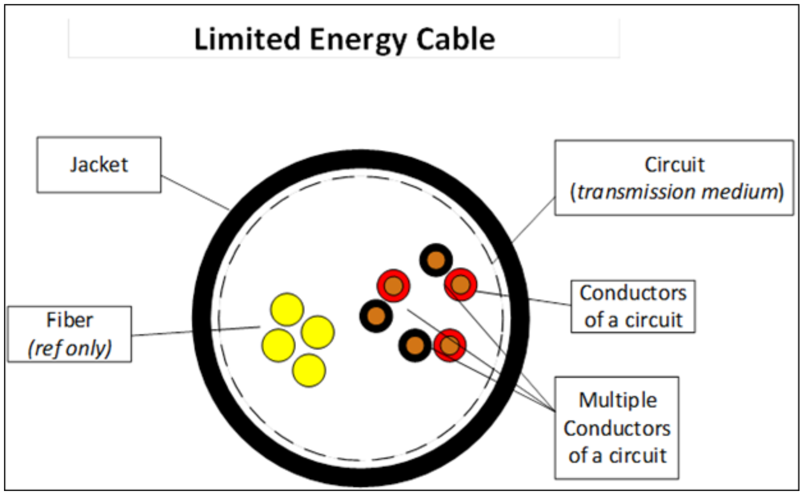
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

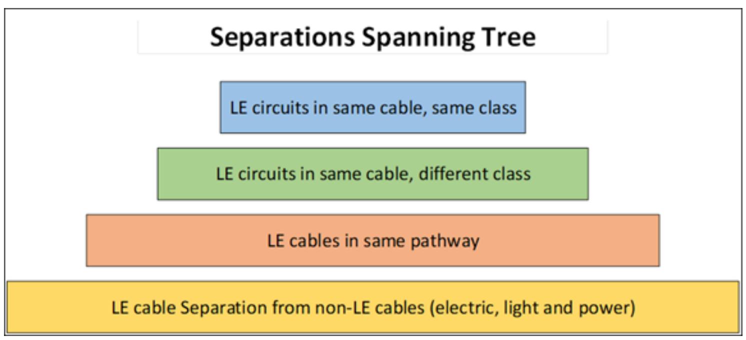
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 2847-NFPA 70-2023 [New Section after 726.1]

726.2 Listing Requirements.

Class 4 systems shall be listed in accordance with the following:

(1) The power source shall be a listed Class 4 power transmitter or a listed Class 4 power transmitter as part of a transmitter/receiver system.

(2) Terminals and connecting hardware used on Class 4 distribution systems shall be listed.

(3) T he equipment and active components of a Class 4 system shall be listed as a Class 4 device. The listing information shall include compatible devices if a listed Class 4 device depends on specific system devices for interoperability, monitoring, or control.
Informational Note No. 1: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part I: General Requirements* , for information on determining applicable requirements for the listing of Class 4 power systems.

Informational Note No. 2: An example of a dependent active device in a Class 4 system is a transmitter that relies on a particular receiver or receivers as part of the monitoring and control system.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Relocated text from 726.121, 726.130(A), and 726.170.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2848-NFPA 70-2023 [Section No. 726.121 [Excluding any Sub-Sections]]	
Public Input No. 2851-NFPA 70-2023 [Sections Part III., 726.170]	
Public Input No. 2852-NFPA 70-2023 [Section No. 726.130(A)]	

Submitter Information Verification

Submitter Full Name: Dean Hunter
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Submittal Date: Fri Aug 25 14:39:51 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8421-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements. This information is relocated from 726.121, 726.130(A), and 726.170.

Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]

726.9 Qualified Persons.

Fault-managed power circuits and equipment covered by this Article shall be installed by Qualified Persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Technology in the limited energy and communications system segments of the electrical industry is rapidly evolving and expanding and is becoming more complicated. These systems require far more training and experience. These systems are often part of essential electrical systems and critical operations power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. ANSI standards such as NFPA 72, NECA 301 and others, address these systems and include requirements that qualified persons perform installations of these systems and equipment, so these new NEC requirements are proposed to correlate and align with those ANSI-accredited industry standards and codes. Licensing and regulatory agencies are developing new examinations and will be updating existing exams for state and other licensing to increase qualification credentials related to growth and advancement in this segment of the electrical industry. Certification organizations have indicated they anticipate following the same course of action. Qualified contractors and installers are a crucial element of safety related to these installations and systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

Submitter Information Verification

Submitter Full Name: Kyle Krueger
Organization: NECA
Affiliation: NECA
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State:
Zip:
Submittal Date: Fri Jul 28 20:03:22 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The proposed requirement would be better suited for location in Chapter 1.

Public Input No. 989-NFPA 70-2023 [Section No. 726.3]

726.3 Other Articles.

The listing of cables for Class 4 circuits shall comply with Article 722, Part II, and the installation of cables for Class 4 circuits shall comply with ~~Article~~ Article 722, Part I . Only those sections of Article 300 referenced in Article 722 ~~shall~~ .3 shall apply to Class 4 circuits.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits references to entire articles other than Article 100 or where required for context. Thus, I've attempted to point the user to the correct part of the article for the listing requirements, the correct part of the article for the installation requirements, and the section which references "other articles" to comply and improve usability.

Submitter Information Verification

Submitter Full Name: Richard Holub

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Submittal Date: Thu Jun 08 12:37:28 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8297-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4. The reference to Article 300 is maintained to provide necessary context.

The section is renumbered to 726.4 to comply with the new requirement for parallel numbering in the NEC Style Manual, section 2.2.1.1.

Public Input No. 3437-NFPA 70-2023 [Section No. 726.10]

~~**726.10** Hazardous (Classified) Locations.~~

~~Class 4 power systems shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First draft substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
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City:
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Submittal Date: Sun Sep 03 05:46:51 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. "Circuits" was changed to "cables" to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to

improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
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The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

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The structure follows this logic:

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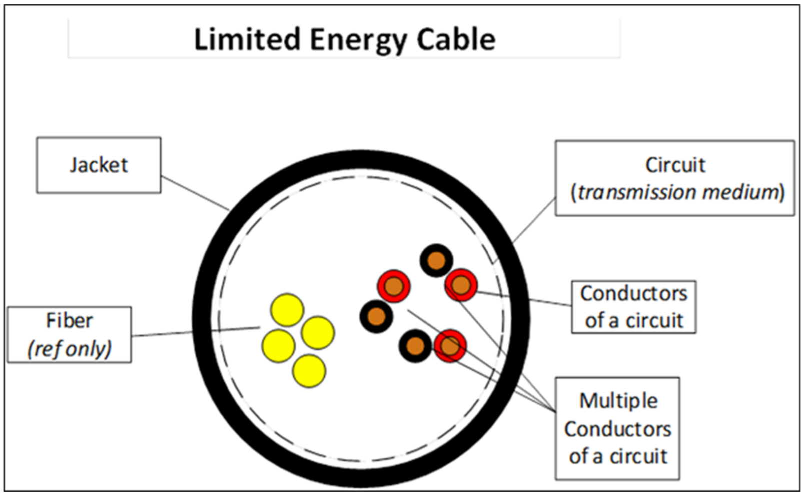
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
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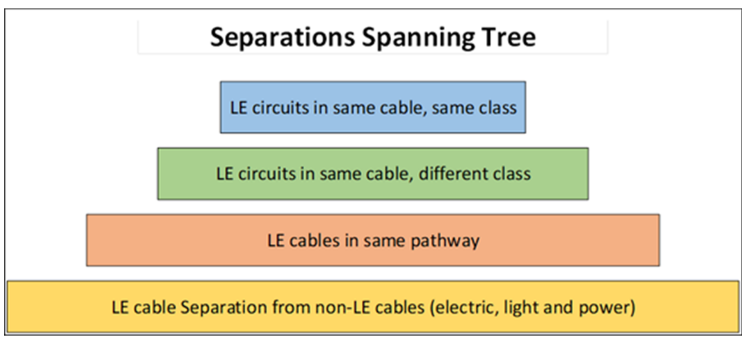

Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]

726.22 Installation.

The installation of Class 4 Fault-Managed power systems shall comply with Sections 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

This new Section 726.22 is to accommodate the revision of Section 726.24 moving the Installation requirements here and leaving the Workmanship requirements in 726.24 to maintain consistency with other parts of this Code and emphasize the need for workmanship.

See Companion PIs pertaining to Sections:

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	

Submitter Information Verification

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Submittal Date: Fri Jul 28 20:07:34 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 4377-NFPA 70-2023 [Section No. 726.12]

~~**726.12** Uses Not Permitted.~~

~~Class 4 power systems shall not be permitted in dwelling units.~~

Statement of Problem and Substantiation for Public Input

The use of class 4 systems in dwelling units allows for efficient and safe distribution of power using new technology permitted. However, the panel statement instituting the prohibition against class 4 systems in dwelling units stated that the use of class 4 systems required further study. At that time, UL1400-1 and UL 1400-2 were racing to conclusion.

The use of UL-1400 listed systems and cabling for point-to-point listed connections could improve safety for these high-voltage systems, because they offer risks of electric shock and fire lower than conventional branch circuits or bundles of class 2 circuits delivering equivalent or lower power. Since the 2023 NEC cycle, progress in systems development and listing of cabling and systems has matured significantly, addressing several concerns voiced as needing further study.

In particular, the following are addressed:

Shock & Fire Safety: Shock and fire safety for FMP systems does not change based on whether the environment is commercial or a dwelling unit. UL1400-1 requires that FMP systems de-energize according to the UL one-year-old shock curve, ensuring safety for all. FMP systems are listed to a shock and fire safety level superior to branch circuits ordinarily present in the dwelling unit, and with protection equivalent or better than AFCI/GFCI protected circuits.

Interoperability: UL1400-1 requires that the class 4 transmitter and receiver units be listed as a system. As a result, interoperability between the transmitter and receiver will be tested as part of the listing process, including interoperability on fault testing.

Cable Heating: For conductor gauge 17 AWG and larger, the NEC requires compliance with 310.15, the same ampacity requirements used for other circuits in dwellings. For conductors 18 AWG and smaller, UL1400-2 adds requirements. Listed class 4 cables 18 AWG and smaller are tested to meet voltage, temperature, and current that the cable is permitted to carry in bundled configurations exceeding that which would be seen in a dwelling unit. Specifically, to cable heating, Section 5.17 of UL1400-2 requires class 4 cabling to be tested and labeled for a current rating in a 37-cable bundled configuration, offering far more power capacity and heating potential than would be seen in a dwelling unit application. The proposed use in this PI requires class 4 cables in dwelling units unlikely providing power to large numbers of circuits, as opposed to the test level of 37 cables bundled, providing an extra level of safety from the standpoint of heating. In fact, cable bundle heating models accepted and used by TIA and ISO/IEC cabling standards groups suggest the use of this large a bundle results in a factor of between 8 and 12 x the temperature rise seen by a single cable, allowing substantial margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation. Heating for class 4 cables is no different than other current-carrying cables used in dwelling units and would generally be used with lower current levels than is common for allowed wiring with branch circuits and class 2 circuits (due to higher permitted voltage levels), which have been safely used in a similar way in the code. This is comparable to adjustment factors for going from groups of 37 to less than 10 conductors in Table 310.15 (C)(1), and allows substantial margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4380-NFPA 70-2023 [Section No. 726.12]	Alternate solution, not preferred
Public Input No. 4380-NFPA 70-2023 [Section No. 726.12]	
Public Input No. 4385-NFPA 70-2023 [Section No. 726.144]	
Public Input No. 4391-NFPA 70-2023 [Section No. 722.135]	

Submitter Information Verification

Submitter Full Name: Bob Voss
Organization: Panduit Corp
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Submittal Date: Thu Sep 07 13:31:58 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8426-NFPA 70-2024

Statement: Dwelling unit installations were prohibited in the 2023 code as FMP was new and the UL listing standards were still under development. The listing standards are now published, and products are making their way to market, building the confidence in the systems. Cable heating has been evaluated with acceptable results for limited bundle sizes with regard to heating or fire initiation concerns.

Public Input No. 4380-NFPA 70-2023 [Section No. 726.12]

726.12 Uses Not Permitted.

Class 4 power systems shall not be permitted in dwelling units.

Exception: Class 4 power systems shall be permitted in attached and detached garages of one- and two-family dwellings, and accessory buildings.

Statement of Problem and Substantiation for Public Input

Class 4 systems are particularly of interest in energy storage and electric vehicle charging units – often located in non-living spaces associated with dwelling units. If a companion public input requesting deletion of 726.12 is not allowed, then we ask the panel to consider uses in non-living spaces to enable these applications.

The present restriction of use in dwelling units may commonly be mistaken as a restriction against uses anywhere in a dwelling premises. Article 100 specifically defines the dwelling unit (a single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation), and makes it clear that various types of dwellings may contain one two or more such units. Confusion may arise when a building or premises contains non-living areas, such as garages, including detached garages. Article 210.52 treats garage areas separately from living areas and states they “may be attached” to an individual dwelling unit in a “dwelling” (a building containing one, two, or more dwelling units). An area that ‘may be attached’ to a dwelling unit is not the same as being ‘part of’ the dwelling unit.

Permitted use of listed class 4 systems in non-living spaces associated with dwelling units would be consistent with electric vehicle and battery energy storage which utilize similar voltage levels, and would provide the safety and efficiency benefits associated with class 4 to these applications and others. The panel statement instituting the prohibition against class 4 systems in dwelling units stated that the use of class 4 systems required further study. At that time, UL1400-1 and UL 1400-2 were racing to conclusion.

The use of UL-1400 listed systems and cabling for point-to-point listed connections could improve safety for these high-voltage systems, because they offer risks of electric shock and fire lower than conventional branch circuits or bundles of class 2 circuits delivering equivalent or lower power. Since the 2023 NEC cycle, progress in systems development and listing of cabling and systems has matured significantly, addressing several concerns voiced as needing further study.

In particular, the following are addressed:

Shock & Fire Safety: Shock and fire safety for FMP systems does not change based on whether the environment is commercial or a dwelling unit. UL1400-1 requires that FMP systems de-energize according to the UL one-year-old shock curve, ensuring safety for all. FMP systems are listed to a shock and fire safety level superior to branch circuits ordinarily present in the dwelling unit, and with protection equivalent or better than AFCI/GFCI protected circuits.

Interoperability: UL1400-1 requires that the class 4 transmitter and receiver units be listed as a system. As a result, interoperability between the transmitter and receiver will be tested as part of the listing process, including interoperability on fault testing.

Cable Heating: For conductor gauge 17 AWG and larger, the NEC requires compliance with 310.15, the same ampacity requirements used for other circuits in dwellings. For conductors 18 AWG and smaller, UL1400-2 adds requirements. Listed class 4 cables 18 AWG and smaller are tested to meet voltage, temperature, and current that the cable is permitted to carry in bundled configurations exceeding that which would be seen in a dwelling unit. Specifically, to cable heating, Section 5.17 of UL1400-2 requires class 4 cabling to be tested and labeled for a current rating in a 37-cable bundled configuration, offering far more power capacity and heating potential than would be seen in a dwelling unit application. The proposed use in this PI requires class 4 cables in dwelling units unlikely providing power to large numbers of circuits, as opposed to the test level of 37 cables bundled, providing an extra level of safety from the standpoint of heating. In fact, cable bundle heating models accepted and used by TIA and ISO/IEC cabling standards groups suggest the use of this large a bundle results in a factor of between 8 and 12 x the temperature rise seen by a single cable, allowing substantial margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

Heating for class 4 cables is no different than other current-carrying cables used in dwelling units and would generally be used with lower current levels than is common for allowed wiring with branch circuits and class 2 circuits (due to higher permitted voltage levels), which have been safely used in a similar way in the code. This is comparable to adjustment factors for going from groups of 37 to less than 10 conductors in Table 310.15 (C)(1), and allows substantial margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4377-NFPA 70-2023 [Section No. 726.12]	Preferred alternate solution
Public Input No. 4377-NFPA 70-2023 [Section No. 726.12]	

Submitter Information Verification

Submitter Full Name: Bob Voss
Organization: Panduit Corp
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City:
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Submittal Date: Thu Sep 07 13:36:00 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The restriction on dwelling units is deleted.

Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]

726.~~24~~ ~~Mechanical Execution of Work.~~

~~Class 4 equipment shall be~~

24 Workmanship.

Class 4 fault-manager power systems and equipment shall be mechanically executed and installed in a ~~neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~ manner consistant with industry practices and standards.

Informational Note No. 1: See definition of *workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

Statement of Problem and Substantiation for Public Input

Workmanship is an egalitarian term, that focuses on evaluating the craftsmanship of any individual or group, the overall standard of work, precision, and dedication put forth in achieving a desirable outcome regardless of gender.

These revisions provide clarity that the focus of Section 726.24 is on "Workmanship" creating consistency with other parts of this Code where Workmanship is either XXX.24 or XXX.24(X).
See Companion PIs pertaining to Sections:

- Article 100 Definition of "Workmanship"
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 722.24(A)
  - NEW 724.22
- 724.24
- NEW 725.22
- 725.24
- 760.24(A)
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]	
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]	
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]	
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]	
Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]	
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]	
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]	

[Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]]
[Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]]
[Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]]
[Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]]
[Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]]
[Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]]
[Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]]
[Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]]
[Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]]
[Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]]
[Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]]
[Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]]
[Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]]
[Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]]
[Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]]

Submitter Information Verification

Submitter Full Name:	Kyle Krueger
Organization:	NECA
Affiliation:	NECA
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jul 28 20:09:43 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]

726.24 Mechanical Execution of Work.

Class 4 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	
Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]	

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 06:38:10 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 726.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]

726.24 Mechanical Execution of Work.

Class 4 equipment shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. The installation shall also comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

Changing the wording matches what is in 110.12. Keeping the wording the same promotes consistency throughout the code. Additional inputs will be done for other code articles. 722.24, 724.24, 725.24
760.24 (A), 770.24(A), 800.24(A).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	

Submitter Information Verification

Submitter Full Name: Lowell Reith
Organization: Interstates Construction Servi
Affiliation: IEC
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 18 12:28:19 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 726.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Merton Bunker & Associates, LLC
22 Gray Birch Ln
Stafford, VA 22554
September 2, 2023

National Fire Protection Association
Attn: Standards Administration
1 Batterymarch Park
Quincy, MA 02169

Please see the attached supporting material and related permission to use the material for Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493. These attachments are the same for all referenced Public Inputs.

I am submitting this PI on behalf of HYLINE SAFETY COMPANY.

The material in all four attachments is not copyrighted; however, I have included permission to publish them from the originator of these attachments, Mr. Evan W. Lipstein.

Thank you in advance for your attention to this matter. If you have any questions or concerns, please contact me at the phone number below.

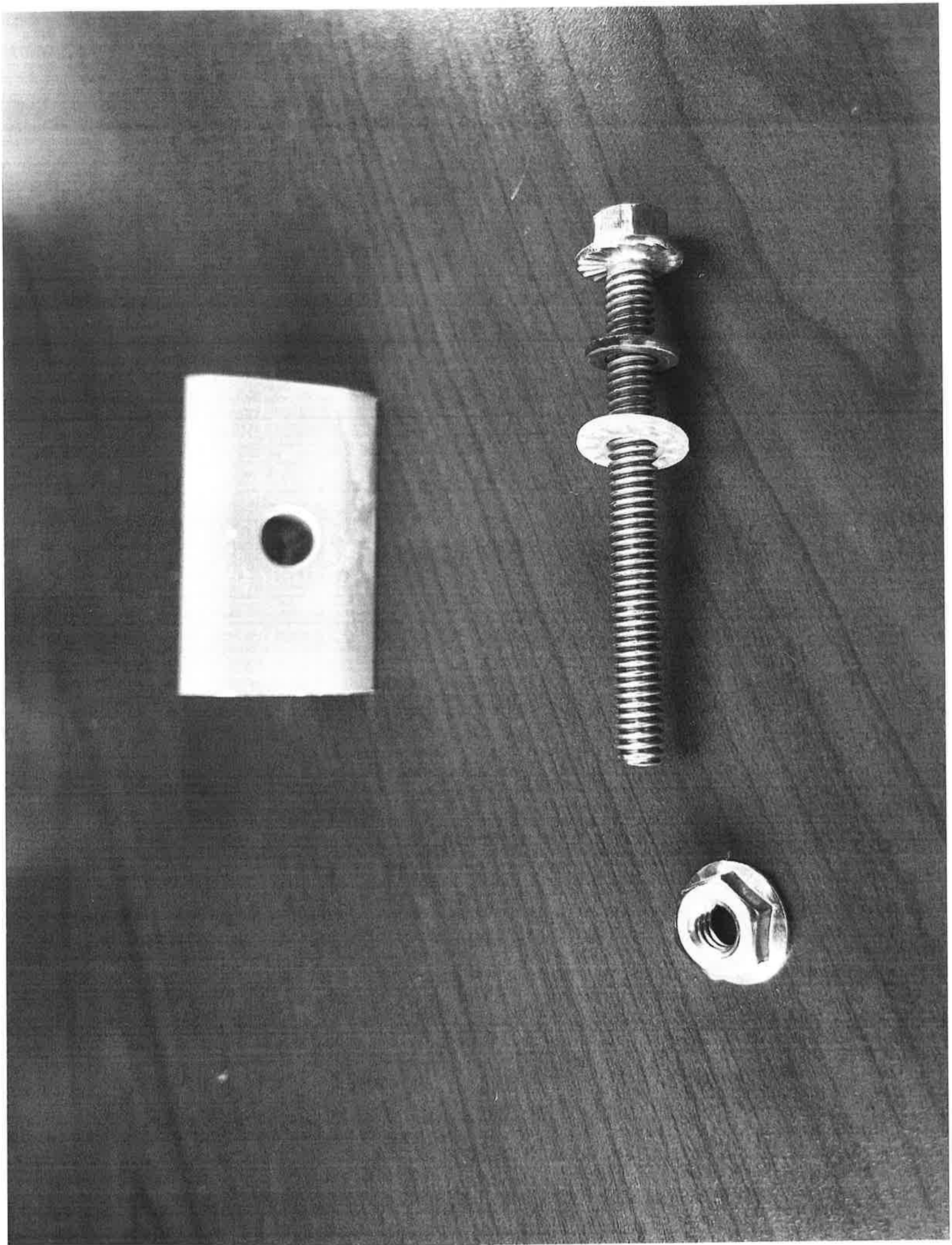
Very truly yours,

Merton Bunker, PE.

Attachment #1

Hardware with an environmentally sealed washer.

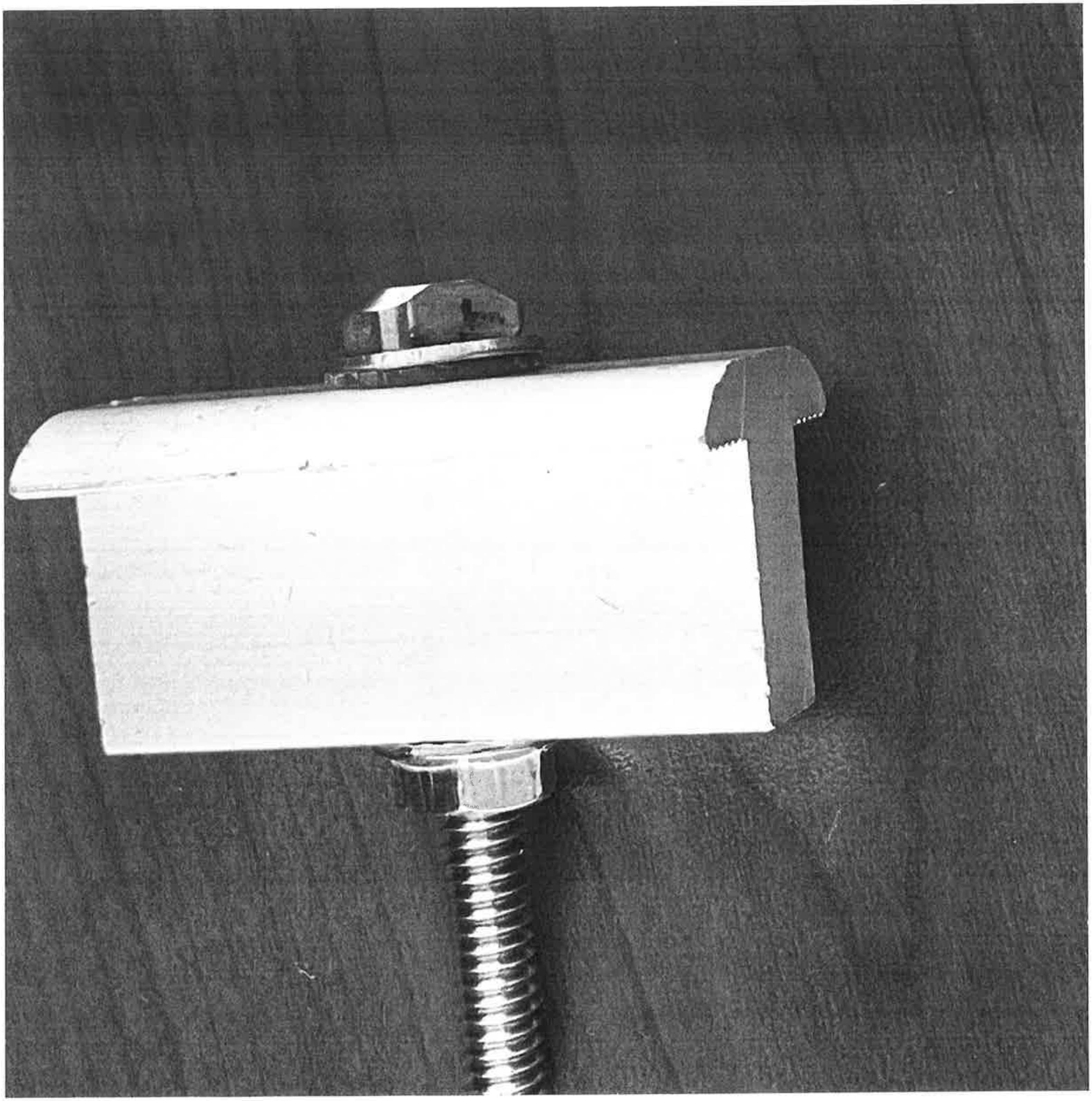
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #2

Hardware with an environmentally sealed washer.

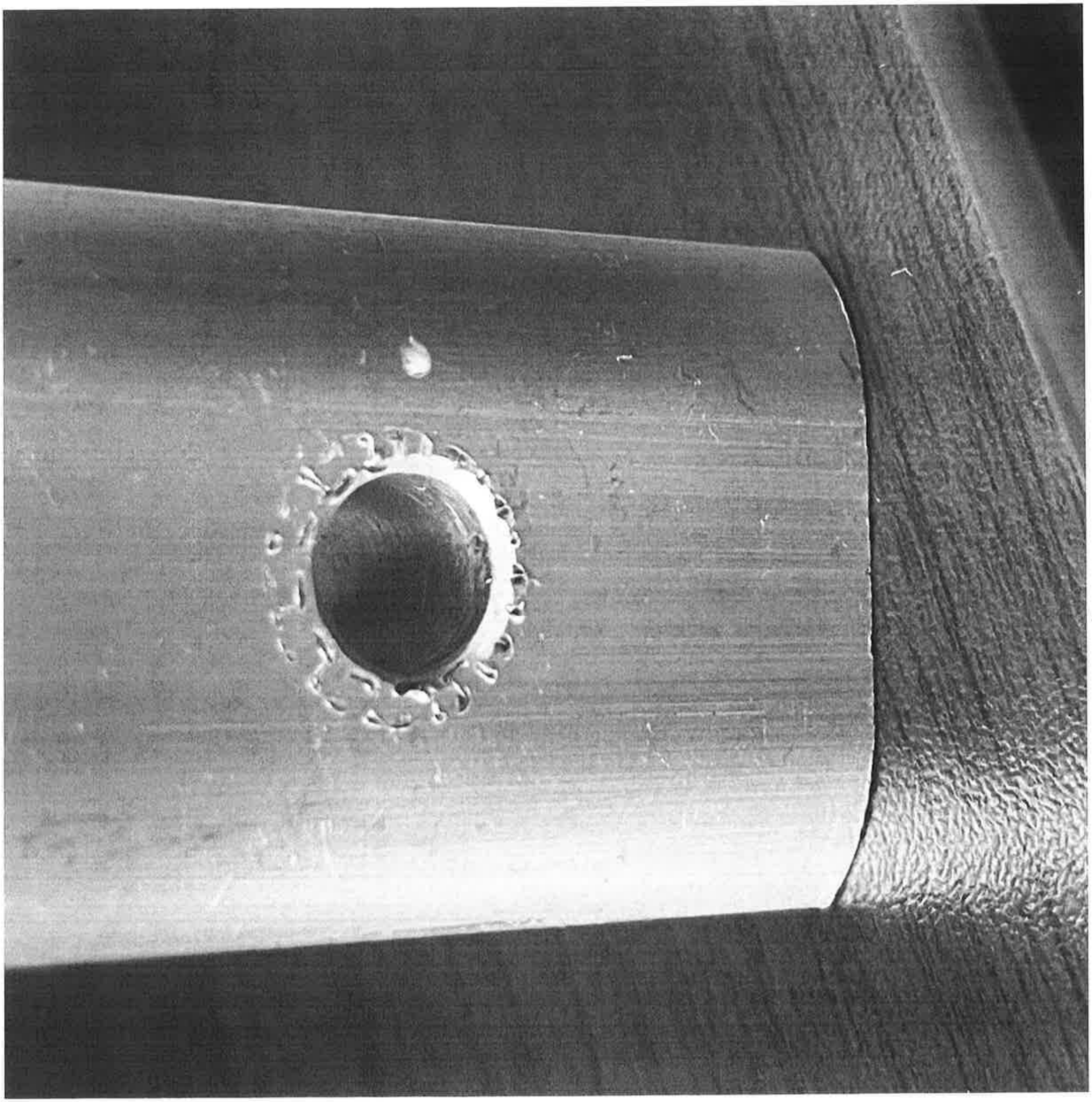
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #3

Aluminum surface showing contact by environmentally sealed washer.

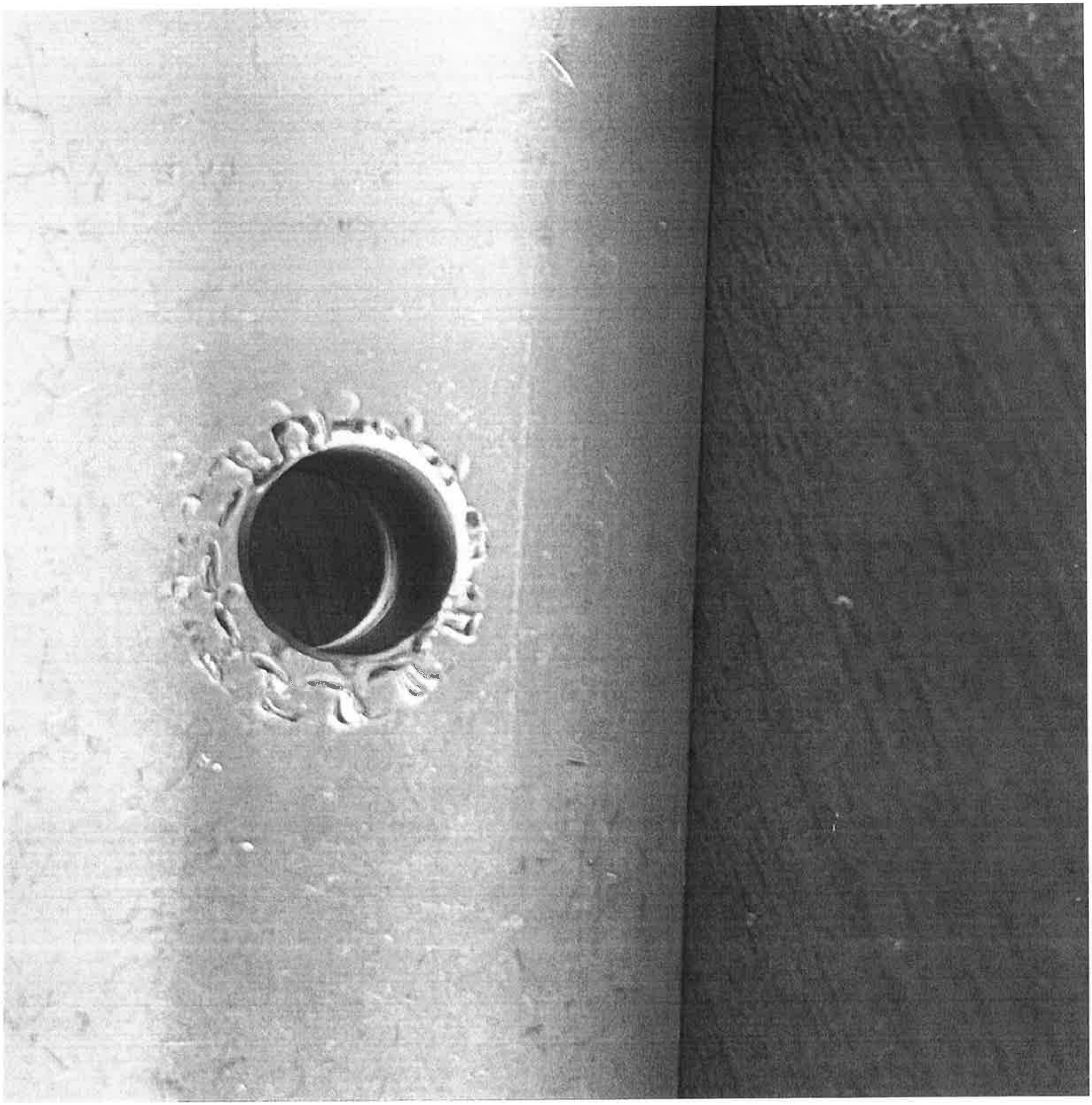
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #4

Aluminum surface showing contact by environmentally sealed washer.

For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Public Input No. 3438-NFPA 70-2023 [Section No. 726.24]

~~**726.24** Mechanical Execution of Work.~~

~~Class 4 equipment shall be installed in a neat and workmanlike manner. The installation shall also comply with 300.4 and 300.11 .~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:

Submittal Date: Sun Sep 03 05:51:41 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to

improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

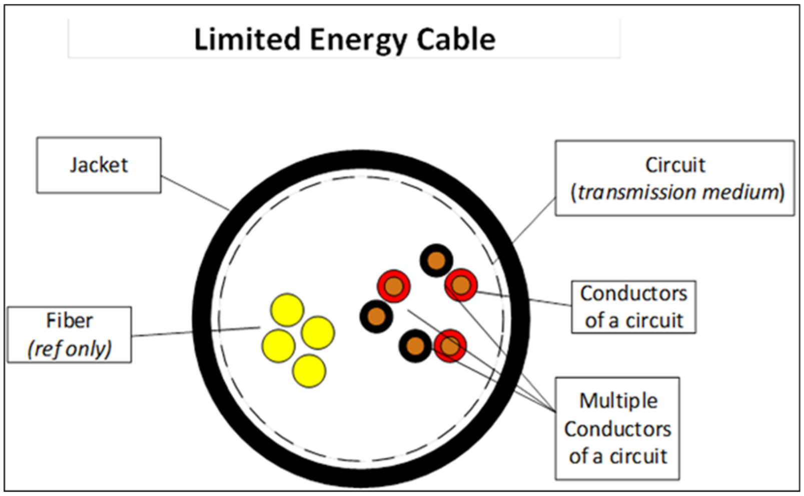
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

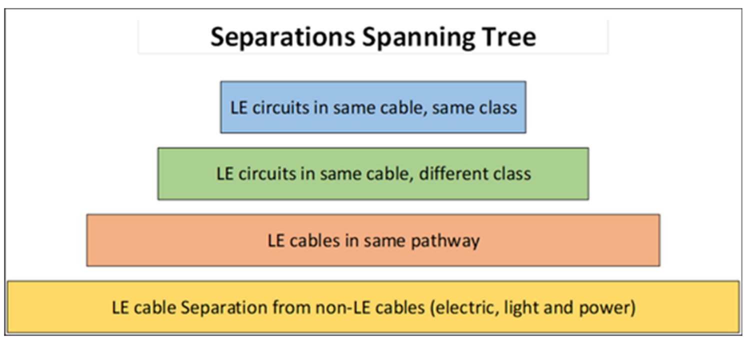
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 55-NFPA 70-2023 [Section No. 726.24]

726.24 Mechanical Execution of Work.

Class 4 equipment shall be installed ~~in a neat and workmanlike manner. The installation shall also comply~~ to comply with 300.4 and 300.11.

Statement of Problem and Substantiation for Public Input

Article 726 is not exempt from 90.3 or Article 110. Therefore, the requirements of Article 110 apply to Chapter 7 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in Article 726 that "Class 4 equipment shall be installed in a professional and skillful manner." Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual as it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful" in 110.12. In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

Submitter Full Name:	Palmer Hickman
Organization:	Electrical Training Alliance
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jan 06 17:35:56 EST 2023
Committee:	NEC-P03

Committee Statement

Resolution: Section 726.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 686-NFPA 70-2023 [Section No. 726.121(A)]

(A) Fault Management.

~~For listing purposes, a~~ A transmitter shall interrupt an energized circuit when any of the following conditions occur on the circuit between the transmitter and receiver:

(1) A short circuit

(2) A line-to-line fault condition that presents an unacceptable risk of fire or electric shock

(3) A ground-fault condition that presents an unacceptable risk of fire or electric shock

(4) An overcurrent condition

(5) A malfunction of the monitoring or control system that presents an unacceptable risk of fire or electric shock

(6) Any other condition that presents an unacceptable risk of fire or electric shock

Informational Note: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part 1: General Requirements*, for information on determining applicable requirements for the listing of Class 4 power systems, including safe operation and limiting the risk of fire and electric shock.

Statement of Problem and Substantiation for Public Input

This belongs in a product standard, not the NEC.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:55:17 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8436-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the XXX.2 section for listing requirements. The deleted text is now located accordingly.

Subsection (A) is revised because listing requirements are part of a product standard.

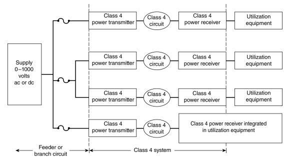
Public Input No. 2848-NFPA 70-2023 [Section No. 726.121 [Excluding any Sub-Sections]]

The class 4 power ~~source shall be a listed Class 4 power transmitter or a listed Class 4 power transmitter as part of a transmitter/receiver system and shall provide the protections in accordance with 726.121(A) . Class 4 circuits shall be~~ source shall be supplied from a power source (transmitter) that has a voltage output of not more than 450 volts peak or dc.

Informational Note No. 1: Informational Note Figure 726.121 illustrates the relationships between Class 4 power transmitters (power sources), Class 4 circuits, Class 4 power receivers, and utilization equipment.

Informational Note No. 2: See UL 1400-1, *Outline for Fault-Managed Power Systems— Part 1: General Requirements*, for information on determining applicable requirements for the listing of Class 4 power systems.

Figure Informational Note Figure 726.121 Class 4 Circuits.



Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

The listing requirements were relocated to the .2 section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2847-NFPA 70-2023 [New Section after 726.1]	Deleted and relocated to the .2 section.

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 25 15:02:09 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8436-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the XXX.2 section for listing requirements. The deleted text is now located accordingly.

Subsection (A) is revised because listing requirements are part of a product standard.

Public Input No. 4410-NFPA 70-2023 [Section No. 726.124(A)]

(A) Class 4 Transmitter Marking.

The equipment supplying the Class 4 circuits shall be durably marked where plainly visible to indicate each circuit that is a Class 4 circuit. The marking shall also include the maximum voltage and current output for each connection point. ~~Where~~ The marking shall also indicate whether the circuit requires 1400-1 Annex A or 1400-1 Annex B connectivity. Where multiple connection points have the same rating, a single label shall be permitted to be used.

Informational Note: An example of marking is “Class 4: +/–190V, 5A” for a Class 4 transmitter capable of delivering 1.9 kW from 380 volts line to line.

Statement of Problem and Substantiation for Public Input

1400-1 has two different types of connectivity requirements depending on whether or not the system provides series resistive fault protection. It should be made clear to AHJs whether or not the system requires Annex A or B connectivity without having to seek additional information. Installation requirements vary depending on if it is an Annex A or Annex B system.

Submitter Information Verification

Submitter Full Name: Stanley Mlyniec
Organization: VoltServer
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 14:40:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: There is one required connectivity requirement in UL 1400-1. The proposed marking is for an optional feature. Further, mandatory references to other standards are not permitted by the NEC Style Manual.

Public Input No. 2954-NFPA 70-2023 [Section No. 726.124(B)(2)]

(2) Output Terminals and Socket Outlets.

Where the Class 4 receiver or Class 4 utilization equipment has outputs, terminals, or socket outlets for providing power to other equipment, each output shall be durably marked where plainly visible. The marking shall include the maximum output voltage and current for each connection point. Where multiple connection points have the same rating, a single label shall be permitted to be used. Class 1, Class 2, and Class 3 circuits shall be identified in accordance with Article 725, 724.30 or Part II ~~of Article 725~~ .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:10:28 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8302-NFPA 70-2024
Statement: The sentence is deleted because the referenced requirements exist elsewhere and do not need to be restated.

Public Input No. 2852-NFPA 70-2023 [Section No. 726.130(A)]

~~**(A)** Listing.~~

~~Connecting hardware used on Class 4 distribution systems shall be listed.~~

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

The listing requirements were relocated to the .2 section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2847-NFPA 70-2023 [New Section after 726.1]	Deleted and relocated to the .2 section.

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 25 15:17:24 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8438-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements. The deleted text in (A) is relocated accordingly.

The term “non-interchangeability” in the title of (B) is hyphenated to make it an English word.

The addition of “incompatible” in (B) clarifies the intent of the requirement, which could have been confused to allow interchanging with other power-limited sources such as Class 2.

Public Input No. 4515-NFPA 70-2023 [Section No. 726.130(B)]

(B) Noninterchangeability.

Connectors for Class 4 circuits shall be designed such that they are not interchangeable with incompatible non-power-limited sources located on the same premises.

Statement of Problem and Substantiation for Public Input

The current requirement does not allow for equipment which can safely support both Class 4 and other related load types. Suggest the addition of "incompatible" to emphasize this requirement is meant to prevent cross-plugging that creates a hazard and not prevent flexible equipment.

Submitter Information Verification

Submitter Full Name: Jason Potterf
Organization: Cisco
Affiliation: ESTA
Street Address:
City:
State:
Zip:
Submittal Date: Thu Sep 07 16:44:01 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8438-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements. The deleted text in (A) is relocated accordingly.

The term “non-interchangeability” in the title of (B) is hyphenated to make it an English word.

The addition of “incompatible” in (B) clarifies the intent of the requirement, which could have been confused to allow interchanging with other power-limited sources such as Class 2.

Public Input No. 687-NFPA 70-2023 [Section No. 726.130(B)]

(B) ~~Noninterchangeability~~ Noninterchangeable .

Connectors for Class 4 circuits shall be designed such that they are not interchangeable with non-power-limited sources located on the same premises.

Statement of Problem and Substantiation for Public Input

This edit makes use of a real word instead of "noninterchangeability" (sic).

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Thu Apr 20 14:58:05 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8438-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements. The deleted text in (A) is relocated accordingly.

The term “non-interchangeability” in the title of (B) is hyphenated to make it an English word.

The addition of “incompatible” in (B) clarifies the intent of the requirement, which could have been confused to allow interchanging with other power-limited sources such as Class 2.

Public Input No. 3439-NFPA 70-2023 [Sections 726.136, 726.139]

~~**Sections 726.136, 726.139**~~

~~**726.136** Separation from Electric Light, Power, Class 1, Non–Power-Limited Fire Alarm Circuit, and Medium-Power Network-Powered Broadband Communications Cables.~~

~~**(A)** General.~~

~~Cables and conductors of Class 4 circuits shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits unless permitted by 726.136(B) through (H).~~

~~**(B)** Separated by Barriers.~~

~~Class 4 circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.~~

~~**(C)** Raceways Within Enclosures.~~

~~In enclosures, Class 4 circuits shall be permitted to be installed in a raceway to separate them from Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits.~~

~~**(D)** Associated Systems Within Enclosures.~~

~~Class 4 circuit conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 4 circuits, and where either of the following applies:~~

(1) ~~The electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm (0.25 in.) separation from the conductors and cables of Class 4 circuits.~~

(2) ~~The non–Class 4 circuit conductors operate at 150 volts or less to ground and the Class 4 circuits are installed using Type CL4, Type CL4R, or Type CL4P cables if any CL4 cable conductors extending beyond the jacket are separated by a minimum of 6 mm (0.25 in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.~~

~~**(E)** Enclosures with Single Openings.~~

~~Class 4 circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 4 circuits. Where Class 4 circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee) if the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.~~

~~**(F)** Manholes.~~

~~Underground Class 4 circuit conductors in a manhole shall be permitted to be installed with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where one of the following conditions is met:~~

(1) ~~The electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are in a metal-enclosed cable or Type UF cable.~~

(2) ~~The Class 4 circuit conductors are permanently and effectively separated from the conductors of other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing, in addition to the insulation or covering on the wire.~~

(3) ~~The Class 4 circuit conductors are permanently and effectively separated from conductors of the other circuits and securely fastened to racks, insulators, or other approved supports.~~

~~**(G)** Cable Trays.~~

~~Class 4 circuit conductors shall be permitted to be installed in cable trays where the conductors of the electric light, Class 1, and non–power-limited fire alarm circuits are separated by a solid fixed barrier of a material compatible with the cable tray or where the Class 4 circuits are installed in Type MC cable.~~

~~**(H)** Other Applications.~~

~~For other applications, conductors of Class 4 circuits shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non–power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:~~

(1) ~~Either all of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or all of the Class 4 circuit conductors are in a raceway or in metal-sheathed, metal-clad, non–metallic-sheathed, Type TC, or Type UF cables~~

(2) ~~All of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the Class 4 circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors~~

~~**726.139** Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.~~

~~**(A)** Two or More Class 4 Circuits.~~

~~Conductors of two or more Class 4 circuits shall be permitted within the same cable, enclosure, raceway, or cable routing assembly.~~

~~**(B)** Class 4 Circuits With Class 2, Class 3, or Communications Circuits.~~

~~Conductors of one or more Class 4 circuits shall be permitted within the same cable assembly as conductors of Class 2, Class 3, or communications circuits if the insulation of the Class 2, Class 3, or communications circuit conductors in the cable is at least that required for Class 4 circuits. Class 4 cables shall be permitted within the same enclosure, raceway, or cable routing assembly as Class 2, Class 3, or communications circuits.~~

~~**(C)** Class 4 Cables With Other Circuit Cables.~~

~~Jacketed cables of Class 4 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:~~

(1) ~~Power-limited fire alarm systems in compliance with Parts I and III of Article 760~~

(2) ~~Nonconductive and conductive optical fiber cables in compliance with Parts I and IV of Article 770~~

(3) ~~Communications circuits in compliance with Parts I and IV of Article 805~~

(4) ~~Community antenna television and radio distribution systems in compliance with Parts I and IV of Article 820~~

(5) ~~Low-power, network-powered broadband communications in compliance with Parts I and IV of Article 830~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
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Zip:
Submittal Date: Sun Sep 03 05:55:22 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

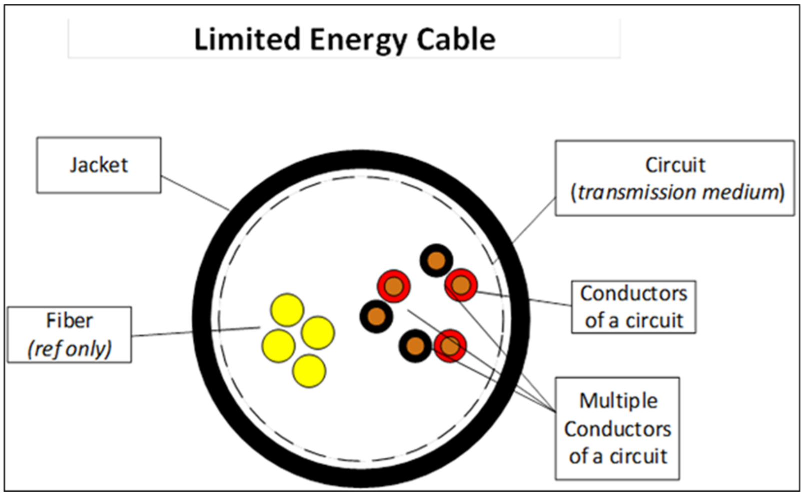
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

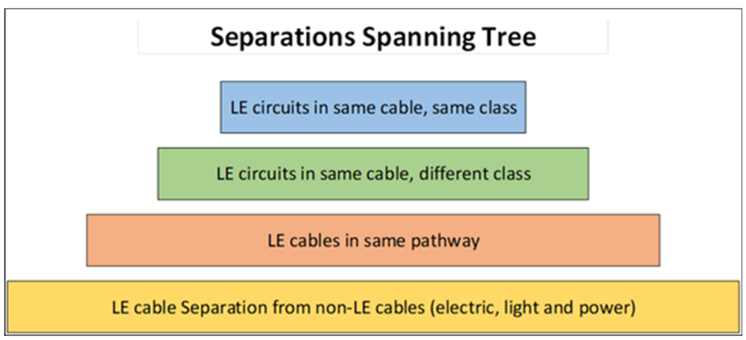
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 4521-NFPA 70-2023 [Section No. 726.136(D)]

(D) Associated Systems Within Enclosures.

Class 4 circuit conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to Class 4 circuits, and where either of the following applies:

(1) The electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm (0.25 in.) separation from the conductors and cables of Class 4 circuits.

(2) The non–Class 4 circuit conductors operate at 150 volts or less to ground and the Class 4 circuits are installed using Type CL4, Type CL4R, or Type CL4P cables ~~if~~ . If any CL4 cable conductors ~~extending beyond~~ extend beyond the jacket, they are separated by a minimum of 6 mm (0.25 in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.

Statement of Problem and Substantiation for Public Input

The sentence had grammar deficiencies that made it difficult to read and comprehend. Split into two sentences for clarity.

Submitter Information Verification

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Submittal Date: Thu Sep 07 16:52:59 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8440-NFPA 70-2024

Statement: The revised text makes no changes to requirements but adds clarity.

Public Input No. 818-NFPA 70-2023 [Section No. 726.139]

726.139 Installation of Conductors of Different Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More Class 4 Circuits ~~.~~ in the Same Cable

Conductors of two or more Class 4 circuits shall be permitted within the same ~~cable, enclosure, raceway, or cable routing assembly~~ listed Class 4 cable .

(B) Class 4 Circuits in the Same Cable With Class 2, Class 3, ~~or~~ and Communications Circuits.

~~Conductors of one or more Class 4 circuits shall be permitted within the same cable assembly as conductors of Class 2, Class 3, or communications circuits if the insulation of the Class 2, Class 3, or communications circuit conductors in the cable is at least that required for Class 4 circuits. Class 4 cables shall be permitted within the same enclosure, raceway, or cable routing assembly as Class 2, Class 3, or communications circuits~~

(1) Dual-listed Class 2/Class 4 Cables. Class 2 and Class 4 circuits shall be permitted in dual-listed Class 2/Class 4 cables.

(2) Dual-listed Class 3/Class 4 Cables. Class 2, Class 3 and Class 4 circuits shall be permitted in dual-listed Class 3/Class 4 cables.

(3) Dual-listed Communications/Class 4 Cables. Class 2, Class 3, communications and Class 4 circuits shall be permitted in dual-listed communications/Class 4 cables .

(C) Class 4 Cables With Other

~~Circuit Cables.~~

~~Jacketed cables of Class 4 circuits~~

Cables in the Same Enclosure, Cable Tray, Raceway or Cable Routing Assembly.

Listed Class 4 cables shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with

~~jacketed cables of~~

any of the following:

~~Power-limited fire alarm systems in compliance with~~

(1) Listed Class 2 and Class 3 remote-control, signaling, and power-limited cables installed in compliance with 645.5(E)(2); or Article 722, Part I, and Article 725, Parts I and II

(2) Other listed Class 4 cables

(3) Listed p ower-limited fire alarm cables installed in compliance with Article 760, Parts I and III

~~of Article 760Nonconductive~~

(4) Listed n onconductive and conductive optical fiber cables installed in in compliance with Article 770, Parts I and

~~IV of Article 770Communications circuits~~

V

(5) Listed c ommunications cables installed in compliance with Article 800, Parts I and IV

~~of Article 805Community~~

(6) Listed c ommunity antenna television and radio distribution systems coaxial cables installed in compliance with Article 800, Parts I and IV

~~of~~

, and Article 820

~~Low~~

, Parts I and V

(7) Listed l ow -power, network-powered broadband communications cables installed in compliance with Article 830, Parts I and

~~IV of Article 830~~

V

Statement of Problem and Substantiation for Public Input

This PI reorganizes 726.139 to separate the requirements dealing with which circuits are permitted in the same cable, versus which cables are permitted in the same pathway (enclosure, cable tray, raceway, and cable routing assembly).

The requirement that a Class 2 or Class 3 circuit run in a Class 4 cable must have insulation “at least that required for Class 4 circuits” is problematical. How can an inspector determine that the insulation is suitable? The answer, of course, is listing. The recommended text relies on dual listing, Class 2 and Class 4, for example, instead of somehow determining if the insulation is “at least that required for Class 4 circuits”

Minor editorial changes were made clarify that “the installation” needs to be in compliance with the installation rules, not the “circuit”. “Circuits” was changed to “cables” to clarify which cables are permitted to be run together in the same pathway. The subsection headings were expanded to improve usability.

The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 817-NFPA 70-2023 [Section No. 725.139]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 895-NFPA 70-2023 [Section No. 760.139]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 826-NFPA 70-2023 [Section No. 830.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 899-NFPA 70-2023 [Section No. 800.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 817-NFPA 70-2023 [Section No. 725.139]	
Public Input No. 895-NFPA 70-2023 [Section No. 760.139]	
Public Input No. 899-NFPA 70-2023 [Section No. 800.133(A)(1)]	
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	

Submitter Information Verification

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Submittal Date:	Sat May 13 07:48:00 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 2955-NFPA 70-2023 [Section No. 726.139(C)]

(C) Class 4 Cables With Other Circuit Cables.

Jacketed cables of Class 4 circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with jacketed cables of any of the following:

(1) Power-limited fire alarm systems in compliance with Article 760, Parts I and III ~~of Article 760~~

(2) Nonconductive and conductive optical fiber cables in compliance with Article 770, Parts I and IV ~~of Article 770~~

(3) Communications circuits in compliance with Article 805, Parts I and IV ~~of Article 805~~

(4) Community antenna television and radio distribution systems in compliance with Article 820, Parts I and IV ~~of Article 820~~

(5) Low-power, network-powered broadband communications in compliance with Article 830, Parts I and IV ~~of Article 830~~

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name:	David Williams
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Submittal Date:	Mon Aug 28 13:11:20 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the

insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 4032-NFPA 70-2023 [Section No. 726.139(C)]

(C) Class 4 Cables With Other Circuit Cables.

~~Jacketed~~
Listed Class 4 cables

~~of Class 4 circuits~~
shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with

~~jacketed cables of any of~~
of the following:

(1) Listed Class 2 and Class 3 remote-control, signaling, and power-limited cables

(2) Listed Power-limited fire alarm
~~systems in compliance with Parts I and III of Article 760~~

(3) cables

(3) Listed Nonconductive and conductive optical fiber cables
~~in compliance with Parts I and IV of Article 770~~

- ~~Communications circuits in compliance with Parts I and IV of Article 805~~

(4) Listed Communications cables

(5) Listed Community antenna television and radio distribution
~~systems in compliance with Parts I and IV of Article 820~~
system coaxial cables

(6) Listed Low-power, network-powered broadband communications
~~in compliance with Parts I and IV of Article 830~~
cables

Statement of Problem and Substantiation for Public Input

- Section 725.139(C) permits Class 4 cables in the same pathway as Class 2 & Class 3, power-limited fire alarm, optical fiber, CATV and low-power network-powered broadband cables. Reciprocal permission is needed in this Article.
- Changes to reflect these are listed cables and other readability improvements (e.g., no need to state in compliance with the installation rules of the Article, as already required for cabling under that Article)

Submitter Information Verification

Submitter Full Name: Jeff Silveira
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Submittal Date: Wed Sep 06 14:34:46 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 3997-NFPA 70-2023 [Section No. 726.144]

726.144 Ampacity.

The ampacity of Class 4 cables shall comply with ~~300~~ 310 .15 based on the temperature rating of the Class 4 cable for conductors sized 16 AWG to 6 AWG. For conductors sized 24 AWG to 17 AWG, the Class 4 cable shall be rated for the intended ampacity as evidenced by the marking FMP-XXA, where XX is the maximum allowable ampacity permitted.

Informational Note No. 1: See 722.179(A)(16) for additional Class 4 cable requirements.

Informational Note No. 2: See UL 1400-1, *Outline of Investigation for Fault-Managed Power Systems — Part 1: General Requirements*, and UL 1400-2, *Outline of Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for information on determining maximum allowable ampacities.

Statement of Problem and Substantiation for Public Input

300.15 is definitely not the right section to reference when we are talking ampacity. It should be 310.15.

Submitter Information Verification

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Submittal Date: Wed Sep 06 13:09:49 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8442-NFPA 70-2024

Statement: The proper section for ampacity is 310.15.

A maximum of 20 conductors (for example, 10 two-conductor cables or 5 four-conductor cables) is a reasonable restriction in a dwelling unit. This restriction allows a margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

The word “allowable” is deleted because there is no "allowable" ampacity.

Public Input No. 4385-NFPA 70-2023 [Section No. 726.144]

726.144 Ampacity.

The ampacity of Class 4 cables shall comply with 300.15 based on the temperature rating of the Class 4 cable for conductors sized 16 AWG to 6 AWG. For conductors sized 24 AWG to 17 AWG, the Class 4 cable shall be rated for the intended ampacity as evidenced by the marking FMP-XXA, where XX is the maximum allowable ampacity permitted.

<u>Where class 4 cables are used in a dwelling unit, no more than 10 cables may be bundled.</u>

Informational Note No. 1: See 722.179(A)(16) for additional Class 4 cable requirements.

Informational Note No. 2: See UL 1400-1, *Outline of Investigation for Fault-Managed Power Systems — Part 1: General Requirements*, and UL 1400-2, *Outline of Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for information on determining maximum allowable ampacities.

Statement of Problem and Substantiation for Public Input

If there remains sufficient concern about heating of multiple class 4 circuits to prevent their use in dwelling units, then we ask the panel to consider this companion public input to the public input removing 726.12.

The use of UL-1400 listed systems and cabling for point-to-point listed connections could improve safety for these high-voltage systems, because they offer risks of electric shock and fire lower than conventional branch circuits or bundles of class 2 circuits delivering equivalent or lower power. Since the 2023 NEC cycle, progress in systems development and listing of cabling and systems has matured significantly, addressing several concerns voiced as needing further study.

Many of these concerns were addressed in substantiation of a companion PI requesting the deletion of 726.12, and removal of the prohibition. Those arguments will not be repeated here.

This public input is specifically addressed to potential concerns for cable heating in dwelling unit applications due to the presence of insulation. For conductor gauge 17 AWG and larger, the NEC requires compliance with 310.15, the same ampacity requirements used for other circuits in dwellings. These have been sufficient for power distribution for branch circuits and should be no different for class 4 circuits on large wire gauges.

For conductors 18 AWG and smaller, UL1400-2 adds requirements testing listed class 4 cables 18 AWG and smaller, and specifically rates the current that the cable is permitted to carry in bundled configurations. The bundles used vastly exceed that which would be needed in dwelling unit applications. Section 5.17 of UL1400-2 requires class 4 cabling to be tested and labeled for a current rating in a 37-cable bundled configuration, which, even with a modest 500 W class 4 system would provide 17,500 Watts of service. Compare this with the capacity of a 100A panel used in a dwelling unit, and it is obvious that this bundle is far larger than would be used for dwelling unit applications.

The proposed use in this PI requires class 4 cables in dwelling units unlikely providing power to large numbers of circuits, and recommends a modest 10 cable bundling limit in dwellings. This would provide an extra level of safety from the standpoint of heating. According to cable bundle heating models accepted and used by TIA and ISO/IEC cabling standards groups suggest the use of this large a bundle results in at least a factor of 2.4 lower temperature rise (in degrees C) when 10 cables are bundled at full capacity, allowing that much extra headroom for heating. This is comparable to adjustment factors for going from groups of 37 to less than 10 conductors in Table 310.15 (C)(1), and allows substantial margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

Heating for class 4 cables is no different than other current-carrying cables used in dwelling units and would generally be used with lower current levels than is common for allowed wiring with branch circuits and class 2 circuits (due to higher permitted voltage levels), which have been safely used in a similar way in the code.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 4377-NFPA 70-2023 [Section No. 726.12]	Allows usage
Public Input No. 4391-NFPA 70-2023 [Section No. 722.135]	

Submitter Information Verification

Submitter Full Name: Bob Voss

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Submittal Date: Thu Sep 07 13:42:18 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8442-NFPA 70-2024

Statement: The proper section for ampacity is 310.15.

A maximum of 20 conductors (for example, 10 two-conductor cables or 5 four-conductor cables) is a reasonable restriction in a dwelling unit. This restriction allows a margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

The word “allowable” is deleted because there is no "allowable" ampacity.

Public Input No. 557-NFPA 70-2023 [Section No. 726.144]

726.144 Ampacity.

The ampacity of Class 4 cables shall comply with ~~300~~ 310 .15 based on the temperature rating of the Class 4 cable for conductors sized 16 AWG to 6 AWG. For conductors sized 24 AWG to 17 AWG, the Class 4 cable shall ~~be rated for the intended ampacity as evidenced by the~~ have an ampacity in accordance with the marking FMP-XXA, where XX is the maximum ~~allowable~~ ampacity permitted.

Informational Note No. 1: See 722.179(A)(16) for additional Class 4 cable requirements.

Informational Note No. 2: See UL 1400-1, *Outline of Investigation for Fault-Managed Power Systems — Part 1: General Requirements*, and UL 1400-2, *Outline of Fault-Managed Power Systems — Part 2: Requirements for Class 4 Cables*, for information on determining maximum ~~allowable~~ ampacities.

Statement of Problem and Substantiation for Public Input

The main reason for this change is fix the reference to 300.15, which is an obvious mistake. Further revisions were made because the word "allowable ampacity" is nonsensical. The ampacity of a conductor is the amount of current it can carry. There is no "allowable" ampacity.

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Submittal Date: Mon Apr 10 13:12:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8442-NFPA 70-2024

Statement: The proper section for ampacity is 310.15.

A maximum of 20 conductors (for example, 10 two-conductor cables or 5 four-conductor cables) is a reasonable restriction in a dwelling unit. This restriction allows a margin for elevated temperature or insulation in the small numbers of circuits expected for dwelling unit installation.

The word “allowable” is deleted because there is no "allowable" ampacity.

Public Input No. 2853-NFPA 70-2023 [New Section after 728.1]

728.2 Listing Requirements.

Fire-resistive cables and conductors and their components shall be tested and listed as a complete system, shall be designated for use in a specific system, and shall not be interchangeable between systems.

Informational Note: One method of defining the fire rating is by testing the system in accordance with UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2854-NFPA 70-2023 [Section No. 728.4]	Deleted and relocated to the .2 section.
Public Input No. 2854-NFPA 70-2023 [Section No. 728.4]	

Submitter Information Verification

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Submittal Date:	Fri Aug 25 15:19:42 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8453-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements.

The revised Informational Note complies with the NEC Style Manual, 2.1.10.3.

Public Input No. 990-NFPA 70-2023 [Section No. 728.3]

728.3 Other Articles.

Wherever the requirements of other articles of this *Code* and ~~Article 728 differ~~ this article differ , the requirements of ~~Article 728 shall~~ this article shall apply.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article except Article 100 or where required for context. Without changing the meaning of this section, referring to "this article" in lieu of Article 728 simplifies the section in compliance with the Style Manual.

Submitter Information Verification

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Committee:	NEC-P03

Committee Statement

Resolution: FR-8455-NFPA 70-2024

Statement: This text is redundant to 90.3.

Public Input No. 2854-NFPA 70-2023 [Section No. 728.4]

~~**728.4** General.~~

~~Fire-resistive cables and conductors and their components shall be tested and listed as a complete system, shall be designated for use in a specific system, and shall not be interchangeable between systems.~~

> ~~Informational Note: One method of defining the fire rating is by testing the system in accordance with UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables* .~~

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2853-NFPA 70-2023 [New Section after 728.1]	Deleted and relocated to the .2 section.
Public Input No. 2853-NFPA 70-2023 [New Section after 728.1]	

Submitter Information Verification

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Submittal Date:	Fri Aug 25 15:21:18 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8453-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements.

The revised Informational Note complies with the NEC Style Manual, 2.1.10.3.

Public Input No. 3687-NFPA 70-2023 [Article 760]

Article 760 Fire Alarm Systems

Part I. General

760.1 Scope.

This article covers the installation of wiring and equipment of fire alarm systems, including all circuits controlled and powered by the fire alarm system.

Informational Note No. 1: Fire alarm systems include fire detection and alarm notification, guard's tour, sprinkler waterflow, and sprinkler supervisory systems. Circuits controlled and powered by the fire alarm system include circuits for the control of building systems safety functions, elevator capture, elevator shutdown, door release, smoke doors and damper control, fire doors and damper control, and fan shutdown, but only where these circuits are powered by and controlled by the fire alarm system.

Informational Note No. 2: See *NFPA 72*, *National Fire Alarm and Signaling Code*, for further information on the installation and monitoring for integrity requirements for fire alarm systems.

760.3 Other Articles.

Circuits and equipment shall comply with 760.3(A) through (O). Only those sections of Article 300 referenced in this article shall apply to fire alarm systems.

~~(A) Spread of Fire or Products of Combustion.~~

~~Installation of fire alarm circuits shall comply with 300.21 .~~

~~**(B)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Power-limited and non-power-limited fire alarm cables installed in ducts, plenums, or other spaces used for environmental air shall comply with 300.22 .~~

~~*Exception No. 1: Power-limited fire alarm cables selected in accordance with Table 760.154 and installed in accordance with 722.135 and 300.22(B) , Exception, shall be permitted to be installed in ducts specifically fabricated for environmental air.*~~

~~*Exception No. 2: Power-limited fire alarm cables selected in accordance with Table 760.154 and installed in accordance with 722.135 shall be permitted to be installed in other spaces used for environmental air (plenums).*~~

~~**(C)** Corrosive, Damp, or Wet Locations.~~

~~Fire alarm circuits and equipment installed in corrosive, damp, or wet locations shall comply with 110.11 , 300.5(B) , 300.6 , 300.9 , and 310.10(F) .~~

~~(~~

D) Building Control Circuits.

Building control systems (e.g., elevator capture, fan shutdown) associated with the fire alarm system shall comply with Article 725.

(E) Optical Fiber Cables.

Where optical fiber cables are utilized for fire alarm circuits, the cables shall be installed in accordance with Article 770 .

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~~F) Installation of Conductors with Other Systems.~~

~~Installations shall comply with 300.8 .~~

~~**(G)** Raceways or Sleeves Exposed to Different Temperatures.~~

~~Installations shall comply with 300.7(A) .~~

~~**(H)** Vertical Support for Fire-Resistive Cables and Conductors.~~

~~Vertical installations of circuit integrity (CI) cables and conductors installed in a raceway or conductors and cables of fire-resistive cable systems shall be installed in accordance with 300.19 .~~

~~**(I)** Installation of Cables and Conductors in Raceway.~~

~~The number and size of cables and conductors shall comply with 300.17 .~~

~~(~~

J) Bushing.

A bushing shall be installed where cables emerge from raceway used for mechanical support or protection in accordance with 300.15(C) .

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~~K) Cable Routing Assemblies.~~

~~Power-limited fire alarm cables shall be permitted to be installed in plenum cable routing assemblies, riser cable routing assemblies, and general-purpose cable routing assemblies selected in accordance with Table 800.154(c) , listed in accordance with 800.182 , and installed in accordance with 800.110(C) and 800.113 .~~

~~**(L)** Communications Raceways.~~

~~Power-limited fire alarm cables shall be permitted to be installed in plenum communications raceways, riser communications raceways, and general-purpose communications raceways selected in accordance with Table 800.154(b) , listed in accordance with 800.182 , and installed in accordance with 800.113 and 362.24 through 362.56 , where the requirements applicable to electrical nonmetallic tubing apply.~~

~~**(M)** Temperature Limitations of Power-Limited and Non–Power-Limited Fire Alarm Cables.~~

~~The requirements of 310.14(A)(3) on the temperature limitation of conductors shall apply to power-limited fire alarm cables and non–power-limited fire alarms cables.~~

~~**(N)** Identification of Equipment Grounding Conductors.~~

~~Equipment grounding conductors shall be identified in accordance with 250.119 .~~

~~*Exception: Conductors with green insulation shall be permitted to be used as ungrounded signal conductors for Types FPLP, FPLR, FPL, and substitute cables installed in accordance with 760.154(A) .*~~

~~(~~

O) Cables for Power-Limited Fire Alarm (PLFA) Circuits.

The listing and installation of cables for power-limited fire alarm circuits shall comply with Part III of this article and Parts I and II of Article 722.

760.

~~10 Hazardous (Classified) Locations.~~

~~Cables and equipment shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

~~**760.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of conductors and cables that prevents removal of panels, including suspended ceiling panels.~~

~~**760.24** Mechanical Execution of Work.~~

~~**(A)** General.~~

~~Fire alarm circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11 .~~

> ~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.~~

~~**(B)** Circuit Integrity (CI) Cable.~~

~~Circuit integrity (CI) cables shall be supported at a distance not exceeding 610 mm (24 in.). Where located within 2.1 m (7 ft) of the floor in accordance with 760.53(A)(1) and 760.130(B)(1) , as applicable, the cable shall be fastened in an approved manner at intervals of not more than 450 mm (18 in.). Cable supports and fasteners shall be steel.~~

~~**760.25** Abandoned Cables.~~

~~The accessible portion of abandoned fire alarm cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.~~

~~760.~~

30 Fire Alarm Circuit Identification.

Fire alarm circuits shall be identified at terminal and junction locations in a manner that helps to prevent unintentional signals on fire alarm system circuit(s) during testing and servicing of other systems.

760.32 Fire Alarm Circuits Extending Beyond One Building.

Non–power-limited fire alarm circuits and power-limited fire alarm circuits that extend beyond one building and run outdoors shall meet the installation requirements of Parts II, III, and IV of Article 805 and shall meet the installation requirements of Part I of Article 300 .

760.33 Supply-Side Overvoltage Protection.

A listed surge-protective device (SPD) shall be installed on the supply side of a fire alarm control panel in accordance with Part II of Article 242.

760.35 Fire Alarm Circuit Requirements.

Fire alarm circuits shall comply with 760.35(A) and (B).

(A) Non–Power-Limited Fire Alarm (NPLFA) Circuits.

See Parts I and II.

(B) Power-Limited Fire Alarm (PLFA) Circuits.

See Parts I and III.

Part II. Non–Power-Limited Fire Alarm (NPLFA) Circuits

760.41 NPLFA Circuit Power Source Requirements.

(A) Power Source.

The power source of non–power-limited fire alarm circuits shall comply with Chapters 1 through 4 , and the output voltage shall be not more than 600 volts, nominal. The fire alarm circuit disconnect shall be permitted to be secured in the “on” position.

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit-interrupters.

760.43 NPLFA Circuit Overcurrent Protection.

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity without applying the ampacity adjustment and correction factors of 310.14 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG conductors.

Exception: Where other articles of this Code permit or require other overcurrent protection.

760.45 NPLFA Circuit Overcurrent Device Location.

Overcurrent devices shall be located at the point where the conductor to be protected receives its supply.

Exception No. 1: Where the overcurrent device protecting the larger conductor also protects the smaller conductor.

Exception No. 2: Transformer secondary conductors. Non–power-limited fire alarm circuit conductors supplied by the secondary of a single-phase transformer that has only a 2-wire (single-voltage) secondary shall be permitted to be protected by overcurrent protection provided by the primary (supply) side of the transformer, provided the protection is in accordance with 450.3 and does not exceed the value determined by multiplying the secondary conductor ampacity by the secondary-to-primary transformer voltage ratio. Transformer secondary conductors other than 2-wire shall not be considered to be protected by the primary overcurrent protection.

Exception No. 3: Electronic power source output conductors. Non–power-limited circuit conductors supplied by the output of a single-phase, listed electronic power source, other than a transformer, having only a 2-wire (single-voltage) output for connection to non–power-limited circuits shall be permitted to be protected by overcurrent protection provided on the input side of the electronic power source, provided this protection does not exceed the value determined by multiplying the non–power-limited circuit conductor ampacity by the output-to-input voltage ratio. Electronic power source outputs, other than 2-wire (single voltage), connected to non–power-limited circuits shall not be considered to be protected by overcurrent protection on the input of the electronic power source.

Informational Note: A single-phase, listed electronic power supply whose output supplies a 2-wire (single-voltage) circuit is an example of a non–power-limited power source that meets the requirements of 760.41 .

760.46 NPLFA Circuit Wiring.

Installation of non–power-limited fire alarm circuits shall be in accordance with 110.3(B) , 300.7 , 300.11 , 300.15 , 300.17 , 300.19(B) , and other appropriate articles of Chapter 3 .

Exception No. 1: As provided in 760.48 through 760.53 .

Exception No. 2: Where other articles of this Code require other methods.

760.48 Conductors of Different Circuits in Same Cable, Enclosure, or Raceway.

(A) Class 1 with NPLFA Circuits.

Class 1 and non–power-limited fire alarm circuits shall be permitted to occupy the same cable, enclosure, or raceway without regard to whether the individual circuits are alternating current or direct current, provided all conductors are insulated for the maximum voltage of any conductor in the enclosure or raceway.

(B) Fire Alarm with Power-Supply Circuits.

Power-supply and fire alarm circuit conductors shall be permitted in the same cable, enclosure, or raceway only where connected to the same equipment.

760.49 NPLFA Circuit Conductors.

(A) Sizes and Use.

Only copper conductors shall be permitted to be used for fire alarm systems. Size 18 AWG and 16 AWG conductors shall be permitted to be used, provided they supply loads that do not exceed the ampacities given in Table 402.5 and are installed in a raceway, an approved enclosure, or a listed cable. Conductors larger than 16 AWG shall not supply loads greater than the ampacities given in 310.14 , as applicable.

(B) Insulation.

Insulation on conductors shall be rated for the system voltage and not less than 600 volts. Conductors larger than 16 AWG shall comply with Article 310 . Conductors 18 AWG and 16 AWG shall be Type KF-2, KFF-2, PAFF, PTFF, PF, PFF, PGF, PGFF, RFH-2, RFHH-2, RFHH-3, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF. Conductors with other types and thickness of insulation shall be permitted if listed for non–power-limited fire alarm circuit use.

Informational Note: See Table 402.3 for application provisions.

(C) Conductor Materials.

Conductors shall be solid or stranded copper.

Exception to (B) and (C): Wire Types PAF and PTF shall be permitted only for high-temperature applications between 90°C (194°F) and 250°C (482°F).

760.51 Number of Conductors in Cable Trays and Raceways, and Ampacity Adjustment Factors.

(A) NPLFA Circuits and Class 1 Circuits.

Where only non-power-limited fire alarm circuit and Class 1 circuit conductors are in a raceway, the number of conductors shall be determined in accordance with 300.17 . The ampacity adjustment factors given in 310.15(C)(1) shall apply if such conductors carry continuous load in excess of 10 percent of the ampacity of each conductor.

(B) Power-Supply Conductors and NPLFA Circuit Conductors.

Where power-supply conductors and non-power-limited fire alarm circuit conductors are permitted in a raceway in accordance with 760.48 , the number of conductors shall be determined in accordance with 300.17 . The ampacity adjustment factors given in 310.15(C)(1) shall apply as follows:

(1) To all conductors where the fire alarm circuit conductors carry continuous loads in excess of 10 percent of the ampacity of each conductor and where the total number of conductors is more than three

(2) To the power-supply conductors only, where the fire alarm circuit conductors do not carry continuous loads in excess of 10 percent of the ampacity of each conductor and where the number of power-supply conductors is more than three

(C) Cable Trays.

Where fire alarm circuit conductors are installed in cable trays, they shall comply with 392.22 and 392.80(A) .

760.53 Multiconductor NPLFA Cables.

Multiconductor non-power-limited fire alarm cables that meet the requirements of 760.176 shall be permitted to be used on fire alarm circuits operating at 150 volts or less and shall be installed in accordance with 760.53(A) and (B).

(A) NPLFA Wiring Method.

Multiconductor non-power-limited fire alarm circuit cables shall be installed in accordance with 760.53(A)(1) , (A)(2), and (A)(3).

(1) In Raceways, Exposed on Ceilings or Sidewalls, or Fished in Concealed Spaces.

Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).

(2) Passing Through a Floor or Wall.

Cables shall be installed in metal raceway or rigid nonmetallic conduit where passing through a floor or wall to a height of 2.1 m (7 ft) above the floor, unless adequate protection can be afforded by building construction such as detailed in 760.53(A)(1) , or unless an equivalent solid guard is provided.

(3) In Hoistways.

Cables shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing where installed in hoistways.

Exception: As provided for in 620.21 for elevators and similar equipment.

(B) Applications of Listed NPLFA Cables.

The use of non–power-limited fire alarm circuit cables shall comply with 760.53(B)(1) through (B)(4).

(1) Ducts Specifically Fabricated for Environmental Air.

Multiconductor non–power-limited fire alarm circuit cables, Types NPLFP, NPLFR, and NPLF, shall not be installed exposed in ducts specifically fabricated for environmental air.

Informational Note: See 300.22(B) .

(2) Other Spaces Used for Environmental Air (Plenums).

Cables installed in other spaces used for environmental air shall be Type NPLFP.

Exception No. 1: Types NPLFR and NPLF cables installed in compliance with 300.22(C) .

Exception No. 2: Other wiring methods in accordance with 300.22(C) and conductors in compliance with 760.49(C) .

Exception No. 3: Type NPLFP-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

(3) Riser.

Cables installed in vertical runs and penetrating one or more floors, or cables installed in vertical runs in a shaft, shall be Type NPLFR. Floor penetrations requiring Type NPLFR shall contain only cables suitable for riser or plenum use.

Exception No. 1: Type NPLF or other cables that are specified in Chapter 3 and are in compliance with 760.49(C) and encased in metal raceway.

Exception No. 2: Type NPLF cables located in a fireproof shaft having firestops at each floor.

Informational Note: See 300.21 for firestop requirements for floor penetrations.

Exception No. 3: Type NPLF-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

(4) Other Wiring Within Buildings.

Cables installed in building locations other than the locations covered in 760.53(B)(1), (B)(2), and (B)(3) shall be Type NPLF.

Exception No. 1: Chapter 3 wiring methods with conductors in compliance with 760.49(C).

Exception No. 2: Type NPLFP or Type NPLFR cables shall be permitted.

Exception No. 3: Type NPLFR-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

Part III. Power-Limited Fire Alarm (PLFA) Circuits

760.121 Power Sources for PLFA Circuits.

(A) Power Source.

The power source for a power-limited fire alarm circuit shall be as specified in the following:

Informational Note No. 1: See Chapter 9, Tables 12(A) and 12(B), for the listing requirements for power-limited fire alarm circuit sources.

(1) A listed PLFA or Class 3 transformer

(2) A listed PLFA or Class 3 power supply

(3) Listed equipment marked to identify the PLFA power source

Informational Note No. 2: Examples of listed equipment are a fire alarm control panel with integral power source; a circuit card listed for use as a PLFA source, where used as part of a listed assembly; a current-limiting impedance, listed for the purpose or part of a listed product, used in conjunction with a non-power-limited transformer or a stored energy source, for example, storage battery, to limit the output current.

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall comply with the following requirements:

(1) The branch circuit shall supply no other loads.

(2) The branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

(3) The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit.

(4) The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified with the following words: “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings.

(5) The fire alarm branch-circuit disconnecting means shall be permitted to be secured in the “on” position.

Informational Note: See 210.8(A)(5), Exception, for requirements on receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.

760.124 Circuit Marking.

The equipment supplying PLFA circuits shall be durably marked where plainly visible to indicate each circuit that is a power-limited fire alarm circuit.

760.127 Wiring Methods on Supply Side of the PLFA Power Source.

Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Part II and Chapters 1 through 4 . Transformers or other devices supplied from power-supply conductors shall be protected by an overcurrent device rated not over 20 amperes.

Exception: The input leads of a transformer or other power source supplying power-limited fire alarm circuits shall be permitted to be smaller than 14 AWG, but not smaller than 18 AWG, if they are not over 300 mm (12 in.) long and if they have insulation that complies with 760.49(B) .

760.

~~130 Wiring Methods and Materials on Load Side of the PLFA Power Source.~~

~~Fire alarm circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 760.130(A) , (B), or a combination of both. Parts I and II of Article 722 shall apply.~~

~~**(A)** NPLFA Wiring Methods and Materials.~~

~~NPLFA wiring methods shall be permitted when used in accordance with 760.46 , 760.49 , or 760.53 for PLFA circuits. Conductors shall be solid or stranded copper. Separation from electric light, power, Class 1, non-power-limited fire alarm circuit conductors, and medium-power network-powered broadband communications cables shall comply with 760.136 .~~

~~*Exception: The ampacity adjustment factors specified in 310.15(C) (1) shall not apply.*~~

~~**(B)** PLFA Wiring Methods and Materials.~~

~~Power-limited fire alarm conductors and cables described in 722.179 shall be installed as detailed in 722.135 and 760.130(B)(1) through (B)(4). Devices shall be installed in accordance with 110.3(B) , 300.11(A) , and 300.15 .~~

~~**(1)** In Raceways, Exposed on Ceilings or Sidewalls, or Fished in Concealed Spaces.~~

~~Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed such that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).~~

~~**(2)** Passing Through a Floor or Wall.~~

~~Cables shall be installed in metal raceways or rigid nonmetallic conduit where passing through a floor or wall to a height of 2.1 m (7 ft) above the floor, unless adequate protection can be afforded by building construction such as detailed in 760.130(B)(1) or unless an equivalent solid guard is provided.~~

~~**(3)** Nonconcealed Spaces.~~

~~Cables specified in Chapter 3 and meeting the requirements of 722.179(A)(15)(a) and (A)(15)(b) shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft).~~

~~**(4)** Portable Fire Alarm Systems.~~

~~A portable fire alarm system provided to protect a stage or set when not in use shall be permitted to use wiring methods in accordance with 530.12 .~~

~~760.~~

~~PLFA cables shall comply with the requirements described in Table 760.154 or where cable substitutions are made as shown in 760.154(A). Where substitute cables are installed, the wiring requirements of Article 760, Parts I and III, shall apply. Types FPLP-CI, FPLR-CI, and FPL-CI cables shall be permitted to be installed to provide 2-hour circuit integrity rated cables.~~

~~Table 760.154 Applications of Listed PLFA Cables in Buildings~~

~~- Cable Type Applications FPLP & FPLP-CI FPLR & FPLR-CI FPL & FPL-CI In fabricated ducts as described in 300.22(B) In fabricated ducts Y* N N In metal raceway that complies with 300.22(B) Y* Y* Y* In other spaces used for environmental air as described in 300.22(C) In other spaces used for environmental air Y* N N - In metal raceway that complies with 300.22(C) Y* Y* Y* - In plenum communications raceways Y* N N - In plenum cable routing assemblies Y* N N - Supported by open metal cable trays Y* N N - Supported by solid bottom metal cable trays with solid metal covers Y* Y* Y* In risers In vertical runs Y* Y* N - In metal raceways Y* Y* Y* - In fireproof shafts Y* Y* Y* - In plenum communications raceways Y* Y* N - In plenum cable routing assemblies Y* Y* N - In riser communications raceways Y* Y* N - In riser cable routing assemblies Y* Y* N - In one- and two-family dwellings Y* Y* Y* Within buildings in other than air-handling spaces and risers General Y* Y* Y* Supported by cable trays Y* Y* Y* - In any raceway recognized in Chapter 3 Y* Y* Y* - In plenum communications raceway Y* Y* Y* - In plenum cable routing assemblies Y* Y* Y* - In riser communications raceways Y* Y* Y* - In riser cable routing assemblies Y* Y* Y* - In general-purpose communications raceways Y* Y* Y* - In general-purpose cable routing assemblies Y* Y* Y*~~

~~Note:~~

~~“N” indicates that the cable type shall not be permitted to be installed in the application.~~

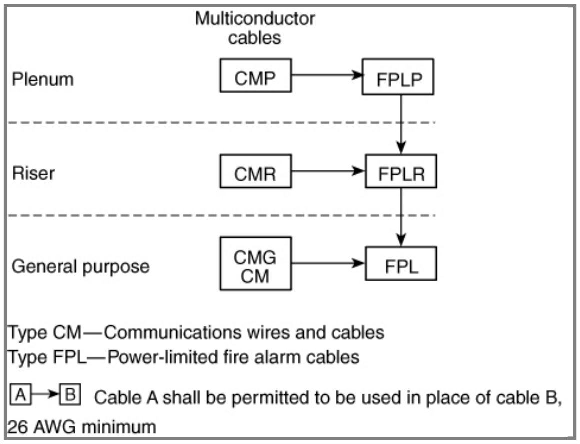
~~“Y*” indicates that the cable type shall be permitted to be installed in the application subject to the limitations described in 760.130 through 760.145.~~

~~**(A)** Fire Alarm Cable Substitutions.~~

~~The substitutions for fire alarm cables listed in Table 760.154(A) and illustrated in Figure 760.154(A) shall be permitted. Where substitute cables are installed, the wiring requirements of Article 760 , Parts I and III, shall apply.~~

~~Informational Note: See 800.179 for information on communications cables (CMP, CMR, CMG, CM).~~

~~Figure 760.154(A) Cable Substitution Hierarchy.~~



~~Table 760.154(A) Cable Substitutions~~

~~Cable Type Permitted Substitutions FPLP CMP FPLR CMP, FPLP, CMR FPL CMP, FPLP, CMR, FPLR, CMG, CM~~

133 Installation of Conductors and Equipment in Cables, Compartments, Cable Trays, Enclosures, Manholes, Outlet Boxes, Device Boxes, Raceways, and Cable Routing Assemblies for Power-Limited Fire Alarm Circuits.

Conductors and equipment for power-limited fire alarm circuits shall be installed in accordance with Parts I and II of Article 722 and 760.136 through 760.143 .

760.136 Separation from Electric Light, Power, Class 1, NPLFA, and Medium-Power Network-Powered Broadband Communications Circuit Conductors.

(A) General.

Power-limited fire alarm circuit cables and conductors shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non–power-limited fire alarm circuits, and medium-power network-powered broadband communications circuits unless permitted by 760.136(B) through (G).

(B) Separated by Barriers.

Power-limited fire alarm circuit cables shall be permitted to be installed together with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.

(C) Raceways Within Enclosures.

In enclosures, power-limited fire alarm circuits shall be permitted to be installed in a raceway within the enclosure to separate them from Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits.

(D) Associated Systems Within Enclosures.

Power-limited fire alarm conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to power-limited fire alarm circuits, and shall comply with either of the following conditions:

(1) The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm ($1/4$ in.) separation from the conductors and cables of power-limited fire alarm circuits.

(2) The circuit conductors operate at 150 volts or less to ground and also comply with one of the following conditions:

   (3) The fire alarm power-limited circuits are installed using Type FPL, Type FPLR, Type FPLP, or permitted substitute cables if these power-limited cable conductors extending beyond the jacket are separated by a minimum of 6 mm ($1/4$ in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.

   (4) The power-limited fire alarm circuit conductors are installed as non-power-limited circuits in accordance with 760.46 .

(E) Enclosures with Single Opening.

Power-limited fire alarm circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to power-limited fire alarm circuits or to other circuits controlled by the fire alarm system to which the other conductors in the enclosure are connected. Where power-limited fire alarm circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee), provided the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.

(F) In Hoistways.

In hoistways, power-limited fire alarm circuit conductors shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21 .

(G) Where Protected.

PLFA circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are installed using NPFLA wiring methods and materials in accordance with Part II of Article 760 and are protected by an approved method.

(H) Other Applications.

For other applications, power-limited fire alarm circuit conductors shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non–power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:

(1) Either (a) all of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or (b) all of the power-limited fire alarm circuit conductors are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, or Type UF cables.

(2) All of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the power-limited fire alarm circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors.

760.139 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More PLFA Circuits.

Cable and conductors of two or more power-limited fire alarm circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly.

(B) Class 2 Circuits with PLFA Circuits.

Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of power-limited fire alarm circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits.

(C) Class 3 and Communications Circuits with PLFA Circuits.

Cable and conductors of Class 3 and communications circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with cables and conductors of power-limited fire alarm circuits.

(D) Low-Power Network-Powered Broadband Communications Cables and PLFA Cables.

Low-power network-powered broadband communications circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with PLFA cables.

(E) Audio System Circuits and PLFA Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited conductors or cables.

760.142 Conductor Size.

Conductors of 26 AWG shall be permitted only where spliced with a connector listed as suitable for 26 AWG to 24 AWG or larger conductors that are terminated on equipment or where the 26 AWG conductors are terminated on equipment listed as suitable for 26 AWG conductors. Single conductors shall not be smaller than 18 AWG.

760.143 Support of Conductors.

Power-limited fire alarm circuit conductors shall not be strapped, taped, or attached by any means to the exterior of any conduit or other raceway as a means of support.

760.145 Current-Carrying Continuous Line-Type Fire Detectors.

(A) Application.

Listed continuous line-type fire detectors, including insulated copper tubing of pneumatically operated detectors, employed for both detection and carrying signaling currents shall be permitted to be used in power-limited circuits.

(B) Installation.

Continuous line-type fire detectors shall be installed in accordance with 760.124 through 760.130 and 760.133 .

~~**760.154** Applications of Listed PLFA Cables.~~

Part IV. Listing Requirements

760.176 Listing and Marking of NPLFA Cables.

Non-power-limited fire alarm cables installed as wiring within buildings shall be listed in accordance with 760.176(A) and (B), be listed as resistant to the spread of fire in accordance with 760.176(C) through (F), and be marked in accordance with 760.176(G) . Cable used in a wet location shall be listed for use in wet locations or have a moisture-impervious metal sheath. Non-power-limited fire alarm cables shall have a temperature rating of not less than 60°C (140°F). Non-power-limited fire alarm cables shall be permitted to contain optical fibers.

> Informational Note: See UL 1425, *Standard for Cables for Non-Power-Limited Fire-Alarm Circuits* , for information on non-power-limited fire alarm cables.

(A) NPLFA Conductor Materials.

Conductors shall be 18 AWG or larger solid or stranded copper.

(B) Insulated Conductors.

Insulation on conductors shall be rated for the system voltage and not less than 600 V. Insulated conductors 14 AWG and larger shall be one of the types listed in Table 310.4(1) or one that is identified for such use. Insulated conductors 18 AWG and 16 AWG shall be in accordance with 760.49 .

(C) Type NPLFP.

Type NPLFP non-power-limited fire alarm cable for use in other space used for environmental air shall be listed as being suitable for use in other space used for environmental air as described in 300.22(C) and shall also be listed as having adequate fire-resistant and low smoke–producing characteristics.

> Informational Note: See NFPA 262, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces* , for one method of defining a cable that is low-smoke producing and fire-resistant if the cable exhibits a maximum peak optical density of 0.50 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested.

(D) Type NPLFR.

Type NPLFR non–power-limited fire alarm riser cable shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

> Informational Note: See UL 1666, *Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts* , for one method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

(E) Type NPLF.

Type NPLF non–power-limited fire alarm cable shall be listed as being suitable for general-purpose fire alarm use, with the exception of use in risers, ducts, plenums, and other space used for environmental air, and shall also be listed as being resistant to the spread of fire.

> Informational Note: See UL 2556, *Wire and Cable Test Methods* , for one method of defining *resistant to the spread of fire* .One method is to demonstrate that the cables do not spread fire to the top of the tray in the “UL Flame Exposure, Vertical Tray Flame Test.” The smoke measurements in the test method are not applicable.
>
> Another method of defining *resistant to the spread of fire* is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the FT4 “Vertical Flame Test.”

(F) Circuit Integrity (CI) Cable, Fire-Resistive Cable System, or Electrical Circuit Protective System.

Cables that are used for survivability of critical circuits under fire conditions shall be listed and meet the requirements of 760.176(F)(1) , (F)(2), or (F)(3).

> Informational Note: See *NFPA 72* , *National Fire Alarm and Signaling Code* , 12.4.3 and 12.4.4, for additional information on circuit integrity (CI) cable, fire-resistive cable systems, or electrical circuit protective systems used for fire alarm circuits to comply with the survivability requirements to maintain the circuit’s electrical function during fire conditions for a defined period of time.

(1) Circuit Integrity (CI) Cables.

Circuit integrity (CI) cables specified in 760.176(C), (D), and (E) and used for survivability of critical circuits shall be marked for an additional classification using the suffix "-CI." In order to maintain its listed fire-resistive rating, CI cables shall only be installed in free air in accordance with 760.24(B). CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of an electrical circuit protective fire-resistive cable system as covered in 760.176(F)(2). CI cables shall only be permitted to be installed in a raceway where specifically listed and marked as part of an electrical circuit protective system as covered in 760.176(F)(2).

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, and UL 1425, *Cables for Non-Power-Limited Fire-Alarm Circuits*, for information on establishing a rating for CI cable. The *UL Guide Information for Nonpower-limited Fire Alarm Circuits* (HNHT) contains information for identifying the cable and its installation limitations to maintain the fire-resistive rating.

(2) Fire-Resistive Cable Systems.

Cables specified in 760.176(C), (D), (E), and (F)(1) that are part of a fire-resistive cable system shall be identified with the system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the system.

Informational Note: See UL 2196, *Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for information on establishing a rating for a fire-resistive cable system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information for identifying the system and its installation limitations to maintain a minimum fire-resistive rating.

(3) Electrical Circuit Protective System.

Protectants for cables specified in 760.176(C), (D), and (E) that are part of an electrical circuit protective system shall be identified with the protective system identifier and hourly rating marked on the protectant or the smallest unit container and installed in accordance with the listing of the protective system.

Informational Note: See UL 1724, *Fire Tests for Electrical Circuit Protective Systems*, for information on establishing a rating for an electrical circuit protective system. The *UL Guide Information for Electrical Circuit Integrity Systems* (FHIT) contains information for identifying the system and its installation limitations to maintain the fire-resistive rating.

(G) NPLFA Cable Markings.

Multiconductor non–power-limited fire alarm cables shall be marked in accordance with Table 760.176(G). Non–power-limited fire alarm circuit cables shall be permitted to be marked with a maximum usage voltage rating of 150 volts. Cables that are listed for circuit integrity shall be identified with the suffix "-CI" as defined in 760.176(F). The temperature rating shall be marked on the jacket of NPLFA cables that have a temperature rating exceeding 60°C (140°F). The jacket of NPLFA cables shall be marked with the conductor size.

Informational Note: Cable types are listed in descending order of fire performance.

Table 760.176(G) NPLFA Cable Markings

Cable Marking	Type	Reference
NPLFP	Non–power-limited fire alarm circuit cable for use in other space used for environmental air	760.176(C) and (G)
NPLFR	Non–power-limited fire alarm circuit riser cable	760.176(D) and (G)
NPLF	Non–power-limited fire alarm circuit cable	760.176(E) and (G)

Notes:

1. Cables identified in 760.176(C), (D), and (E) and meeting the requirements for circuit integrity shall have the additional classification using the suffix "-CI" (for example, NPLFP-CI, NPLFR-CI, and NPLF-CI).

2. Cables containing optical fibers shall be provided with the suffix "-OF".

760.179 Listing and Marking of Insulated Continuous Line-Type Fire Detectors.

Insulated continuous line-type fire detectors shall be listed in accordance with 760.179(A) through (D). Cable used in a wet location shall be listed for use in wet locations or have a moisture-impervious metal sheath.

(A) Listing.

The cable shall be listed as being resistant to the spread of fire in accordance with 722.179(A)(1) , (A)(2), and (A)(3).

(B) Voltage and Temperature Rating.

The cable shall have a voltage rating of not less than 300 volts. The cable shall have a temperature rating of not less than 60°C (140°F).

(C) Markings.

The cable shall be marked as fire resistance Type FPLP, Type FPLR, or Type FPL in accordance with 722.179(B). The voltage rating shall not be marked on the cable. The temperature rating shall be marked on the jacket of cables that have a temperature rating exceeding 60°C (140°F). The jacket of PLFA cables shall be marked with the conductor size.

Informational Note: Voltage ratings on cables might be misinterpreted to suggest that the cables could be suitable for Class 1, electric light, and power applications.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

(D) Cable Jacket Compound.

The cable jacket compound shall have a high degree of abrasion resistance.

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_Substantiation.docx	Substantiation	

Statement of Problem and Substantiation for Public Input

This PI is submitted as part of the work of the 722 Limited Energy Task group. It deletes text that was relocated by the TG. See the attachment for the substantiation from the overall TG.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 3673-NFPA 70-2023 [Article 722]	same TG effort
Public Input No. 3674-NFPA 70-2023 [Article 724]	same TG effort
Public Input No. 3684-NFPA 70-2023 [Article 725]	same TG effort
Public Input No. 3686-NFPA 70-2023 [Article 726]	same TG effort
Public Input No. 3690-NFPA 70-2023 [Article 770]	
Public Input No. 3694-NFPA 70-2023 [Chapter 8]	

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Committee: NEC-P03

Committee Statement

Resolution: FR-8611-NFPA 70-2024

Statement: A new article was created to relocate all cable requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating

Committee.

The revision incorporates cabling requirements from Article 770 and Chapter 8.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

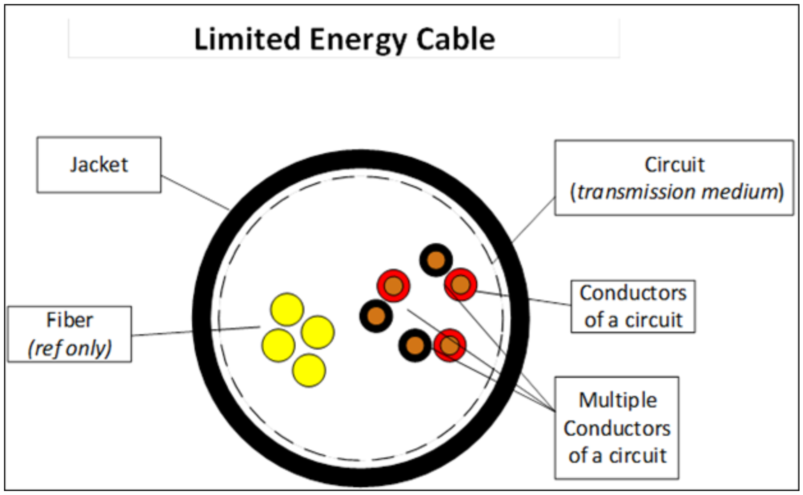
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

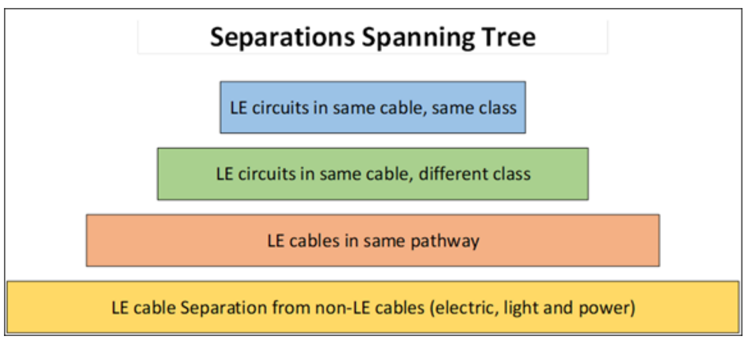
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1701-NFPA 70-2023 [New Section after 760.3]

760.9 Qualified Persons.

Fire Alarm systems covered by this Article shall be installed by Qualified Persons.

Informational Note: See definition of *Qualified Person* in Article 100.

Statement of Problem and Substantiation for Public Input

Technology in the limited energy and communications system segments of the electrical industry is rapidly evolving and expanding and is becoming more complicated. These systems require far more training and experience. These systems are often part of essential electrical systems and critical operations power systems requiring a greater degree of training and experience, in design, planning, installation, and programing in many instances. These systems and others require trained qualified personnel and contractors. ANSI standards such as NFPA 72, NECA 301 and others, address these systems and include requirements that qualified persons perform installations of these systems and equipment, so these new NEC requirements are proposed to correlate and align with those ANSI-accredited industry standards and codes. Licensing and regulatory agencies are developing new examinations and will be updating existing exams for state and other licensing to increase qualification credentials related to growth and advancement in this segment of the electrical industry. Certification organizations have indicated they anticipate following the same course of action. Qualified contractors and installers are a crucial element of safety related to these installations and systems.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1557-NFPA 70-2023 [Section No. 90.2(A)]	
Public Input No. 1629-NFPA 70-2023 [New Section after 393.6]	
Public Input No. 1672-NFPA 70-2023 [New Section after 700.8]	
Public Input No. 1684-NFPA 70-2023 [New Section after 701.7]	
Public Input No. 1686-NFPA 70-2023 [New Section after 708.8]	
Public Input No. 1690-NFPA 70-2023 [New Section after 722.3]	
Public Input No. 1694-NFPA 70-2023 [New Section after 724.3]	
Public Input No. 1695-NFPA 70-2023 [New Section after 725.3]	
Public Input No. 1698-NFPA 70-2023 [New Section after 726.3]	
Public Input No. 1706-NFPA 70-2023 [New Section after 770.3]	
Public Input No. 1708-NFPA 70-2023 [New Section after 800.3]	
Public Input No. 4394-NFPA 70-2023 [New Section after 625.6]	

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Committee:	NEC-P03

Committee Statement

Resolution: The proposed requirement would be better suited for location in Chapter 1.

Public Input No. 3440-NFPA 70-2023 [Sections 760.3(A), 760.3(B)]

~~**Sections 760.3(A), 760.3(B)**~~

~~**(A)** Spread of Fire or Products of Combustion.~~

~~Installation of fire alarm circuits shall comply with 300.21 .~~

~~**(B)** Ducts, Plenums, and Other Air-Handling Spaces.~~

~~Power-limited and non-power-limited fire alarm cables installed in ducts, plenums, or other spaces used for environmental air shall comply with 300.22 .~~

~~*Exception No. 1: Power-limited fire alarm cables selected in accordance with Table 760.154 and installed in accordance with 722.135 and 300.22(B) , Exception, shall be permitted to be installed in ducts specifically fabricated for environmental air.*~~

~~*Exception No. 2: Power-limited fire alarm cables selected in accordance with Table 760.154 and installed in accordance with 722.135 shall be permitted to be installed in other spaces used for environmental air (plenums).*~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 03 05:59:40 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the

insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

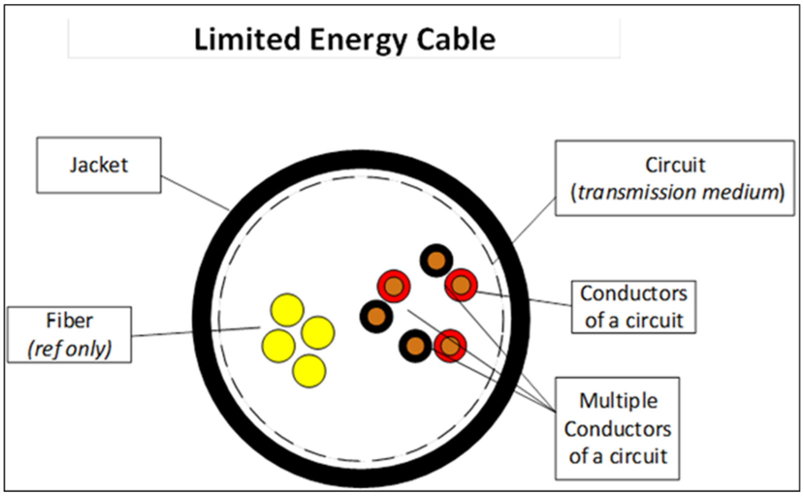
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

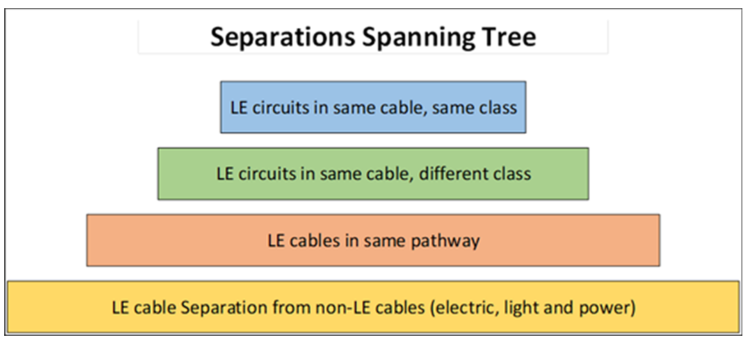
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 3371-NFPA 70-2023 [Section No. 760.3(D)]

(D) Building Control Circuits.

Building control systems (e.g., elevator capture, fan shutdown) associated with the fire alarm system shall comply with ~~Article 725~~ Class I, Class II, or Class III requirements elsewhere in this Code .

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article with the exception of Article 100 or where required for context. It is not clear whether this section was updated with the 2023 revision when the Class I requirements were moved to article 722, so I've proposed we simply refer to the Class I, Class II, or Class III requirements stated elsewhere in this Code. Alternatively, the panel could choose to be specific and point to a specific part but this language should make it clear that they user needs to go the appropriate requirements and there is a table of contents and an index available to direct them.

Submitter Information Verification

Submitter Full Name:	Richard Holub
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Street Address:	
City:	
State:	
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Submittal Date:	Fri Sep 01 15:18:29 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution:	FR-8458-NFPA 70-2024 - Per the Style Manual section 4.1.4 references to entire articles are permitted when required to provide the necessary context.
Statement:	These circuits can be Class 1, 2, or 3 and the move of Class 1 to Article 724 in the 2023 code requires an update of the reference.

Public Input No. 2956-NFPA 70-2023 [Section No. 760.3(O)]

(O) Cables for Power-Limited Fire Alarm (PLFA) Circuits.

The listing and installation of cables for power-limited fire alarm circuits shall comply with Part III of this article and Article 722, Parts I and II ~~of Article 722~~ .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 28 13:13:00 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8309-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3441-NFPA 70-2023 [Sections 760.10, 760.21, 760.24, 760.25]

~~**Sections 760.10, 760.21, 760.24, 760.25**~~

~~**760.10** Hazardous (Classified) Locations.~~

~~Cables and equipment shall be permitted to be used in hazardous (classified) locations where specifically permitted by other articles in this *Code* .~~

~~**760.21** Access to Electrical Equipment Behind Panels Designed to Allow Access.~~

~~Access to electrical equipment shall not be denied by an accumulation of conductors and cables that prevents removal of panels, including suspended ceiling panels.~~

~~**760.24** Mechanical Execution of Work.~~

~~**(A)** General.~~

~~Fire alarm circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11 .~~

> ~~Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.~~

~~**(B)** Circuit Integrity (CI) Cable.~~

~~Circuit integrity (CI) cables shall be supported at a distance not exceeding 610 mm (24 in.). Where located within 2.1 m (7 ft) of the floor in accordance with 760.53(A)(1) and 760.130(B)(1) , as applicable, the cable shall be fastened in an approved manner at intervals of not more than 450 mm (18 in.). Cable supports and fasteners shall be steel.~~

~~**760.25** Abandoned Cables.~~

~~The accessible portion of abandoned fire alarm cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:

Submittal Date: Sun Sep 03 06:02:28 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

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Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

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The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

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1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
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3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
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    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

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The following information and diagrams are provided to outline the thought process.

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This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

The structure follows this logic:

- The list of all limited energy cables is called for in X22.
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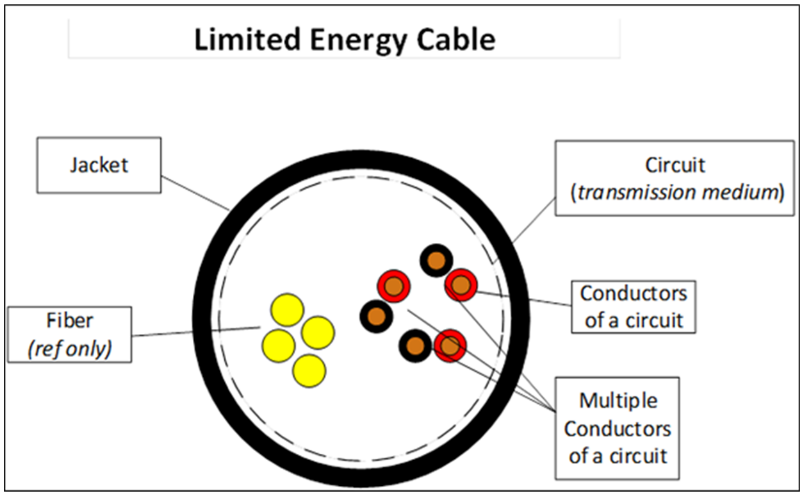

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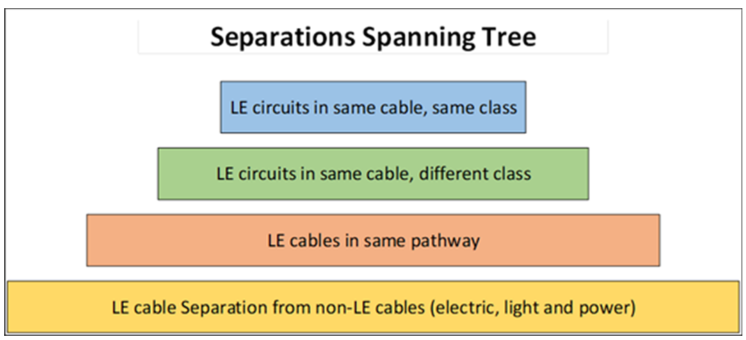

Public Input No. 1702-NFPA 70-2023 [Section No. 760.24]

760.~~24~~ ~~Mechanical Execution of Work~~ 24 Installation .

(A) General.

~~Fire alarm circuits shall be installed in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

(B) Workmanship.

Fire alarm circuits and equipment shall be mechanically executed and installed in a manner consistant with industry practices and standards.

Informational Note No. 1: See definition of *Workmanship* in Article 100.

Informational Note No. 2: See Section 110.12 for more information on Workmanship.

(C) Circuit Integrity (CI) Cable.

Circuit integrity (CI) cables shall be supported at a distance not exceeding 610 mm (24 in.). Where located within 2.1 m (7 ft) of the floor in accordance with 760.53(A)(1) and 760.130(B)(1), as applicable, the cable shall be fastened in an approved manner at intervals of not more than 450 mm (18 in.). Cable supports and fasteners shall be steel.

Statement of Problem and Substantiation for Public Input

Workmanship is an egalitarian term, that focuses on evaluating the craftsmanship of any individual or group, the overall standard of work, precision, and dedication put forth in achieving a desirable outcome regardless of gender.

These revisions provide clarity that the focus of Section 760.24 is on the General Installation rules and by adding a separate subsection on "Workmanship" it emphasizes the need for Workmanship in these installations, as well as creating consistency with other parts of this Code where Workmanship is either XXX.24 or XXX.24(X).

See Companion PIs pertaining to Sections:

- Article 100 Definition of "Workmanship"
- 110.12
- 393.24
- 600.24
- 600.33(B)
- 724.22
- 724.24
- 725.24
- 726.24
- 760.24
- 770.24
- 800.24

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]	
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]	
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]	
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]	
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]	
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]	

Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1691-NFPA 70-2023 [Section No. 724.24]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]
Public Input No. 1571-NFPA 70-2023 [New Definition after Definition: Work Surface.]
Public Input No. 1596-NFPA 70-2023 [Section No. 110.12]
Public Input No. 1630-NFPA 70-2023 [Section No. 393.14]
Public Input No. 1632-NFPA 70-2023 [New Section after 393.21]
Public Input No. 1668-NFPA 70-2023 [Section No. 600.24]
Public Input No. 1669-NFPA 70-2023 [New Section after 600.24]
Public Input No. 1670-NFPA 70-2023 [Section No. 600.33(B)]
Public Input No. 1687-NFPA 70-2023 [Section No. 722.24]
Public Input No. 1692-NFPA 70-2023 [New Section after 724.21]
Public Input No. 1696-NFPA 70-2023 [New Section after 725.21]
Public Input No. 1697-NFPA 70-2023 [Section No. 725.24]
Public Input No. 1699-NFPA 70-2023 [New Section after 726.12]
Public Input No. 1700-NFPA 70-2023 [Section No. 726.24]
Public Input No. 1707-NFPA 70-2023 [Section No. 770.24]
Public Input No. 1709-NFPA 70-2023 [Section No. 800.24]

Submitter Information Verification

Submitter Full Name: Kyle Krueger
Organization: NECA
Affiliation: NECA
Street Address:
City:
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Zip:
Submittal Date: Fri Jul 28 20:17:14 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: This text is already present in 110.12 and applies globally. Therefore, it is not needed.

Public Input No. 1391-NFPA 70-2023 [Section No. 760.24(A)]

(A) General.

Fire alarm circuits shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

Statement of Problem and Substantiation for Public Input

To more closely correlate with article 110.12

Submitter Information Verification

Submitter Full Name: Kelly Wofford
Organization: EIG
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jul 12 16:13:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 760.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 2017-NFPA 70-2023 [Section No. 760.24(A)]

(A) General.

Fire alarm circuits shall be installed in a ~~neat~~ professional and ~~workmanlike manner~~ skillful manner . Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

Statement of Problem and Substantiation for Public Input

This revision is needed to correlate with the wording in 110.12

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2009-NFPA 70-2023 [Section No. 722.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2010-NFPA 70-2023 [Section No. 724.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2011-NFPA 70-2023 [Section No. 725.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2012-NFPA 70-2023 [Section No. 726.24]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2013-NFPA 70-2023 [Section No. 800.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2014-NFPA 70-2023 [Section No. 770.24(A)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2015-NFPA 70-2023 [Section No. 600.33(B)]	“professional and skillful” instead of “neat and workmanlike”
Public Input No. 2016-NFPA 70-2023 [Section No. 393.14(A)]	“professional and skillful” instead of “neat and workmanlike”

Submitter Information Verification

Submitter Full Name: Russ Leblanc
Organization: Leblanc Consulting Services
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 11 07:02:13 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 760.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 2493-NFPA 70-2023 [Section No. 760.24(A)]

(A) General.

Fire alarm circuits shall be installed in a ~~neat~~ professional and ~~workmanlike~~ skillful manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

Statement of Problem and Substantiation for Public Input

Changing the wording matches what is in 110.12. Keeping the wording the same promotes consistency throughout the code. Additional inputs will be done for other code articles. 722.24, 724.24, 725.24
726.24 , 770.24(A), 800.24(A).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	
Public Input No. 2486-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 2488-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 2491-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 2492-NFPA 70-2023 [Section No. 726.24]	
Public Input No. 2494-NFPA 70-2023 [Section No. 770.24(A)]	
Public Input No. 2495-NFPA 70-2023 [Section No. 800.24(A)]	

Submitter Information Verification

Submitter Full Name: Lowell Reith
Organization: Interstates Construction Servi
Affiliation: IEC
Street Address:
City:
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Zip:
Submittal Date: Fri Aug 18 12:29:39 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 760.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Merton Bunker & Associates, LLC
22 Gray Birch Ln
Stafford, VA 22554
September 2, 2023

National Fire Protection Association
Attn: Standards Administration
1 Batterymarch Park
Quincy, MA 02169

Please see the attached supporting material and related permission to use the material for Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493. These attachments are the same for all referenced Public Inputs.

I am submitting this PI on behalf of HYLINE SAFETY COMPANY.

The material in all four attachments is not copyrighted; however, I have included permission to publish them from the originator of these attachments, Mr. Evan W. Lipstein.

Thank you in advance for your attention to this matter. If you have any questions or concerns, please contact me at the phone number below.

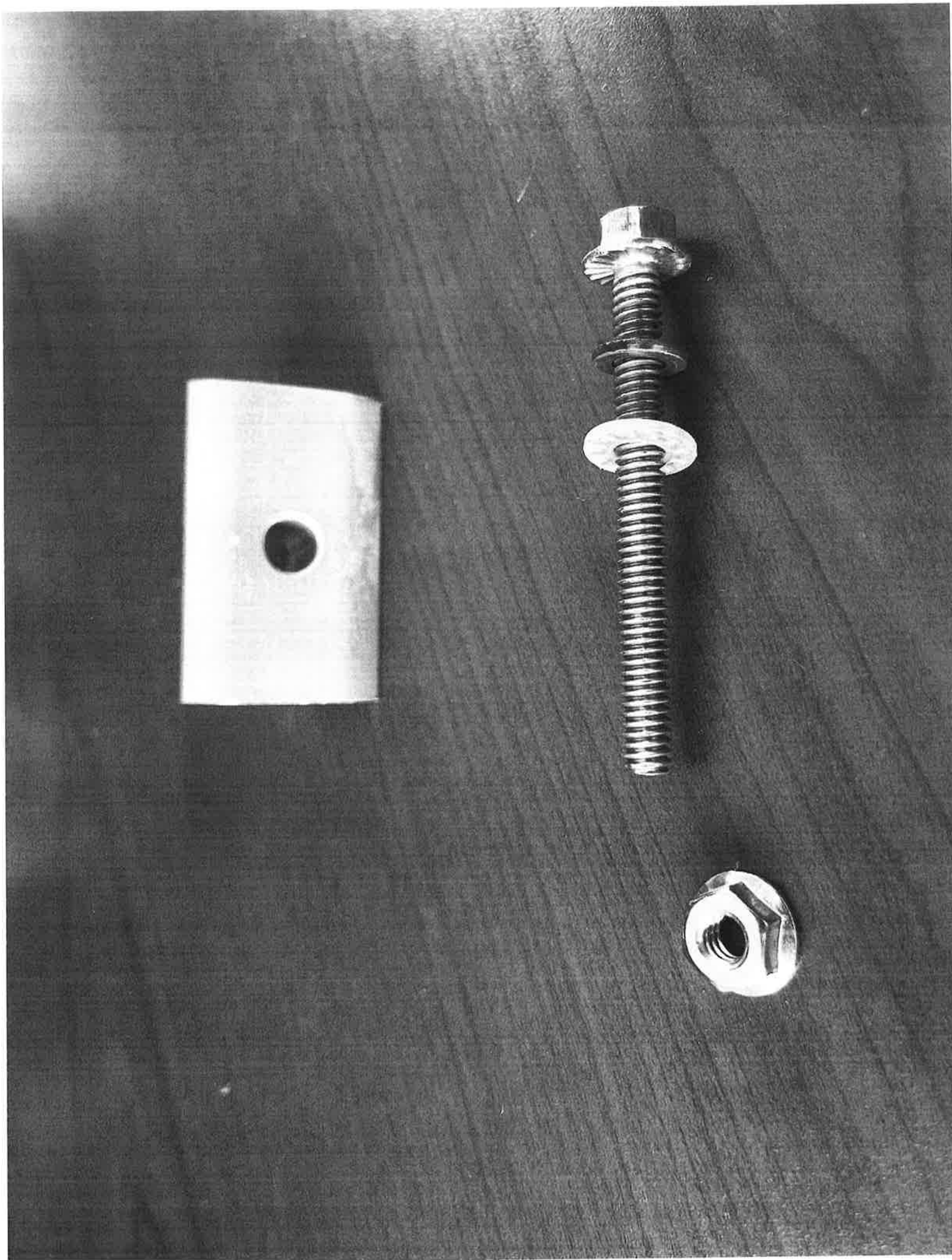
Very truly yours,

Merton Bunker, PE.

Attachment #1

Hardware with an environmentally sealed washer.

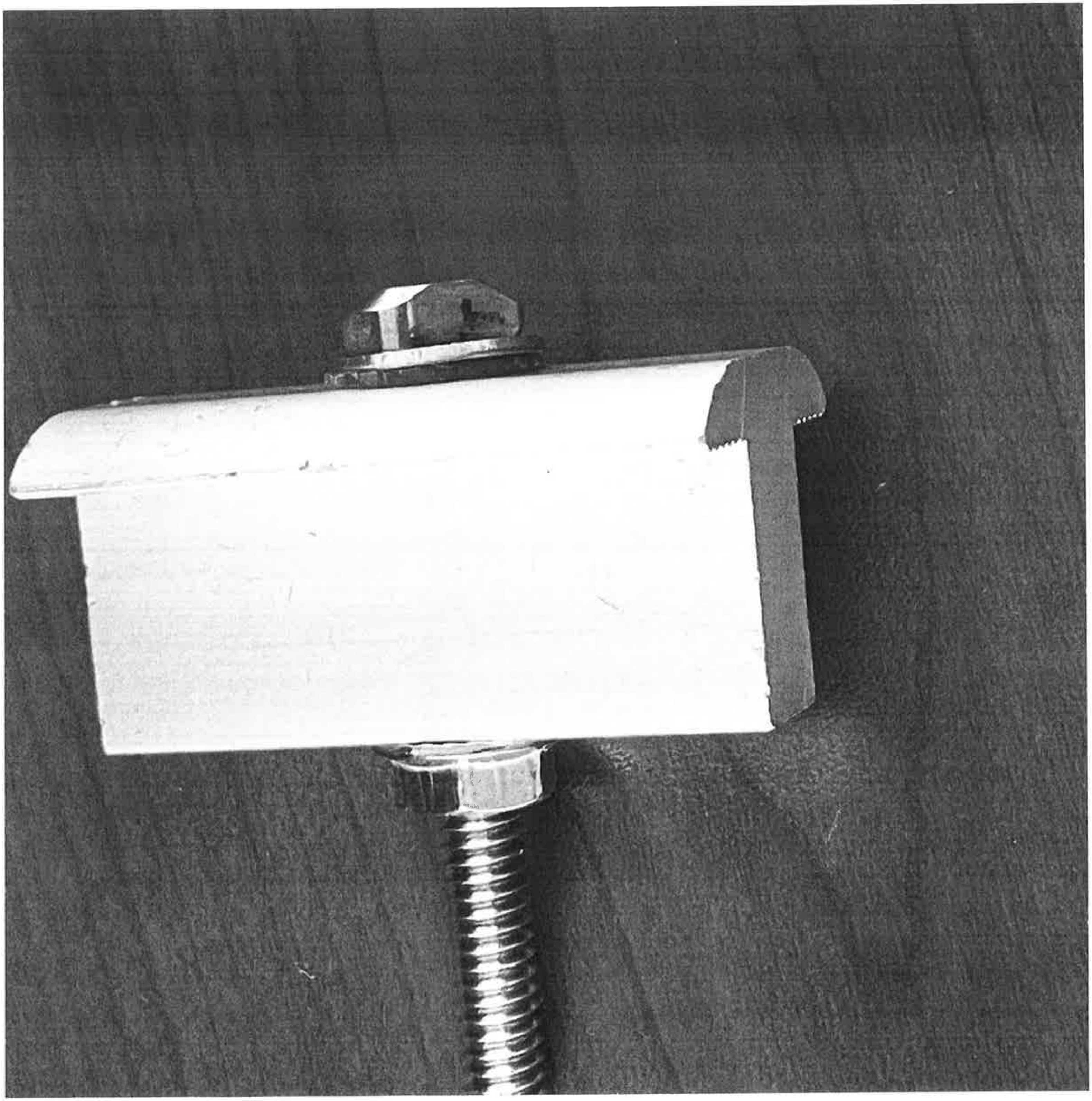
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #2

Hardware with an environmentally sealed washer.

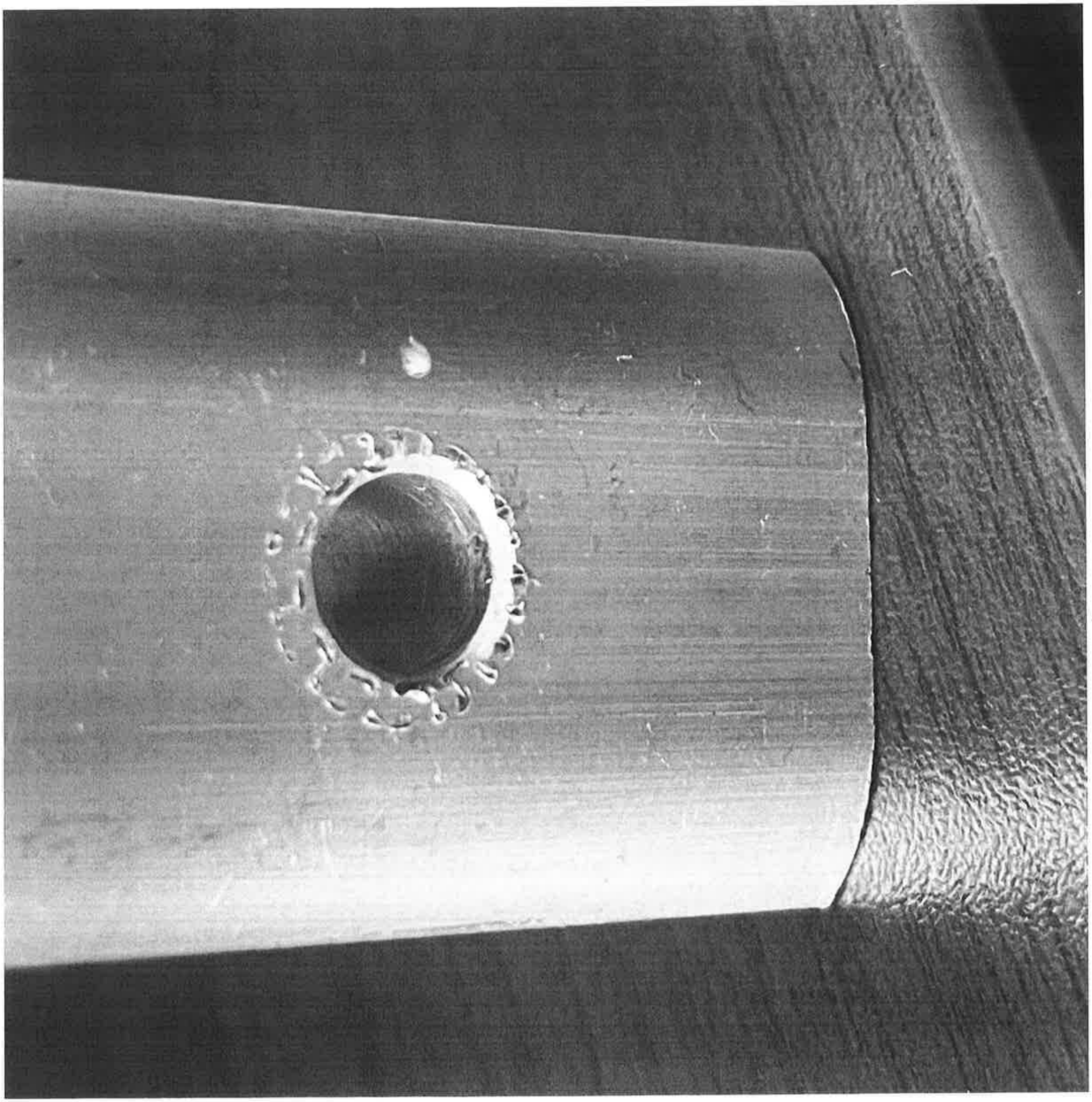
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #3

Aluminum surface showing contact by environmentally sealed washer.

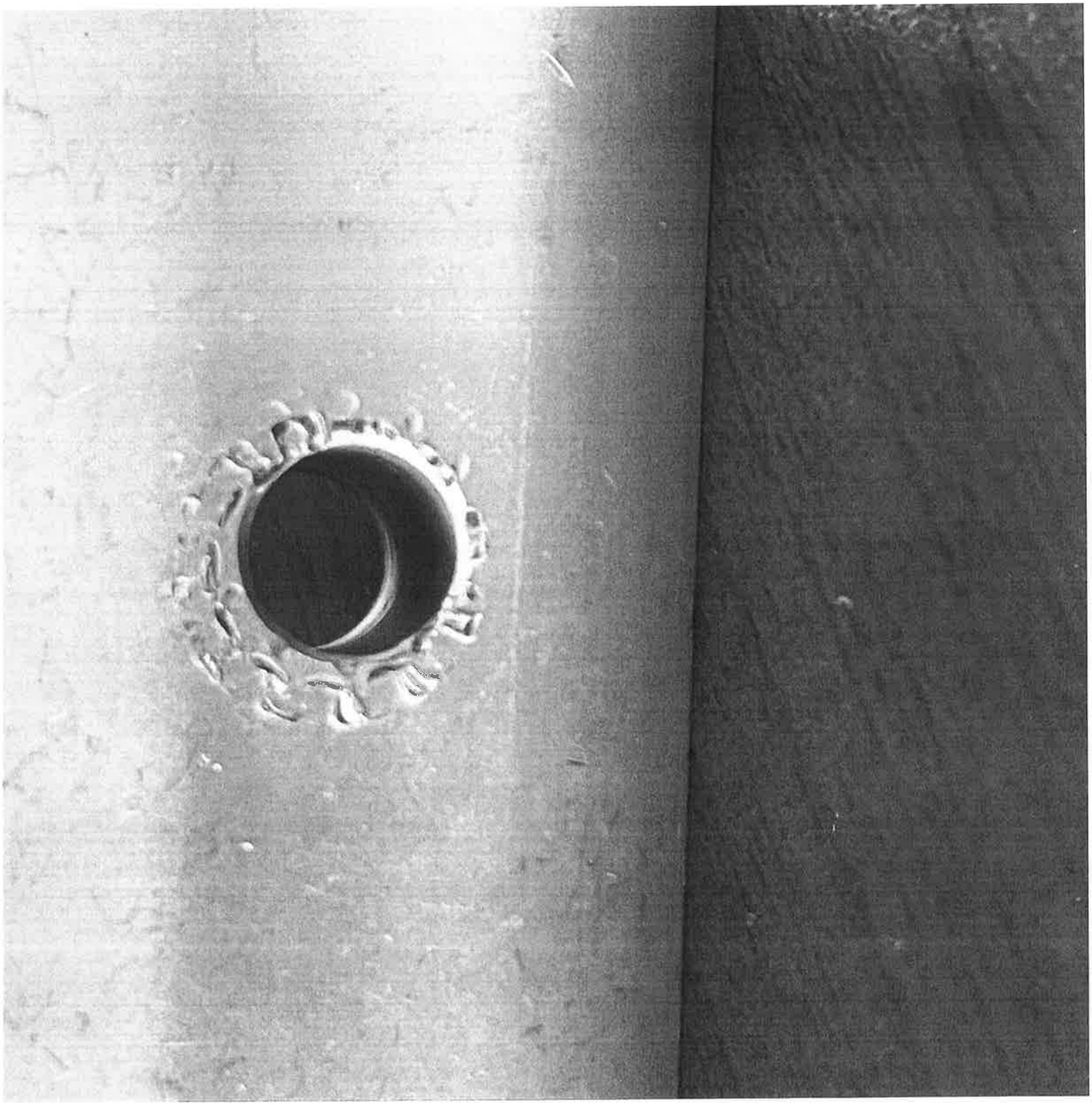
For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Attachment #4

Aluminum surface showing contact by environmentally sealed washer.

For Public Inputs 2411, 2412, 2413, 2414, 2415, 2492, and 2493.



Public Input No. 286-NFPA 70-2023 [Section No. 760.24(A)]

(A) General.

Fire alarm circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 ~~and~~ , 300.11 and 334 . 30 .

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

Statement of Problem and Substantiation for Public Input

Since the makeup of small conductor cables is about the same as NMB then supports should not exceed that as required for NMB. This would also make for a more "workmanlike manner"

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 283-NFPA 70-2023 [Section No. 722.24(A)]	
Public Input No. 284-NFPA 70-2023 [Section No. 724.24]	
Public Input No. 285-NFPA 70-2023 [Section No. 725.24]	
Public Input No. 287-NFPA 70-2023 [Section No. 770.24(A)]	

Submitter Information Verification

Submitter Full Name: Robert Nakamichi
Organization: City of Seattle
Street Address:
City:
State:
Zip:
Submittal Date: Sat Feb 04 09:44:27 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Section 760.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 56-NFPA 70-2023 [Section No. 760.24(A)]

(A) General.

~~Fire alarm circuits shall be installed in a neat and workmanlike manner.~~ Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by hardware, including straps, staples, hangers, listed cable ties identified for securement and support, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

Informational Note: Paint, plaster, cleaners, abrasives, corrosive residues, or other contaminants might result in an undetermined alteration of PLFA and NPLFA cable properties.

Statement of Problem and Substantiation for Public Input

Article 760 is not exempt from 90.3 or Article 110. Therefore, the requirements of Article 110 apply to Chapter 7 of the NEC. Accordingly, there is no need to restate the requirements of 110.12 in 760.24(A) that "fire alarm circuits shall be installed in a professional and skillful manner." Further, in addition to there being no need to repeat general requirements from Article 110 here in this section, the requirements in this section do not comply with the NEC Style Manual as it was determined that "neat" and "workmanlike" were vague and unenforceable and were therefore changed to "professional" and "skillful" in 110.12. In sum, this sentence should be removed because it is unnecessary as it is redundant per 90.3, there is lack of correlation with 110.12, and it is in violation of the NEC Style Manual.

Submitter Information Verification

Submitter Full Name: Palmer Hickman

Organization: Electrical Training Alliance

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jan 06 17:39:41 EST 2023

Committee: NEC-P03

Committee Statement

Resolution: Section 760.24 was deleted to comply with the NEC Style Manual, section 4.1.1. This is covered in 110.12.

Public Input No. 866-NFPA 70-2023 [Section No. 760.30]

760.30 Fire Alarm Circuit Identification.

(A) General. Fire alarm circuits shall be identified at terminal and junction locations in a manner that helps to prevent unintentional signals on fire alarm system circuit(s) during testing and servicing of other systems.

(B) PLFA Conductor Jacket Color

Where the installation plan calls for 2 or more PLFA circuits to utilize color striped jackets that identify dedicated functions of the system, the standard must remain constant throughout the entire installation. For the purpose of a dedicated standard, the color markings shall be defined as follows:

1. Solid Red jacket; for the smoke and heat detection devices.
2. Red jacket with blue stripe; for visible (as well as) combined visible/audible notification devices.
3. Red jacket with green stripe; for audible-only devices such as speakers.
4. Red jacket with yellow stripe; for means to connect power supply to associated equipment and/or devices such as damper relays and door magnets.

Exception No. 1: Where additions and upgrades are being made to existing multi-circuit systems, pre existing circuits shall be permitted to remain as previously installed. As long as these existing circuits will remain in-use and otherwise do not meet the conditions of "abandoned cables" as provided in 760.25.

Exception No. 2: As per application, additional LEDs may be installed as part of a way-finding system — to better direct emergency personnel and first responders during an emergency. Where a separate conductor is permanently connected to a smoke or heat device for the purpose of installing additional LEDs, it shall be acceptable to use a solid Red jacket, as this is a direct extension from a smoke or heat detection device.

Statement of Problem and Substantiation for Public Input

Statement of Problem and Substantiation for Public Input (Required)

As 760.30 currently states, fire alarm circuits shall be identified at terminal and junction locations in a manner that helps to prevent unintentional signals …during testing and servicing of other systems. This idea doesn't go far enough to address the application of multiple and complex systems to be identified.

For the last six months I have been working on two different (yet large) hospital projects. Both are major construction projects that required old systems to be partitioned and removed, prior to the installation of multi-wire circuit upgrades. A large amount of time was spent tracing overlapping circuits through very busy rooms, ceilings and hallways. This was only complicated by the fact that there was no consistent marking of multi-wire systems and even though these two hospitals were part of the same network, each location was using different wire sizes and types of wire coverings. Also, the hospital had called an independent service company for troubleshooting …and in those cases, the service company would simply take apart circuits without understanding the role of different circuits. For all of this, so much time spent troubleshooting would have been greatly diminished if there was a visual system (consistently defined) for ongoing service, scheduled testing and future expansion projects.

Submitter Information Verification

Submitter Full Name:	Keith DeWaters
Organization:	E Light
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sun May 21 18:15:01 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: NFPA 72 contains the requirements for the labeling of circuits. Existing installations that do not comply to the new proposed requirements could become misunderstood resulting in dangerous situations.

Public Input No. 226-NFPA 70-2023 [Section No. 760.32]

760.32 Fire Alarm Circuits Extending Beyond One Building.

Non–power-limited fire alarm circuits and power-limited fire alarm circuits that extend beyond one building and run outdoors shall meet the installation requirements of Parts II, III, and IV of Article 805 (should be highlighted grey) and shall meet the installation requirements of Part I of Article 300.

Statement of Problem and Substantiation for Public Input

Article 805 is a new section so it should be highlighted in grey because the previous version stated article 800

Submitter Information Verification

Submitter Full Name: Robert Warren
Organization: Montana Electrical JATC
Street Address:
City:
State:
Zip:
Submittal Date: Wed Jan 25 10:56:56 EST 2023
Committee: NEC-P03

Committee Statement

Resolution: Shading is an automated function done through the publication process. The Code-Making Panel has no control of the formatting aspect of the Code.

Public Input No. 2957-NFPA 70-2023 [Section No. 760.32]

760.32 Fire Alarm Circuits Extending Beyond One Building.

Non–power-limited fire alarm circuits and power-limited fire alarm circuits that extend beyond one building and run outdoors shall meet the installation requirements of Article 805, Parts II, III, and ~~IV of Article 805 and~~ IV and shall meet the installation requirements of ~~Part I of~~ Article 300 , Part I .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:13:47 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8310-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 2959-NFPA 70-2023 [Section No. 760.33]

760.33 Supply-Side Overvoltage Protection.

A listed surge-protective device (SPD) shall be installed on the supply side of a fire alarm control panel in accordance with ~~Part II of~~ Article 242, Part II .

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:15:04 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8466-NFPA 70-2024 - [Response to PI-3412] Deleting the article 242 reference is a disservice to the reader as a fire alarm technician may not know the contents of Article 242. The pointer provides a valuable service.

Statement: Changing the section title is appropriate as this section is about surge-protective devices and not overvoltage.

The editorial change in the reference to Article 242, Part II, is made to comply with the NEC Style Manual, section 4.1.4.

A requirement to place the SPD as close as practicable is added to ensure protection of the control panel.

Public Input No. 3412-NFPA 70-2023 [Section No. 760.33]

760.33 Supply-Side ~~Overvoltage~~ Surge Protection.

A listed surge-protective device (SPD) shall be installed on the supply side of a fire alarm control panel ~~in accordance with Part II of Article 242~~ .

Statement of Problem and Substantiation for Public Input

This public input deletes “in accordance with Part II of Article 242” as 90.3 already tells the code user that Article 242 applies
generally to all electrical installations. Additionally, the title of the section is changed from “overvoltage” to “surge” to be consistent
with all other surge protection titled sections of the code. This includes but is not limited to sections 215.18, 225.42, 230.67, 409.70, 501.35, 502.35, 620.51(E), 645.18, 695.15, 700.8, and 708.20(D).

Submitter Information Verification

Submitter Full Name:	Megan Hayes
Organization:	NEMA
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Sat Sep 02 17:42:14 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8466-NFPA 70-2024 - [Response to PI-3412] Deleting the article 242 reference is a disservice to the reader as a fire alarm technician may not know the contents of Article 242. The pointer provides a valuable service.

Statement: Changing the section title is appropriate as this section is about surge-protective devices and not overvoltage.

The editorial change in the reference to Article 242, Part II, is made to comply with the NEC Style Manual, section 4.1.4.

A requirement to place the SPD as close as practicable is added to ensure protection of the control panel.

Public Input No. 1259-NFPA 70-2023 [New Section after 760.35]

TITLE OF NEW CONTENT

Type your content here ...

760.37. Cybersecurity

Fire Alarm Systems that are connected to a communication network and have the capability to be controlled or permit control of any portion of the premises shall comply with either of the following:

(1) The ability to control the system is limited to a direct connection through a local nonnetworked interface.

(2) The Fire Alarm Sytem is connected through a networked interface complying with both of the following methods:

a. The Fire Alarm System and associated software are identified as being evaluated for cybersecurity.

b. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyber attacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, identification, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ANSI/ISA 62443, Cybersecurity Standards series; UL 2900, Cybersecurity Standards series; and the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1, for assessment guidelines.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

(1) The ISA Security Compliance Institute (ISCI) conformity assessment program

(2) Certification of compliance by a nationally recognized test laboratory

Statement of Problem and Substantiation for Public Input

Most of the cybersecurity focus has been on IT systems. There has been very little public discussion about cybersecurity for Operational Technology (OT), but cyber attacks on OT, by both domestic and foreign actors, occur on almost a daily basis. Hackers can easily destroy unprotected equipment and shut down entire unprotected facilities. Our adversaries such as Russia, China, North Korea, and Iran, are continuously mounting cyber attacks. They understand their limits and, so far, prohibit catastrophic attacks on our financial/banking system and electrical grid. In the mean time, they attack our infrastructure, such as the southeast gas pipeline. We have the ability, and obligation, to prevent this type of damage to our infrastructure from malicious cyber attacks. This Public Input is based upon 240.6(D) and 708.7 in the 2023 NEC. Pay particular attention to the word "identified" in (2) a. "Identified" as applied to equipment, is defined in Article 100 as "Recognizable as suitable for the specific purpose, function, use, environment, application, and so forth, where described in a particular Code requirement. Informational Note: Some examples of ways to determine suitability of equipment for a specific purpose, environment, or application include investigations by a qualified testing laboratory (listing and labeling), an inspection agency, or other organization concerned with product evaluation." This Public Input simply requires that a Fire Alarm System either not be connected to the internet, or if it is connected to the internet, that it be identified for cybersecurity and that an assessment is provided.

Submitter Information Verification

Submitter Full Name: Vincent Saporita

Organization: Saporita Consulting

Street Address:

City:

State:

Zip:

Submittal Date: Fri Jun 30 15:47:20 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: The installation aspect of cybersecurity is already addressed as a general requirement in 110.3(A)(8). The scope of NFPA 72 (see Section 1.1.1) indicates that the performance of the system is covered by that document.

Public Input No. 3065-NFPA 70-2023 [Section No. 760.35]

760.35 Fire Alarm Circuit Requirements.

Fire alarm circuits shall comply with 760.35(A) and (B).

(A) Non–Power-Limited Fire Alarm (NPLFA) Circuits.

See Parts I and II of this article for the requirements for non-power-limited fire alarm circuits .

(B) Power-Limited Fire Alarm (PLFA) Circuits.

See Parts I and III of this article for the requirements for power-limited fire alarm circuits ..

Statement of Problem and Substantiation for Public Input

This revision provides clarity and complete sentences to comply with the NEC Style Manual Section 3.5 for writing styles.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 10:46:05 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8475-NFPA 70-2024

Statement: The existing text was superfluous and has been deleted. It's not possible to install a fire alarm without already complying with this requirement.

Public Input No. 562-NFPA 70-2023 [Section No. 760.35]

~~**760.35** Fire Alarm Circuit Requirements.~~

~~Fire alarm circuits shall comply with 760.35(A) and (B).~~

~~**(A)** Non–Power-Limited Fire Alarm (NPLFA) Circuits.~~

~~See Parts I and II.~~

~~**(B)** Power-Limited Fire Alarm (PLFA) Circuits.~~

~~See Parts I and III.~~

Statement of Problem and Substantiation for Public Input

Telling a person to look at something ("see" Part II or Part III) is unenforceable. This section is not needed.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 10 13:26:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8475-NFPA 70-2024
Statement: The existing text was superfluous and has been deleted. It’s not possible to install a fire alarm without already complying with this requirement.

Public Input No. 1496-NFPA 70-2023 [Section No. 760.41(A)]

(A) Power Source.

The power source of non–power-limited fire alarm circuits shall comply with Chapters 1 through 4, and the output voltage shall be not more than 600 volts, nominal. The fire alarm circuit disconnect ~~shall be permitted to be~~ shall be secured in the “on” position.

Statement of Problem and Substantiation for Public Input

Any circuit that isn’t serving as a within sight disconnect is permitted to be secured in the on position. Some fire marshals mandate a breaker lock on the fire alarm circuit because of this code reference even though it is written as optional. Securing a fire alarm circuit in the on position at its disconnect should be mandatory. We don’t want to lose power to that life safety circuit and we don’t want to run the system’s back-up batteries down. A securement at the fire alarm disconnect will aid in the inadvertent loss of power to the fire alarm circuit.

Submitter Information Verification

Submitter Full Name:	Norman Feck
Organization:	State of Colorado
Affiliation:	self
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Fri Jul 21 17:55:32 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: The requirements for securing fire alarm circuit disconnecting means are located in NFPA 72. This text simply gives an option to secure, if that is required.

Public Input No. 3184-NFPA 70-2023 [Section No. 760.41(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings. This branch circuit shall not ~~be supplied~~ be part of a multiwire branch circuit and shall not be supplied through ground-fault circuit interrupters ~~or arc~~ or arc - fault circuit-interrupters.

-

Statement of Problem and Substantiation for Public Input

Contractors are currently installing the fire alarm system on a multiwire branch circuit with other circuits that have nothing to do with the fire alarm (for example, the lighting circuit of the room the FACP is located). The installation of the fire alarm system on a multiwire branch circuit keeps the fire alarm system from being an "independent" circuit and defeats the purpose of requiring it to be its own circuit. The fire alarm circuit will trip when the second circuit trips. Any maintenance on the second circuit will shut off the fire alarm panel, putting the system in trouble.

Submitter Information Verification

Submitter Full Name: Alex Owens
Organization: City of Rexburg
Street Address:
City:
State:
Zip:
Submittal Date: Wed Aug 30 09:39:07 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8484-NFPA 70-2024

Statement: Multiwire branch circuits often employ common trip functionality allowing one fault on a non-associated circuit to deenergize the fire alarm control panel. This revision eliminates that possibility.

Public Input No. 3292-NFPA 70-2023 [Section No. 760.41(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit-interrupters, or a multi-wire branch circuit .

Statement of Problem and Substantiation for Public Input

This added language would provide for the ability of the technician or owner to shut off the fire alarm system without having to shut off other circuits. This would also allow the owner or technician to shut off the other connected branch circuit without shutting off the fire alarm system. Allowing a fire alarm system to be shut off with other branch circuits creates the potential of leaving the fire alarm system off creating a potential life safety system non-functional. Another potential problem is having a neutral connection be removed inadvertently from the other branch circuits on the multi-wire branch circuit, that would damage the fire alarm system. With the lead times of equipment currently, this can be a great length of time to replace the fire alarm system control panel or power supplies. I recognize most main electrical services are technically multi-wire branch circuits, the connections are not done as well in branch circuits as they are in electrical services.

Submitter Information Verification

Submitter Full Name: Clinton Stoddard
Organization: City of Rexburg
Street Address:
City:
State:
Zip:

Submittal Date: Thu Aug 31 16:33:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8484-NFPA 70-2024

Statement: Multiwire branch circuits often employ common trip functionality allowing one fault on a non-associated circuit to deenergize the fire alarm control panel. This revision eliminates that possibility.

Public Input No. 561-NFPA 70-2023 [Section No. 760.43]

760.43 NPLFA Circuit Overcurrent Protection.

Overcurrent protection for conductors 14 AWG and larger shall be provided in accordance with the conductor ampacity without applying the ampacity adjustment and correction factors of 310.14 to the ampacity calculation. Overcurrent protection shall not exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG conductors.

~~*Exception: Where other articles of this Code permit or require other overcurrent protection.*~~

Statement of Problem and Substantiation for Public Input

This exception is broad that it is meaningless. The Style Manual prohibits references to whole articles, yet this exception refers to EVERY article.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Mon Apr 10 13:24:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8485-NFPA 70-2024
Statement: The exception violates the Style Manual section 4.1.4 by referring to every article and is overly broad.

Public Input No. 2504-NFPA 70-2023 [Section No. 760.45]

760.45 NPLFA Circuit Overcurrent Device Location.

Overcurrent devices shall be located at the point where the conductor to be protected receives its supply.

Exception No. ~~1~~ 1 : ~~Where the overcurrent device protecting the larger conductor also protects the smaller conductor. Exception No. 2:~~ Transformer secondary conductors. Non–power-limited fire alarm circuit conductors supplied by the secondary of a single-phase transformer that has only a 2-wire (single-voltage) secondary shall be permitted to be protected by overcurrent protection provided by the primary (supply) side of the transformer, provided the protection is in accordance with 450.3 and does not exceed the value determined by multiplying the secondary conductor ampacity by the secondary-to-primary transformer voltage ratio. Transformer secondary conductors other than 2-wire shall not be considered to be protected by the primary overcurrent protection.

Exception No. ~~3~~ 2 : Electronic power source output conductors. Non–power-limited circuit conductors supplied by the output of a single-phase, listed electronic power source, other than a transformer, having only a 2-wire (single-voltage) output for connection to non–power-limited circuits shall be permitted to be protected by overcurrent protection provided on the input side of the electronic power source, provided this protection does not exceed the value determined by multiplying the non–power-limited circuit conductor ampacity by the output-to-input voltage ratio. Electronic power source outputs, other than 2-wire (single voltage), connected to non–power-limited circuits shall not be considered to be protected by overcurrent protection on the input of the electronic power source.

Informational Note: A single-phase, listed electronic power supply whose output supplies a 2-wire (single-voltage) circuit is an example of a non–power-limited power source that meets the requirements of 760.41.

Statement of Problem and Substantiation for Public Input

Exception one is nonsensical. If the small conductor is protected by the overcurrent device, what rule does this exception except out? The requirement is already satisifed.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Fri Aug 18 13:17:58 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8487-NFPA 70-2024
Statement: The existing exception was not a complete sentence and upon further examination, deleting it does not appear to remove any requirements.

Public Input No. 3376-NFPA 70-2023 [Section No. 760.46]

760.46 NPLFA Circuit Wiring.

Installation of non–power-limited fire alarm circuits shall be in accordance with 110.3(B), 300.7, 300.11, 300.15, 300.17, 300.19(B), and ~~other appropriate articles of Chapter 3~~ . 300.26(C).

Exception No. 1: As provided in 760.48 through 760.53.

Exception No. 2: Where other articles of this Code require other methods.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article with the exception of Article 100 or where required for context. 90.3 makes it clear that the general requirements of Chapters 1 through 4 apply except as modified by the latter chapters. In this case, it seems appropriate to include a reference to 300.26(C) since that includes specific instructions for non-power limited remote control and signaling cables, but the other raceway, cable, and cable tray articles would most certainly apply depending on the wiring method chosen. There is no need for a vague reference to "other appropriate articles of Chapter 3", which isn't even enforceable as written.

Submitter Information Verification

Submitter Full Name: Richard Holub

Organization: The DuPont Company, Inc.

Street Address:

City:

State:

Zip:

Submittal Date: Fri Sep 01 15:40:03 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8311-NFPA 70-2024

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 1603-NFPA 70-2023 [Section No. 760.48(A)]

(A) Class 1 with NPLFA Circuits.

Class 1 and non–power-limited fire alarm circuits shall be permitted to occupy the same cable, enclosure, or raceway without regard to whether the individual circuits are alternating current or direct current, provided all conductors are insulated for the maximum voltage of any conductor in the enclosure or raceway.

Proposal to require power limited fire alarm cables and non-power limited fire alarm cable to be installed in a separate raceway with no other cables.

Reasoning: It is favored by the electrical inspector and the fire marshal during inspections to be able to trace the system. I believe this would also reduce the risk of damage during the installation for future cables when intermixed in the same raceway.

Additional Proposed Changes

File Name	Description	Approved
Code_Proposal_1_2026.docx	Proposal to have a separate raceway for fire alarm cables	

Statement of Problem and Substantiation for Public Input

It is favored by the electrical inspector and the fire marshal during inspections to be able to trace the system. I believe this would also reduce the risk of damage during the installation for future cables when intermixed in the same raceway.

Submitter Information Verification

Submitter Full Name: Edward Weaver
Organization: City of East Lansing
Affiliation: IAEI Michigan Chapter
Street Address:
City:
State:
Zip:
Submittal Date: Thu Jul 27 10:37:31 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The proposal included no text to be incorporated nor a technical justification for the change and therefore does not conform to section 4.3.4.1 of the NFPA Regulations.

Code Proposal

2026

Proposal to require power limited fire alarm cables and non-power limited fire alarm cable to be installed in a separate raceway with no other cables.

Reasoning: It is favored by the electrical inspector and the fire marshal during inspections to be able to trace the system. I believe this would also reduce the risk of damage during the installation for future cables when intermixed in the same raceway.

Scott Weaver
14489 Brown Rd Sunfield MI 48890
Code Panel 16

27-July 2023

Public Input No. 3373-NFPA 70-2023 [Section No. 760.49(B)]

(B) Insulation.

Insulation on conductors shall be rated for the system voltage and not less than 600 volts. Conductors larger than 16 AWG shall comply with ~~Article~~ Table 310. ~~Conductors~~ 4(1) or Table 310.4(2) as applicable. Conductors 18 AWG and 16 AWG shall be Type KF-2, KFF-2, PAFF, PTFF, PF, PFF, PGF, PGFF, RFH-2, RFHH-2, RFHH-3, SF-2, SFF-2, TF, TFF, TFN, TFFN, ZF, or ZFF. Conductors with other types and thickness of insulation shall be permitted if listed for non–power-limited fire alarm circuit use.

Informational Note: See Table 402.3 for application provisions.

Statement of Problem and Substantiation for Public Input

Section 4.1.4 of the NEC(r) Style Manual prohibits referencing an entire article with the exception of Article 100 or where required for context. It is recommended here to point to the applicable tables in Article 300 that give the available constructions as opposed to the useless pointer to the entire article. 90.3 would apply, here, as well and this requirement could be omitted since it doesn't specifically modify the Chapter 3 requirement, but I've attempted to point the user here to the correct location for usability.

Submitter Information Verification

Submitter Full Name: Richard Holub
Organization: The DuPont Company, Inc.
Street Address:
City:
State:
Zip:
Submittal Date: Fri Sep 01 15:25:15 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8312-NFPA 70-2024 - Table 310.4(2) was not included because it applies to conductors rated at 2000 V.

Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 1488-NFPA 70-2023 [Section No. 760.121(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall comply with the following requirements:

(1) The branch circuit shall supply no other loads.

(2) The branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

(3) The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit.

(4) The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified with the following words: “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings.

(5) The fire alarm branch-circuit disconnecting means shall be permitted to be secured in the “on” position.

~~Informational Note: See 210.8(A)(5), Exception, for requirements on receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.~~

Statement of Problem and Substantiation for Public Input

This PI proposes to remove the Informational Note as the exception referenced was deleted in the 2020 NEC.

Submitter Information Verification

Submitter Full Name: Vincent Della Croce
Organization:
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 21 13:36:28 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8488-NFPA 70-2024
Statement: The exception referred to in the Informational Note was deleted in the 2023 Code, therefore the exception is deleted.

Public Input No. 1497-NFPA 70-2023 [Section No. 760.121(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall comply with the following requirements:

(1) The branch circuit shall supply no other loads.

(2) The branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

(3) The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit.

(4) The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified with the following words: “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings.

(5) The fire alarm branch-circuit disconnecting means shall be ~~permitted to be~~ secured in the “on” position.

Informational Note: See 210.8(A)(5), Exception, for requirements on receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.

Statement of Problem and Substantiation for Public Input

Any circuit that isn’t serving as a within sight disconnect is permitted to be secured in the on position. Some fire marshals mandate a breaker lock on the fire alarm circuit because of this code reference even though it is written as optional. Securing a fire alarm circuit in the on position at its disconnect should be mandatory. We don’t want to lose power to that life safety circuit and we don’t want to run the system’s back-up batteries down. A securement at the fire alarm disconnect will aid in the inadvertent loss of power to the fire alarm circuit.

Submitter Information Verification

Submitter Full Name: Norman Feck
Organization: State of Colorado
Affiliation: self
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 21 17:58:52 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The requirements for securing fire alarm circuit disconnecting means are located in NFPA 72. This text simply gives an option to secure, if that is required.

Public Input No. 1931-NFPA 70-2023 [Section No. 760.121(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall comply with the following requirements:

(1) The branch circuit shall supply no other loads.

(2) The branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

(3) The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit.

(4) The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified with the following words: “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings.

(5) ~~The fire alarm branch-circuit disconnecting means shall be permitted to be secured in the “on” position~~ Where a circuit breaker is the disconnecting means, an approved breaker locking device shall be installed. [72:10.6.5.4] This device shall be permitted to require the use of a tool to operate the breaker .

Informational Note: See 210.8(A)(5), Exception, for requirements on receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.

Statement of Problem and Substantiation for Public Input

The installation of the breaker lock is required by the rule in NFPA 72, National Fire Alarm and Signaling Code. The typical electrician will not be looking at that code. This change will help insure that the requirement of the Fire Alarm Code is complied with.
The rule in 240.24(A) requires that the operating handle of the breaker be readily accessible. If the breaker lock-on device requires a tool to operate the breaker would not be readily accessible per the definition of that term in Article 100. 90.3 permits a rule in Chapter 7 to modify a rule in Chapter 2 and the second part of this change is intended to do that.

Submitter Information Verification

Submitter Full Name: Don Ganiere
Organization: none
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 07 15:46:08 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: The requirements for securing fire alarm circuit disconnecting means are located in NFPA 72. This text simply gives an option to secure, if that is required.

Public Input No. 560-NFPA 70-2023 [Section No. 760.121(B)]

(B) Branch Circuit.

The branch circuit supplying the fire alarm equipment(s) shall comply with the following requirements:

(1) The branch circuit shall supply no other loads.

(2) The branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit interrupters.

(3) The location of the branch-circuit overcurrent protective device shall be permanently identified at the fire alarm control unit.

(4) The circuit disconnecting means shall have red identification, shall be accessible only to qualified personnel, and shall be identified with the following words: “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer's markings.

(5) The fire alarm branch-circuit disconnecting means shall be permitted to be secured in the “on” position.

~~Informational Note: See 210.8(A)(5), Exception, for requirements on receptacles in dwelling-unit unfinished basements that supply power for fire alarm systems.~~

Statement of Problem and Substantiation for Public Input

The note refers to an exception that does not exist.

Submitter Information Verification

Submitter Full Name: Ryan Jackson

Organization: Self-employed

Street Address:

City:

State:

Zip:

Submittal Date: Mon Apr 10 13:21:49 EDT 2023

Committee: NEC-P03

Committee Statement

Resolution: FR-8488-NFPA 70-2024

Statement: The exception referred to in the Informational Note was deleted in the 2023 Code, therefore the exception is deleted.

Public Input No. 3082-NFPA 70-2023 [Section No. 760.127]

760.127 Wiring Methods on Supply Side of the PLFA Power Source.

Conductors and equipment on the supply side of the power source shall be installed in accordance with the appropriate requirements of Part II ~~and Chapters 1 through 4~~ of this article . Transformers or other devices supplied from power-supply conductors shall be protected by an overcurrent device rated not over 20 amperes.

Exception: The input leads of a transformer or other power source supplying power-limited fire alarm circuits shall be permitted to be smaller than 14 AWG, but not smaller than 18 AWG, if they are not over 300 mm (12 in.) long and if they have insulation that complies with 760.49(B).

Statement of Problem and Substantiation for Public Input

The revision clarifies that the Part II reference applies to this article. The reference to Chapters 1 through 4 are not needed and would also conflict with 760.3.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Tue Aug 29 11:11:21 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8491-NFPA 70-2024
Statement: The first sentence was deleted as compliance with Chapters 1 -4 is already required by 90.3. The title was changed to more accurately reflect the contents of the section.

Public Input No. 1703-NFPA 70-2023 [Section No. 760.130]

760.130 Wiring Methods and Materials on Load Side of the PLFA Power Source.

Fire alarm circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 760.130(A), (B), or a combination of both. Parts I and II of Article 722 shall apply.

(A) NPLFA Wiring Methods and Materials.

NPLFA wiring methods shall be permitted when used in accordance with 760.46, 760.49, or 760.53 for PLFA circuits. Conductors shall be solid or stranded copper. Separation from electric light, power, Class 1, non-power-limited fire alarm circuit conductors, and medium-power network-powered broadband communications cables shall comply with 760.136.

Exception: The ampacity adjustment factors specified in 310.15(C)(1) shall not apply.

(B) PLFA Wiring Methods and Materials.

Power-limited fire alarm conductors and cables described in 722.179 shall be installed as detailed in 722.135 and 760.130(B)(1) through (B)(4). Devices shall be installed in accordance with 110.3(B), 300.11(A), and 300.15.

(1) In Raceways, Exposed on Ceilings or Sidewalls, or Fished in Concealed Spaces.

Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed such that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).

(2) Passing Through a Floor or Wall.

Cables shall be installed in metal raceways or rigid nonmetallic conduit where passing through a floor or wall to a height of 2.1 m (7 ft) above the floor, unless adequate protection can be afforded by building construction such as detailed in 760.130(B)(1) or unless an equivalent solid guard is provided.

(3) Nonconcealed Spaces.

Cables ~~specified in Chapter 3 and meeting the~~ cover by Chapter 3, used for wiring of PLFA circuits and installed in nonconcealed spaces, shall comply with all of the following:

(a) Installed in accordance with the requirements of 722.179(A)(15)(a) and (A)(15)(b) ~~shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft~~ .

(b) Exposed portions of cable shall have a length not exceeding 3 m (10 ft.).

(4) Portable Fire Alarm Systems.

A portable fire alarm system provided to protect a stage or set when not in use shall be permitted to use wiring methods in accordance with 530.12.

Statement of Problem and Substantiation for Public Input

With the reorganization, this Code Section is no longer grouped with the other cable requirements for Fire Alarm installations. Adding clarifying language to ensure the code user is certain it only applies to non-PLFA Cable used on the load-side of a Fire Alarm.

Submitter Information Verification

Submitter Full Name: Kyle Krueger
Organization: NECA
Affiliation: NECA
Street Address:
City:
State:

Zip:
Submittal Date: Fri Jul 28 20:22:37 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8493-NFPA 70-2024

Statement: The editorial change in the charging text is made to comply with the NEC Style Manual, section 4.1.4.

In 760.130(B)(3), the text is revised to ensure the code user can be certain that the requirement applies only to non-PLFA Cable used on the load-side of a Fire Alarm.

Public Input No. 2960-NFPA 70-2023 [Section No. 760.130 [Excluding any Sub-Sections]]

Fire alarm circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 760.130(A), (B), or a combination of both. Article 722, Parts I and ~~II of Article 722 shall~~ II shall apply.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:

Submittal Date: Mon Aug 28 13:17:12 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8493-NFPA 70-2024
Statement: The editorial change in the charging text is made to comply with the NEC Style Manual, section 4.1.4.

In 760.130(B)(3), the text is revised to ensure the code user can be certain that the requirement applies only to non-PLFA Cable used on the load-side of a Fire Alarm.

Public Input No. 2961-NFPA 70-2023 [Section No. 760.133]

760.133 Installation of Conductors and Equipment in Cables, Compartments, Cable Trays, Enclosures, Manholes, Outlet Boxes, Device Boxes, Raceways, and Cable Routing Assemblies for Power-Limited Fire Alarm Circuits.

Conductors and equipment for power-limited fire alarm circuits shall be installed in accordance with Article 722, Parts I and ~~II of Article 722 and~~ II and 760.136 through 760.143.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
State:
Zip:
Submittal Date: Mon Aug 28 13:18:06 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8313-NFPA 70-2024
Statement: The editorial change is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3442-NFPA 70-2023 [Sections 760.136, 760.139]

~~**Sections 760.136, 760.139**~~

~~**760.136** Separation from Electric Light, Power, Class 1, NPLFA, and Medium-Power Network-Powered Broadband Communications Circuit Conductors.~~

~~**(A)** General.~~

~~Power-limited fire alarm circuit cables and conductors shall not be placed in any cable, cable tray, compartment, enclosure, manhole, outlet box, device box, raceway, or similar fitting with conductors of electric light, power, Class 1, non–power-limited fire alarm circuits, and medium-power network-powered broadband communications circuits unless permitted by 760.136(B) through (G).~~

~~**(B)** Separated by Barriers.~~

~~Power-limited fire alarm circuit cables shall be permitted to be installed together with Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are separated by a barrier.~~

~~**(C)** Raceways Within Enclosures.~~

~~In enclosures, power-limited fire alarm circuits shall be permitted to be installed in a raceway within the enclosure to separate them from Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits.~~

~~**(D)** Associated Systems Within Enclosures.~~

~~Power-limited fire alarm conductors in compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to power-limited fire alarm circuits, and shall comply with either of the following conditions:~~

(1) ~~The electric light, power, Class 1, non-power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are routed to maintain a minimum of 6 mm ($^1/_4$ in.) separation from the conductors and cables of power-limited fire alarm circuits.~~

(2) ~~The circuit conductors operate at 150 volts or less to ground and also comply with one of the following conditions:~~

    (3) ~~The fire alarm power-limited circuits are installed using Type FPL, Type FPLR, Type FPLP, or permitted substitute cables if these power-limited cable conductors extending beyond the jacket are separated by a minimum of 6 mm ($^1/_4$ in.) or by a nonconductive sleeve or nonconductive barrier from all other conductors.~~

    (4) ~~The power-limited fire alarm circuit conductors are installed as non-power-limited circuits in accordance with 760.46 .~~

~~**(E)** Enclosures with Single Opening.~~

~~Power-limited fire alarm circuit conductors entering compartments, enclosures, device boxes, outlet boxes, or similar fittings shall be permitted to be installed with electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are introduced solely to connect the equipment connected to power-limited fire alarm circuits or to other circuits controlled by the fire alarm system to which the other conductors in the enclosure are connected. Where power-limited fire alarm circuit conductors must enter an enclosure that is provided with a single opening, they shall be permitted to enter through a single fitting (such as a tee), provided the conductors are separated from the conductors of the other circuits by a continuous and firmly fixed nonconductor, such as flexible tubing.~~

~~**(F)** In Hoistways.~~

~~In hoistways, power-limited fire alarm circuit conductors shall be installed in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing. For elevators or similar equipment, these conductors shall be permitted to be installed as provided in 620.21 .~~

~~**(G)** Where Protected.~~

~~PLFA circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are installed using NPFLA wiring methods and materials in accordance with Part II of Article 760 and are protected by an approved method.~~

~~**(H)** Other Applications.~~

~~For other applications, power-limited fire alarm circuit conductors shall be separated by at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, non–power-limited fire alarm, or medium-power network-powered broadband communications circuits unless one of the following conditions is met:~~

(1) ~~Either (a) all of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors or (b) all of the power-limited fire alarm circuit conductors are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, or Type UF cables.~~

(2) ~~All of the electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuit conductors are permanently separated from all of the power-limited fire alarm circuit conductors by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the conductors.~~

~~**760.139** Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.~~

~~**(A)** Two or More PLFA Circuits.~~

~~Cable and conductors of two or more power-limited fire alarm circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly.~~

~~**(B)** Class 2 Circuits with PLFA Circuits.~~

~~Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of power-limited fire alarm circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits.~~

~~**(C)** Class 3 and Communications Circuits with PLFA Circuits.~~

~~Cable and conductors of Class 3 and communications circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with cables and conductors of power-limited fire alarm circuits.~~

~~**(D)** Low-Power Network-Powered Broadband Communications Cables and PLFA Cables.~~

~~Low-power network-powered broadband communications circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with PLFA cables.~~

~~**(E)** Audio System Circuits and PLFA Circuits.~~

~~Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited conductors or cables.~~

Additional Proposed Changes

File Name	Description	Approved
Limited_Energy_TG_First_Draft_Substantiation.docx	First Draft Substantiation	

Statement of Problem and Substantiation for Public Input

This text is being deleted as part of the reorganization of the limited energy articles. The deleted text is relocated as a general requirement to new Article X00.

Submitter Information Verification

Submitter Full Name: Mark Hilbert
Organization: MR Hilbert Insp. & Training
Street Address:
City:
State:
Zip:
Submittal Date: Sun Sep 03 06:04:30 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Substantiation

The NEC Correlating Committee has created several task groups for the 2026 cycle, but specifically, has created one group to look at the long-term enhancement of the National Electrical Code. This group has looked at and determined that the rapidly changing technology landscape requires that the Limited Power Articles of Chapter 7 and the Communication Articles of Chapter 8, be revised to provide greater usability and clarity for today's world.

This Public Input is one of a series of Public Inputs to increase the usability of the existing limited energy requirements.

Nearly 30 industry professionals were split among five different Sub Task Groups. Additional meetings were held among the Sub Task Group Chairs to share ideas, complications, correlation issues and other information. Overall dozens of meetings were held to work on this project.

The Task group members for this work include: Derrick Atkins, Tom Domitrovich, Ernie Gallo, Scott Harding, Mark Hilbert, Chad Jones, Alan Manche, Ken McKinney, Nathan Phillips, Dan Ashton, George Bish, Trevor Bowmer, Shane Clary, Michael Cogbill, Jim Conrad, Adam Corbin, Dale Crawford, Ray Horner, Ryan Jackson, Stan Kaufman, Kyle Krueger, William McCoy, Tim Mikloiche, Samuel Rokowski, Anthony Tassone, Ron Tellas, Keith Waters, John Williams and George Zimmerman.

The task group recommends restructuring of the limited energy articles to include protection, cable installation requirements and equipment, similar in concept to the structure used in other parts of the NEC.

To accomplish this, the following is a suggested course of action:

1. Create a limited power NEC structure where the main focus is not the technology but rather the installation requirements of the cable.
2. Articles that look similar to general requirements, wiring, overcurrent protection and grounding.
3. Restructuring of Articles as follows:
    a. Existing Article 722, will take on the look and theme of 310 and 315 and placed in new Article X22
    b. New grounding and bonding Article X50 will be similar to 250.
    c. New overcurrent protection Article X90 will be similar to current Article 240. New Article X90 was chosen in lieu of X40, since there currently is an Article 840 (in case the new Articles are placed in Article 800)
    d. Existing Articles 724, 725, and 726, will take on the look and theme of branch circuits with the general requirements placed in new Article X00, the installation requirements in X22, the grounding requirements in X50 and the protection requirements X90.

The goal of these Articles both existing and new is to ultimately locate all content into one chapter in 2029.

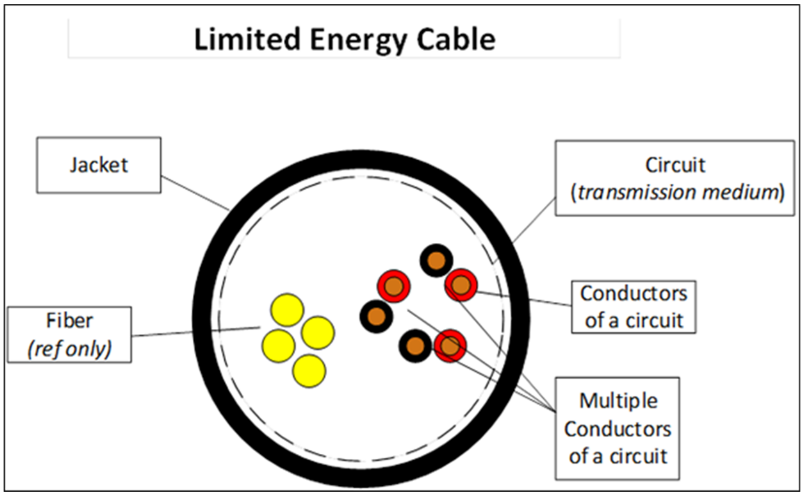
The following information and diagrams are provided to outline the thought process.

Section X00.100 combines the separation requirements from 133, 136 and 139 in 725, 726, 760, 770 along with the separation requirements in 800, 805 and 815.

This was the logic the sub task group used to develop what we are calling the X00.100 separation requirements.

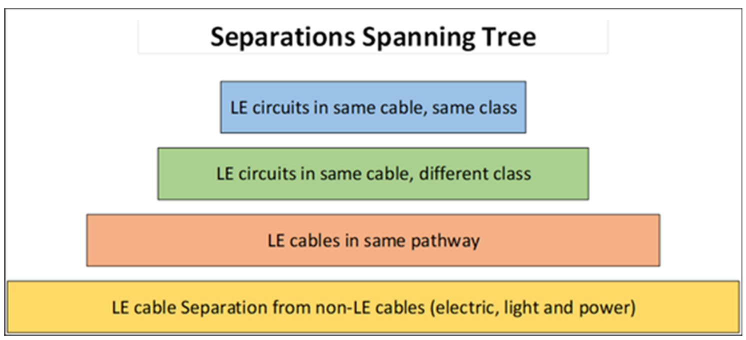
The structure follows this logic:

- The list of all limited energy cables is called for in X22.
- A Limited Energy cable has the following construction when placed in a Limited Energy System.



The structure of X00.100 follows the following hierarchy:

- X00.100 (A) is the blue block
- X00.100 (B) and (C) are the green block
- X00.100 (D) and (E) are the salmon block
- X00.100 (F) (G) (H) (I) are the yellow block



Public Input No. 1490-NFPA 70-2023 [Section No. 760.136(G)]

(G) Where Protected.

PLFA circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits ~~where they are~~ <u>if they are functionally-associated and</u> installed using NPFLA wiring methods and materials in accordance with Part II of Article 760 ~~and are protected by an approved method~~ .

Statement of Problem and Substantiation for Public Input

Previous versions of the Code only allowed this practice if the circuits were functionally associated. The revisison in 2023 removed this requirement, which means any circuit can now be installed in the same raceway as a fire alarm circuit. Should a fault occur between these circuits the entire fire alarm system could be lost.
This PI also changes "where" to "if" for style manual compliance and removes unneccesary langauge.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
State:
Zip:
Submittal Date: Fri Jul 21 15:21:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8496-NFPA 70-2024

Statement: Previous versions of the Code allowed this practice only if the circuits were functionally associated. The revision in 2023 unintentionally removed this requirement, which meant that any circuit could be installed in the same raceway as the limited energy circuit. The restriction is restored by this revision.

The editorial change in the reference to Article 760 is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 2962-NFPA 70-2023 [Section No. 760.136(G)]

(G) Where Protected.

PLFA circuits shall be permitted to be installed together with the conductors of electric light, power, Class 1, non–power-limited fire alarm, and medium-power network-powered broadband communications circuits where they are installed using NPFLA wiring methods and materials in accordance with ~~Part II of~~ Article 760, Part II and are protected by an approved method.

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document. The text is revised to to comply with the NEC Style Manual Section 4.1.4, regarding the use of Parts.
4.1.4 References to an Entire Article. References shall not be made to an entire article, except for the Article 100 or where referenced to provide the necessary context. References to specific parts within articles shall be permitted. References to all parts of an article shall not be permitted. The article number shall precede the part number.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

Submitter Information Verification

Submitter Full Name: David Williams
Organization: Delta Charter Township
Street Address:
City:
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Zip:
Submittal Date: Mon Aug 28 13:18:56 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8496-NFPA 70-2024

Statement: Previous versions of the Code allowed this practice only if the circuits were functionally associated. The revision in 2023 unintentionally removed this requirement, which meant that any circuit could be installed in the same raceway as the limited energy circuit. The restriction is restored by this revision.

The editorial change in the reference to Article 760 is made to comply with the NEC Style Manual, section 4.1.4.

Public Input No. 3923-NFPA 70-2023 [Section No. 760.139]

760.139 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, Class 4, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More PLFA Circuits.

Cable and conductors of two or more power-limited fire alarm circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly.

(B) Class 2 Circuits with PLFA Circuits.

Conductors of one or more Class 2 circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of power-limited fire alarm circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits.

(C) Class 3 and Communications Circuits with PLFA Circuits.

Cable and conductors of Class 3 and communications circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with cables and conductors of power-limited fire alarm circuits.

(D) Class 4 Circuits with PLFA Circuits.

Conductors of one or more Class 4 circuits shall be permitted within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of power-limited fire alarm circuits if the insulation of the circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits or the Class 4 circuit, whichever is greater.

(E) Low-Power Network-Powered Broadband Communications Cables and PLFA Cables.

Low-power network-powered broadband communications circuits shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with PLFA cables.

(~~E~~ F) Audio System Circuits and PLFA Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited conductors or cables.

Statement of Problem and Substantiation for Public Input

Class 4 systems were added in the 2023 code and have equivalent or better than fire and life safety requirements as Class 2 circuits. An effort to analyze all the locations of Class 2 in the code to see if Class 4 was also appropriate in the application should have happened for the 2023 code and not doing it was an oversight.
While the author is aware of no products that use FMP in this application, not allowing it in the code could prevent development of these products. Article 722 covers the cables in this list and treats them all the same. Therefore, Class 4 should be added to the list.

Submitter Information Verification

Submitter Full Name: Chad Jones
Organization: Cisco Systems
Street Address:
City:
State:
Zip:

Submittal Date: Wed Sep 06 10:32:48 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 4041-NFPA 70-2023 [Section No. 760.139]

760.139 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) **Two or More PLFA Circuits in the Same Cable** .

~~Cable and conductors~~ Conductors of two or more power-limited fire alarm circuits shall be permitted ~~within~~ in the same ~~cable, enclosure, cable tray, raceway, or cable routing assembly~~ listed power-limited fire alarm cable .

(B) Class 2 Circuits with PLFA ~~Circuits~~ Circuit **s** **in the Same Cable** .

~~Conductors of one or more~~ Class 2 circuits shall be permitted ~~within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of power-limited fire alarm circuits if the insulation of the Class 2 circuit conductors in the cable, enclosure, raceway, or cable routing assembly is at least that required by the~~ in listed power-limited fire alarm - ~~circuits~~ cables .

(C) Class 3 and Communications Circuits with PLFA Circuits~~.~~

~~Cable and conductors of Class 3~~

in the Same Cable .

Power-limited fire alarm circuits, Class 3 circuits and communications circuits shall be permitted ~~within~~ in the same ~~cable, enclosure, cable tray, raceway, or cable routing assembly with cables and conductors of power-limited fire alarm circuits~~ listed communications cable .

(D) Low-Power Network-Powered Broadband Communications Cables and PLFA Cables **in the Same Cable** .

~~Low-~~ Power-limited fire alarm circuits and low- power network-powered broadband communications circuits shall be permitted in the same ~~enclosure, cable tray, raceway, or cable routing assembly with PLFA cables~~ listed low-power network-powered communications cable .

(E) Audio System Circuits and PLFA Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited ~~conductors or cables.~~ fire alarm circuits .

(F) Power-limited Fire Alarm Cables with Other Cables.

Listed power-limited fire alarm cables shall be permitted in the same enclosure, cable tray, raceway, or cable routing assembly with any of the following:

(1) Listed Class 2 and Class 3 cables

(2) Listed Class 4 cables

(3) Other listed power-limited fire alarm cables

(4) Listed nonconductive and conductive optical fiber cables

(5) Listed communications cables

(6) Listed community antenna television and radio distribution coaxial cables

(7) Listed low-power, network powered broadband communications cables

Statement of Problem and Substantiation for Public Input

1. Section 760.139 is not parallel with similar sections in Articles 722 and 725. The recommended text creates parallelism and thereby complies with the NEC Style Manual.
2. Section 726.139(C) permits Class 4 cables in the same pathway as Class 2 & Class 3, power-limited fire alarm, optical fiber, CATV and low-power network-powered broadband cables. Reciprocal permissions are needed in the other Articles.
3. Changes to reflect these are listed cables and other readability improvements to distinguish that the requirements of 760.139 apply to the cable.

Submitter Information Verification

Submitter Full Name: Jeff Silveira
Organization: Bicsi
Street Address:
City:
State:
Zip:
Submittal Date: Wed Sep 06 14:49:05 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2 and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 895-NFPA 70-2023 [Section No. 760.139]

760.139 Installation of Conductors of Different PLFA Circuits, Class 2, Class 3, and Communications Circuits in the Same Cable, Enclosure, Cable Tray, Raceway, or Cable Routing Assembly.

(A) Two or More PLFA Circuits in the Same Cable .

~~Cable and conductors~~ Conductors of two or more power-limited fire alarm circuits shall be permitted ~~within~~ in the same ~~cable, enclosure, cable tray, raceway, or cable routing assembly~~ listed power-limited fire alarm cable .

(B) Class 2 Circuits with PLFA Circuits in the Same Cable .

~~Conductors of one or more~~ Class 2 circuits shall be permitted ~~within the same cable, enclosure, cable tray, raceway, or cable routing assembly with conductors of~~ in listed power-limited fire alarm ~~circuits if the insulation of the Class 2 circuit conductors in the~~ cable~~, enclosure, raceway, or cable routing assembly is at least that required by the power-limited fire alarm circuits~~ .

(C) Class 3 and Communications Circuits with PLFA Circuits in the Same Cable .

~~Cable and conductors of Class 3~~ Power-limited fire alarm circuits, Class 3 circuits and communications circuits shall be permitted ~~within~~ in the same ~~cable, enclosure, cable tray, raceway, or cable routing assembly with cables and conductors of power-limited fire alarm circuits~~ listed communications cable .

(D) Low-Power Network-Powered Broadband Communications Cables and PLFA Cables in the Same Cable .

~~Low-~~ Power-limited fire alarm circuits and low- power network-powered broadband communications circuits shall be permitted in the same ~~enclosure, cable tray, raceway, or cable routing assembly with PLFA cables~~ listed low-power network-powered communications cable .

(E) Audio System Circuits and PLFA Circuits.

Audio system circuits described in 640.9(C) and installed using Class 2 or Class 3 wiring methods in compliance with 722.135 shall not be installed in the same cable, cable tray, raceway, or cable routing assembly with power-limited conductors or cables.

(F) Power-limited Fire Alarm Cables with Other Cables.

Listed power-limited fire alarm cables shall be permitted in the same enclosure, cable tray, raceway or cable routing assembly with any of the following:

(1) Listed Class 2 and Class 3 cables installed in compliance with 645.5(E)(2); or Article 722, Part I, and Article 725, Parts I and II

(2) Listed Class 4 cables installed in compliance with Article 726, Part II

(3) Other listed power-limited fire alarm cables installed in compliance with Article 760, Parts I and III

(4) Listed nonconductive and conductive optical fiber cables installed in compliance with Article 770, Parts I and V

(5) Listed communications cables installed in compliance with Article 800, Parts I and IV

(6) Listed community antenna television and radio distribution coaxial cables installed in compliance with Article 800, Parts I and IV, and Article 820, Parts I and V

(7) Listed low-power, network powered broadband communications cables installed in compliance with Article 830, Parts I and V

Statement of Problem and Substantiation for Public Input

The primary purpose of this PI is to correlate with 726.139(C) which permits Class 4 cables to be run in the same pathway as the cables in 770.133(C).

In order to improve usability, word “listed” is inserted before each cable type to clarify that all the cables that are permitted to be run together are listed cables. This clarification is need to avoid any interpretation that unlisted outside-plant communications and optical fiber cables are permitted to be run with listed communications and optical fiber cables; and Class 2, Class 3 and Class 4 cables, which are always listed.

Minor editorial changes were made clarify that “the installation” needs to be in compliance with the installation rules, not the “circuit”. “Circuits” was changed to “cables” to clarify that this section is about which cables are permitted to be run together in the same pathway.

Subsection (F) was added to provide to correlate with 725.139(E), 770.133(C), 800.133(A)(1)and 830.133(A)(1)(b).

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 817-NFPA 70-2023 [Section No. 725.139]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 818-NFPA 70-2023 [Section No. 726.139]	Provide for dual listing
Public Input No. 826-NFPA 70-2023 [Section No. 830.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 899-NFPA 70-2023 [Section No. 800.133(A)(1)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	Correlate with 726.139 Class 4 cable requirements
Public Input No. 817-NFPA 70-2023 [Section No. 725.139]	
Public Input No. 818-NFPA 70-2023 [Section No. 726.139]	
Public Input No. 918-NFPA 70-2023 [Section No. 770.133(C)]	

Submitter Information Verification

Submitter Full Name:	David Kiddoo
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Affiliation:	Communications Cable & Connectivity Association
Street Address:	
City:	
State:	
Zip:	
Submittal Date:	Thu May 25 14:03:11 EDT 2023
Committee:	NEC-P03

Committee Statement

Resolution: FR-8610-NFPA 70-2024

Statement: A new article was created to relocate all general requirements for limited-energy systems into one place, instead of across multiple articles and chapters.

The scope statement is recommended by CMP-3 but is under the purview of the Correlating Committee.

See the definitions for Limited-Energy System and Limited-Energy Circuit.

Section 790.100 incorporates and combines 725.139, 726.139, and 760.139 with additional changes for the following reasons:

(1) One of the primary changes is to remove an inconsistency between subsections (C) and (E). Subsection (C) only permits Class 2 cables to be in the same raceway, enclosure or cable routing assembly with Class 3 cables if the insulation of the Class 2 cable is rated equal to or greater than the insulation in a Class 3 cable. Subsection (E) permits Class 2 cables, without any step-up in the insulation rating, to be in the same raceway, enclosure or cable routing assembly with power-limited fire alarm and communications cables which have insulation requirements similar to Class 3.

(2) The other primary change is to include Class 4 cables in two places. The text clarifies that Class 2

and Class 3 cables can be installed in the same pathway with Class 4 cables, thereby correlating with 726.139. The text also permits Class 2 or Class 3 circuits to be installed in a Class 4 cable if the cable is dual-listed.

(3) Minor editorial changes were made clarify that the installation, not the circuit, needs to be in compliance with the installation rules. “Circuits” was changed to “cables” to clarify which cables are permitted to be installed together in the same pathway. The subsection headings were expanded to improve usability.

(4) A few other minor editorial changes are included to improve usability, including adding the word “listed” to clarify that all the cables that are permitted to be installed together are listed cables. This clarification is needed to avoid any interpretation that unlisted communications cables are permitted to be installed with the Class 2, Class 3, and Class 4 cables, which are always listed.

(5) The references to other Articles have been revised to comply with the 2023 NEC Style Manual section 4.1.4 which states, “The article number shall precede the part number.” Some of the references were revised because of changes made in the 2023 NEC.

Public Input No. 2505-NFPA 70-2023 [Part II.]

Part II. ~~Class 2 and Class 3 Circuits~~ Installation Requirements

Statement of Problem and Substantiation for Public Input

With the changes mad to the article's scope in 2023, the title of this Part should be revised. In previous versions it made sense, it no longer does.

Submitter Information Verification

Submitter Full Name: Ryan Jackson
Organization: Self-employed
Street Address:
City:
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Zip:
Submittal Date: Fri Aug 18 13:24:07 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8394-NFPA 70-2024
Statement: The title of Part II is revised to be consistent with the changes made to the article's scope in 2023.

Public Input No. 2851-NFPA 70-2023 [Sections Part III., 726.170]

~~**Sections Part III., 726.170**~~

~~**Part III.** Listing Requirements~~

~~**726.170** Listing of Equipment for Class 4 Systems.~~

~~The active components of a Class 4 system shall be listed as a Class 4 device. The listing information shall include compatible devices if a listed Class 4 device depends on specific system devices for interoperability, monitoring, or control.~~

> ~~Informational Note No. 1: See UL 1400-1, *Outline for Fault-Managed Power Systems — Part I: General Requirements* , for information on determining applicable requirements for the listing of Class 4 power systems.~~
>
> ~~Informational Note No. 2: An example of a dependent active device in a Class 4 system is a transmitter that relies on a particular receiver or receivers as part of the monitoring and control system.~~

Statement of Problem and Substantiation for Public Input

This Public Input is being submitted on behalf of the NEC Correlating Committee Usability Task Group in order to provide correlation throughout the document when general listing requirements are covered within an article. The NEC Style Manual Section 2.2.1 Parallel Numbering Required, states that technical committees shall use the following section numbers for the same purposes within articles. The listing requirements are to be located in the .2 section.
The Usability Task Group members are: Derrick Atkins, David Hittinger, Richard Holub, Dean Hunter, Chad Kennedy and David Williams.

The listing requirements were relocated to the .2 section.

Related Public Inputs for This Document

Related Input	Relationship
Public Input No. 2847-NFPA 70-2023 [New Section after 726.1]	Deleted and relocated to the .2 section.

Submitter Information Verification

Submitter Full Name: Dean Hunter
Organization: Minnesota Department of Labor
Street Address:
City:
State:
Zip:

Submittal Date: Fri Aug 25 15:15:52 EDT 2023
Committee: NEC-P03

Committee Statement

Resolution: FR-8451-NFPA 70-2024

Statement: The NEC Style Manual Section 2.2.1 states that technical committees shall use the .2 section for listing requirements. The deleted text is relocated accordingly.