

# BFAAM Apprenticeship Program

Period 4

Related Training Instruction (RTI)

Module 3 – NFPA 70 –

Reading material associated with this  
module: Article 760 NPLFA & Related Chapter  
3 Requirements of NFPA 70,  
*National Electrical Code (NEC)*, 2014 Edition

# National Electric Code

## Article 760

- **760.41 NPLFA Circuit Power Source Requirements.**

**(A) Power Source.** The power source of NPLFA circuits shall comply with Chapters 1 through 4, and the output voltage shall not exceed 600 volts, nominal.

# National Electric Code

## Article 760

**(B) Branch Circuit.** An individual branch circuit shall be required for the supply of the power source. This branch circuit shall not be supplied by either ground-fault or arc-fault circuit interrupters.

# National Electric Code

## Article 760

- **760.43 NPLFA Circuit Overcurrent Protection.** Overcurrent protection for conductors 14 AWG and larger must be provided in accordance with the conductor ampacity without applying the derating factors of 310.15 to the ampacity calculation. Overcurrent protection cannot exceed 7 amperes for 18 AWG conductors and 10 amperes for 16 AWG conductors.

# National Electric Code

## Article 760, NPLFA

- **760.45 NPLFA Circuit Overcurrent Device Location.** Overcurrent devices shall be located at the point where the conductor to be protected receives its supply (See Exceptions 1, 2 & 3).

# National Electric Code

## Article 760, NPLFA

- **760.46 NPLFA Circuit Wiring.**

Installation of non-power-limited fire alarm circuits must be in accordance with 110.3 (B), 300.7, 300.11, 300.15, 300.17, and other appropriate articles of Chapter 3.

Exception 1: As provided in 760.48 through 760.53.

Exception 2: Where other articles require other methods ex: Hazardous.

# National Electric Code Article 760 & Chapter 3

## **110.3 (B) Installation and Use.**

Listed or labeled equipment must be installed and used in accordance with any instructions included in the listing or labeling.

# **National Electric Code**

## **Article 760 NPLFA & Chapter 3**

### **300.7 Raceways Exposed to Different Temperatures.**

(A) Sealing. If there is a condensation potential the raceway or sleeve shall be filled with an approved material to prevent the circulation of warm air.

(B) Expansion Fittings. Raceways shall be provided with expansion fittings where necessary.



# National Electric Code

## Article 760 NPLFA & Chapter 3

### **300.11 Securing and Supporting.**

(A) Secured in Place. Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place. Support wires that do not provide support secure support shall not be permitted as the sole support. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires will be allowed as the sole support.

# **National Electric Code**

## **Article 760 NPLFA & Chapter 3**

Where independent support wires are used, they shall be secured at both ends. Cables and raceways shall not be supported by the ceiling grid.

# National Electric Code

## Article 760 NPLFA & Chapter 3

**(1) Fire-Rated Assemblies.**

**(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 allowed to be attached to the assembly.

# National Electric Code

## Article 760 NPLFA & Chapter 3

*Exception:* The ceiling support system shall be allowed to support branch-circuit wiring and associated equipment where installed in accordance with the ceiling system manufacturer's instructions.

# National Electric Code

## Article 760 NPLFA & Chapter 3

- **300.15 Boxes, Conduit Bodies, or Fittings – Where Required.** Fittings and connectors shall be used only with the specific wiring methods for which they are designed and listed. Where the wiring method is conduit, tubing or other cables a box or conduit body shall be installed at each conductor splice point, outlet point, switch point, junction point, termination point, or pull point, unless otherwise permitted in 300.15 (A) Through (L).

# National Electric Code

## Article 760 NPLFA & Chapter 3

**(B) Equipment.** An integral junction box or wiring compartment as part of approved equipment shall be permitted.

**(C) Protection.** A box or conduit body shall not be required where cables enter or exit from conduit or tubing that is used to provide cable support or protection against physical damage. A fitting must be provided on the end(s) of the conduit or tubing to protect the cable from abrasion.

# National Electric Code

## Article 760 NPLFA & Chapter 3

- **300.17 Number and Size of Conductors in Raceway.** The number and size of conductors in any raceway shall not be more than will permit dissipation of the heat and ready installation or withdrawal of the conductors without damage to the conductors or their insulation.

# National Electric Code

## Article 760, NPLFA

- **760.48 Conductors of Different Circuits in Same Cable, Enclosure or Raceway.**

(A) Class 1 & NPLFA circuits shall be permitted to occupy the same cable, enclosure, or raceway without regard to whether the individual circuits are AC or DC, provided all conductors are insulated for the maximum voltage of any conductor in the enclosure or raceway.



# National Electric Code

## Article 760, NPLFA

**(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 when connected to the same equipment.

# National Electric Code

## Article 760, NPLFA

### ■ 760.49 NPLFA Circuit Conductors.

(A) Sizes and Use. Only copper conductors will be permitted to be used for fire alarm systems. Size 18 AWG & 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 comply with 310.15 as applicable.

# National Electric Code

## Article 760, NPLFA

(B) Insulation. Insulation on conductors shall be rated for the system voltage & not less than 600 volts. Conductors larger than 16 AWG shall comply with Article 310.

Conductors 18 AWG & 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 insulation shall be allowed if listed for NPLFA circuit use.

# National Electric Code Article 760, NPLFA

**(C) Conductor Materials.** Conductors shall be solid or stranded copper.

# National Electric Code

## Article 760, NPLFA

- **760.51 Number of Conductors in Cable Trays and Raceways, and Derating.**

(A) NPLFA Circuits and Class 1 Circuits. Where only NPLFA circuit and Class 1 circuit conductors are in a raceway, the number of conductors shall be in accordance with 300.17. The derating factors of 310.15 (B)(2)(a) must be applied if such conductors carry continuous load in excess of 10% of the ampacity of each conductor.

# National Electric Code

## Article 760, NPLFA

(B) Power-Supply Conductors and NPLFA Circuit Conductors. Where power-supply conductors & non-power limited fire alarm circuit conductors are permitted in a raceway in accordance with 760.48, the number of conductors shall be in accordance with 300.17. The derating factors of 310.15 (B)(3)(a) shall apply as follows:

# National Electric Code

## Article 760, NPLFA

- (1) To all conductors where the fire alarm circuit conductors carry continuous loads in excess of 10% of the ampacity of each conductor & where the total number of conductors is more than 3.
- (2) To the power-supply conductors only, where the fire alarm circuit conductors do not carry continuous loads in excess of 10% of the ampacity of each conductor & where the number of power-supply conductors is more than 3.

# National Electric Code

## Article 760, NPLFA

(C) Cable Trays. Where fire alarm circuit conductors are installed in cable trays, they shall comply with 392.22 and 392.80 (A).



# National Electric Code

## Article 760, NPLFA

- **760.53 Multiconductor NPLFA Cables.** Multiconductor NPLFA cables that meet the requirement of 760.176 shall be permitted to be used on fire alarm circuits operating at 150 volts or less & shall be installed in accordance with 760.53 (A) & (B).

# National Electric Code

## Article 760, NPLFA

### **(A) NPLFA Wiring Method.**

Multiconductor non-power-limited fire alarm circuit cables shall be installed in accordance with 760.53 (A)(1), (A)(2), & (A)(3).

# National Electric Code

## Article 760, NPLFA

### **(1) In raceway, 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. Where located within 7 feet of the floor, cables shall be securely fastened at intervals of not more than 18 inches.

# National Electric Code

## Article 760, NPLFA

### **(2) Passing Through a Floor or Wall.**

In metal raceway or rigid nonmetallic conduit where passing through a floor or wall to a height of 7 feet above the floor unless adequate protection can be afforded by building construction or unless an equivalent solid guard is provided.

# National Electric Code

## Article 760, NPLFA

**(3) In Hoistways.** In Rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing where installed in hoistways.

# National Electric Code

## Article 760, NPLFA

**(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).

# National Electric Code

## Article 760, NPLFA

**(1) Ducts.** Multiconductor NPLFA circuit cables, types NPLFP, NPLFR, and NPLF, shall not be installed exposed in ducts.

# National Electric Code Article 760, NPLFA

**(2) Other Spaces Used for Environmental Air.** Cables installed in other spaces used for environmental air shall be NPLFP (Non-Power-Limited Fire Plenum). (See Exceptions 1, 2, & 3)



# National Electric Code

## Article 760, NPLFA

**(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 (Non-Power-Limited Fire Riser). Floor penetrations requiring Type NPLFR shall contain only cables suitable for riser or plenum use. (See Exceptions 1, 2, & 3)

# National Electric Code

## Article 760, NPLFA

**(4) Other Wiring Within Buildings.**  
Cables installed in building locations other than the locations covered in 760.53(B)(1), (B)(2), & (B)(3) shall be Type NPLF (Non-Power-Limited Fire).  
(See Exceptions 1, 2, & 3)

# BFAAM Apprenticeship Program

Period 4

Reading Assignment for  
Module 24 – NFPA 70 NEC –

Reading material associated with this  
module: Chapter 7, Article 760 Section III  
Power Limited Fire Alarm, NFPA 70, *National  
Electrical Code, (NEC) 2014 Edition*