

exit the building) or the exterior zone of protection defined by a 46 m (150 ft) radius rolling sphere and isolated from outside cable plant, the shield shall be permitted to be grounded by a connection to an equipment grounding conductor as described in 250.118. Connecting to an equipment grounding conductor through a grounded receptacle using a dedicated bonding jumper and a permanently connected listed device shall be permitted. Use of a cord and plug for the connection to an equipment grounding conductor shall not be permitted.

Informational Note: See NFPA 780-2020, *Standard for the Installation of Lightning Protection Systems*, 4.7.3.1, for the application of the term *rolling sphere*.

**(A) General Requirements.** The installation shall be in accordance with 800.100.

**(B) Shield Protection Devices.** Grounding of a coaxial drop cable shield by means of a protective device that does not interrupt the grounding system within the premises shall be permitted.

The electric utility supply, the CATV system, and the premises wiring are all grounded. When a ground fault occurs, the current tries to return to its source. Such ground faults can cause current on the CATV shield, the primary function of which is to prevent radio frequency (RF) leakage out of the cable. The fault current can cause the cable shield to burn open and also damage the cable insulation. A device that can safely conduct current at 60 hertz and block current at the higher frequencies can be connected between the cable shield and ground, thereby maintaining grounding integrity. An ordinary fuse, for example, would not be suitable.

**820.103 Equipment Grounding.** Unpowered equipment and enclosures or equipment powered by the coaxial cable shall be considered grounded where connected to the metallic cable shield.

## Part V. Installation Methods Within Buildings

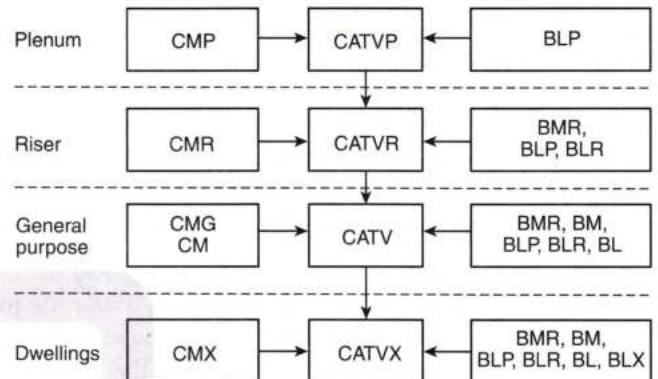
**820.154 Substitutions of Listed CATV Cables.** The substitutions for coaxial cables in Table 820.154 and illustrated in Figure 820.154 shall be permitted.

Informational Note: The substitute cables in Table 820.154 and Figure 820.154 are only coaxial-type cables.

The application of coaxial cables, communications raceways, and cable routing assemblies is summarized in Table 800.154(a). All communication wires, cables and raceways, and cable routing assemblies in Table 800.154(a) must be listed. The installation location dictates the type of coaxial cable permitted within the raceway or assembly and is subject to the installation requirements of 800.110 and 800.113.

**TABLE 820.154** 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



**A** → **B** Coaxial cable A shall be permitted to be used in place of coaxial cable B.

Type BL—Network-powered broadband communications low-power cables

Type BM—Network-powered broadband communications medium-power cables

Type CATV—Community antenna television cables

Type CM—Communications cables

**FIGURE 820.154** Coaxial Cable Substitution Hierarchy.

## ARTICLE 830

## Network-Powered Broadband Communications Systems

### Part I. General

**830.1 Scope.** This article covers network-powered broadband communications systems that provide any combination of voice, audio, video, data, and interactive services through a network interface unit.

Informational Note: A typical basic system configuration includes a cable supplying power and broadband signal to a network interface unit that converts the broadband signal to the component signals. Typical cables are coaxial cable with both broadband signal and power on the center conductor, composite metallic cable with a coaxial member(s) or twisted pair members for the broadband signal and twisted pair members for power, and hybrid optical fiber cable with a pair of conductors for power. Larger



systems may also include network components such as amplifiers that require network power.

Network-powered broadband communications circuits provide a wide array of subscriber services, including voice, data (such as Internet access), interactive services, and television signals.

Article 830 contains requirements for wiring both the inside and the outside of buildings. Other articles cover the wiring derived from the network interface unit (NIU) into the premises. The major difference between Articles 820 and 830 is the voltage present on the circuit conductors. Article 820 systems are limited to 60 volts, but Article 830 systems are permitted to have ratings as high as 150 volts. Higher voltages allow systems to power more sophisticated electronics and to provide a wider variety of services.

Δ **830.15 Power Limitations.** Network-powered broadband communications systems shall be classified as having low- or medium-power sources as specified in the following:

- (1) Sources shall be classified as defined in Table 830.15.
- (2) Direct-current power sources exceeding 150 volts to ground, but no more than 200 volts to ground, with the current to ground limited to 10 mA dc, that meet the current and power limitation for medium-power sources in Table 830.15 shall be classified as medium-power sources.

Informational Note: See UL 60950-21-2007, *Standard for Safety for Information Technology Equipment — Safety — Part 21: Remote Power Feeding*, for listing information on equipment that complies with 830.15(2).

Δ **TABLE 830.15** Limitations for Network-Powered Broadband Communications Systems

Network Power Source	Low	Medium
Circuit voltage, $V_{\max}$ (volts) <sup>1</sup>	0–100	0–150
Power limitation, $VA_{\max}$ (volt-amperes) <sup>1</sup>	250	250
Current limitation, $I_{\max}$ (amperes) <sup>1</sup>	$1000/V_{\max}$	$1000/V_{\max}$
Maximum power rating (volt-amperes)	100	100
Maximum voltage rating (volts)	100	150
Maximum overcurrent protection (amperes) <sup>2</sup>	$100/V_{\max}$	NA

<sup>1</sup> $V_{\max}$ ,  $I_{\max}$ , and  $VA_{\max}$  are determined with the current-limiting impedance in the circuit (not bypassed) as follows:

$V_{\max}$  — Maximum system voltage regardless of load with rated input applied

$I_{\max}$  — Maximum system current under any noncapacitive load, including short circuit, and with overcurrent protection bypassed if used.  $I_{\max}$  limits apply after 1 minute of operation

$VA_{\max}$  — Maximum volt-ampere output after 1 minute of operation regardless of load and overcurrent protection bypassed if used

<sup>2</sup>Overcurrent protection is not required if the current-limiting device provides equivalent current limitation and the current-limiting device does not reset until power or the load is removed.

Only network-powered broadband systems that operate within the voltage, current, and power parameters specified in Table 830.15 or a direct current (dc) system operating at not more than 200 volts and 10 milliamperes to ground are permitted. The dc systems must meet the current and power limitations for medium-power systems specified in Table 830.15.

## Part II. Cables Outside and Entering Buildings

**830.40 Entrance Cables.** Network-powered broadband communications cables located outside and entering buildings shall comply with 830.40(A) and (B).

(A) **Medium-Power Circuits.** Medium-power network-powered broadband communications circuits located outside and entering buildings shall be installed using Type BMU, Type BM, or Type BMR network-powered broadband communications medium-power cables.

Δ (B) **Low-Power Circuits.** Low-power network-powered broadband communications circuits located outside and entering buildings shall be installed using Type BLU or Type BLX low-power network-powered broadband communications cables. Cables shown in Table 830.154 shall be permitted to substitute.

**830.44 Overhead (Aerial) Cables.** Overhead (aerial) network-powered broadband communications cables shall comply with 830.44(A) through (F).

Network-powered broadband communications systems can contain sufficient energy to pose an electric shock hazard. For that reason, they are subject to requirements similar to those for overhead power conductors.

Overhead (aerial) spans of network-powered broadband communications cables must be of sufficient size and strength to maintain clearances and must avoid possible contact with light or power conductors. Splices and joints must be made with approved connectors or other means that provide sufficient mechanical strength so that conductors are not weakened, which could cause them to break and come into contact with higher-voltage conductors.

### See also

**800.44** for general requirements for overhead (aerial) communications wires and cables

(A) **On Poles and In-Span or Above Roofs.** Where network-powered broadband communications cables are installed on poles and in-span or above roofs, they shall comply with 800.44.

Δ (B) **Clearance from Ground.** Overhead (aerial) spans of network-powered broadband communications cables shall conform to not less than the following:

- (1) 2.9 m (9½ ft) — above finished grade, sidewalks, or from any platform or projection from which they might be reached and accessible to pedestrians only



- (2) 3.5 m (11½ ft) — over residential property and driveways, and those commercial areas not subject to truck traffic
- (3) 4.7 m (15½ ft) — over public streets, alleys, roads, parking areas subject to truck traffic, driveways on other than residential property, and other land traversed by vehicles such as cultivated, grazing, forest, and orchard

Informational Note: See ANSI/IEEE C2-2017, *National Electrical Safety Code*, Table 232-1, which provides for clearances of wires, conductors, and cables above ground and roadways, rather than using the clearances referenced in 225.18.

**(C) Over Pools.** Clearance of network-powered broadband communications cable in any direction from the water level, edge of pool, base of diving platform, or anchored raft shall comply with those clearances in 680.9.

**(D) Final Spans.** Final spans of network-powered broadband communications cables without an outer jacket shall be permitted to be attached to the building, but they shall be kept not less than 900 mm (3 ft) from windows that are designed to be opened, doors, porches, balconies, ladders, stairs, fire escapes, or similar locations.

*Exception: Conductors run above the top level of a window shall be permitted to be less than the 900-mm (3-ft) requirement above.*

Overhead (aerial) network-powered broadband communications cables shall not be installed beneath openings through which materials might be moved, such as openings in farm and commercial buildings, and shall not be installed where they obstruct entrance to these building openings.

**(E) Between Buildings.** Network-powered broadband communications cables extending between buildings or structures, and also the supports or attachment fixtures, shall be identified as suitable for outdoor aerial applications and shall have sufficient strength to withstand the loads to which they may be subjected.

*Exception: Where a network-powered broadband communications cable does not have sufficient strength to be self-supporting, it shall be attached to a supporting messenger cable that, together with the attachment fixtures or supports, shall be acceptable for the purpose and shall have sufficient strength to withstand the loads to which they may be subjected.*

In addition to the weight of the cable itself, wind and ice loads also must be considered because they can damage cables and attachment points.

**(F) On Buildings.** Where attached to buildings, network-powered broadband communications cables shall be securely fastened in such a manner that they are separated from other conductors in accordance with 830.44(F)(1) through (F)(3).

**(1) Electric Light or Power.** The network-powered broadband communications cable shall have a separation of at least 100 mm (4 in.) from electric light, power, Class 1, or non-power-limited fire alarm circuit conductors not in raceway or cable, or

be permanently separated from conductors of the other system by a continuous and firmly fixed nonconductor in addition to the insulation on the wires.

**(2) Other Communications Systems.** Network-powered broadband communications cables shall be installed so that there will be no unnecessary interference in the maintenance of the separate systems. In no case shall the conductors, cables, messenger strand, or equipment of one system cause abrasion to the conductors, cables, messenger strand, or equipment of any other system.

**(3) Protection from Damage.** Network-powered broadband communications cables attached to buildings or structures and located within 2.5 m (8 ft) of finished grade shall be protected by enclosures, raceways, or other approved means.

*Exception: A low-power network-powered broadband communications circuit that is equipped with a listed fault protection device, appropriate to the network-powered broadband communications cable used, and located on the network side of the network-powered broadband communications cable shall not be required to be additionally protected by enclosures, raceways, or other approved means.*

**830.47 Underground Network-Powered Broadband Communications Cables Entering Buildings.** Underground network-powered broadband communications cables entering buildings shall comply with 830.47(A) and (B).

**Δ (A) Protection from Physical Damage.** Direct-buried cable, conduit, or other raceways shall be installed to meet the minimum cover requirements of Table 830.47(A). In addition, direct-buried cables emerging from the ground shall be protected by enclosures, raceways, or other approved means extending from the minimum cover distance required by Table 830.47(A) below grade to a point at least 2.5 m (8 ft) above finished grade. In no case shall the protection be required to exceed 450 mm (18 in.) below finished grade. Types BMU and BLU direct-buried cables emerging from the ground shall be installed in rigid metal conduit (RMC), intermediate metal conduit (IMC), rigid nonmetallic conduit, or other approved means extending from the minimum cover distance required by Table 830.47(A) below grade to the point of entrance.

*Exception: Protection from physical damage shall not be required if a low-power network-powered broadband communications circuit is equipped with a listed fault protection device that is located on the network side of the network-powered broadband cable being protected and the device is appropriate to the network-powered broadband communications cable used.*

**(B) Pools.** Cables located under the pool or within the area extending 1.5 m (5 ft) horizontally from the inside wall of the pool shall meet those clearances and requirements specified in 680.11.



**TABLE 830.47(A)** *Network-Powered Broadband Communications Systems Minimum Cover Requirements*

Location of Wiring Method or Circuit	Direct Burial Cables		Rigid Metal Conduit (RMC) or Intermediate Metal Conduit (IMC)		Nonmetallic Raceways Listed for Direct Burial; Without Concrete Encasement or Other Approved Raceways	
	mm	in.	mm	in.	mm	in.
All locations not specified below	450	18	150	6	300	12
In trench below 50 mm (2 in.) thick concrete or equivalent	300	12	150	6	150	6
Under a building (in raceway only)	0	0	0	0	0	0
Under minimum of 100 mm (4 in.) thick concrete exterior slab with no vehicular traffic and the slab extending not less than 150 mm (6 in.) beyond the underground installation	300	12	100	4	100	4
One- and two-family dwelling driveways and outdoor parking areas and used only for dwelling-related purposes	300	12	300	12	300	12

**Notes:**

1. Cover is the shortest distance measured between a point on the top surface of any direct-buried 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 rise for terminations or splices or where access is otherwise required.
4. Where solid rock is encountered, all wiring shall be installed in metal or 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.

**Part III. Protection****830.90 Primary Electrical Protection.**

**(A) Application.** Primary electrical protection shall be provided on all network-powered broadband communications conductors that are neither grounded nor interrupted and are run partly or entirely in aerial cable not confined within a block. Also, primary electrical protection shall be provided on all aerial or underground network-powered broadband communications conductors that are neither grounded nor interrupted and are located within the block containing the building served so as to be exposed to lightning or accidental contact with electric light or power conductors operating at over 300 volts to ground.

*Exception: Primary electrical protection shall not be required on the network-powered broadband communications conductors where electrical protection is provided on the derived circuit(s) (output side of the NIU) in accordance with 830.90(B)(3).*

Informational Note No. 1: On network-powered broadband communications conductors not exposed to lightning or accidental contact with power conductors, providing primary electrical protection in accordance with this article helps protect against other hazards, such as ground potential rise caused by power fault currents, and above-normal voltages induced by fault currents on power circuits in proximity to the network-powered broadband communications conductors.

Informational Note No. 2: Network-powered broadband communications circuits are considered to have a lightning exposure unless one or more of the following conditions exist:

- (1) Circuits in large metropolitan areas where buildings are close together and sufficiently high to intercept lightning.
- (2) Areas having an average of five or fewer thunderstorm days each year and earth resistivity of less than 100 ohm-meters. Such areas are found along the Pacific coast.

Utility companies may provide primary protectors if conductors are exposed to lightning. Typically, cables are not considered to be exposed to lightning if one or both of the conditions in Informational Note No. 2 exist. A primary protector is required at each end of a communications circuit where lightning exposure exists, unless protection is provided on the output side of the NIU.

Informational Note No. 3: See NFPA 780-2020, *Standard for the Installation of Lightning Protection Systems*, for information on lightning protection systems.

**(1) Fuseless Primary Protectors.** Fuseless-type primary protectors shall be permitted where power fault currents on all protected conductors in the cable are safely limited to a value no greater than the current-carrying capacity of the primary protector and of the primary protector bonding conductor or grounding electrode conductor.

**(2) Fused Primary Protectors.** Where the requirements listed in 830.90(A)(1) are not met, fused-type primary protectors shall be used. Fused-type primary protectors shall consist of an arrester connected between each conductor to be protected and ground, a fuse in series with each conductor to be protected, and an appropriate mounting arrangement. Fused primary protector terminals shall be marked to indicate line, instrument, and ground, as applicable.



**(B) Location.** The location of the primary protector, where required, shall comply with the following:

- (1) A listed primary protector shall be applied on each network-powered broadband communications cable external to and on the network side of the network interface unit.
- (2) The primary protector function shall be an integral part of and contained in the network interface unit. The network interface unit shall be listed as being suitable for application with network-powered broadband communications systems and shall have an external marking indicating that it contains primary electrical protection.
- (3) The primary protector(s) shall be provided on the derived circuit(s) (output side of the NIU), and the combination of the NIU and the protector(s) shall be listed as being suitable for application with network-powered broadband communications systems.

A primary protector, whether provided integrally or external to the network interface unit, shall be located as close as practicable to the point of entrance.

For purposes of this section, a network interface unit and any externally provided primary protectors located at mobile home service equipment located in sight from and not more than 9.0 m (30 ft) from the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located in sight from and not more than 9.0 m (30 ft) from the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

**Informational Note:** Selecting a network interface unit and primary protector location to achieve the shortest practicable primary protector bonding conductor or grounding electrode conductor helps limit potential differences between communications circuits and other metallic systems.

**(C) Hazardous (Classified) Locations.** The primary protector or equipment providing the primary protection function shall not be located in any hazardous (classified) location as defined in 500.5 and 505.5 or in the vicinity of easily ignitable material.

*Exception:* As permitted in 501.150, 502.150, and 503.150.

## Part IV. Grounding Methods

**830.93 Grounding or Interruption of Metallic Members of Network-Powered Broadband Communications Cables.** Network-powered communications cables entering buildings or attaching to buildings shall comply with 830.93(A) or (B).

For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile

home it serves, shall be considered to meet the requirements of this section.

**Informational Note:** Selecting a grounding location to achieve the shortest practicable bonding conductor or grounding electrode conductor helps limit potential differences between the network-powered broadband communications circuits and other metallic systems.

Proper bonding of the network-powered broadband communications system cable sheath to the electrical power grounding electrode is needed to prevent potential fire and shock hazards. Failure to bond the two systems together can lead to a difference in potential between normally non-current-carrying parts.

### See also

**250.94** for more information regarding bonding of communications systems

**(A) Entering Buildings.** In installations where the network-powered communications cable enters the building, the shield shall be grounded in accordance with 800.100, and metallic members of the cable not used for communications or powering shall be grounded in accordance with 800.100 or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.

**(B) Terminating Outside of the Building.** In installations where the network-powered communications cable is terminated outside of the building, the shield shall be grounded in accordance with 800.100, and metallic members of the cable not used for communications or powering shall be grounded in accordance with 800.100 or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of attachment of the NIU.

## Part V. Installation Methods Within Buildings

**830.133 Installation of Network-Powered Broadband Communications Cables and Equipment.** Cable and equipment installations within buildings shall comply with 830.133(A) through (C), as applicable.

### (A) Separation of Conductors.

**(1) In Raceways, Cable Trays, Boxes, Enclosures, and Cable Routing Assemblies.**

(a) *Low- and Medium-Power Network-Powered Broadband Communications Circuit Cables.* Low- and medium-power network-powered broadband communications cables shall be permitted in the same raceway, cable tray, box, enclosure, or cable routing assembly.

(b) *Low-Power Network-Powered Broadband Communications Circuit Cables with Other Circuits.* Low-power network-powered broadband communications cables shall be



permitted in the same raceway, cable tray, box, enclosure, or cable routing assembly with jacketed cables of any of the following circuits:

- (1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and II of Article 725
- (2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760
- (3) Communications circuits in compliance with Parts I and IV of Article 805
- (4) Nonconductive and conductive optical fiber cables in compliance with Parts I and V of Article 770
- (5) Community antenna television and radio distribution systems in compliance with Parts I and V of Article 820

(c) *Medium-Power Network-Powered Broadband Communications Circuit Cables with Optical Fiber Cables and Other Communications Cables.* Medium-power network-powered broadband communications cables shall not be permitted in the same raceway, cable tray, box, enclosure, or cable routing assembly with conductors of any of the following circuits:

- (1) Communications circuits in compliance with Parts I and IV of Article 805
- (2) Conductive optical fiber cables in compliance with Parts I and V of Article 770
- (3) Community antenna television and radio distribution systems in compliance with Parts I and V of Article 820

(d) *Medium-Power Network-Powered Broadband Communications Circuit Cables with Other Circuits.* Medium-power network-powered broadband communications cables shall not be permitted in the same raceway, cable tray, box, enclosure, or cable routing assembly with conductors of any of the following circuits:

- (1) Class 2 and Class 3 remote-control, signaling, and power-limited circuits in compliance with Parts I and II of Article 725
- (2) Power-limited fire alarm systems in compliance with Parts I and III of Article 760

(e) *Electric Light, Power, Class 1, Nonpowered Broadband Communications Circuit Cables.* Network-powered broadband communications cable shall not be placed in any raceway, cable tray, compartment, outlet box, junction box, or similar fittings with conductors of electric light, power, Class 1, or non-power-limited fire alarm circuit cables.

*Exception No. 1: Network-powered broadband communications cable shall be permitted to be placed in a raceway, cable tray, compartment, outlet box, junction box, or similar fittings with conductors of electric light, power, Class 1, or non-power-limited fire alarm circuit cables where all of the conductors of electric light, power, Class 1, non-power-limited fire alarm circuits are separated from all of the network-powered*

*broadband communications cables by a permanent barrier or listed divider.*

*Exception No. 2: Where power circuit conductors in outlet boxes, junction boxes, or similar fittings or compartments where such conductors are introduced solely for power supply to the network-powered broadband communications system distribution equipment, the power circuit conductors shall be routed within the enclosure to maintain a minimum 6 mm (¼ in.) separation from network-powered broadband communications cables.*

Δ (2) **Other Applications.** Network-powered broadband communications cable shall be separated at least 50 mm (2 in.) from conductors of any electric light, power, Class 1, and non-power-limited fire alarm circuits.

*Exception No. 1: Separation shall not be required where: (1) all of the conductors of electric light, power, Class 1, and non-power-limited fire alarm circuits are in a raceway or in metal-sheathed, metal-clad, nonmetallic-sheathed, Type AC, or Type UF cables, or (2) all of the network-powered broadband communications cables are encased in a raceway.*

*Exception No. 2: Separation shall not be required where the network-powered broadband communications cables are permanently separated from the conductors of electric light, power, Class 1, and non-power-limited fire alarm circuits by a continuous and firmly fixed nonconductor, such as porcelain tubes or flexible tubing, in addition to the insulation on the wire.*

(B) **Support of Network-Powered Broadband Communications Cables.** Raceways shall be used for their intended purpose. Network-powered broadband communications cables shall not be strapped, taped, or attached by any means to the exterior of any conduit or raceway as a means of support.

N (C) **Splicing of Medium-Powered Network-Powered Communications Cables.** Where a medium-powered network-powered broadband communications cable is spliced or extended, a listed junction box or listed patch panel shall be used.

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

The applications for the cable, communications raceways, and cable routing assemblies are summarized in Table 800.154(a). The installation location dictates the type of cable permitted within the raceway or assembly and is subject to the installation requirements of 800.110, 800.113, and 830.40. Table 830.154 reflects permitted interchangeability between cable types that may be utilized within the applications listed in Table 800.154(a).



**TABLE 830.154** 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

**830.160 Bends.** Bends in network broadband cable shall be made so as not to damage the cable. The radius of the curve of the inner edge of any bend shall not be less than 10 times the diameter of the cable.

Informational Note: See ANSI/TIA-568.0-E *Generic Telecommunications Cabling for Customer Premises*, for information on bend radii of network broadband cable during different types of installation conditions.

## Part VI. Listing Requirements

**830.179 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.

An insulation rating of 300 volts is necessary for the following reasons:

1. This rating coordinates with protector installation requirements.
2. Primary protectors are designed to allow voltages below 300 to pass.

3. Network-powered broadband communications circuits typically operate in a voltage range up to 150 volts root-mean square (rms).

**(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.

## ARTICLE 840

## Premises-Powered Broadband Communications Systems

### Part I. General

**840.1 Scope.** This article covers premises-powered broadband communications systems.

Informational Note: A typical basic system configuration consists of an optical fiber, twisted pair, or coaxial cable to the premises supplying a broadband signal to a network terminal that converts the broadband signal into component signals, such as traditional telephone, video, high-speed Internet, and interactive services. Powering for the network terminal and network devices is typically accomplished through a premises power supply that might be built into the network terminal or provided as a separate unit. In order to provide communications in the event of a power interruption, a battery backup unit or an uninterruptible power supply (UPS) is typically part of the powering system.

Although similar to Article 830, which addresses network-powered broadband communications systems, Article 840 covers premises-powered broadband communications systems.

Premises-powered broadband communications systems provide a wide array of subscriber services, including voice, video, data (such as Internet access), and interactive services, through an optical network terminal (ONT).

Article 840 contains requirements for wiring both the inside and the outside of buildings. Other articles cover the wiring derived from the ONT into the premises.

### See also

**Article 725**, which covers wiring of Class 2 and Class 3 circuits

**Article 760**, which covers the wiring of fire alarm systems

**Article 770**, which covers the installation of optical fiber cables

**Article 800**, which covers general requirements for all communications systems

**Article 820**, which covers coaxial cable installations for television signals