

**810.71 General.** Transmitters shall comply with 810.71(A) through (C).

**(A) Enclosing.** The transmitter shall be enclosed in a metal frame or grille or separated from the operating space by a barrier or other equivalent means, all metallic parts of which are effectively connected to a bonding conductor or grounding electrode conductor.

**(B) Grounding of Controls.** All external metal handles and controls accessible to the operating personnel shall be effectively connected to an equipment grounding conductor if the transmitter is powered by the premises wiring system or grounded with a conductor in accordance with 810.21.

**(C) Interlocks on Doors.** All access doors shall be provided with interlocks that disconnect all voltages of over 350 volts between conductors when any access door is opened.

## ARTICLE

## 820

## Community Antenna Television and Radio Distribution Systems

## Part I. General

**820.1 Scope.** This article covers coaxial cable distribution of radio frequency signals typically employed in community antenna television (CATV) systems.

Article 820 covers the installation of coaxial cable for closed-circuit television, cable television, and security television cameras. This article also covers coaxial cable for radio and television receiving equipment. Article 830 covers network-powered broadband system installations. Many of the requirements that were similar or redundant to other Chapter 8 articles have been consolidated within the new Article 800.

**820.3 Other Articles.** The wiring methods of Article 830 shall be permitted to substitute for the wiring methods of Article 820.

*Informational Note:* Use of Article 830 wiring methods will facilitate the upgrading of Article 820 installations to network-powered broadband applications.

**820.15 Power Limitations.** Coaxial cable shall be permitted to deliver power to equipment that is directly associated with the radio frequency distribution system if the voltage is not over 60 volts and if the current is supplied by a transformer or other device that has power-limiting characteristics.

Power shall be blocked from premises devices on the network that are not intended to be powered via the coaxial cable.

## Part III. Protection

**820.93 Grounding of the Outer Conductive Shield of Coaxial Cables.** Coaxial cables entering buildings or attached

to buildings shall comply with 820.93(A) or (B). Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required. 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 block location to achieve the shortest practicable bonding conductor or grounding electrode conductor helps limit potential differences between CATV and other metallic systems.

Proper bonding of the community antenna television (CATV) system coaxial 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 coaxial cable enters the building, the outer conductive shield shall be grounded in accordance with 820.100. The grounding shall be as close as practicable to the point of entrance.

**(B) Terminating Outside of the Building.** In installations where the coaxial cable is terminated outside of the building, the outer conductive shield shall be grounded in accordance with 820.100. The grounding shall be as close as practicable to the point of attachment or termination.

**(C) Location.** Where installed, a listed primary protector shall be applied on each community antenna and radio distribution (CATV) cable external to the premises. The listed primary protector shall be located as close as practicable to the entrance point of the cable on either side or integral to the ground block.

**(D) Hazardous (Classified) Locations.** If a primary protector or equipment providing the primary protection function is used, it 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:* Primary protection equipment shall be used only if permitted by 501.150, 502.150, and 503.150.

## Part IV. Grounding Methods

**Δ 820.100 Cable Bonding and Grounding.** The shield of the coaxial cable shall be bonded or grounded as specified in 820.100(A) and (B).

*Exception:* For communications systems using coaxial cable completely contained within the building (i.e., they do not



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

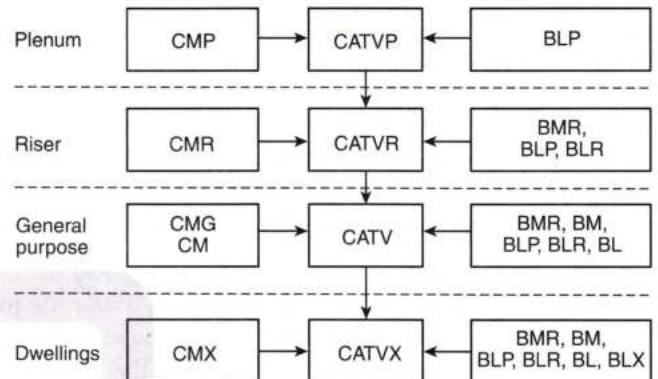
**820.154 Substitutions of Listed CATV Cables.** The substitutions for coaxial cables in Table 820.154 and illustrated in Figure 820.154 shall be permitted.

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