

This article does not require the use of fire-resistive cable systems. It provides requirements if such systems are required to be installed. Some of the common applications of fire-resistive cable systems are fire pump installations and critical operations power systems (COPS). Often, the use of fire-resistive cable systems will be a design consideration to ensure circuit integrity.

Δ 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*.

728.5 Installations. Fire-resistive cable systems installed outside the fire-rated rooms that they serve, such as the electrical room or the fire pump room, shall comply with the requirements of 728.5(A) through (H) and all other installation instructions provided in the listing.

(A) Mounting. The fire-resistive cable system shall be secured to the building structure in accordance with the listing and the manufacturer's installation instructions.

(B) Supports. The fire-resistive cable system shall be supported in accordance with the listing and the manufacturer's installation instructions.

Informational Note: The supports are critical for survivability of the system. Each system has its specific support requirements.

Δ (C) Raceways and Couplings. Where fire-resistive cable is listed to be installed in a raceway, the raceway enclosing the cable, any couplings, and any connectors shall be listed as part of the fire-resistive cable system.

The raceway fill for each system shall comply with the listing requirements for the system and shall not be greater than the fill permitted in Chapter 9, Table 1.

Informational Note: Raceway fill might not be the same for all listed fire-resistive cable systems.

(D) Cable Trays. Cable trays used as part of a fire-resistive cable system shall be listed as part of the fire-resistive cable system.

(E) Boxes. Boxes or enclosures used as part of a fire-resistive cable system shall be listed as part of the fire-resistive cable system and shall be secured to the building structure independently of the raceways or cables listed in the system.

Δ (F) Pulling Lubricants. Fire-resistive cable installed in a raceway shall only use pulling lubricants listed as part of the fire-resistive cable system.

(G) Vertical Supports. Cables and conductors installed in vertical raceways shall be supported in accordance with the listing of the fire-resistive cable system and in accordance with 300.19.

(H) Splices. Only splices that are part of the listing for the fire-resistive cable system shall be used. Splices shall have manufacturer's installation instructions.

Δ 728.60 Equipment Grounding Conductor. Fire-resistive cables installed in a raceway requiring an equipment grounding conductor shall use the same fire-resistive cable described in the system unless alternative equipment grounding conductors are listed with the system. Any alternative equipment grounding conductors shall be marked with the system number. The system shall specify a permissible equipment grounding conductor. If not specified, the equipment grounding conductor shall be the same as the fire-resistive cable described in the system.

728.120 Marking. In addition to the marking required in 310.8, system cables and conductors shall be surface marked with the suffix "FRR" (fire-resistive rating), along with the circuit integrity duration in hours, and with the system identifier.

ARTICLE 750

Energy Management Systems

750.1 Scope. This article applies to the installation and operation of energy management systems.

Informational Note: Performance provisions in other codes establish prescriptive requirements that may further restrict the requirements contained in this article.

This article addresses the installation and operation of energy management systems. Energy management systems have become integral elements of the electrical infrastructure through the control of utilization equipment, energy storage, and power protection. Energy management has two basic aspects: monitoring the system and controlling some part of the system. These two elements must be separated in order to allow the system to monitor and possibly restrict those areas of control that would adversely affect the electrical system. The requirements ensure that an energy management system does not overload a branch circuit, feeder, or service or override a load-shedding system for an alternate power source for fire pumps and other emergency systems.

• N 750.6 Listing. Energy management systems shall be one of the following:

- (1) Listed as a complete energy management system
- (2) Listed as a kit for field installation in switch or overcurrent device enclosures
- (3) Listed individual components assembled as a system

750.20 Alternate Power Sources. An energy management system shall not override any control necessary to ensure continuity of an alternate power source for the following:

- (1) Fire pumps
- (2) Health care facilities

- (3) Emergency systems
- (4) Legally required standby systems
- (5) Critical operations power systems

750.30 Load Management. Energy management systems shall be permitted to monitor and control electrical loads and sources in accordance with 750.30(A) through (C).

Systems necessary for life safety, fire protection, and critical operations must continue to operate even with the loss of primary power. Load shedding is often employed for the alternate power source of a backup system to give priority to needed equipment. Disconnecting some equipment — such as a ventilation system that prevents an explosive concentration from being reached — could introduce safety hazards and must be avoided. An energy management system must not disconnect or override the control of those systems.

(A) Load Shedding Controls. An energy management system shall not override the load shedding controls put in place to ensure the minimum electrical capacity for the following:

- (1) Fire pumps
- (2) Emergency systems
- (3) Legally required standby systems
- (4) Critical operations power systems

Δ (B) Disconnection of Power. An energy management system shall not cause disconnection of power to the following:

- (1) Elevators, escalators, moving walks, or stairway lift chairs
- (2) Positive mechanical ventilation for hazardous (classified) locations
- (3) Ventilation used to exhaust hazardous gas or reclassify an area
- (4) Circuits supplying emergency lighting
- (5) Essential electrical systems in health care facilities

(C) Capacity of Branch Circuit, Feeder, or Service. An energy management system shall not cause a branch circuit, feeder, or service to be overloaded. If an EMS is used to limit the current on a conductor, 750.30(C)(1) through (C)(4) shall apply:

N (1) Current Setpoint. A single value equal to the maximum ampere setpoint of the EMS shall be permitted for one or more of the following:

- (1) For calculating the connected load per 220.70
- (2) For the maximum source current permitted by EMS control

N (2) System Malfunction. The EMS shall use monitoring and controls to automatically cease current flow upon malfunction of the EMS.

N (3) Settings. Adjustable settings shall be permitted if access to the settings is accomplished by at least one of the following:

- (1) Located behind removable and sealable covers over the adjustment means

- (2) Located behind a cover or door that requires the use of a tool to open
- (3) Located behind locked doors accessible only to qualified personnel
- (4) Password protected with password accessible only to qualified personnel
- (5) Software that has password protected access to the adjusting means accessible to qualified personnel only

N (4) Marking. The equipment that supplies the branch circuit, feeder, or service shall be field marked with the following information:

- (1) Maximum current setting
- (2) Date of calculation and setting
- (3) Identification of loads and sources associated with the current limiting feature
- (4) The following or equivalent wording: “The setting for the EMS current limiting feature shall not be bypassed”

The markings shall meet the requirements in 110.21(B) and shall be located such that they are clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Δ 750.50 Directory. Where an energy management system is employed to control electrical power through the use of a remote means, a directory identifying the controlled device(s) and circuit(s) shall be posted on the enclosure of the controller, disconnect, or branch-circuit overcurrent device.

ARTICLE

760

Fire Alarm Systems

Part I. General

Δ 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.

Article 760 covers only circuits that are powered and controlled by the fire alarm system, including fire safety features such as smoke door control, damper control, fan shutdown, and elevator recall. Circuits powered and controlled by other building systems such as heating, ventilating, and air conditioning (HVAC); security; lighting controls; and time recording are covered by Article 725.