

for broken, disconnected, or shorted wires. Loss of integrity shall start the generator(s).

Informational Note: See NFPA 20-2019, *Standard for the Installation of Stationary Pumps for Fire Protection*, 3.3.7.2, for more information on fault-tolerant external control circuits.

The control conductors shall be protected to resist potential damage by fire or structural failure. Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

- (1) The cable or raceway is encased in a minimum 50 mm (2 in.) of concrete.
- (2) The cable or raceway is **part of** a listed fire-resistive cable system.

Informational Note No. 1: See UL 2196-2017, *Standard for Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables*, for testing requirements for fire-resistive cables.

Informational Note No. 2: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

- (3) The cable or raceway is protected by a listed electrical circuit protective system.

Informational Note No. 3: See UL 1724, *Fire Tests for Electrical Circuit Protection Systems*, for testing requirements for circuit protective systems.

Informational Note No. 4: Electrical circuit protective systems could include, but are not limited to, thermal barriers or a protective shaft.

Informational Note No. 5: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Having the power wiring protected against fire damage is only one reliability consideration. For the generator to provide power,

it has to receive the necessary signal to start. It is also critical to protect the control circuit wiring between the fire pump transfer switch/controller and the on-site standby generator.

695.15 Surge Protection. A listed surge protective device (SPD) shall be installed in or on the fire pump controller.

Informational Note: See UL 1449-2021, *Standard for Surge Protective Devices*, for proper application of SPD types.

Exception: Surge-protective devices shall not be required in or on a fire pump controller for diesel fire pumps.

Electronic components are used for control functions within fire pump controllers. These components are sensitive to over-voltages, and the proper operation of the electrically driven fire pump could be compromised due to component failure. As cited in the Fire Protection Research Foundation (FPRF) report *Data Assessment for Electrical Surge Protective Devices*, a survey of facility managers conducted by the National Electrical Manufacturers Association (NEMA) for the years 2013 and 2014 documented that 12 percent of the respondents indicated they had experienced surge damage to fire pump associated equipment. Considering that most electric motor-driven fire pumps and associated controllers are supplied directly by services, the exposure of such equipment to line surges due to lightning or utility switching is extremely high. The type of surge protective device (SPD) is largely driven by where the fire pump and controller are located within the electrical distribution system. The SPD for the fire pump controller can be field or factory installed.

The FPRF report can be viewed at: www.nfpa.org/News-and-Research/Data-research-and-tools/Electrical/Data-Assessment-for-Electrical-Surge-Protection-Devices.

See also

Article 242 for the requirements covering types and installation of SPDs