

Electrical Checklist Supplement – Based on NFPA 72, 2007 edition

4.4.1.2 Code Conformance. All power supplies shall be installed in conformity with the requirements of **NFPA 70, *National Electrical Code***, for such equipment and with the requirements indicated in this subsection.

Power Supply Sources

4.4.1.3.1 At least two independent and reliable power supplies shall be provided, one primary and one secondary, each of which shall be of adequate capacity for the application.

Primary Power Supply

4.4.1.4.1 Dedicated Branch Circuit. A dedicated branch circuit of one of the following shall supply primary power:

- (1) Commercial light and power
- (2) An engine-driven generator or equivalent in accordance with 4.4.1.9.2, where a person specifically trained in its operation is on duty at all times
- (3) An engine-driven generator or equivalent arranged for cogeneration with commercial light and power in accordance with 4.4.1.9.2, where a person specifically trained in its operation is on duty at all times

Mechanical Protection

4.4.1.4.2.1 The dedicated branch circuit(s) and connections shall be mechanically protected.

4.4.1.4.2.2 Circuit disconnecting means shall have a **red marking**, shall be accessible only to authorized personnel, and shall be identified as **“FIRE ALARM CIRCUIT.”**

4.4.1.4.2.3 The location of the circuit disconnecting means shall be permanently identified at the fire alarm control unit.

4.4.1.4.3 Overcurrent Protection. An overcurrent protective device of suitable current-carrying capacity that is capable of interrupting the maximum short-circuit current to which it can be subject shall be provided in each ungrounded conductor.

4.4.1.4.4 Circuit Breakers and Engine Stops. Circuit breakers or engine stops shall not be installed in such a manner as to cut off the power for lighting or for operating elevators.

4.4.1.5 Secondary Power Supply.

4.4.1.5.1* Secondary Power Supply for Protected Premises

Fire Alarm Systems. The secondary power supply shall consist of one of the following:

- (1) A storage battery dedicated to the fire alarm system arranged in accordance with 4.4.1.8

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(2) An automatic starting, engine-driven generator serving the dedicated branch circuit specified in 4.4.1.4.1 and arranged in accordance with 4.4.1.9.3.1 and storage batteries dedicated to the fire alarm system with 4 hours of capacity arranged in accordance with 4.4.1.8

4.4.1.5.3* Capacity.

4.4.1.5.3.1 Unless otherwise permitted or required by 4.4.1.5.3.1(A) or 4.4.1.5.3.1(B), the secondary power supply shall have sufficient capacity to operate the fire alarm system under quiescent load (system operating in a non-alarm condition) for a **minimum of 24 hours** and, at the end of that period, **shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 5 minutes.**

(A) The secondary power supply for emergency voice/alarm communications service shall be capable of operating the system under quiescent load for a **minimum of 24 hours** and then **shall be capable of operating the system during a fire or other emergency condition for a period of 15 minutes at maximum connected load.**

(B) The secondary power supply capacity for supervising station facilities and equipment shall be capable of supporting operations for a minimum of 24 hours.

4.4.1.5.3.2 The secondary power supply capacity required shall include all power supply loads that are not automatically disconnected upon the transfer to secondary power supply.

4.4.1.5.4 Secondary Power Operation. Operation on secondary power shall not affect the required performance of a fire alarm system or supervising station facility. The system shall produce the same alarm, supervisory, and trouble signals and indications, excluding the alternating current (ac) power indicator, when operating from the secondary power source as are produced when the unit is operating from the primary power source.

Exception: Audio amplifier monitoring shall comply with 4.4.7.2.1.

4.4.1.6* Continuity of Power Supplies.

4.4.1.6.1 The secondary power supply shall automatically provide power to the protected premises fire alarm system within 10 seconds, whenever the primary power supply fails to provide the minimum voltage required for proper operation.

4.4.1.6.2 The secondary power supply shall automatically provide power to the supervising station facility and equipment within 60 seconds whenever the primary power supply fails to provide the minimum voltage required for proper operation.

4.4.1.6.3 Required signals shall not be lost, interrupted, or delayed by more than 10 seconds as a result of the primary power failure.

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4.4.1.6.3.1 Storage batteries dedicated to the fire alarm system or an uninterruptible power supply (UPS) arranged in accordance with the provisions of *NFPA 111, Standard on Stored Electrical Energy Emergency and Standby Power Systems*, shall be permitted to supplement the secondary power supply to ensure required operation during the transfer period.

4.4.1.6.3.2 Where a UPS is employed in 4.4.1.6.3.1, a positive means for disconnecting the input and output of the UPS system while maintaining continuity of power supply to the load shall be provided.

4.4.1.8* Storage Batteries.

4.4.1.8.1* Marking. Batteries shall be permanently marked with the month and year of manufacture, using the month/year format.

4.4.1.8.2 Location. Storage batteries shall be located so that the fire alarm equipment, including overcurrent devices, are not adversely affected by battery gases and shall conform to the requirements of *NFPA 70, National Electrical Code, Article 480*.

4.4.1.8.2.1 Cells shall be suitably insulated against grounds and crosses and shall be mounted securely in such a manner so as not to be subject to mechanical injury.

4.4.1.8.2.2 Racks shall be suitably protected against deterioration.

4.4.1.8.2.3 If not located in or adjacent to the fire alarm control unit, the batteries and their charger location shall be permanently identified at the fire alarm control unit.

4.4.1.8.3 Battery Charging.

4.4.1.8.3.1 Adequate facilities shall be provided to automatically maintain the battery fully charged under all conditions of normal operation.

4.4.1.8.3.2 Adequate facilities shall be provided to recharge batteries within 48 hours after fully charged batteries have been subject to a single discharge cycle as specified in 4.4.1.5.3.

4.4.1.8.3.3 Upon attaining a fully charged condition, the charge rate shall not be so excessive as to result in battery damage.

4.4.1.8.3.4* Batteries shall be either trickle- or float-charged.

4.4.1.8.3.5 Supervising stations shall maintain spare parts or units available, which shall be used to restore failed charging capacity prior to the consumption of one-half of the capacity of the batteries for the supervising station equipment.

4.4.1.8.4 Overcurrent Protection.

4.4.1.8.4.1 The batteries shall be protected against excessive load current by overcurrent devices.

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4.4.1.8.4.2 The batteries shall be protected from excessive charging current by overcurrent devices or by automatic current-limiting design of the charging source.

4.4.1.8.5 Metering. The charging equipment shall provide either integral meters or readily accessible terminal facilities for the connection of portable meters by which the battery voltage and charging current can be determined.

4.4.1.8.6 Charger Supervision. Supervision means appropriate for the batteries and charger employed shall be provided to detect a failure of battery charging and initiate a trouble signal in accordance with 4.4.3.5.

4.4.1.9 Engine-Driven Generators.

4.4.1.9.1 Application and Installation. The application and installation of engine-driven generators shall be as specified in 4.4.1.9.2 through 4.4.1.9.7.

4.4.1.9.2 Primary Power Supply. Engine-driven generators arranged as the primary supply shall be designed and installed in an approved manner.

4.4.1.9.3 Secondary Power Supplies.

4.4.1.9.3.1 Protected Premises.

(A) Engine-driven generators used to provide secondary power for a protected premises fire alarm system shall comply with **NFPA110, *Standard for Emergency and Standby Power Systems, Chapter 4***, requirements for a Type 10, Class 24, Level 1 System. Installation shall be in accordance with **NFPA70, *National Electrical Code, Article 700***.

(B) Where survivability of circuits is required by **Chapter 6**, equal protection shall be provided for power supply circuits.

4.4.4 Performance and Limitations.

4.4.4.1 Voltage, Temperature, and Humidity Variation. Equipment shall be designed so that it is capable of performing its intended functions under the following conditions:

- (1)*At 85 percent and at 110 percent of the nameplate primary (main) and secondary (standby) input voltage(s)
- (2) At ambient temperatures of 0°C (32°F) and 49°C (120°F)
- (3) At a relative humidity of 85 percent and an ambient temperature of 30°C (86°F)

4.4.4.2 Installation and Design.

4.4.4.2.1* All systems shall be installed in accordance with the specifications and standards approved by the authority having jurisdiction.

4.4.4.2.2 Devices and appliances shall be located and mounted so that accidental operation or failure is not caused by vibration or jarring.

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4.4.4.2.3 All apparatus requiring rewinding or resetting to maintain normal operation shall be restored to normal as promptly as possible after each alarm and kept in normal condition for operation.

4.4.4.2.4 Equipment shall be installed in locations where conditions do not exceed the voltage, temperature, and humidity limits specified in 4.4.4.1.

Exception: Equipment specifically listed for use in locations where conditions can exceed the upper and lower limits specified in 4.4.4.1 shall be permitted.

4.4.4.3 Transient Protection. To reduce the possibility of damage by induced transients, circuits and equipment shall be properly protected in accordance with the requirements of **NFPA 70, National Electrical Code, Article 800**.

4.4.4.4* Wiring. The installation of all wiring, cable, and equipment shall be in accordance with **NFPA 70, National Electrical Code**, and specifically with **Articles 760, 770, and 800**, where applicable. Optical fiber cables shall be protected against mechanical injury in accordance with **Article 760**.

4.4.4.5 Grounding. All systems shall test free of grounds. *Exception: Parts of circuits or equipment that are intentionally and permanently grounded to provide ground-fault detection, noise suppression, emergency ground signaling, and circuit protection grounding shall be permitted.*