

PORTLAND FIRE & RESCUE

March 16, 2018



FIR 8.06 - POWER SUPPLY REQUIREMENTS FOR ELECTRIC MOTOR-DRIVEN FIRE PUMPS

I. SCOPE

- A. This policy is established September 10, 1987.
- B. The purpose of this policy is to ensure an adequate and appropriate power supply to electric motor driven fire pumps; to develop a joint Portland Fire & Rescue and Bureau of Development Services policy establishing minimum requirements for primary and alternate sources of electrical power for electric fire pump installations.
- C. This policy applies only at the time a permit is required for the installation of electric motor driven fire pumps within areas served by Portland Fire & Rescue. This policy does not apply to existing installations except when electric fire pumps or their power supplies are being replaced. This policy does not apply to diesel engine driven fire pump installations.

II. GUIDELINES

- A. General Requirements
 - 1. The power supply shall be installed in accordance with NFPA 20 and the National Electric Code (NEC) unless otherwise stated in this policy, and shall be installed as an emergency power source.
 - 2. The following items from NFPA Standards have been overlooked on many fire pump installations. They are restated here to emphasize their importance in all installations of electric motor-driven fire pumps:
 - a. Primary power for electric fire pumps shall be supplied from a separate service or from a connection located ahead of the service disconnecting means; or
 - b. If the primary power supply is connected through a disconnecting means and overcurrent device, they both shall be rated to carry indefinitely the sum of the locked rotor currents of the fire pump and associated equipment.
 - c. When alternate power sources are supplied or required, they shall be connected with an approved automatic transfer switch and if the capacity of the emergency sources are not adequate to serve all the connected emergency and optional loads, selective automatic load pickup and load shedding must be provided.

B. Specific Requirements

1. Existing High Challenge Storage Warehouse Buildings (e.g. high piled combustible storage, flammable and combustible liquid storage, aerosol storage): Electric motor-driven fire pumps serving existing high challenge storage warehouses, as defined by the Fire Marshal, are not required to have an approved alternate emergency power source.
2. New High-Rise Buildings (Over 75 'in height): An approved alternate power source is required and shall be supplied by an engine driven generator complying with all OSSC and NEC requirements.
3. Existing High-Rise and all New and Existing Buildings Not Otherwise Covered: An approved alternate emergency power source is required per OSSC and NEC requirements or as allowed in Section 3.1 below. See Table 1 – Types of Buildings and Alternative Power Sources.

Exception: *No alternate emergency power source is required when an applicant provides specific reports showing that **all** the following conditions can be met:*

- a. A reliability report indicating that the commercial primary power supply serving the specific property is not at risk of failure beyond what is normal or safe as determined jointly by the Portland Fire & Rescue and the Bureau of Development Services. Normal or safe will be defined as not having more than one (1) power outage in the previous three (3) years with a duration not exceeding four (4) hours in a 24-hour period. Consideration of a 21-year average of power outage and duration conditions will be considered. A reliability report from the power company will be required for verification.
 - b. A fire protection report indicating that the fire suppression system is served by pressure water mains capable of supplying the required pressure to the two (2) most remote sprinkler heads without fire pump assistance (excluding fire hose requirements).
 - c. Fire apparatus can provide adequate pressure (this provision is not met if, in the judgment of the Fire Marshal, fire apparatus response may be delayed by factors such as long response distances, limited access (e.g. across rail tracks which could be blocked or a history of delayed response).
 - d. Sprinkler system water flow is monitored by an approved central station.
- 3.1 Approved Alternate Emergency Power Sources: All alternate power sources must be provided with approved automatic transfer switches and be capable of selective automatic load pickup and load shedding if the capacity of the emergency source is not adequate to serve all connected emergency and optional loads.

The following are approved alternate sources of power:

- a. A second and separate electrical service tap from a utility power source separate from the one supplying the primary power. These two connections must be physically separated by one-hour, fire resistive construction or 2" of concrete.

- b. Two connections to a secondary grid network system. In the downtown Portland area supplied by the secondary grid system or in areas supplied by a comparable system, a tap ahead of the existing service supplied from the secondary grid, provided necessary measures are taken to keep the two systems separated and remote to minimize the possibility of simultaneous power disruption due to fire or other hazards within the building (a one-hour, fire resistive separation or 2" of concrete is considered adequate).

Special Problems in Downtown Area: Fault currents in the downtown grid are high. It is the responsibility of the electrical contractor or engineer to investigate existing fault current conditions and select equipment accordingly.

- c. Engine driven generator sized to accommodate the running currents of the fire pump plus all other loads to be supplied.

C. Other Requirements

1. Fire pumps shall be installed in accordance with the currently adopted edition of NFPA 20 and NFPA 70. Specifically, these requirements include:
 - a. A separate controller for each fire pump.
 - b. When an alternate power supply is required, a separate automatic transfer switch is required for each pump.
 - c. Controller and transfer switches are to be listed or approved for "fire pump service."
 - d. Transfer switches separate from controllers may be used only if they are listed or approved for "fire pump service."

III. TABLES

Table 1 - Types of Buildings and Alternative Power Sources

Type of Building	Type of Alternate Power Source X = Acceptable type of Source NR = Not Required (See conditions in Sections II.B.1 & II.B.3 above)		
	Generator	Two Connections to Secondary Grid System	Two Taps to Separate Utility Grids
NEW HIGH-RISE	X		
EXISTING HIGH-RISE with adequate water pressure and volume to supply 2 or more sprinkler heads without a pump	NR	NR	NR
EXISTING HIGH-RISE without adequate water to supply at least 2 heads without a pump	X	X	X
EXISTING HIGH CHALLENGE STORAGE WAREHOUSE	NR	NR	NR
ALL OTHER NEW AND EXISTING BUILDINGS with adequate water pressure and volume to supply 2 or more sprinkler heads without a pump	NR	NR	NR
ALL OTHER NEW AND EXISTING BUILDINGS without adequate water pressure and volume to supply 2 or more sprinkler heads without a pump	X	X	X



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