

Informational Note: Guy wires supporting grounded towers are unlikely to become energized under normal conditions, but partial lightning currents could flow through guy wires when exposed to a lightning environment. Grounding of metallic guy wires may be required by lightning standards. For information on lightning protection systems, see NFPA 780-2014, *Standard for the Installation of Lightning Protection Systems*.

Part VI. Marking

694.50 Interactive System Point of Interconnection. All interactive system points of interconnection with other sources shall be marked at an accessible location at the disconnecting means and with the rated ac output current and the nominal operating ac voltage.

694.52 Power Systems Employing Energy Storage. Wind electric systems employing energy storage shall be marked with the maximum operating voltage, any equalization voltage, and the polarity of the grounded circuit conductor.

694.54 Identification of Power Sources.

(A) Facilities with Stand-Alone Systems. Any structure or building with a stand-alone system and not connected to a utility service source shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location. The plaque or directory shall indicate the location of system disconnecting means and shall indicate that the structure contains a stand-alone electrical power system.

(B) Facilities with Utility Services and Wind Electric Systems. Buildings or structures with both utility service and wind electric systems shall have a permanent plaque or directory providing the location of the service disconnecting means and the wind electric system disconnecting means.

694.56 Instructions for Disabling Turbine. A plaque shall be installed at or adjacent to the turbine location providing basic instructions for disabling the turbine.

Part VII. Connection to Other Sources

694.60 Identified Interactive Equipment. Only inverters that are listed, labeled, and identified as interactive shall be permitted in interactive systems.

694.62 Installation. Wind electric systems, where connected to utility electric sources, shall comply with the requirements of Article 705.

694.66 Operating Voltage Range. Wind electric systems connected to dedicated branch or feeder circuits shall be permitted to exceed normal voltage operating ranges on these circuits, provided that the voltage at any distribution equipment supplying other loads remains within normal ranges.

Informational Note: Wind turbines might use the electric grid to dump energy from short-term wind gusts. Normal operating voltages are defined in ANSI C84.1-2006, *Voltage Ratings for Electric Power Systems and Equipment (60 Hz)*.

694.68 Point of Connection. Points of connection to interconnected electric power sources shall comply with 705.12.

ARTICLE 695 Fire Pumps

695.1 Scope.

Informational Note: Text that is followed by a reference in brackets has been extracted from NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*. Only editorial changes were made to the extracted text to make it consistent with this Code.

(A) Covered. This article covers the installation of the following:

- (1) Electric power sources and interconnecting circuits
- (2) Switching and control equipment dedicated to fire pump drivers

(B) Not Covered. This article does not cover the following:

- (1) The performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system
- (2) The installation of pressure maintenance (jockey or makeup) pumps

Informational Note: For the installation of pressure maintenance (jockey or makeup) pumps supplied by the fire pump circuit or another source, see Article 430.

- (3) Transfer equipment upstream of the fire pump transfer switch(es)

Informational Note: See NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*, for further information.

695.2 Definitions.

Fault-Tolerant External Control Circuits. Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions.

On-Site Power Production Facility. The normal supply of electric power for the site that is expected to be constantly producing power.

On-Site Standby Generator. A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility, in that it is not constantly producing power.

695.3 Power Source(s) for Electric Motor-Driven Fire Pumps. Electric motor-driven fire pumps shall have a reliable source of power.

Informational Note: See Sections 9.3.2 and A.9.3.2 from NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*, for guidance on the determination of power source reliability.

(A) Individual Sources. Where reliable, and where capable of carrying indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply, the power source for an electric motor driven fire pump shall be one or more of the following:

(1) **Electric Utility Service Connection.** A fire pump shall be permitted to be supplied by a separate service, or from a connection located ahead of and not within the same cabinet, enclosure, vertical switchgear section, or vertical switchboard section as the service disconnecting means. The connection shall be located and arranged so as to minimize the possibility of damage by fire from within the premises and from exposing hazards. A tap ahead of the service disconnecting means shall comply with 230.82(5). The service equipment shall comply with the labeling requirements in 230.2 and the location requirements in 230.72(B). [20:9.2.2(1)]

(2) **On-Site Power Production Facility.** A fire pump shall be permitted to be supplied by an on-site power production facility. The source facility shall be located and protected to minimize the possibility of damage by fire. [20:9.2.2(3)]

(3) **Dedicated Feeder.** A dedicated feeder shall be permitted where it is derived from a service connection as described in 695.3(A)(1). [20:9.2.2(3)]

(B) **Multiple Sources.** If reliable power cannot be obtained from a source described in 695.3(A), power shall be supplied by one of the following: [20:9.3.2]

(1) **Individual Sources.** An approved combination of two or more of the sources from 695.3(A).

(2) **Individual Source and On-site Standby Generator.** An approved combination of one or more of the sources in 695.3(A) and an on-site standby generator complying with 695.3(D). [20:9.3.4]

Exception to (B)(1) and (B)(2): An alternate source of power shall not be required where a back-up engine-driven or back-up steam turbine-driven fire pump is installed. [20:9.3.3]

(C) **Multibuilding Campus-Style Complexes.** If the sources in 695.3(A) are not practicable and the installation is part of a multibuilding campus-style complex, feeder sources shall be permitted if approved by the authority having jurisdiction and installed in accordance with either (C)(1) and (C)(3) or (C)(2) and (C)(3).

(1) **Feeder Sources.** Two or more feeders shall be permitted as more than one power source if such feeders are connected to, or derived from, separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B)(1)(b).

(2) **Feeder and Alternate Source.** A feeder shall be permitted as a normal source of power if an alternate source of power independent from the feeder is provided. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B)(1)(b).

(3) **Selective Coordination.** The overcurrent protective device(s) in each disconnecting means shall be selectively coordinated with any other supply-side overcurrent protective device(s).

(D) **On-Site Standby Generator as Alternate Source.** An on-site standby generator(s) used as an alternate source of power shall comply with (D)(1) through (D)(3). [20:9.6.2.1]

(1) **Capacity.** The generator shall have sufficient capacity to allow normal starting and running of the motor(s) driving the

fire pump(s) while supplying all other simultaneously operated load(s). [20:9.6.1.1]

Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted.

(2) **Connection.** A tap ahead of the generator disconnecting means shall not be required. [20:9.6.1.2]

(3) **Adjacent Disconnects.** The requirements of 430.113 shall not apply.

(E) **Arrangement.** All power supplies shall be located and arranged to protect against damage by fire from within the premises and exposing hazards. [20:9.1.4]

Multiple power sources shall be arranged so that a fire at one source does not cause an interruption at the other source.

(F) **Transfer of Power.** Transfer of power to the fire pump controller between the individual source and one alternate source shall take place within the pump room. [20:9.6.4]

(G) **Power Source Selection.** Selection of power source shall be performed by a transfer switch listed for fire pump service. [20:10.8.1.3.1]

(H) **Overcurrent Device Selection.** An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices specified in 695.4(B)(2)(a)(1), provided that it is part of a transfer switch assembly listed for fire pump service that complies with 695.4(B)(2)(a)(2).

(I) **Phase Converters.** Phase converters shall not be permitted to be used for fire pump service. [20:9.1.7]

695.4 Continuity of Power. Circuits that supply electric motor-driven fire pumps shall be supervised from inadvertent disconnection as covered in 695.4(A) or (B).

(A) **Direct Connection.** The supply conductors shall directly connect the power source to a listed fire pump controller, a listed combination fire pump controller and power transfer switch, or a listed fire pump power transfer switch.

(B) **Connection Through Disconnecting Means and Overcurrent Device.**

(1) **Number of Disconnecting Means.**

(a) *General.* A single disconnecting means and associated overcurrent protective device(s) shall be permitted to be installed between the fire pump power source(s) and one of the following: [20:9.1.2]

- (1) A listed fire pump controller
- (2) A listed fire pump power transfer switch
- (3) A listed combination fire pump controller and power transfer switch

(b) *Feeder Sources.* For systems installed under the provisions of 695.3(C) only, additional disconnecting means and the associated overcurrent protective device(s) shall be permitted.

(c) *On-Site Standby Generator.* Where an on-site standby generator is used to supply a fire pump, an additional disconnecting means and an associated overcurrent protective device(s) shall be permitted.

(2) **Overcurrent Device Selection.** Overcurrent devices shall comply with 695.4(B)(2)(a) or (b).

(a) *Individual Sources.* Overcurrent protection for individual sources shall comply with 695.4(B)(2)(a)(1) or (2).