Fire Systems, Generator – Emergency or Standby

This handout outlines the items to be identified when submitting for a generator permit. A fire permit from the Department of Local Service, Permit Division (Permitting) is required prior to the installation of a “Stand-by” or “Emergency” generators for commercial use.

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Emergency or Stand-By Generators

This information sheet discusses how the National Fire Protection Agency (NFPA) codes[1] apply to standby generator systems for the system designer.

The NFPA standard for generator systems most frequently encountered by the designer is NFPA 110 – Standard for Emergency Power Supply Systems (EPSS). This consists of an engine-driven generator set connected to a system of conductors, disconnecting and over-current protection devices, transfer switches, supervisory and support devices (including fuel storage) up to and including the load terminals of the transfer equipment.

NFPA 110 details three categories in classifying an emergency power supply system. The categories defined are Class, Type and Level. Each category needs to be defined in any project specification to ensure that the proper configuration is quoted and supplied.

Class. This defines the minimum number of hours the generator set can operate at its rated load without refueling. Most commonly specified are Class 48 (minimum of 48 hours) and sometimes Class 72 (minimum of 72 hours).

Level 1 installations in high seismic risk areas (Zones 3 and 4) require a minimum of a 96-hour on-site fuel supply (i.e., Class 96). This fuel supply cannot be shared with any other purpose.

Type. This defines the maximum time, in seconds, from a utility outage until the standby generator is supplying power that the load terminals of the Automatic Transfer Switch can be without acceptable electrical power. For example, Type 10 means that the standby system must provide power within 10 seconds.

[1] International Fire Code (IFC), section 604 and the National Fire Protection Agency (NFPA) 70, 110 and 111

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Level. Level 1 is most stringent and imposed when failure of the standby system could result in loss of human life or serious injury. Level 2 is used when failure is less critical to human life and safety.

Site Testing and Maintenance of Generators to NFPA 110

Testing. NFPA 110 stipulates several different site tests which should be referred to in order to ensure compliance. Tests can be made at unity power factor if the 0.8 power factor rated load testing of the complete unit was carried out by the manufacturer before shipment from the factory.

NFPA stipulates exhaust-stack temperatures to prevent wet stacking (oil blow-by of piston rings) based on the generator size. These can be given to technicians by the manufacturer of the generator set. If no more than 60% of generator rated output is available in building load; a resistive load bank must be used to test the generator at its full output capacity.

Maintenance and Operational Testing/Inspection. All EPSS with ancillary equipment, including transfer switches, must be inspected weekly and exercised under load at least monthly, for a minimum of 30 minutes, preferably with load, also NFPA 110 requires circuit breakers be exercised annually with EPPS in “off” position. Breakers rated in excess of 600 volts should be exercised every six months and tested every two years under simulated overload conditions. This will require careful planning and diligent coordination. It is vital that all management and staff are aware when scheduled maintenance is arranged to be carried out. A Level 1 EPSS must be tested for at least four hours, at least once every 36 months.

Automatic transfer switches are subject to an annual maintenance program, including one major maintenance and three quarterly inspections. All data and readings should be recorded in the on-site maintenance log, for future inspection and reference.

Obtaining a Fire, Other Systems and Equipment Permit

Go to MyBuildingPermit.com. The permit type selections are:

Jurisdiction: *King County*

Application Type: *Fire*

Project Type: *Nonresidential*

Activity Type: (*Choose one)*

Scope of Work: *Other Systems and Equipment*

If you have questions or would like to inquire about alternatives, please email: fmo.dper@kingcounty.gov

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Submittal Requirements

A Fire, Other System and Equipment application permit submittal package must include:

A. Plan set cover sheet and digital plan.
   a. Plan cover sheets should include the following information:
      i. A statement of the scope of work that this permit is intended to cover.
      ii. Type of fuel; Diesel, Natural Gas, Propane, Gasoline.
      iii. NEC classification of system; 700, 701 or 702. Emergency, Standby or Optional
      iv. Manufacturer's cut sheets identifying the:

Make	Fill Port/Spill Container	ATS Information
Model	Batteries	Atmospheric and Emergency Venting

B. Stamped structural calculations and drawings for any concrete pad the generator will set on and if installed, an additional set of calculations and drawings for the fuel tank concrete pad.
C. The Structural Engineer shall also include the make, part number, type of steel, total anchor length and embedment depth for all anchors.
D. Detail on the drawing the 5-gallon fill/spill box required to be installed on the exterior of the generator. Provide make and model.
E. The drawings shall detail the atmospheric vent penetrating the enclosure and terminating 12' above grade.
F. Identify which model fuel tank will be installed, the gallons and the CFH of venting required for each emergency vent.
G. Provide manufacturer's drawing of the top of the tank. It shall detail all bung fittings and detail the two emergency vents, the atmospheric vent and the fill/spill connection.
H. The site plan shall detail the property lines, proximity to other buildings, cabinets, towers, propane or fuel tanks and any source of ignition or electrical within 10' of the generator.
I. Will the generator or tank be exposed to ice falling off of a tower?
J. Additional requirements maybe required for generators and fuel tanks installed in snow areas such as shed roofs over generators and tanks, falling ice protection, snow shield over fuel and vent lines, 15' high poles with signs on top to indicate location of fuel tanks and generators. The signs shall be 12" by 16" with reflective blue background and white letters and face fire department access.
K. One-line electrical drawing.
L. Panel schedules.

This is not a complete list of requirements and additional items may be required.

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Additional Resources

King County Department of Local Services, Permitting Division

- Permit Fees
- Location and office hours
- Fire, Other Systems and Equipment
- King County Green Building Handbook