

Emergency Power Systems – Existing Installations

OVERVIEW OF ISSUE

An emergency power system provides backup electrical power during power outages caused by events such as extreme weather situations or system failures. Generally, this emergency system is composed of generator(s), fuel storage (usually diesel fuel oil), fuel transfer system and other components such as switchgears, switches, transformers, etc.

Although an emergency power system greatly increases the reliability of the electrical supply, it carries with it inherent risks that expose the healthcare facility and should be mitigated.

This document does not address environmental pollution concerns, fuel storage tank installations and uninterruptible power supply systems. For future renovations or installations, refer to the Emergency Power Systems – Future Upgrades/New Installations Risk Notes.

KEY POINTS

- Although an emergency power system greatly increases the reliability of the electrical supply, it carries with it inherent risks that should be mitigated.

THINGS TO CONSIDER

Fuel Distribution System

- Arrange the fuel distribution system (including fuel tank filling operations) to automatically shut down the flow of fuel in case of a fire involving or exposing the tank room, pump room, generator room, or fuel piping anywhere along its path through the building. Enable automatic fuel supply shutdown by providing safety shutoff valves before fuel lines exit the room in question. Use of an approved fusible link operated valve is an acceptable way to shut off discharge line(s) between the day tanks or pipe headers and the generator unit(s).
- Provide automatic leak detection in the main fuel storage tank room/vault, fuel pump room/vault, and on the generator room floor in diked areas surrounding day tanks. FM Approved devices are suggested due to their reliability and longevity.
- Provide a manual shutoff to actuate the safety shutoff valves and to turn off the fuel pump in case of fire. Locate this manual shutoff in a remote location that can be safely accessed in case of a fire exposing the fuel system (e.g. outside pump, tank, or generator rooms and at the main alarm panel).
- Arrange pumps to operate when both of the following conditions are met: when the fuel level in the day tank is low and when the generator is running. This

arrangement may require that pumps be set up to run manually to top-off tanks after engine tests. Arrange manual pump operation via a “dead-man” switch.

- Ensure use of flexible hoses of high-strength, noncombustible materials that are resistant to decomposition or melting when exposed to a fire, and compatible with the fuel in use. Protect the hose against mechanical damage.
- Replace flexible hoses at the end of their service life, as specified by the manufacturer, or in accordance with local codes and regulations.
- Install a pressure-relief valve downstream of the positive displacement pump, piped back to the supply tank.

Operation and Maintenance

- Conduct a regular 30-minute run test of the generator unit to ensure it is in good working condition (typically monthly although some facilities opt for a weekly test).
- Run engine drives in accordance with local code requirements. Where it is not possible to energize the emergency load during the

Emergency Power System – Existing Installations

tests, provide a “dummy load.” Check the driver and fuel system for adequate lubrication and fuel levels as well as fluid leaks, hose wear, and the condition of safety shutoff devices. Check the generator output for adequate voltage and frequency.

- Replace the fuel in the main storage tank in accordance with local code requirements. Keep in mind that biodiesel fuels may develop stability issues when stored for long periods of time; they should be periodically replaced even if not required by code.
- Conduct maintenance and testing of motors, generators, batteries, fuel storage/transfer system, emergency controls, relief devices, and system controls in accordance with original equipment manufacturer’s recommendations, appropriate standards, provincial/local codes, and best practices.
- Keep the generator room and equipment clean, cool, and dry. Inspect the system for loose connections at least annually.
- Change:
 - Oil filter and check the air filter every six months;
 - Governor and lubricating oil, as needed;
 - Fuel filters every year.
- Periodically check:
 - The engine cooling system for rust accumulations and plugging;
 - For adequate room temperature;
 - For signs of oil or water heating.
- Conduct frequent inspections to detect and repair leaks. Use an approved flammable-vapor detector to locate small leaks. Prohibit the use of open flames or spark-producing devices in the area.
- Develop a pre-fire plan with the fire department. Ensure the fire department, emergency response team, and building engineers are aware of how to shut down fuel flow in the event of a fuel-fed fire or leak.



REFERENCES

- Canadian Standards Association. (2006). Ontario installation code for oil-burning equipment.
- Canadian Standards Association. (2011). Z8000-11 Canadian health care facilities.
- FM Global. (2012). Emergency and standby power systems, *Data Sheet*.
- National Fire Protection Association. (2015). NFPA 99 - Health care facilities code.