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There are many factors to be considered when specifying backup generators for hospitals or other healthcare facilities where human life would be at risk if primary power was interrupted. Normally comprehensive and detailed supply specifications are written by consulting engineers or architect for public bids. These specifications will reference several codes for life-critical applications. This Information Sheet discusses the application of backup generator sets for Healthcare Facilities, and the key factors influencing specifications for generators used in hospitals, nursing home, and surgery centers for standby power applications.

1.0 LOCATION:

For existing hospitals whose standby power capabilities are being upgraded or increased, most generators will be placed outdoors, near the switchgear and load connections. Generator sets for outside locations should be in weather protection enclosures. Frequently enclosures are sound attenuated to minimize or eliminate noise.

New hospital designs may call for the emergency generators to be installed inside the facility. In this case, an unenclosed generator set could be specified with the required vibration isolation mounts in a generator room having the required sound attenuation. (Continued Over)

1.0 LOCATION (CONTINUED):

The generator location also must be chosen to minimize the loss of the emergency power service due to flooding, wind damage or other natural calamities, particularly in coastal areas susceptible to storm surges.

It is essential that there is easy access to the unit for technicians to carry out regular planned maintenance and to complete systems testing (load banking) at periodic intervals.

2.0 STABLE ELECTRICAL LOAD:

Healthcare system generators need to meet the voltage and frequency limits specified by healthcare equipment loads. In some cases, the generator will be supplying an emergency circuit, not the full load normally supplied by the utility. In this case, system managers will advise the characteristics of the load. Large motor loads such as elevators can effect variations in voltage.

3.0 CONTROLS:

An Automatic Transfer Switch (ATS) is required to automatically transfer the required load to the emergency generator when the utility goes off-line. How quickly the load will be transferred after a utility outage will be specified. When no interruption in power can be tolerated, an Uninterrupted Power System (UPS) will be specified. UPS supplies power while the generator is running up to speed to come on-line. Frequently the specification also will call for the generator to run for a minimum time after the utility power comes back on-line.

NFPA 110 codes require the generator system, including ATS, to be tested weekly on load for a minimum thirty (30) minutes.

4.0 PRIME MOVER:

Generators for healthcare facilities are frequently powered by diesel engines, but natural gas (NG) powered generators can be specified when approved by the local authority having jurisdiction. Fire codes can require gaseous sets to be located outside the facility.

5.0 ARRANGEMENT:

An outside installation requires the generator to be in a weather protecting enclosure. Frequently, the enclosure will be sound attenuated. Other generator arrangements can also include:

- Permanent Magnet Generator (PMG) voltage regulators to manage higher motor starting loads.
- Upgraded automatic voltage regulators (AVR's) to manage SER loads of certain medical testing equipment.
- Normally critical hospital grade silencers are specified with greater attenuation than regular residential silencers.

6.0 FUEL SUPPLY:

The planners' specifications will detail the diesel fuel tank requirements regarding how many hours the unit must run on full load, whether the tanks will be located remote from generator or in a sub-base tank under the generator, and environmental spill requirements. Fuel for gaseous sets will cover LPG storage tanks, or supply and location of NG.

The generator should be fitted with fuel filters including water separators. Planned maintenance programs to NFPA codes address testing of stored diesel supply.

7.0 MAINTENANCE AND TESTING:

Life critical installations should be regularly maintained through authorized distributor planned maintenance programs.

8.0 CODES:

In the USA, standby generator sets Healthcare Facilities have to comply with National Fire Protection Association (NFPA) Codes 99 – Standard for Healthcare Facilities (such as nursing homes that do not provide life support), and 110 – Standard for Emergency and Standby Power Systems, Level 1 or Level 2. Level 1 requirements are the most stringent, applied where failure of the standby system could result in loss of human life or serious injury. Level 2 is used where failure is less critical to human life and safety.

For Areas of Seismic Activity. Designers of key buildings (commercial and government buildings designated as essential facilities such as hospitals, schools, fire and police stations, and multi-unit housing) in areas of high seismic activity must take into account International Building Codes (IBC) covering building utility systems (e.g. a certified engine driven generator system)which must comply with shake table criteria laid out in Section 1708.5 and test standard IBC code ICC-ES-AC 156. The aim is to ensure that the generator will continue to operate despite seismic and wind related events. The codes include:

- UL 2200 for entire generator set.
- UL 142 for above ground steel fuel tanks.
- UL 891 for safety criteria for electrical switchgear up to 600 volts.
- UL 1008 for automatic transfer switches.
- UL 1558 for low voltage power circuit breakers.

To fulfill our commitment to be the leading supplier in the power generation industry, the Buckeye Power Sales team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our Information Sheets are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

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