Buckeye Power Sales
Reliable Power Professionals Since 1947

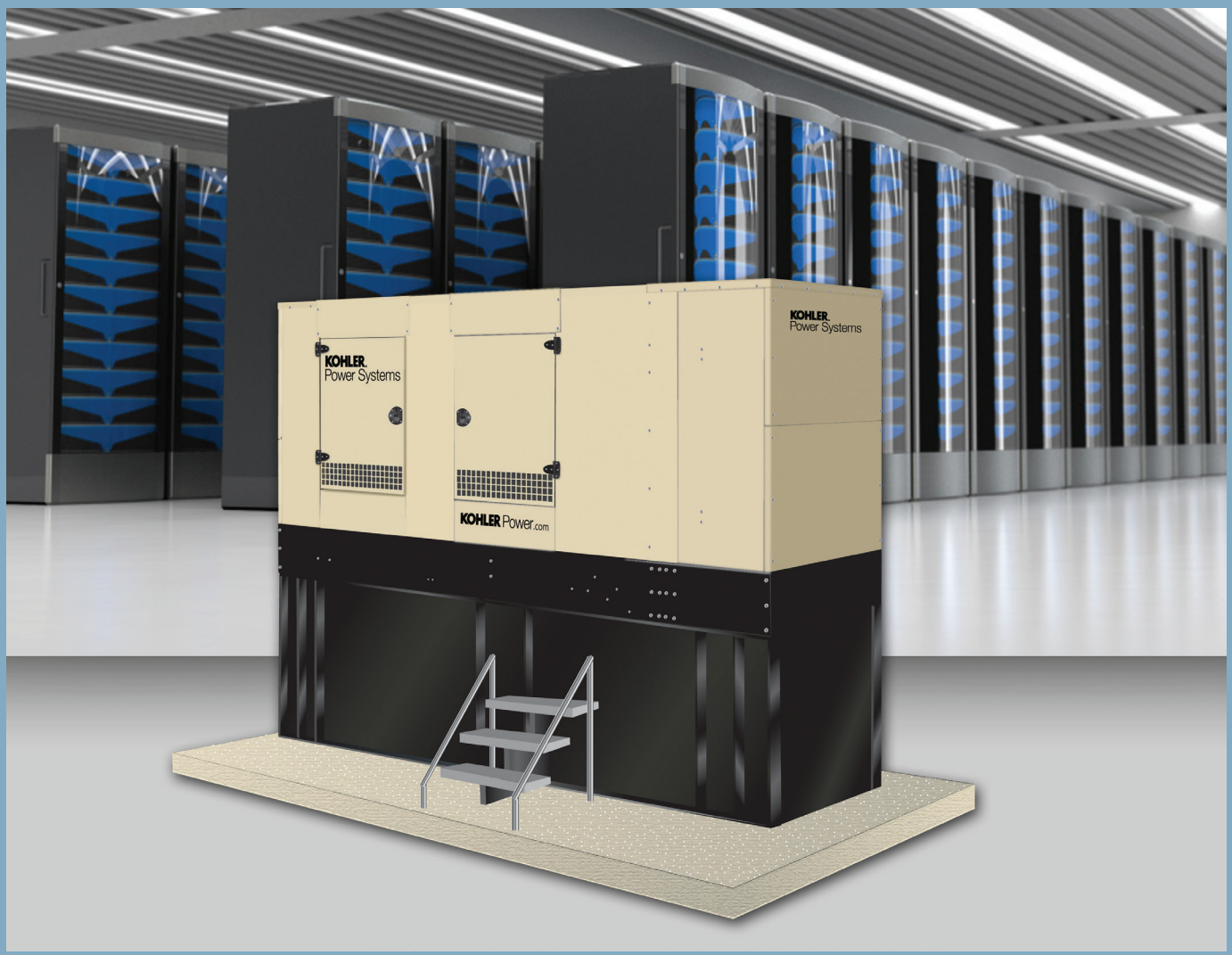
All types of businesses and commerce rely on data centers; they are vital in the management of information technology. Rapid growth in consumer and business reliance on stored data has driven the demand for data centers that hold customer's IT information. Data center customers rely on having 24/7 uninterrupted access to their data and are most unforgiving should a utility power outage interrupt access to their centrally stored data. Interruptions in access to critical data can impact both life and economic situations. This Information Sheet discusses the factors to be considered for data center loads and how they influence the specification of a generator set being used in standby power application.

1.0 LOCATION:

Emergency generators for data centers are normally installed outdoors in groups with weather or sound attenuated enclosures, and placed close to the data center building with switchgear mounted indoors.

2.0 EMERGENCY POWER AVAILABILITY:

While data centers try to utilize a number of different utility sources to lessen the likelihood of losing total utility power, all centers need an immediate UPS emergency source by means of battery banks and/or constant operating, and vertical flywheel units to bridge the time gap until the backup generators can come on line in 10 seconds or less. This is a critical function for this application. It is customary to have some degree of redundancy with an additional generator or two to permit planned maintenance programs on generators without the loss of the backup ability at site.



4.0 ELECTRICAL INPUT:

A stable electrical supply is not critical. However, the emergency generators should always be supplied, having the ability to handle any non-linear load distortions in the specific installation that may be present with battery rectifier systems, etc. It is worth considering an AVR upgrade to ensure such distortions do not result in system damage or overheating. Oversized alternators with permanent magnet excitation are normal features to mitigate any such problem.

5.0 PRIME MOVER:

Either diesel or natural gas (NG) fueled. The predominant fuel is diesel, as these engines come up to operating speed and accept loads in shorter times than NG units, as well as being more flexible and more responsive in handling load variations. It should be noted that the technology in large NG engines has improved to allow them to come online in under 60 seconds and accept 50% load in a single step.

6.0 GENERATOR ARRANGEMENT:

Data center standby generators mainly are fitted with free standing, weather or sound attenuated enclosures installed close together outside and adjacent to the main building. Suggested overall station design may include plans with space and wiring provision for the addition of future units as the center's load demand increase beyond original capacity.

Switchgear and transfer switches are normally placed inside the buildings.

7.0 FUEL SUPPLY:

Diesel fuel storage tank (s) of sufficient capacity should be sized to give sufficient emergency run time with utility power outage, say 48-hours. Diesel fuel system fitted with water separator and adequate filtration.

8.0 OPTIONS:

Energy-saving architectural designs such as reflective roof materials, chilled-water cooling system, green vegetation on sidewalls, etc. can reduce energy use by some 30%.

If standby generators are installed inside buildings, remote radiators are used to reduce the amount of outside air required for cooling purposes and also lower the mechanical load from the radiator fan.

International Building Code (IBC-2009) certification for installation in seismic areas and withstand wind speeds of up to 150mph.

9.0 CODES:

In the US, standby generators must comply at a minimum with the Environmental Protection Agency (EPA) exhaust regulations for stationary emergency generators and all local and state ordinances. If strictly used during power outage emergencies only (100 hours run allowed per year for maintenance and test), the EPA allows previous Tier 2 and 3 engines to be utilized. However, if any operation for other duties (peak load shedding, etc.) considered, they must comply with the latest Tier 4 regulations.

- 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

10.0 MAINTENANCE:

It is vital that adequate regular planned maintenance program be organized thus ensuring that backup generators are always in their very best operating condition and ready to run, by identifying any likely potential weaknesses in equipment before failure can occur.
Diesel fuel should also be checked regularly by lab analysis during planned maintenance visits with fuel polishing and/or additive treatment if necessary.

11.0 ADDITIONAL RECOMMENDATIONS:

We strongly recommend running units on normal station load for say 48-hours at time of equipment commissioning so as to simulate likely operational duty. If connected station loads are insufficient to reach nameplate rating, then employ suitable artificial load banks.

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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