

Protecting Your Power

Specifying the Best Outdoor Enclosure for Your Genset

If electrical power is lost, most business operations can no longer function. For many companies this can cost \$1 million per hour or more, so management has been challenged to identify a solution. Back-up power systems are often the answer to this potential threat.

The demand for back-up power systems is growing, and these installations are moving outdoors since indoor space is not available. Outdoor genset installations need protection from weather and environmental hazards. They need security that keeps vital equipment safe from unauthorized access. In many locales there also may be restrictions on the amount of noise generated by the system.

These requirements call for specialized enclosures that can deliver the protection, security and noise attenuation specified for a particular installation. As opposed to the simple sheet metal constructions of the past, today's outdoor genset enclosures play a vital role in ensuring that back-up power systems are ready to go whenever needed.

This article will review the key issues to be addressed when specifying an enclosure for an outdoor genset installation.

PROTECTION

Weather

Precipitation is the major problem. Depending on location, an installation will need protection from rain, sleet, hail, snow or a combination of these elements. An outdoor genset enclosure should have a moisture-resistant finish (often electrocoated steel), corrosion-resistant hinges, handles, and other hardware, a cambered roof to allow run-off, and rain shields on openings.

Rain penetration, as measured in ounces or inches of rain per hour, is a major concern in some installations. Doors are the most obvious openings that require shielding, but air intakes are a problem, also. These openings may need rain hoods or motorized louvers to keep precipitation out of the enclosure. Exhaust air dampers should close automatically when the genset is off to prevent precipitation from entering.

Consider snow accumulation around doors, louvers and dampers. If a system will be in an area that is regularly subjected to heavy snows, look for an enclosure that is designed to allow adequate air intake and exhaust even with heavy snow cover. Consider roof loading, as well. The enclosure roof needs the structural strength to handle the weight of accumulated snow and ice as measured in lbs/ft².

Wind can be a factor in some areas. An outdoor enclosure will need the structural strength to stand up to anticipated winds. High wind resistance (wind speeds of over 120 mph) may only be offered as an option.

(Suggested visual: Diagram of Cummins enclosure showing cambered roof and rain shields)

Environmental Hazards

Corrosion from salt spray is a serious issue in coastal areas. Many standard genset enclosures are constructed of electrocoated steel. A careful examination of enclosure specifications will indicate if a standard enclosure will stand up to corrosive agents in your setting. If a standard enclosure will not hold up in your location, many enclosure providers offer a corrosion resistant option.

Earthquakes are common enough in some locations to necessitate regulations for withstanding seismic activity. Thorough research of local ordinances will

indicate if an installation requires a seismic enclosure. Many enclosure suppliers offer seismic isolators as an option.

Sand, etc. Other environmental factors may be important in a location. Careful thought and research prior to installation will allow identification of all relevant factors and their inclusion in enclosure specifications.

(Suggested visual: Diagram of seismic package)

Security

Vandalism and other types of human interference are common problems. Lockable enclosure doors keep intruders out. Connections, switches and valves located *inside* the enclosure prevent interference with system operation. Access to the fuel tank and system controls should also be restricted. Remote monitoring of the back-up power system can be very helpful.

Rodents, insects and birds are common, non-human genset enclosure threats. Screens can be employed to guard against them. Screens may be standard or only offered as options by enclosure suppliers.

Sound Attenuation

Controlling “noise pollution” has become a major concern. Most locales have ordinances that set limits on permissible sound levels (as measured in decibels – dB) that can cross property lines. Gensets, by their nature, generate noise from engine operation. Enclosed gensets also generate noise at air intake and exhaust points.

The genset manufacturer will specify how much noise the operating equipment produces. That information combined with local regulations and the location of the installation relative to property lines allows calculation of the amount of sound attenuation needed.

Most outdoor genset enclosure providers offer one or more levels of sound attenuation as options. These providers can help specify the right enclosure package for an installation.

If sound attenuation is required, keep in mind:

- Sound attenuation will increase the overall footprint, complexity and cost of an installation.
- Sound attenuating materials act like insulation, increasing heat build-up in an enclosure.
- If sound attenuation is required, specify non-hydroscopic material to prevent moisture build-up inside the enclosure.
- Pay particular attention to noise generated at air intake and exhaust points. Specify silencers and other sound attenuating options as needed.

(Suggested visual: Photo or diagram showing size difference between “regular” and sound attenuating enclosure)

Other Issues

Temperature

Gensets operate at their rated output at up to 122°F (40°C). This maximum temperature can be reached quickly when a genset is enclosed. Heat generated by the equipment may not be rejected quickly enough, and ambient temperature may contribute to the problem. If the temperature in the enclosure climbs above maximum, the engine can overheat leaving the genset unable to deliver its rated output.

Specify an enclosure with adequate flow-through ventilation to speed heat rejection and keep internal temperatures in the optimum operating range. This will allow the genset to operate at its nameplate rating. This is especially important in areas where ambient temperatures are high. An enclosure that incorporates

advanced radiator, fan and louver designs can eliminate possible genset derating and may negate the need for costly remote radiator cooling systems.

Cold temperatures can rob a genset of power and make maintenance difficult. In environs where low ambient temperatures are common supplemental heating as well as motorized louvers and dampers may be needed.

Fuel

The genset manufacturer can specify the fuel tank size that meets specific installation requirements. A sub-base tank is protects connections within the enclosure and incorporates fuel storage in the overall footprint of the installation.

Often the sub-base tank only provides enough fuel for 24 hours of operation. Additional fuel must be stored in a remote tank.

Look for tanks that include dual-wall construction, fuel gauges, and provision for safely handling leaks, ruptures and overflow conditions. Locate tanks for easy filling.

Maintenance

Easy access is a key maintenance issue. This includes access to both the enclosure and the components of the genset that will require maintenance. The enclosure should have large access doors with retainers to keep them open. Further, drains, valves, filters and system controls need to be easy to get to.

Lighting – both inside and outside the enclosure – can make the tasks of system troubleshooting and maintenance easier. Lighting packages may only be offered as optional equipment by enclosure manufacturers.

(Suggested visual: Photo of someone doing maintenance on an enclosed genset))

Aesthetics

The “look” of the finished installation may be important. An installation in an out-of-the-way area may simply need to be functional. However, an installation in a prominent place on a corporate campus may need to be aesthetically pleasing.

Convenience

Some genset manufacturers offer pre-engineered packages that include a genset, enclosure and sub-base fuel tank. These packages can offer the specifying engineer additional convenience and excellent functionality.

(Suggested visual: More installation photos)

Specifying the best enclosure for a back-up power system is an important task since it influences overall system size, cost and output. However, it is not difficult. Start with a thorough assessment of power needs, installation location and environment. Then use the above information as a guide for writing specs. Many genset manufacturers will work with you to design an installation that fits all your specifications exactly.