

Generator Ratings

Overview

Generator ratings help you understand how much power a unit can safely deliver and under what conditions it is designed to operate. These ratings are set by the manufacturer and verified through standardized testing. Knowing how to read and interpret generator ratings is essential when selecting the right unit for your facility.

kW Rating (Real Power)

The primary rating most buyers pay attention to is the kW rating. This defines the generator's real power output at a specific voltage and frequency. A generator listed as a 300 kW unit is designed to support up to 300 kilowatts of connected load. This rating determines how many motors, lights, pumps, and systems the generator can power during an outage.

kVA Rating (Apparent Power)

Generators are also rated in kVA. This rating measures apparent power, which includes both real power and reactive power. Most commercial facilities operate at a power factor of 0.8, meaning the usable real power (kW) is about 80 percent of the kVA value. Understanding the difference ensures proper sizing for inductive loads such as motors and pumps.

Voltage Ratings

Voltage ratings define what electrical systems the generator can support. Common commercial voltages include 120/240, 120/208, and 277/480. Some generators are reconnectable to different voltages, while others are fixed. Matching generator voltage output to your facility's electrical system is essential for proper operation.

Frequency Ratings

In North America, commercial generators operate at 60 hertz. Frequency stability is critical for sensitive electronics, control systems, and industrial machinery. A well maintained generator maintains steady frequency under load, and variation may indicate mechanical or electrical issues.

Ambient Conditions & Derating

Ambient conditions affect generator performance. Manufacturers set ratings based on standard temperature and altitude. High temperatures or high elevation reduce available power because the engine receives less oxygen and cooling efficiency decreases. This reduction, known as derating, is especially important in regions such as Colorado or Wyoming.

Duty Cycle Ratings

Duty cycle ratings define how the generator is designed to operate. Standby rated generators are intended for emergency use only and can deliver full output during outages. Prime or continuous rated generators are built for long duration operation with different load expectations. Most commercial facilities rely on standby rated units.

Breaker Ratings & Protection

Breakers and protective devices have their own ratings. Breaker sizing determines how much current can safely be delivered. A generator may be capable of more output than the breaker allows, which is why breaker selection, load expectations, and safety margins must be aligned. Incorrect breaker sizing can cause nuisance trips or limit generator performance.

Why Ratings Matter

Understanding generator ratings ensures your unit is correctly matched to your facility's electrical system, environmental conditions, and operational requirements. Accurate interpretation leads to proper planning, reliable performance, and reduced downtime during outages. These ratings form the foundation of correct generator sizing and long term system reliability.