

Generator Set Ratings

Understanding Genset Ratings

Rating gensets for standby, prime or continuous power uses is based on industry and engineering standards.

Architectural engineers, contractors and even building owners and maintenance personnel have common questions about CAT genset rating criteria.

Following are answers to commonly asked questions:

Q. What is the meaning of standby and prime ratings?

A. Standby power ratings for specific genset models are determined under the following parameters:

- Peak cylinder pressure
- Exhaust temperature
- Smoke level
- Turbocharger speed (if applicable)

It is further defined as the output available with varying load for the duration of the interruption of the normal source of power. Ratings are based on fuel stop power in accordance with ISO 3046/1, AS 2789, DIN 6271 and BS 5514. The fuel stop is fixed for each engine model/configuration. It represents the maximum safe horsepower the engine model/configuration will be able to produce without exceeding the limits set according to the parameters.

Prime ratings are defined as the output available with a varying load for an unlimited time. It is set approximately 10% below the standby power ratings for each model/configuration.

Q. Are there any other ratings?

A. Continuous rating is output available with constant or near-constant load for an unlimited amount of time. These are determined in accordance with ISO 8528 as well as ISO 3046/1, AS 2789, DIN 6271 and BS 5514. This would typically only be used in parallel-to-utility base load application.

Electric Power Generation Rating Guidelines

Rating	Standby	Prime + 10%	Prime	Continuous
Typical load factor	60% or less	60% or less	60-70%	70-100%
Typical load	Varying	Varying	Varying	Non-varying
Typical hours/year	100 hours	500 hours	No limit	No limit
Typical peak demand	80% of standby rated kW with 100% of rating available for duration of an emergency outage.	80% of prime +10% rated kW with 100% rating available for duration of emergency continuous rated outage.	100% of prime rated kW used occasionally but for less than 20% of operating hours.	100% of kW for 100% of operating hours.
Typical application	Building service standby	Standby	Industrial	Base load
	Enclosure/sheltered	Rental	Pumping	Utility
		Power module	Construction	Cogeneration
		Unreliable utility	Peak shaving	Cogeneration
		Interruptible rates		

Note: For conditions outside the above limits, please contact Cashman Power Solutions. Typical load factors are the loads applied to the generator set divided by the engine operating hours under those loads.

Generator Set Ratings

Q. How do you apply these rating definitions?

A. Unfortunately there are no hard and fast rules to determine what generator set to utilize in any installation. However, the following guidelines can help you select the kW rating that best suits your application. Cashman Power Solutions can also help make judgements based on your load profile. Once the appropriate rating definition is determined, you may use CAT SpecSizer software to properly size your genset with your loads. It may be downloaded for free [here](#).

Prime Rated Gensets are Divided into Two Areas of Use

Prime plus 10% rated gensets are best utilized in standby, rentals or power modules, or where there is unreliable utility power and/or interruptible rates. These are generally used less than 500 hours per year with a typical load factor of 60% or less; peak demand is 80% of prime plus 10% rated kW with 100% of rating available for the duration of an emergency outage.

Prime-rated gensets are most common where the genset will be the only power source. At the prime rating, a genset can be used 24 hours per day, 365 days per year. They should be sized to meet the demands of a variable load that is 60 to 70% of the genset prime power rating, but can supply 100% of that rating for less than 20% of operating hours. These prime gensets are used for industrial pumping, construction, peak shaving and cogeneration applications.

Continuous Rated Gensets

Continuous-rated gensets are sized to operate at 70 to 100% of maximum load that is non-varying and has no hour-use limit. Typical peak demand is 100% of continuous rated kW for 100% of the time. Typically, this rating is used when the units are being operated in parallel with the utility and the output will remain constant, such as a cogeneration application.

An Important Note on Deration Factors

One of the most misunderstood aspects of generator set application is the effects of altitude and ambient temperatures upon machine performance. For example, just because a unit has a radiator rated for 122°F ambient, does NOT mean it will carry full load at that ambient temperature. As altitude increases and temperatures rise, air density decreases and it becomes increasingly difficult to force sufficient air into the combustion chamber for the engine to make full power. In our geographic area, it's critical both ambient temperatures and altitude are considered together – the two deration factors are additive. Example: a 200kW genset at 2,500ft and 122°F. According to manufacturers data, this unit derates 2% per 1,000' above 1,000' above sea level (ASL) and 3% per 10° over 77°F. At our given site, conditions with these deration factors, we have 1,500' of altitude and 45°F to account for and properly derate. 1,500' requires 3% of deration and 45°F requires 13.5% deration for a total deration factor of 16.5%. This means the 200kW unit you were expecting will only make 167kW(E) at these site conditions. Typically, the only way to overcome this is to oversize the generator set accordingly. Consult Cashman Power Solutions for assistance when determining the right machine for your application. Alternately, you may download CAT SpecSizer [here](#) and it will assist you in accounting for altitude and heat in sizing your generator set.