



Duty Rating Of Our Generators

◆ Three Classes of Generators:

- ◆ Electric power generators can be classified in one of three ways depending on their mode of operation: continuous, prime, or standby. Continuous and prime power generators are very similar as they function as the main source of power and are designed to operate continuously or for extended periods of time. The major difference between the two is that continuous generator sets are designed to operate continually with a consistent load while prime generators are designed to operate for long durations at variable load. The other type of generator – standby / emergency – are to be run only when there is an outage to the utility grid or the main source of power in a backup situation.
- ◆ Continuous and prime generators are primarily used in remote locations such as mining and oil and gas operations, construction, ships, etc., where there is no access to the grid to supply electric power. These are also used when there is a limitation on the amount of electric power that can be drawn from the grid. In case of gas generators, it is cheaper to generate power through the generator than to buy electric power from the grid. On the other hand, the need for standby power arises when there is a temporary disruption in the primary supply of electrical power.

◆ Why prime / continuous operating generators need to be more rugged

- ◆ Like any other machinery running continuously for long hours, continuous or prime generators also need to be rugged to handle the heavy loads supported by them. Additionally, these units have to be able to handle friction between moving parts for longer periods and handle sustained heat generation. There are several features that need to be incorporated in continuous power diesel generators to make them function efficiently over long periods. Some of these are detailed below:

◆ Cooling Systems

(i) For the engine:

- ◆ Prime generators typically have a large cooling system. Continuous fuel combustion in the engine causes enormous amounts of heat to be generated. This heat has to be removed by artificial means in order to prevent inevitable buildup of temperature. Engines are often cooled by circulating cooling water in a jacket around the engine. The circulating water absorbs heat from the engine and is in turn cooled by a large-sized radiator fitted with a fan. A cooling system is also required to cool lubricating oil. In very large industrial generators (2250kW and above), a cooling tower with heat exchangers is often required.

Since standby units work for only a limited time, they do not get heated up as much as prime generators do. Consequently, these units require smaller cooling systems. Some small capacity standby power generators can even be air-cooled eliminating the need for water circulation.

(ii) For the alternator:

- ◆ The alternator is also subject to temperature rise due to continuous flow of current through the windings of the alternator. Therefore, the alternator needs to have heavy-duty winding. The alternator operates continuously to provide uninterrupted power supply. Therefore, there is no specific cooling time that can be allotted for the alternator to cool down naturally. The cooling system usually restricts the temperature rise of an alternator to 105oC.

The alternators of standby diesel generators can withstand high temperatures for small periods of time but not on a continuous basis.

- ◆ Therefore, they are not designed to withstand prolonged exposure to high temperatures. These temperature limit differences require the windings of the alternator to have different insulation for prime / continuous vs. standby units.



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◆ Air Cleaner Assemblies:

- ◆ Since a prime generator would usually be in continuous operation, it is not possible to clean its internal parts and components intermittently. Therefore, continuous power generators require heavy-duty air cleaners, air filters, and air cleaner assemblies.

◆ Revolution Speeds:

- ◆ Normally, diesel generator sets operate at 1,500 revolutions per minute (rpm) but continuous power generators of larger capacities have been designed to operate at 1,000 rpm or even 750 rpm. This increases the life of the unit significantly and reduces maintenance costs. On the flipside, these diesel generator sets tend to be more expensive.

◆ Power Output:

- ◆ Continuously operated generators usually provide 25% to 100% of the rated capacity for an unlimited amount of time. In addition, these units usually provide only constant output at the rated capacity. In the case of loads entirely dependent on power supply from diesel generators, it is often prudent to have two identical generators installed. They should be connected such that when one of the units fails to function the other one should start up automatically. Standby generators usually provide varying outputs for the time specified. These generators should be connected with an automatic transfer switch so they start automatically when there is an outage from the main electrical supply.

◆ Which Generator Will Work For You – Continuous, Prime or Standby?

- ◆ Before you set out to purchase a diesel generator, it is very important that you be clear about the purpose of your generator. Sometimes a generator may be required for standby usage only. However, if power outages occur frequently and / or for long periods of time, it might be worth the extra investment in prime or continuous rated power generators to ensure uninterrupted supply of backup power for extended periods of time. If you try to operate your standby generator for longer than the prescribed number of hours at a stretch, it will most likely lead to more frequent breakdowns and malfunctioning of the unit.
- ◆ If you are unsure what type of generator is best suited for your particular application, be sure to contact ESL today and one of our knowledgeable representatives can help assess your situation and walk you through the process. Furthermore, ESL representative can brief you about limited prime operation vs. unlimited prime operation, number of hours of operation allowed under limited prime, unlimited prime and standby operations per year as well as maintenance prerequisites for each.