How to size & select mobile diesel generators

To Supply GENERATOR		To Ask LOAD
kW	>	Required kW
kVA	>	Required kVA
Voltage	=	Required Voltage
Frequency	=	Required Frequency
# of Phases	=	Required # of Phases
Load step acceptance G2 or maximum	>	Biggest load step
Voltage dip at load impact (Alternator spec)	<	Maximum allowed voltage dip
Overload capability of the alternator	>	Starting current of Electric Motors

Derating

- A derating table consists of an engine derating table and an alternator derating table combined.
- Engine manufacturers provide us with the necessary data to create this table.
- For the generator diesel engine we must always take into account the **altitude and temperature of the environment.** The higher the altitude, the less oxygen there is in the air, so the less power we obtain from the engine.

Load step performance

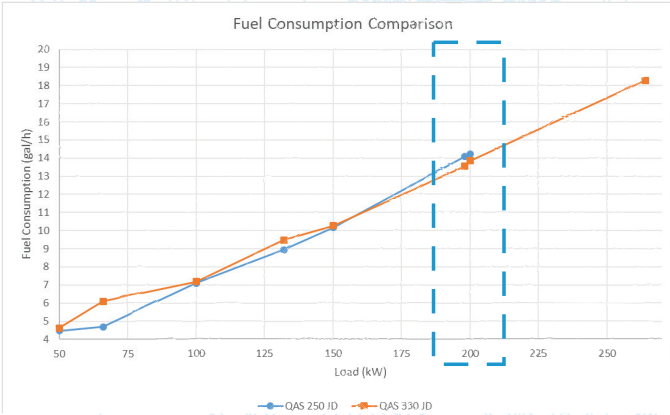
- On the specs sheets of the generator you'll find **'single step load capability',** which shows 100%. This means that this machine is capable of taking a zero to 100% load in one step.
- 'Single step load acceptance' shows the performance within class G2. This means that the generator can have a load step of X% and still be within the allowed voltage and frequency requirements according to the G2 class regulations.

Low load conditions

- Low loads are defined as less than 30% of the generator capacity and running for long periods of low load operation should be avoided because they are of the main causes of **Wet Stacking.**
- Wet stacking is when there are deposits of carbonized oil & unburned fuel building up within the exhaust system.
- With heavy carbon build-up on pistons, piston ring grooves, valves and turbo charger it can bring severe engine damage and decreased engine lifetime. **Low load conditions also lead to oil leaks and risk of fire.**
- Low loads can be avoided by **providing adequate sizing** for the application with an average load of more than 30%.
- PMS (Power management system), Use of artificial load, or Work in Hybrid mode with Energy Storage Systems are also good solutions to avoid low loads.

Fuel Consumption

- When diesel engines run at constant speeds, the peak of efficiency **is reached at around 80%**.
- The example below shows that for the same load of 200kW, it's a better choice to go with a QAS 330 instead of a QAS 250, due to a better fuel consumption and the extend the lifetime of its engine.



Alternator overload capability

- A self-excited system, usually called as SHUNT system, has only a 180% overload capability, whereas a **PMG or AREP system** has a 300% overload capability for up to 10 seconds . This is an important diff erence f or motor starting where very high start-up current peaks are required.
- PMG or AREP system is the best option for motor starting applications, as it allows a lower size of generator to operate, bringing savings not only on the asset investment, but on operational costs as well.

Atlas Copco Power Technique
1059 Paragon Way, Rock Hill SC
Phone: (803) 732-6762

atlascopco.com/en-us/construction-equipment

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