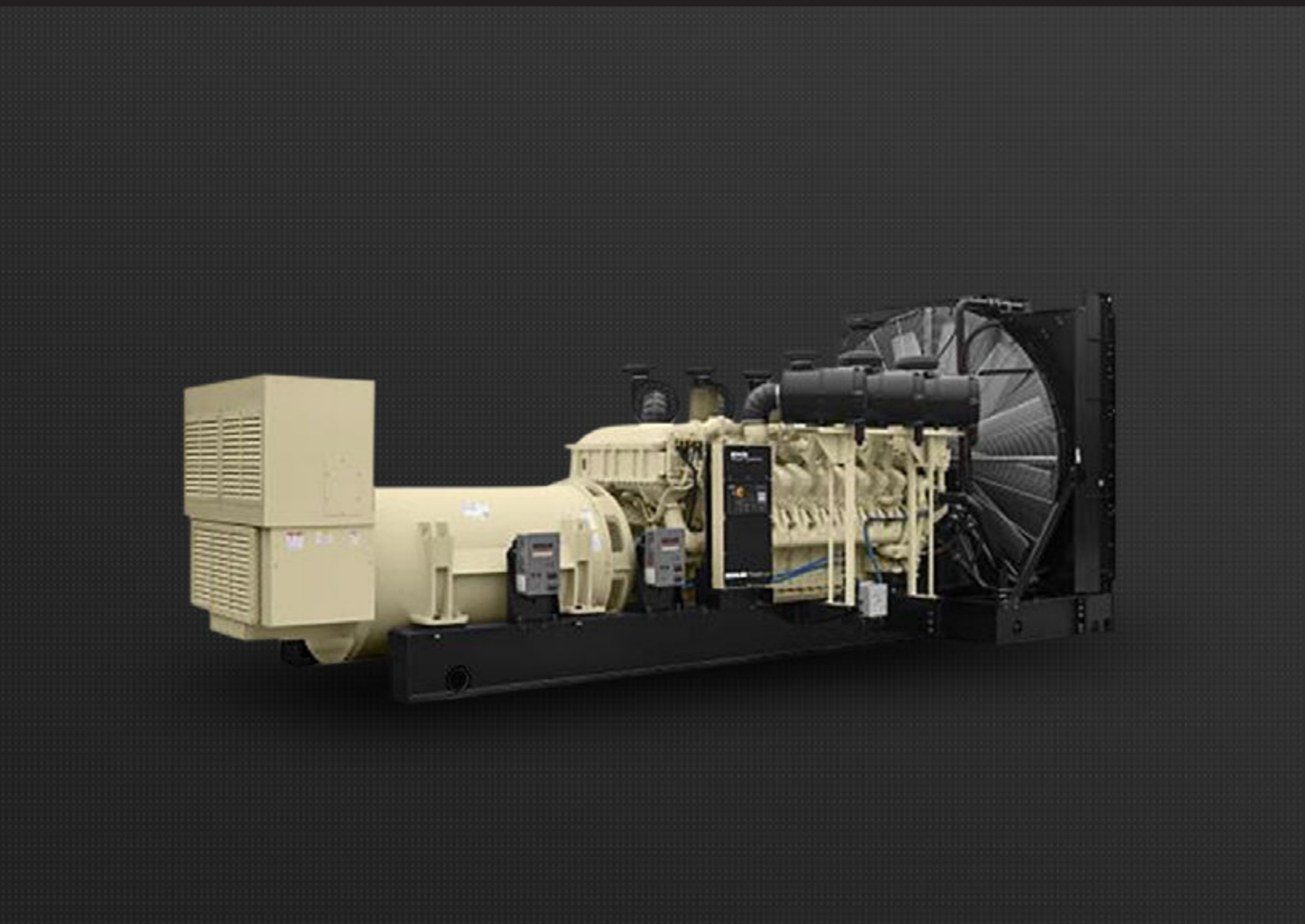
CK POWER®

KEYS TO RUNNING YOUR **GENERATOR EFFICIENTLY**



No one wants to invest in their equipment more often than they have to. That's why running backup and prime power generators efficiently is important. It helps prolong the life of the machinery and keeps it running great, every time it's called upon.

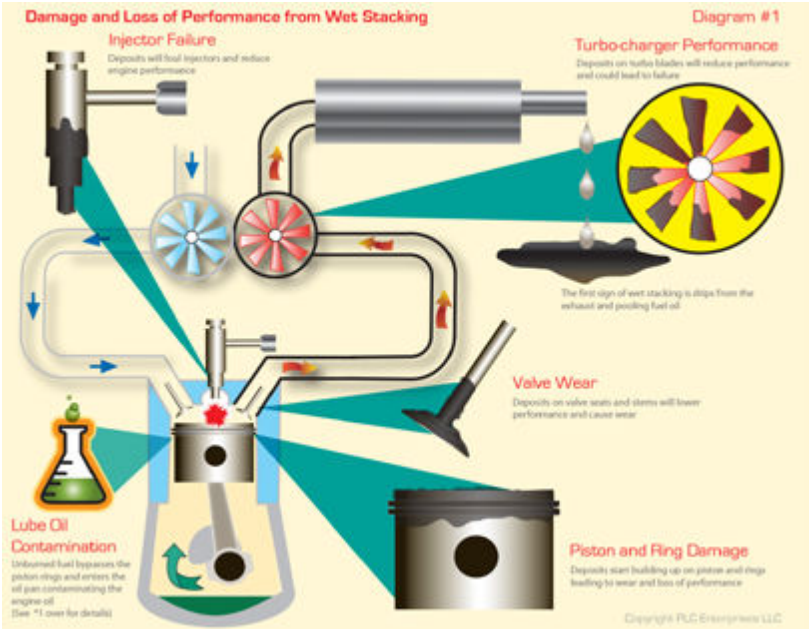
Running a generator improperly isn't like running a car that's overdue for an oil change. Whereas it's possible to go more than the recommended distance before getting your oil changed, running a generator without keeping up with maintenance or while "light loaded" will inevitably shorten the lifespan of the generator.

When not maintained and loaded properly, generator sets can be the cause of unplanned downtime, increased time spent on regularly scheduled "lifecycle" maintenance and increased operating costs from excessive fuel consumption, undue wear and increased emission outputs.

WHAT DOES DIESEL GENERATOR EFFICIENCY MEAN?

All generator sets, whether diesel or natural gas and regardless of application, load setting and operation, are designed to provide power in the most efficient manner possible. As such, every generator set will have an optimal workload-to-fuel-consumption sweet spot. Because different engines consume fuel at different rates, and higher workloads almost always burn fuel most efficiently, diesel generator efficiency is usually achieved at the higher end of the load setting the generator was designed to maintain. A 15kw residential generator, for instance, may have lower fuel consumption operating at 10kw rather than at 6kw.

One of the most prevalent problems with diesel engines running below their designed load capacity for extended periods of time is the phenomenon known as “wet stacking.” Wet stacking occurs when unburned fuel is exhausted due to low operating temperatures. When unburned fuel is exhausted from the combustion chamber, it starts to build up in the exhaust side of the engine, resulting in fouled injectors and a buildup of carbon on the exhaust valves, turbo charger and exhaust.



To avoid wet stacking and other problems resulting from running your generator on a light load, it's important to run your generator within its optimal range as often as possible. Here are some commonly accepted best practices for achieving diesel and natural gas generator efficiency.

Generator load settings

- **Standby and prime powered diesel generators** - These generators are usually optimized to run at 50-80 percent of total load rating
- **Continuous-rated diesel generator** - These generator sets are usually optimized to run at 70-100 percent of total load rating
- **Natural gas generator sets** - Regardless of application and rating, natural gas generator sets are almost always optimized to run between 70-100 percent of total load rating

Running your generator on a light load for extended periods of time will have an impact on the health of your equipment. It's likely to lead to unscheduled downtime, higher maintenance costs, decreased fuel efficiency and an overall shortened service life for the generator. Remaining within its optimal load bearing recommendations is key to diesel generator efficiency.

ENSURING GENERATOR LONGEVITY

Light loading responsibly

While it's not advisable to run generators below their optimal workload-to-fuel-consumption level, the reality on job sites and in emergency situations sometimes demands it. If this happens to be the case, regularly scheduled and preventative maintenance regimens become even more crucial for maintaining the health of the power system. Generators regularly expected to run on light loads should be subject to more rigorous maintenance regimens to ensure there's no excessive wear or deposit buildup.

If generators must be run at light load for a period of time, then in general they should afterwards be run under an increased load. This raises the temperature and pressure within the generator's cylinders, which helps to clean off deposits in the combustion chamber.

Light loading should be even more limited for natural gas generator sets. It's recommended that they be run at a 0 to 30 percent load level only for half and hour, and from 31 to 50 percent load level for only two hours. All light loading should be followed by at least two hours of running at no less than a 70 percent load level.

Scheduled and preventative maintenance

Scheduled and preventative generator maintenance plans are a must for users looking to prolong the life of their generator equipment. For generators in critical applications, such as standby generators at hospitals, data centers and laboratories, generator maintenance plans are an absolute must.

Some components of a scheduled maintenance plan may be as simple as the user making sure generator exercisers are in place and working properly. These kick on the generator at set intervals to verify that everything is working properly.

Load bank testing is another critical element in a preventative generator maintenance plan. This test artificially boosts the load placed on the generator, usually to about the height of the generator's output capacity. This helps to erase any effects of wet stacking or other buildup, and to verify that a generator is actually capable of performing at its peak output rate. It is generally recommended that load bank testing be conducted at least once per year.

The ambient conditions in which a generator operates will also have an effect on how often it should be serviced. Dust, moisture, salinity, altitude and extreme temperatures will all have a bearing on how often routine generator maintenance should be conducted.

In general, regularly scheduled "lifecycle" maintenance can save time and money by preventing downtime, allowing for small issues to be addressed before they become large ones and by prolonging the service life of the generator.

DIESEL GENERATOR EFFICIENCY AND TIER 4

As is the case in many sectors of the power generation industry, the EPA's final Tier 4 regulations are shaking up the way we buy and maintain diesel generators. Many of the diesel generators designed to meet Tier 4's new emission standards are even less tolerant to light loading than previous models were. This is largely due to the fact that the selective catalytic reduction (SCR) components, which were introduced to reduce NOx emissions, must operate within a very narrow temperature range.

It's also important to realize that final Tier 4 diesel generators cannot be operated without the additive diesel exhaust fluid (DEF). DEF is a non-hazardous solution that's sprayed into the exhaust stream of diesel engines to help to reduce NOx emissions. In addition to verifying a Tier 4 diesel generator is running with the proper levels of DEF, it's also key to verify beforehand that a particular type of DEF is approved for use with the specific generator model.

Final Tier 4 standards are tweaking best practices for running diesel generators efficiently. While some of the effects are new to all of us, it's always best to consult experienced engineers who know how this type of machinery will function with new components and additives. Consulting a professional before any adverse effects of inefficient operation have time to add up will help to prolong the life of final Tier 4 generator equipment.

LET'S TALK

CK Power is a leading supplier of generators for both prime and standby applications. Our staff of engineers is made up of experts experienced in helping our customers choose and maintain the equipment that's right for them.

Visit our generator services page for more information on running your generator efficiently, or get in touch with CK Power today to discuss your generator needs.

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