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PowerHour FAQs

Emissions and Air Permitting Requirements for Generator Sets

Air permits for standby generator sets vary considerably from site to site, and when misunderstood can have a major impact on project success. Although EPA regulations have stabilized, ever-increasing local requirements are making air permitting critical for engine-driven generator sets. This overview of regulated emissions is intended to provide a foundational understanding of engine emissions. Next, the EPA's New Source Performance Standards (NSPS) will be reviewed as they relate to both compression-ignited (diesel) and spark-ignited (natural gas or propane) engine-equipped generator sets. Content includes a discussion of common pitfalls related to emissions permitting and various strategies employed to meet local emissions regulations.

To learn more about emissions and air permitting requirements, please join the Cummins PowerHour webinar:

Following this PowerHour participants should be able to:

- Recognize commonly regulated exhaust emissions constituents.
- Describe EPA emissions requirements for diesel and gaseous standby generator sets
- Identify common requirements for permitting engine-driven generator sets

Is it correct to say that the EPA defines a stationary emergency application as any application where there is a loss of the normal power, regardless of the type of load supplied, life safety or optional owner?

Yes, as far as the EPA is concerned, a stationary emergency application is any emergency situation that is caused by the loss of the normal source of utility power. It doesn't matter what kind of load is being served by the generator set. If there is a loss of the normal source of power, that is considered a stationary emergency application.

There have been a lot of questions about renewable applications, including solar and wind. In most cases, the EPA has stated that if a backup generator set is serving a remote location where there is no utility power source, and

the generator set is backing up the solar power source, that is still considered stationary non-emergency. This is a topic of discussion in the industry and may change, but for now stationary generator sets backing up renewables such as solar are considered stationary, non-emergency.

If you can't qualify a converted generator set as Tier 4, why do the conversion?

In general, it might be worthwhile to upgrade an existing generator set to meet more stringent local regulations, even if the upgraded generator set would not qualify as Tier 4. A generator set might have originally been certified by the manufacturer as Tier 2, and the owner could then have an after-treatment system installed to bring the generator set up to Tier 4 levels. Why do this conversion, especially when there's a cost associated with the upgrade and it may negatively affect performance? This might be done to comply with a strict state requirement in a state that's trying to drive emissions down to meet national air quality standards.

We often see this at large sites, such as a data center or hospital campus, where there are a large number of generator sets onsite—60, 80 or even 100. The sheer number of engines can attract the attention of the air authority, simply because of the relatively large potential for emissions. The air authority can require the owner to add after-treatment systems to ensure that use of the generators would not adversely impact local air quality.

Some states and localities require a number of one-hour tests to demonstrate compliance. Is it possible to do this testing at the factory?

Most of the time the local air authority will require onsite testing. Typically, factory testing is not acceptable. The manufacturer's nominal emissions data is not acceptable, either. Because

the air authority wants assurance that the local emissions standards will be met onsite, in a real-world situation. The local authority wants proof, and onsite testing is the best way to achieve this.

Are there exemptions in Alaska for off-road standby generators that are not in the road system or Alaska marine highway system?

There are areas in North America under EPA jurisdiction that do have exemptions. Typically they are at locations off the highway system. You should always work closely with the local air authority—the local leaders and the local experts. Determine who you should be contacting at the local Air Board and verify what the requirements are in that area.

EPA requirements stabilized in around 2015 when Tier 4 was implemented and we don't foresee any changes in 2020. But state requirements and local requirements can change month to month. It can be challenging to keep track of all of these requirements; that's why it pays to have a contact on the local air board, and to consult with local leaders and experts at the planning stages of your project.

What are the Tier 4 requirements for documenting usage?

For stationary, non-emergency certified generator sets, there may be different reporting requirements depending on the locality. For example, some state or local air boards have runtime limitations, despite the fact that the EPA doesn't limit runtime for stationary, non-emergency applications. The local air board may say the generator can only run for 500 hours, or some other arbitrary number.

The challenge is, how do you document that? How do you track the runtime hours? There are solutions available from various manufacturers. The generator set controls may have a feature that tracks runtime and other key metrics. Some master

controls have automated reporting features that automatically generate reports indicating runtime and test time. Some also keep track of maintenance schedules. This is another situation where you need to understand the local requirements and then work with your vendor to see if there is a way to automate some of the tracking, and eliminate the manual reporting process.

Please discuss ability of manufacturers to perform witness testing with the after-treatment system installed.

Exhaust after-treatment systems are often as large as the generators, especially for high horsepower products. In many cases, the after-treatment system is installed on top of the enclosure. High horsepower generator set manufacturers usually work closely with the enclosure fabricator to customize a system that is appropriate for the specific site. As a result, after-treatment testing is sometimes done at a third-party facility rather than at the factory. This ensures the testing is performed with the proper load bank, under conditions that are as close as possible to the installation site environment. In most cases, testing is done onsite with the after-treatment system installed, as part of the commissioning process. On-site testing is the best way to demonstrate compliance for the applicable air board.

If my project requires 1,000 kW of power, would the EPA requirements be less stringent if I specify two 500 kW generator sets rather than one 1,000 kW?

It is true that as the size of the generator set increases, the emissions requirements change. But generally the smaller generators have to meet more stringent Tier 4 or Tier 3 requirements, not less stringent. Tier 2 might be sufficient for higher horsepower systems.

It's best not to specify generator sets by Tier level. Rather, specify the usage category such as

stationary emergency. This ensures that whether you're specifying one 500 kW generator, two 500 kW or a 1,000 kW product, the generators will be EPA certified for stationary emergency use, regardless of the Tier level.

You need to work closely with the local air board to understand their requirements. If there are varying requirements for different sizes of generator sets, you should work closely with the generator set manufacturer to understand what the optimal combination of products would be for your specific application and location. In some cases, the state authority may have stricter requirements for smaller generators and it might be easier to select a larger product.

You mentioned that Cummins does not manufacture after-treatment systems and Cummins does not endorse any particular third-party product. When a stationary generator set does not meet emission standards, where do I go to find a solution for my customer?

Cummins does offer a full lineup of products and components in addition to generator sets, including engines, turbochargers, filters, transfer switches and switchgear. We do provide after-treatment products that can be installed on existing generator sets in the field, especially for high horsepower systems. But Cummins believes that the best solution is for the manufacturer to install after-treatment components at the factory, before the generator is shipped to the customer.

There are a variety of third-party after-treatment vendors, and some of them provide good products that can be tailored to work with a variety of Cummins generators. Consult with your Cummins representative or other generator set supplier to understand what types of after-treatment systems are available, and which solution is best for your particular application.

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