



## Your Reliable Guide for Power Solutions

To fulfill our commitment to be the leading supplier in the power generation industry, the Total Energy Systems, LLC. team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our **Information Sheets** are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

### EPA Emissions Standards for Emergency Standby Diesel Generator Sets

#### 1.0 Introduction

The US Environmental Protection Agency (EPA) issued its final exhaust emission regulations in 2010 for emergency Standby Diesel Generator Sets, which took effect on January 1, 2011.

***This Information Sheet discusses the regulations for diesel standby sets and generator set systems that qualify.***

EPA began to enforce limitations on exhaust emissions for off-highway diesel engines in 1996, and in 2006, for stationary diesel generator sets. These 'progressive' regulations (called Tier levels) became more stringent over the intervening years and have had a major effect in substantially lowering the levels of nitrogen oxide (NOx), carbon monoxide (CO), particulate matter (PM) and non-methane hydrocarbons (NMHC). *(Continued over)*

By the time that Tier 4 Final regulations are introduced in 2013 and 2014 (Table 1), the NOx and PM levels from diesel exhaust will have been reduced by 99%. These Tier levels were introduced and 'staggered' over this time frame, dependent on the generator diesel engine horsepower (or metric mechanical kW equivalent) and NOT the kW output per the generator nameplate.

Diesel engine manufacturers were able to achieve compliance by in-engine or internal design changes (e.g. combustion chamber, fuel injection pressure, valve timing, cooled exhaust gas recirculation, and engine controls) to meet the Tier 2 and Tier 3 regulations and this has resulted in an emission reduction improvement of more than 85%.

#### 2.0 Alternative standard (see table 2 overleaf)

EPA has found that the low exhaust emission rates with Tier 2 and Tier 3 engines will be acceptable for Emergency Standby Power (ESP) installations and thus they are exempt from the need to use Tier 4 Interim and Tier 4 Final diesel engines. The smaller HP sizes (below 50hp) however already are required to comply with Tier 4 Interim (since 2008). In addition, ESP's normally only run for less than 200 hours per year and thus have a very small impact on the local air quality. There is no limit to the number of hours run in true emergency occasions such as utility outages or equipment malfunctions. This means that such generators will be in compliance with EPA through 2015 and beyond where they are used strictly for emergency duties. Currently, they will be allowed to be run for up to 100 hours per year for testing and maintenance purposes. This definition is under review and may be increased later in 2011.

#### 3.0 Definition of "Emergency Standby" Applications.

These are generator installations that ONLY operate (i.e. limited operation) upon the loss of a normal power source such as the utility or mains grid. In this instance, when the normal power source is lost, the emergency generator starts to supply the electrical loads. Once the normal power source is reestablished and the emergency generator shuts down, these electrical loads are once again supplied from the normal source.

All operation of an emergency generator MUST be recorded by the user and referenced to a non-resettable hour recorder fitted to the genset. Any new emergency diesel engines that are built after the effected introduction date of the Tier 4 regulation MUST also be fitted with a permanent label stating that they are only for emergency use.

#### 4.0 Exemptions.

State and local authorities may dictate stricter regulated emissions limits. For example, the State of California will not exempt emergency diesel generators with these applicable EPA rules in 2011 and will enforce even lower regulations for non-emergency stationary engines. This will result in the large majority of generator sets sold into California to require the supply of exhaust after-treatment devices, beginning in 2011.

Certain regions and locations in the United States of America may also enforce more stringent stationary emission regulations than the EPA diesel engine Tier levels. These include non-attainment areas, normally large population centers, where either high local emissions, local weather conditions, or ozone concentrations exceed the EPA air quality standard recommendations. For example, we can refer to such as areas of Southern California; areas of many New England states; Atlanta, Georgia; and Houston, Texas. This means that a stationary diesel-fueled emergency generator set – even if certified to the appropriate EPA Tier level, may not meet the local requirements. As the EPA lowers National Ambient Air Quality levels across the nation, more areas are likely to fall into non-attainment status and therefore further engine emission regulations are likely to be implemented.

#### 5.0 Further Reading

The final authority on emissions regulations governing emergency standby diesel generator sets rests with Environmental Protection Agency (EPA) for access to their site go to: [www.epa.gov](http://www.epa.gov)

**TABLE 1. TIERS 1 - 4 RELATING to STATIONARY NON-EMERGENCY & MOBILE GENERATOR SETS**

Horse Power	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
<11					Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>11 - <25					Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>25 - <50				Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>50 - <75			Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>75 - <100				Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>100 - <175		Red	Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Green	Green	Green
>175 - <300	Red	Red	Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>300 - <600	Red	Red	Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow
>600 - <750	Red	Red	Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Green	Green	Green
>750				Red	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Yellow	Yellow	Yellow

i = interim    Red = Tier 1    Blue = Tier 2    Yellow = Tier 3    Orange = Tier 3 Flexibility    Dark Blue = Tier 4i    Green = Tier 4i Flexibility    Light Yellow = Tier 4 Final

**TABLE 2. APPLICABLE TIERS for STATIONARY EMERGENCY STANDBY POWER (ESP)**

Horse Power	April 2006	2007	2008	2009	2010	2011	2012	2013	2014
<11	Red	Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
>11 - <25	Red	Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
>25 - <50	Red	Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
>50 - <75	Red	Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
>75 - <100	Red	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
>100 - <175	Red	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
>175 - <300	Red	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
>300 - <600	Red	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
>600 - <750	Red	Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
>750 - <3000	Red	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
>3000	Red	Red	Red	Red	Red	Blue	Blue	Blue	Blue

Red = Tier 1    Blue = Tier 2    Yellow = Tier 3    Dark Blue = Tier 4