

Frequently Asked Questions for Stationary Internal Combustion Engines



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Disclaimer: The BAPC reserves the right to modify this guidance at any time. This document supersedes any previous documents that relate to stationary engines issued by the BAPC.

1) I have a generator that I need to add to my permit. What information should I provide?

- *The BAPC permits the engine that is powering the generator. The facility should provide the horsepower, specification sheet, and any other information about the engine. If the facility has the unit already onsite this information would be shown on the engine plate of the generator.*

2) What do I need to provide in my application if I have an engine at my facility?

- *Manufacturer's specification that includes maximum fuel flow, rated power (in hp or kW), and EPA certified emissions (e.g. for 40 CFR Part 60 Subparts IIII, JJJJ).*

3) How do I comply with the maximum fuel rate?

- *For all fuel types – install a fuel flow meter (additional monitoring requirements will be written in the permit); or*
- *For all fuel types – provide a manufacturer's specification sheet displaying the maximum fuel consumption rate; or*
- *For diesel fuel only – Provide a photograph of the engine's name plate displaying the horsepower or kilowatt rating.*

Example calculation to obtain the fuel flow of diesel fuel can be found below:

$$\text{Fuel Rate}_{\max} = 7,000 \frac{\text{Btu}}{(\text{HP})(\text{hr})} * \frac{\text{gal}_{\text{diesel}}}{140,000_{\text{Btu}}} * \text{HP} = X \frac{\text{gal}_{\text{diesel}}}{\text{hr}}$$

The conversion factor in units of $\frac{\text{Btu}}{(\text{HP})(\text{hr})}$ for other fuel types vary widely; therefore, the Fuel Rate_{max} equation above is recommended for diesel fuel only.

4) Which emission factors should I use to calculate emissions?

- *EPA certified emissions (e.g. for 40 CFR Part 60 Subparts IIII, JJJJ); or*
- *Worst-case emission factors included in the manufacturer specification sheet; or*
- *The appropriate AP-42 emission factors; or*
- *For propane engines – CARB, attached to this guidance; or*
- *Other approved emission factors.*

The requested emission limits cannot exceed any applicable federal emission standards.

5) Which SO₂ emission factors should I use for diesel?

- *A mass balance calculation is acceptable and must provide step-by-step calculations showing how the emissions were derived. Please refer to the example below.*

$$EL_{\frac{\text{lb}}{\text{hr}}} = FR * \rho_{\text{diesel}} * S_{\text{diesel}} * \frac{2 \text{ lbs SO}_2}{1 \text{ lb S}} \qquad EL_{\frac{\text{ton}}{\text{yr}}} = \frac{FR * \rho_{\text{diesel}} * S_{\text{diesel}} * \frac{2 \text{ lbs SO}_2}{1 \text{ lb S}} * \frac{\text{hrs}}{\text{yr}}}{2,000 \frac{\text{lbs}}{\text{ton}}}$$

Where:

FR = *The requested combustion diesel fuel rate in gallons per hour (gph).*

ρ_{diesel} = *Density of diesel in pounds per gallon. The BAPC default value is 6.943 lbs/gal*

S_{diesel} = *Sulfur content of diesel fuel in parts per million by weight (ppmw).*

EL = *Emission Limit*

Note: Modern diesel cannot exceed 15 ppm S pursuant to 40 CFR 80.510(b). The SO₂ emission limit of an engine is dependent on the sulfur content of the fuel. The fuel supplier should provide the sulfur content of the fuel.

- *AP-42 Chapter 3.4 SO₂ emission factors may be utilized for small and large diesel and dual fuel engines.*

6) What is the maximum number of hours per year I can operate my emergency engine?

- *Emergency engines are limited to 100 hours per year of non-emergency use. Operating hours are not limited during emergency situations.*

7) AP-42 provides emission factors in units of lb/hp-hr and lb/MMBtu. Which one should I use?

- *The BAPC prefers emission factors in lb/MMBtu; however, both are acceptable.*

8) What if I have a NMHC+NO_x emission factor?

- *This emission factor may only be used to calculate NO_x emission limits and no other pollutant.*

9) What federal subpart(s) is my engine subject to?

- The table below is a summary created by NDEP. Other resources through EPA under <https://www.epa.gov/stationary-engines/implementation-tools-neshap-reciprocating-internal-combustion-engines>, the business environmental program (<https://unrbep.org/>), and consultants are available.

Federal Subparts Which May be Applicable			
Engine Type	Year Engine Manufactured	You may be subject to...	Reference
Compression Ignition (CI) (i.e. Diesel)	2006 and Older	40 CFR Part 63, Subpart ZZZZ	40 CFR 63.6580
	2006 to Present	40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ	40 CFR 60.4200 40 CFR 63.6580
Spark Ignition (SI) (i.e. Gasoline, Natural Gas, or Propane)	2007 and Older	40 CFR Part 63, Subpart ZZZZ	40 CFR 63.6580
	2007 to Present	40 CFR Part 60, Subpart JJJJ and 40 CFR Part 63, Subpart ZZZZ	40 CFR 60.4230 40 CFR 63.6580

10) What if I submitted an application for a generator that I have not purchased yet and/or have a range of sizes that may apply?

- *In the application, please include the largest rated power (worst case) of the applicable standard and calculate the emissions with an environmental evaluation (as applicable).*

For example, if purchasing a Tier 3, year 2007 or newer diesel engine within 37 kW to 74 kW, the emissions must be calculated utilizing a rated power of 74 kW (see example table below). In your next permitting action (ie. renewal or revision), you may ask for the details to be updated in the permit as applicable.

Table 3 to 40 CFR Part 1039 Appendix I – Tier 3 Emission Standards				
Rated Power (kW)	Starting Model Year	NO _x +NMHC (g/kw-hr)	CO (g/kw-hr)	PM (g/kw-hr)
37 ≤ kW < 75	2008	4.7	5	0.4
75 ≤ kW < 130	2007	4	5	0.3
130 ≤ kW ≤ 560	2006	4	3.5	0.2

- *If your purchased generator is larger than the worst-case scenario you applied for and has been permitted, you must submit a revision application.*

11) What do I do if I need to replace my generator?

- *If your proposed replacement generator matches the subpart requirements as the permitted generator and the descriptions in 10 above, then you may replace that generator without a permit revision.*

For example, if the original generator was a Tier 3, year 2007 or newer 50 kW diesel engine (permitted as described in 11 above), and the proposed replacement generator was 74 kW, then the facility may continue with the replacement without a permit revision if the generator was permitted with the larger rated power. The unit description of the proposed generator may be updated in the next permitting action as appropriate (ie. next renewal). However, if the proposed replacement generator was 80 kW, a permit revision application must be submitted to move forward with the replacement.

- *It is the facility's responsibility to confirm the parameters of the generator with the startup notification to the BAPC to avoid potential violations.*

Attachment 1

E08 - ENGINE, PROPANE FIRED, UNCONTROLLED

CALCULATION METHODS

$E_a = U_a \times EF$ (lbs/1000 gallons)

$E_h = U_h$ (gal/hr) \times (1/1000) \times EF (lbs/1000 gallons)

NOTES:

- Control efficiencies must be included in emission factors since the calculation procedure will not refer to this data.

- There are no current emission factors specified in AP-42 for propane fired engines. Previous factors were identified in the ARB Instructions for the Emission Data System (8/91), Appendix III, Page III-7.

- Trace metal emission factors are assumed to be negligible for propane fuel.

- Trace organic compounds are assumed 100% propane. ARB VOC Speciation Profile 719 (8/91) is for natural gas not propane.

POLLUTANT	District Emission Factor	REFERENCE	ARB	(UNITS)	COMMENTS
	(lbs/1000 gal fuel burned)	DOCUMENT	FACTOR		
NOX	139.00	See Comments	139	(lbs/1000 gal)	ARB "Instructions for the Emission Data System Review & Update Report 8/91".
CO	129.00		129		
SOX	0.35		0.35		
TOG	83.00		83		Assume all TOG and ROG is propane (i.e.; negligible methane, formaldehyde, etc.)
ROG	83.00		83		
TSP	5.00		5		
PM10	5.00		5		
BENZENE					
1,3-BUTADIENE					
CHLORINE					
ETHYL BENZENE					
FORMALDEHYDE					
HEXANE					
HYDROGEN CHLORIDE					
HYDROGEN SULFIDE					
PROPANE	83.00	Not a listed substance			Assume all ROG and TOG is propane.
TOLUENE					
XYLENES					