

Summary of Requirements¹

40 CFR part 60, subpart JJJJ

Standards of Performance for Spark Ignition Internal Combustion Engines

For Rich Burn Liquefied Petroleum Gas Engines greater than or equal to 500 Horsepower that commenced construction after 6/12/2006 and were manufactured on or after 7/1/2007

Emission Standards: 60.4231(c) and 60.4233(c)

60.4231(c) Stationary SI internal combustion engine manufacturers must certify their stationary SI ICE with a maximum engine power greater than 19 KW (25 HP) (except emergency stationary ICE with a maximum engine power greater than 25 HP and less than 130 HP) that are rich burn engines that use LPG and that are manufactured on or after the applicable date in §60.4230(a)(2), or manufactured on or after the applicable date in §60.4230(a)(4) for emergency stationary ICE with a maximum engine power greater than or equal to 130 HP, to the certification emission standards and other requirements for new nonroad SI engines in 40 CFR part 1048. Stationary SI internal combustion engine manufacturers must certify their emergency stationary SI ICE with a maximum engine power greater than 25 HP and less than 130 HP that are manufactured on or after the applicable date in §60.4230(a)(4) to the Phase 1 emission standards in 40 CFR 90.103, applicable to class II engines, and other requirements for new nonroad SI engines in 40 CFR part 90. Stationary SI internal combustion engine manufacturers may certify their stationary SI ICE with a maximum engine power less than or equal to 30 KW (40 HP) with a total displacement less than or equal to 1,000 cc to the certification emission standards and other requirements for new nonroad SI engines in 40 CFR part 90 or 1054, as appropriate.

60.4233(c) Owners and operators of stationary spark ignition internal combustion engines with a maximum engine power greater than 19 KW (25 HP) manufactured on or after the applicable date in [§60.4230\(a\)\(4\)](#) that are rich burn engines that use LPG must comply with the emission standards in [§60.4231\(c\)](#) for their stationary spark ignition internal combustion engines.

Fuel Requirements: No requirements

Importing/Installing Requirements: 60.4236(b), (d)

These requirements do not apply to owners and operators of stationary SI ICE that have been modified or reconstructed, and they do not apply to engines that were removed from one existing location and reinstalled at a new location.

60.4236(b) After July 1, 2009, owners and operators may not install stationary spark ignition internal combustion engines with a maximum engine power of greater than or equal to 500 HP that do not meet the applicable requirements in [§60.4233](#), except that lean burn engines with a maximum engine power

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greater than or equal to 500 HP and less than 1,350 HP that do not meet the applicable requirements in [§60.4233](#) may not be installed after January 1, 2010.

60.4236(d) In addition to the requirements specified in [§§60.4231](#) and [§60.4233](#) it is prohibited to import stationary spark ignition internal combustion engines less than or equal to 19 KW (25 HP), stationary rich burn LPG spark ignition internal combustion engines, and stationary gasoline spark ignition internal combustion engines that do not meet the applicable requirements specified in paragraphs (a), (b), and (c) of this section, after the date specified in paragraph (a), (b), and (c) of this section.

Compliance Requirements for Engines Being Operated and Maintained in a Certified Manner:

If you operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, you are operating in a certified manner.

General Compliance Requirements:

All Engines 60.4234: Owners and operators of stationary spark ignition internal combustion engines must operate and maintain stationary spark ignition internal combustion engines that achieve the emission standards as required in [§60.4233](#) over the entire life of the engine.

If using AFR controller: 60.4243(g)

60.4243(g) It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.

For engines manufactured after 7/1/2007 and before 7/1/2008-

60.4243(h) If you are an owner/operator of an stationary SI internal combustion engine with maximum engine power greater than or equal to 500 HP that is manufactured after July 1, 2007 and before July 1, 2008, and must comply with the emission standards specified in sections [§60.4233](#) (b) or (c), you must comply by one of the methods specified in paragraphs (h)(1) through (h)(4) of this section.

(1) Purchasing an engine certified according to 40 CFR part 1048. The engine must be installed and configured according to the manufacturer's specifications.

(2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

(3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

For engines manufactured after 7/1/2008-

60.4243(a)(1) If you operate and maintain the certified stationary SI internal combustion engine and control device according to the manufacturer's emission-related written instructions, you must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required if you are an owner or operator. You must also meet the requirements as specified in 40 CFR part 1068, subparts A through D, as they apply to you. If you adjust engine settings according to and consistent with the manufacturer's instructions, your stationary SI internal combustion engine will not be considered out of compliance.

Performance Testing: No requirements

Compliance Requirements for Engines Being Operated and Maintained in a Non-Certified Manner:

If you do not operate and maintain the certified stationary SI internal combustion engine and control device according to manufacturer's emission-related written instructions, your engine will be considered a non-certified engine.

General Compliance Requirements:

All Engines- 60.4234: Owners and operators of stationary spark ignition internal combustion engines must operate and maintain stationary spark ignition internal combustion engines that achieve the emission standards as required in [§60.4233](#) over the entire life of the engine.

If using AFR controller: 60.4243(g)

60.4243(g) It is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The AFR controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.

For engines manufactured after 7/1/2007 and before 7/1/2008-

60.4243(h) If you are an owner/operator of an stationary SI internal combustion engine with maximum engine power greater than or equal to 500 HP that is manufactured after July 1, 2007 and before July 1, 2008, and must comply with the emission standards specified in sections [§60.4233](#) (b) or (c), you must comply by one of the methods specified in paragraphs (h)(1) through (h)(4) of this section.

- (1) Purchasing an engine certified according to 40 CFR part 1048. The engine must be installed and configured according to the manufacturer's specifications.
- (2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.
- (3) Keeping records of engine manufacturer data indicating compliance with the standards.

(4) Keeping records of control device vendor data indicating compliance with the standards.

For engines manufactured after 7/1/2008-

These requirements do not apply to owners and operators of stationary SI ICE that have been modified or reconstructed, and they do not apply to engines that were removed from one existing location and reinstalled at a new location.

60.4243(a)(2)(iii) If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test within 1 year of engine startup and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

Performance Testing:

For engines manufactured after 7/1/2007 and before 7/1/2008: No requirements

For engines manufactured after 7/1/2008:

60.4243(a)(2)(iii): If you are an owner or operator of a stationary SI internal combustion engine greater than 500 HP, you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, you must conduct an initial performance test within 1 year of engine startup and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

60.4244: Owners and operators of stationary SI ICE engine who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.

(a) Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in [§60.8](#) and under the specific conditions that are specified by [Table 2](#) to this subpart.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in [§60.8\(c\)](#). If your stationary sparking ignition internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine.

(c) You must conduct three separate test runs for each performance test required in this section, as specified in [§60.8\(f\)](#). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.

(d) To determine compliance with the NO_x mass per unit output emission limitation, convert the concentration of NO_x in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \quad (\text{Eq. 1})$$

Where:

ER = Emission rate of NO_x in g/HP-hr.

C_d= Measured NO_x concentration in parts per million by volume (ppmv).

1.912×10⁻³ = Conversion constant for ppm NO_x to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

(e) To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \quad (\text{Eq. 2})$$

Where:

ER = Emission rate of CO in g/HP-hr.

C_d= Measured CO concentration in ppmv.

1.164×10⁻³ = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

(f) For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \quad (\text{Eq. 3})$$

Where:

ER = Emission rate of VOC in g/HP-hr.

Cd= VOC concentration measured as propane in ppmv.

1.833×10^{-3} = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

(g) If the owner/operator chooses to measure VOC emissions using either [Method 18](#) of 40 CFR part 60, appendix A, or [Method 320](#) of 40 CFR part 63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{M_i}}{C_{A_i}} \quad (\text{Eq. 4})$$

Where:

RF_i= Response factor of compound i when measured with EPA Method 25A.

C_{Mi}= Measured concentration of compound i in ppmv as carbon.

C_{AI}= True concentration of compound i in ppmv as carbon.

$$C_{\text{corr}} = RF_i \times C_{\text{meas}} \quad (\text{Eq. 5})$$

Where:

C_{corr}= Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

C_{meas}= Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{\text{Peq}} = 0.6098 \times C_{\text{corr}} \quad (\text{Eq. 6})$$

Where:

C_{Peq}= Concentration of compound i in mg of propane equivalent per DSCM.

Notifications, Reports, and Records Requirements:

All Engines: **60.4245(a),(d)**

60.4245(a) Owners and operators of all stationary SI ICE must keep records of the information in paragraphs (a)(1) through (4) of this section.

(1) All notifications submitted to comply with this subpart and all documentation supporting any notification.

(2) Maintenance conducted on the engine.

(3) If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR [parts 90, 1048, 1054, and 1060](#), as applicable.

(4) If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to [§60.4243\(a\)\(2\)](#), documentation that the engine meets the emission standards.

60.4245(d) Owners and operators of stationary spark ignition internal combustion engines that are subject to performance testing must submit a copy of each performance test as conducted in [§60.4244](#) within 60 days after the test has been completed.

If your engine is not certified: 60.4245(c)

60.4245(c) Owners and operators of stationary spark ignition internal combustion engines greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in §60.4231 must submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of this section.

(1) Name and address of the owner or operator;

(2) The address of the affected source;

(3) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

(4) Emission control equipment; and

(5) Fuel used.

General Provisions (40 CFR part 60): 60.4246, Table 3

60.4246: [Table 3](#) to this subpart shows which parts of the General Provisions in §60.1 through §60.19 apply to you.