(4) The approximate location of the intake and exhaust valves (or ports).

(5) The combustion chamber general configuration and the approximate surface-to-volume ratio of the combustion chamber when the piston is at top dead center position, using nominal combustion chamber dimensions.

(6) The method of air aspiration (turbocharged, supercharged, naturally aspirated, Roots blown).

(7) The type of air inlet cooler (air-to-air, air-to-liquid, approximate degree to which inlet air is cooled).

(8) The type of fuel and general fuel system configuration.

(9) The general configuration of the fuel injectors and approximate injection pressure.

(10) The type of fuel injection system control (electronic or mechanical).

(d) You may subdivide a group of locomotives that is identical under paragraph (b) or (c) of this section into different engine families if you show the expected emission characteristics are different during the useful life. This allowance also covers locomotives for which only calculated emission rates differ, such as locomotives with and without energy-saving design features. For the purposes of determining whether an engine family is a small engine family in §1033.405(a)(2), we will consider the number of locomotives that could have been classed together under paragraph (b) or (c) of this section, instead of the number of locomotives that are included in a subdivision allowed by this paragraph (d).

(e) In unusual circumstances, you may group locomotives that are not identical with respect to the things listed in paragraph (b) or (c) of this section in the same engine family if you show that their emission characteristics during the useful life will be similar.

(f) During the first six calendar years after a new tier of standards becomes applicable, remanufactured engines/locomotives may be included in the same engine family as freshly manufactured locomotives, provided the same engines and emission controls are used for locomotive models included in the engine family.

[73 FR 37197, June 30, 2008, as amended at 73 FR 59190, Oct. 8, 2008]

§1033.235 Emission testing required for certification.

This section describes the emission testing you must perform to show compliance with the emission standards in §1033.101.

(a) Select an emission-data locomotive (or engine) from each engine family for testing. It may be a low mileage locomotive, or a development engine (that is equivalent in design to the engines of the locomotives being certified), or another low hour engine. Use good engineering judgment to select the locomotive configuration that is most likely to exceed (or have emissions nearest to) an applicable emission standard or FEL. In making this selection, consider all factors expected to affect emission control performance and compliance with the standards, including emission levels of all exhaust constituents, especially NO_X and PM.

(b) Test your emission-data locomotives using the procedures and equipment specified in subpart F of this part.

(c) We may measure emissions from any of your emission-data locomotives or other locomotives from the engine family.

(1) We may decide to do the testing at your plant or any other facility. If we do this, you must deliver the locomotive to a test facility we designate. If we do the testing at your plant, you must schedule it as soon as possible and make available the instruments, personnel, and equipment we need.

(2) If we measure emissions from one of your locomotives, the results of that testing become the official emission results for the locomotive. Unless we later invalidate these data, we may decide not to consider your data in determining if your engine family meets applicable requirements.

(3) Before we test one of your locomotives, we may set its adjustable parameters to any point within the adjustable ranges (*see* §1033.115(b)).

(4) Before we test one of your locomotives, we may calibrate it within normal production tolerances for anything we do not consider an adjustable parameter. For example, this would apply where we determine that an engine parameter is not an adjustable parameter (as defined in §1033.901) but

that it is subject to production variability.

(d) You may ask to use carryover emission data from a previous model year instead of doing new tests if all the following are true:

(1) The engine family from the previous model year differs from the current engine family only with respect to model year, or other factors not related to emissions. You may include additional configurations subject to the provisions of §1033.225.

(2) The emission-data locomotive from the previous model year remains the appropriate emission-data locomotive under paragraph (b) of this section.

(3) The data show that the emission-data locomotive would meet all the requirements that apply to the engine family covered by the application for certification.

(e) You may ask to use emission data from a different engine family you have already certified instead of testing a locomotive in the second engine family if all the following are true:

(1) The same engine is used in both engine families.

(2) You demonstrate to us that the differences in the two families are sufficiently small that the locomotives in the untested family will meet the same applicable notch standards calculated from the test data.

(f) We may require you to test a second locomotive of the same or different configuration in addition to the locomotive tested under paragraph (b) of this section.

(g) If you use an alternate test procedure under 40 CFR 1065.10 and later testing shows that such testing does not produce results that are equivalent to the procedures specified in subpart F of this part, we may reject data you generated using the alternate procedure.

(h) The requirement to measure smoke emissions is waived for certification and production line testing, except where there is reason to believe your locomotives do not meet the applicable smoke standards.

(i) Measure CO_2 with each test. Measure CH_4 with each low-hour certification test using the procedures specified in 40 CFR part 1065 starting in the 2012 model year. Also measure N_2O with each low-hour certification test using the procedures specified in 40 CFR part 1065 for any engine family that depends on NOx aftertreatment to meet emission standards. Small manufacturers/remanufacturers may omit measurement of N_2O and CH_4. Use the same units and modal calculations as for your other results to report a single weighted value for CO_2, N_2O, and CH_4. Round the final values as follows:

(1) Round CO_2 to the nearest 1 g/bhp-hr.

(2) Round N_2O to the nearest 0.001 g/bhp-hr.

(3) Round CH_4 to the nearest 0.001g/bhp-hr.

[73 FR 37197, June 30, 2008, as amended at 74 FR 56508, Oct. 30, 2008; 75 FR 22984, Apr. 30, 2010]

§1033.240 Demonstrating compliance with exhaust emission standards.

(a) For purposes of certification, your engine family is considered in compliance with the applicable numerical emission standards in §1033.101 if all emission-data locomotives representing that family have test results showing official emission results and deteriorated emission levels at or below these standards.

(1) If you include your locomotive in the ABT program in subpart H of this part, your FELs are considered to be the applicable emission standards with which you must comply.

(2) If you do not include your remanufactured locomotive in the ABT program in subpart H of this part, but it was previously included in the ABT program in subpart H of this part, the previous FELs are considered to be the applicable emission standards with which you must comply.

(b) Your engine family is deemed not to comply if any emission-data locomotive representing that family has test results showing an official emission result or a deteriorated emission level for any pollutant that is above an applicable emission standard. Use the following steps to determine the deteriorated emission level for the test locomotive:

(1) Collect emission data using measurements with enough significant figures to calculate the cycle-weighted