TABLE 1 OF § 1065.715.—TEST FUEL SPECIFICATIONS FOR NATURAL GAS

Item	Reference procedure	Value
1. Methane, CH_4	ASTM D 1945–96	Minimum, 87.0 μmol/mol.
2. Ethane, C_2H_6	ASTM D 1945–96	Maximum, 5.5 μmol/mol.
3. Propane, C_3H_8	ASTM D 1945–96	Maximum, 1.2 μmol/mol.
4. Butane, C_4H_{10}	ASTM D 1945–96	Maximum, 0.35 μmol/mol.
5. Pentane, C_5H_{12}	ASTM D 1945–96	Maximum, 0.13 μmol/mol.
6. C_6 and higher	ASTM D 1945–96	Maximum, 0.1 μmol/mol.
7. Oxygen	ASTM D 1945–96	Maximum, 1.0 μmol/mol.
8. Inert gases (sum of CO_2 and N_2)	ASTM D 1945–96	Maximum, 5.1 μmol/mol.

[1] All ASTM standards are incorporated by reference in § 1065.1010.

(b) At ambient conditions, natural gas must have a distinctive odor detectable down to a concentration in air not more than one-fifth the lower flammability limit.

§ 1065.720 Liquefied petroleum gas.

(a) Liquefied petroleum gas for testing must meet the specifications in the following table:

TABLE 1 OF § 1065.720—TEST FUEL SPECIFICATIONS FOR LIQUEFIED PETROLEUM GAS

Item	Reference procedure [1]	Value
1. Propane, C_3H_8	ASTM D 2163–91	Minimum, 850,000 $\mu m^3/m^3$.
2. Vapor pressure at 38 °C	ASTM D 1267–02 or 2598–02 [2]	Maximum, 1400 kPa.
3. Volatility residue (evaporated temperature, 35°C).	ASTM D 1837–02	Maximum −38 °C.
4. Butanes	ASTM D 2163–91	Maximum, 50,000 $\mu m^3/m^3$.
5. Butenes	ASTM D 2163–91	Maximum, 20,000 $\mu m^3/m^3$.
6. Pentenes and heavier	ASTM D 2163–91	Maximum, 5,000 $\mu m^3/m^3$.
7. Propene	ASTM D 2163–91	Maximum, 100,000 $\mu m^3/m^3$.
8. Residual matter (residue on evap. of 100) ml oil stain observ.).	ASTM D 2158–02	Maximum, 0.05 ml pass.[3]
9. Corrosion, copper strip	ASTM D 1838–91	Maximum, No. 1.
10. Sulfur	ASTM D 2784–98	Maximum, 80 mg/kg.
11. Moisture content	ASTM D 2713–91	Pass.

[1] All ASTM standards are incorporated by reference in § 1065.1010.
[2] If these two test methods yield different results, use the results from ASTM D 1267–02.
[3] The test fuel must not yield a persistent oil ring when you add 0.3 ml of solvent residue mixture to a filter paper in 0.1 ml increments and examine it in daylight after two minutes.

(b) At ambient conditions, liquefied petroleum gas must have a distinctive odor detectable down to a concentration in air not more than one-fifth the lower flammability limit.

§ 1065.740 Lubricants.

(a) Use commercially available lubricating oil that represents the oil that will be used in your engine in use.

(b) You may use lubrication additives, up to the levels that the additive manufacturer recommends.

§ 1065.745 Coolants.

(a) You may use commercially available antifreeze mixtures or other coolants that will be used in your engine in use.

(b) For laboratory testing of liquid-cooled engines, you may use water with or without rust inhibitors.

(c) For coolants allowed in paragraphs (a) and (b) of this section, you may use rust inhibitors and additives required for lubricity, up to the levels that the additive manufacturer recommends.

§ 1065.750 Analytical Gases.

Analytical gases must meet the accuracy and purity specifications of this section, unless you can show that other specifications would not affect your ability to show that your engines comply with all applicable emission standards.

(a) Subparts C and D of this part refer to the following gas specifications:

(1) Use purified gases to zero measurement instruments and to blend with calibration gases. Use gases with contamination up to the highest of the following values in the gas cylinder or at the outlet of a zero-gas generator:

(i) 2% contamination, measured relative to the flow-weighted average concentration expected at the standard.

(ii) 2% contamination, measured relative to the flow-weighted average concentration measured during testing.

(iii) Contamination as specified in the following table:

TABLE 1 OF § 1065.750—GENERAL SPECIFICATIONS FOR PURIFIED GASES

Constituent	Purified Air [1]	Purified N_2 [1]
THC (C1 equivalent)	< 0.05 μmol/mol	< 0.05 μmol/mol.
CO_1 μmol/mol	< 1 μmol/mol..	
CO_2	< 10 μmol/mol	< 10 μmol/mol.
O_2	0.205 to 0.215 mol/mol	< 2 μmol/mol.

TABLE 1 OF § 1065.750—GENERAL SPECIFICATIONS FOR PURIFIED GASES—Continued

Constituent	Purified Air [1]	Purified N_2 [1]
NO_X	< 0.02 µmol/mol	< 0.02 µmol/mol.

[1] We do not require that these levels of purity be traceable to NIST standards.

(2) Use the following gases with a flame-ionization detector (FID) analyzer:

(i) Use FID fuel with an H2 concentration of (0.4 ±0.02) mol/mol, balance He. Make sure the mixture contains no more than 0.05 µmol/mol THC.

(ii) Use FID burner air that meets the specifications of purified air in paragraph (a)(1) of this section.

(iii) Zero flame-ionization detectors with purified air meeting the specifications in paragraph (a)(1) of this section.

(3) Use the following gas mixtures, with gases traceable within ±1% of the NIST true value or other gas standards we approve:

(i) CH_4, balance purified synthetic air or N_2.

(ii) C_2H_6, balance purified synthetic air or N_2.

(iii) C_3H_8, balance purified synthetic air or N_2.

(iv) CO, balance purified N_2.

(v) CO_2, balance purified N_2.

(vi) NO, balance purified N_2.

(vii)) NO_2, balance purified N_2.

(viii) O_2, balance purified N_2.

(ix) C_3H_8, CO, CO_2, NO, balance purified N_2.

(4) You may use gases for species other than those listed in paragraph (a)(3) of this section (such as methanol in air, which you may use to determine response factors), as long as they are traceable to ±1% of the NIST true value or other similar standards we approve.

(5) You may generate your own calibration gases using a precision blending device, such as a gas divider, to dilute gases with purified N_2 or purified synthetic air. Gas dividers must meet the specifications in § 1065.248.

(b) Record the concentration of any calibration gas standard and its expiration date specified by the gas supplier. Do not use any calibration gas standard after its expiration date.

(c) Transfer gases from their source to analyzers using components that are dedicated to controlling and transferring only those gases. For example, do not use a regulator, valve, or transfer line for zero gas if those components were previously used to transfer a different gas mixture. We recommend that you label regulators, valves, and transfer lines to prevent contamination. Note that even small traces of a gas mixture in the dead volume of a regulator, valve, or transfer line can diffuse upstream into a high-pressure volume of gas, which would contaminate the entire high-pressure gas source, such as a compressed-gas cylinder.

§ 1065.790 Mass standards.

(a) *PM balance calibration weights.* Use PM balance calibration weights that are certified as traceable to NIST standards to within 0.1% uncertainty. Calibration weights may be certified by any calibration lab that maintains NIST traceability. Make sure your lowest calibration weight has no greater than ten times the mass of an unused PM-sample medium.

(b) *Dynamometer calibration weights.* [Reserved]

Subpart I—Testing With Oxygenated Fuels

§ 1065.801 Applicability.

(a) This subpart applies for testing with oxygenated fuels. Unless the standard-setting part specifies otherwise, the requirements of this subpart do not apply for fuels that contain less than 25% oxygenated compounds by volume. For example, you generally do not need to follow the requirements of this subpart for tests performed using a fuel containing 10% ethanol and 90% gasoline, but you must follow these requirements for tests performed using a fuel containing 85% ethanol and 15% gasoline.

(b) This subpart specifies sampling procedures and calculations that are different than those used for non-oxygenated fuels. All other test procedures of this part 1065 apply for testing with oxygenated fuels.

§ 1065.805 Sampling system.

(a) Proportionally dilute engine exhaust, and use batch sampling collect flow-weighted dilute samples at a constant flow rate.

(b) You may collect background samples for correcting dilution air for background concentrations.

(c) Maintain sample temperatures within probes and sample lines that prevent aqueous condensation up to the point where a sample is collected.

(d) You may bubble a sample of the exhaust through water to collect alcohols for later analysis.

(e) For alcohol-containing oxygenated fuels, sample the exhaust through cartridges impregnated with 2,4-dinitrophenylhydrazine to collect carbonyls for later analysis. If the standard-setting part specifies a duty cycle that has multiple test intervals (such as multiple engine starts or an engine-off soak phase), you may proportionally collect a single carbonyl sample for the entire duty cycle.

(f) You may use a photo-acoustic analyzer to quantify ethanol and methanol in an exhaust sample.

(g) Use good engineering judgment to sample other oxygenated hydrocarbon compounds in the exhaust.

§ 1065.810 Calculations.

Use the calculations specified in § 1065.665 to determine THCE or NMHCE.

Subpart J—Field Testing

§ 1065.901 Applicability.

(a) The test procedures in this subpart measure brake-specific emissions from engines while they are installed in vehicles in the field.

(b) These test procedures apply to your engines only as specified in the standard-setting part.

§ 1065.905 General provisions.

(a) Unless the standard-setting part specifies deviations from the provisions of this subpart, field testing must conform to all of the provisions of this subpart.

(b) Testing conducted under this subpart may include any normal in-use operation of an engine.

(c) This part specifies procedures for field testing various categories of engines. See the standard-setting part for directions in applying specific provisions in this part for a particular type of engine. Before using this subpart's procedures, read the standard-setting part to answer at least the following questions:

(1) How many engines must I test?

(2) How many times must I repeat a field test on an individual engine?

(3) How do I select vehicles for field testing?

(4) What maintenance steps may I take before or between tests?

(5) What data are needed for a single field test on an individual engine?

(6) What are the limits on ambient conditions for field testing?

(7) Which exhaust constituents do I need to measure?

(8) How do I account for crankcase emissions?

(9) Which engine and ambient parameters do I need to measure?

(10) How do I process the data recorded during field testing to determine if my engine meets field-testing standards? How are individual test intervals determined? Note that ''test interval'' is defined in subpart K of this part (Part 1065).

(11) Should I warm up the test engine before measuring emissions, or do I need to measure cold-start emissions during a warm-up segment of in-use operation?

(12) Do any unique specifications apply for test fuels?

(13) Do any special conditions invalidate a field test?

(14) Does any special margin apply to field-test emission results based on the accuracy and repeatability of field-testing measurement instruments?

(15) Do results of initial field testing trigger any requirement for additional field testing?

(16) How do I report field-testing results?

(d) Use the following specifications in other subparts of this part (Part 1065) for field testing:

(1) Use the applicability and general provisions of subpart A of this part.

(2) Use equipment specifications in § 1065.101 and in § 1065.140 through § 1065.190. Section 1065.910 specifies additional equipment specific to field testing.

(3) Use measurement instruments in subpart C of this part, except as specified in § 1065.915.

(4) Use calibrations and performance checks in subpart D of this part, except as specified in § 1065.920. Section 1065.920 also specifies additional calibration and performance checks for field testing.

(5) Use the provisions of the standard-setting part for selecting and maintaining engines instead of the specifications in subpart E of this part.

(6) Use the procedures in §§ 1065.930 and 1065.935 to start and run a field test. If you use a gravimetric balance for PM, weigh PM samples according to §§ 1065.590 and 1065.595.

(7) Use the calculations in subpart G of this part to calculate emissions over each test interval. Note that ''test interval'' is defined in subpart K of this part (Part 1065), and that the standard setting parts indicate how to determine test intervals for your engine. Section 1065.940 specifies additional calculations for field testing. Use any calculations specified in the standard-setting part to determine if your engines meet the field-testing standards. The standard-setting part may also contain additional calculations that determine when further field testing is required.

(8) Use a fuel typical of what you would expect the engine to use in service. You need not use the fuel specified in subpart H of this part.

(9) Use the lubricant and coolant specifications in § 1065.740 and § 1065.745.

(10) Use the analytical gases and other calibration standards in § 1065.750 and § 1065.790.

(11) Use the procedures specified for testing with oxygenated fuels in subpart I of this part.

(12) Apply the definitions and reference materials in subpart K of this part.

(e) The following table summarizes the requirements of paragraph (d) of this section:

TABLE 1 OF § 1065.905—SUMMARY OF FIELD-TESTING REQUIREMENTS THAT ARE SPECIFIED OUTSIDE OF THIS SUBPART J[1]

Subpart * * *	Use for field testing * * *
A: Applicability and general provisions	Use all.
B: Equipment for testing	Use § 1065.101and § 1065.140 through end of subpart B. § 1065.910 specifies equipment specific to field testing.
C: Measurement instruments	Use all. § 1065.915 allows deviations.
D: Calibrations and performance checks	Use all. § 1065.920 allows deviations, but also has additional.
E: Test engine maintenance, and durability	Do not use. selection, Use standard-setting part.
F: Running an emission test in the laboratory	Use §§ 1065.590 and 1065.595 for weighing PM with a gravimetric balance. § 1065.930 and § 1065.935 to start and run a field test.
G: Calculations	Use all. Use standard-setting part.
H: Fuels, engine fluids, analytical gases, and other calibration materials	Use an in-use fuel. You do not have to use fuels in subpart H.
I: Testing with oxygenated fuels	Use all.
K: Definitions and reference materials	Use all.

[1] Refer to § 1065.905 (d) for complete specifications.

§ 1065.910 Field-testing equipment.

(a) Use field-testing equipment that meets the specifications of § 1065.101 and § 1065.140 through § 1065.190.

(b) This section describes additional equipment that is specific to field testing.

(c) To field test an engine, you will likely route its exhaust to a raw exhaust flow meter and to sample probes. Route exhaust, as follows:

(1) Use short flexible connectors at the end of the engine's exhaust pipe.

(i) You may use flexible connectors to enlarge or reduce the exhaust-pipe diameter to match that of your test equipment.

(ii) Use flexible connectors that do not exceed a length of three times their largest inside diameter.

(iii) Use at least 315 °C temperature rated, four-ply silicone fiberglass fabric material for flexible connectors. You may use connectors with a spring steel wire helix for support and/or Nomex™ coverings or linings for durability. You may also use any other material that performs equivalently in terms of permeability, and durability as long as it seals tightly around tailpipes and does not react with exhaust.

(iv) Use stainless steel hose clamps to seal flexible connectors to the outside diameter of tailpipes or use clamps that seal equivalently.

(v) You may use additional flexible connectors to connect to flow meters and sample probe locations.

(2) Use rigid 300 series stainless steel tubing to connect between flexible connectors. Tubing may be straight or bent to accommodate vehicle geometry. You may use 300 series stainless steel tubing ''T'' or ''Y'' fittings to join exhaust from multiple tailpipes. Alternatively, you may cap or plug redundant tailpipes if it is recommended by the engine manufacturer.

(3) Use connectors and tubing that do not increase back pressure so much that it exceeds the manufacturer's maximum specified exhaust restriction. You may verify this at the maximum exhaust flow rate by measuring back pressure at the vehicle tailpipe with your system connected. Alternatively, you may verify this by engineering analysis, taking into account the maximum exhaust flow rate expected and the flexible connectors and tubing pressure drops versus flow characteristics.

(d) Use mounting hardware as required for securing flexible connectors and exhaust tubing. We recommend mounting hardware such as clamps, suction cups, and magnets that are specifically designed for vehicle applications. We also recommend using structurally sound mounting points such as vehicle frames, trailer hitches, and payload tie-down fittings.

(e) Field testing may require portable electrical power to run your test equipment. Power your equipment, as follows:

(1) You may use electrical power from the vehicle, up to the highest power level, such that all the following are true:

(i) The vehicle power system is capable of safely supplying your power, such that your demand does not overload the vehicle's power system.

(ii) The engine emissions do not significantly change when you use vehicle power.

(iii) The power you demand does not increase output from the engine by more than 1 % of its maximum power.

(2) You may install your own portable power supply. For example, you may use batteries, fuel cells, a portable electrical generator, or any other power supply to supplement or replace your use of vehicle power. However, in no case may you provide power to the vehicle's power system.

§ 1065.915 Measurement instruments.

(a) *Instrument specifications.* We recommend that you use field-testing equipment that meets the specifications of subpart C of this part. For field testing, the specifications in Table 1 of § 1065.915 apply instead of the specifications in Table 1 of § 1065.205.

TABLE 1 OF § 1065.915.—RECOMMENDED MINIMUM MEASUREMENT INSTRUMENT PERFORMANCE FOR FIELD TESTING

Measurement	Measured quantity symbol	Rise time and fall time	Recording update frequency	Accuracy [1]	Repeatability [1]	Noise [1]
Engine speed transducer	f_n	1 s	5 Hz	5.0% of pt., or 1.0% of max.	2.0% of pt., 1.0% of max.	0.5% of max.
Engine torque estimator, BSFC	T	1 s	5 Hz	8.0% of pt., or 3% of max.	2.0% of pt., 1.0% of max.	1.0 of max.
General pressure transducer (not a part of another instrument).	p	5 s	1 Hz	5.0% of pt., or 2.0% of max.	2.0% of pt., or 0.5% of max.	1.0% of max.
Barometer	p_{barom}	50 s	0.1 H	250 Pa	200 Pa	100 Pa.
General temperature sensor (not a part of another instrument).	T	5 s	1 Hz	1.0% of pt., or 3 °C	0.5% of pt., or 2 °C	0.5 °C.
General dewpoint sensor	T_{dew}	50 S	0.1 Hz	3 °C	1 °C	0.5 °C.
Exhaust flow meter	$\dot{n}$	1 s	5 Hz	5.0% of pt., or 3.0% of max.	2.0% of pt.	2.0% of max.
Constituent concentration continuous analyzer.	x	5 s	1 Hz	2.5% of pt., 2.5% of meas.	1.0% of pt., 1.0% of meas.	0.4% of max.
Inertial PM balance	m_{PM}	5 s	1 Hz	2.0% of pt., 2.0% of meas.	1.0% of pt., 1.0% of meas.	0.4% of max.
Gravimetric PM balance	m_{PM}	N/A	N/A	See § 1065.790	0.25 µg	0.1 µg.

[1] Accuracy, repeatability, and noise are determined with the same collected data as described in § 1065.305. ''pt.'' refers to a single point at the average value expected during testing at the standard—the reference value used in § 1065.305; ''max.'' refers to the maximum value expected during testing at the standard over a test interval, not the maximum of the instrument's range; ''meas'' refers to the flow-weighted average measured value during any test interval.

(b) *ECM signals.* You may use signals from the engine's electronic control module (ECM) in place of values recorded by measurement instruments, subject to the following provisions:

(1) You must filter ECM signals to discard discontinuities and irrational records.

(2) You must perform time-alignment and dispersion of ECM signals, as described in § 1065.201.

(3) You may use any combination of ECM signals, with or without other measurements, to determine the start-time and end-time of a test interval. Note that ''test interval'' is defined in subpart K of this part (Part 1065).

(4) You may use any combination of ECM signals along with other measurements to determine brake-specific emissions over a test interval.

(5) For each ECM signal that you use, you must state one of the following:

(i) The signal meets all the specifications, calibrations, and performance checks of any measurement instrument or system that the signal replaces.

(ii) The signal deviates from one or more of the specifications, calibrations, or performance checks, but its deviation does not prevent you from demonstrating that you meet the applicable standards. For example, your emissions results are sufficiently below the applicable standard such that the deviation would not significantly change the result.

(c) *Redundant measurements.* You may make any other measurements, such as redundant measurements, to

ensure the quality of the data you collect.

(d) *Ambient effects on instruments.* Measurement instruments must not be affected by ambient conditions such as temperature, pressure, humidity, physical orientation, or mechanical shock and vibration. If an instrument is inherently affected by ambient conditions, those conditions must be monitored and the instrument's signals must be adjusted in a way that compensates for the ambient effect. Follow the instrument manufacturer's instructions for proper field installation.

(e) *Engine torque estimator.* Because engine brake torque may be difficult or impossible to measure during field testing, we allow other means of estimating torque based on other parameters. We recommend that the overall performance of any torque estimator should meet the performance specifications in Table 1 of § 1065.915. Although you may develop your own torque estimator, we recommend using one of the following:

(1) *ECM signals.* You may use ECM signals to estimate torque if they meet the specifications of paragraph (b) of this section. Some electronic control modules calculate torque directly, based on the amount of fuel commanded to the engine and possibly other parameters. Other electronic control modules output a signal that is the ratio of the amount of fuel commanded divided by the maximum possible command at the given engine speed. This value is commonly called ''% load''. You may use this value in combination with the engine manufacturer's published maximum torque versus speed data to estimate engine torque. You may use a combination of ECM signals such as intake manifold pressure and temperature and engine speed if you have detailed laboratory data that can correlate such signals to torque.

(2) *Brake-specific fuel consumption.* You may multiply brake-specific fuel consumption (BSFC) information by fuel-specific emission results to determine brake-specific emission results. This approach avoids any requirement to estimate torque in the field. Fuel-specific results can be calculated from emission concentrations and a signal linear to exhaust flow rate. See § 1065.650 for the calculations. You may interpolate brake-specific fuel consumption data, which might be available from an engine laboratory as a function of engine speed and other engine parameters that you can measure in the field. You may also use a single BSFC value that approximates the mean BSFC over a test interval (as defined in subpart K). This value may be a nominal BSFC value for all engine operation, which may be determined over one or more laboratory duty cycles. Refer to the standard-setting part to determine if the range of engine operation represented by a duty cycle approximates the range of operation that defines a field-testing test interval. Select a nominal BSFC based on duty cycles that best represent the range engine operation that defines a field-testing test interval.

§ 1065.920 Calibrations and performance checks.

(a) Use all of the applicable calibrations and performance checks in subpart D of this part, including the linearity checks in § 1065.307, to calibrate and check your field test system.

(b) Your field-testing system must also meet an overall check. We require only that you maintain a record that shows that the make, model, and configuration of your system meets this check. The record itself may be supplied to you by the field-testing system manufacturer. However, we recommend that you generate your own record to verify that your specific system meets this check. If you upgrade or change the configuration of your field test system, we require that your record shows that your new configuration meets this check. The check consists of comparing field test data and laboratory data that are generated simultaneously over a repeated duty cycle in a laboratory. Two statistical comparisons are made. One statistical comparison checks the difference between the field test and lab data with respect to the lab standard. The second statistical comparison checks the field-testing system's upper confidence limit with respect to the lab's upper confidence limit. The field test upper confidence limit is determined only after applying any measurement allowance that is specified in the standard-setting part. Refer to § 1065.605 for an example calculation of these two statistical tests. Perform the check as follows:

(1) Install your field-testing system on an engine in a dynamometer laboratory that meets all of the specifications of this part with respect to the engine and its applicable emission standards. We recommend that you select an engine that has emissions near its applicable laboratory standards.

(2) If the standard-setting part does not specify a duty cycle specifically for this check, select or create a duty cycle that has all of the following:

(i) Expected in-use engine operation. Consider using data from previous field tests to generate a cycle.

(ii) (20 to 40) min duration.

(iii) At least 10 discrete field-testing test intervals (*e.g.*, 10 NTE events).

(iv) At least 50% of its time in the operating range where valid field-testing test intervals may be calculated. For example, for heavy-duty highway compression-ignition engines, select a duty cycle in which at least 50% of the engine operating time can be used to calculate valid NTE events.

(3) Prepare the laboratory and field-testing systems for emission testing as described in this part.

(4) Run at least seven valid repeat emission tests with the duty cycle, using a warmed up running engine. For a valid repeat of the duty cycle, the laboratory and field test systems must both return validated tests (*e.g.*, tests must meet drift check, hydrocarbon contamination check, proportional validation, etc).

(5) Calculate all brake-specific emission results with the lab and the field test data for every field-testing test interval (*e.g.*, each NTE event) that occurred. Repeat this for every repeated duty cycle.

(6) Calculate the mean for each test interval (*e.g.*, each NTE event) with the repeated data for each test interval.

(7) For each test interval (*e.g.*, each NTE event), subtract its lab mean from its field test mean, and divide the result by the applicable lab standard. If this result is within ±5% for all test intervals (*e.g.*, all NTE events), then the field test system passes this statistical test.

(8) First apply any measurement allowance to the field-testing results in paragraph (b)(5) of this section and recalculate the field test results in the same way you calculated the results for paragraph (b)(6) of this section. Then calculate two times the standard deviation for each of the test interval means from the adjusted field test results and the lab means from (b)(6) of this section. Add these values to each of their respective means. The result is the upper confidence limit for each test interval (*e.g.*, each NTE event). For each test interval subtract the laboratory upper confidence limit from the field test upper confidence limit. If the result of this subtraction is less than or equal to zero for all the test intervals (*e.g.*, all NTE events), then the field test system passes this statistical test.

(c) If the field test system passes both statistical tests in paragraphs (b)(7) and (b)(8) of this section, then the field-test system passes the overall field-testing system check.

§ 1065.925 Measurement equipment and analyzer preparation.

(a) If your engine must comply with a PM standard and you use a gravimetric balance to measure PM, follow the procedures for PM sample preconditioning and tare weighing as described in § 1065.590.

(b) Verify that ambient conditions are initially within the limits specified in the standard-setting part.

(c) Install all of the equipment and measurement instruments required to conduct a field test.

(d) Power the measurement system, and allow pressures, temperatures, and flows to stabilize to their operating set points.

(e) Operate dilution systems and PM sampling systems at their expected flow rates using a bypass.

(f) Bypass or purge any gaseous sampling systems until sampling begins.

(g) Conduct calibrations and performance checks.

(h) Check for contamination in the NMHC sampling system as follows:

(1) Select the NMHC analyzer range for measuring the flow-weighted average concentration expected at the NMHC standard.

(2) Zero the NMHC analyzer using zero air introduced at the analyzer port.

(3) Span the NMHC analyzer using span gas introduced at the analyzer port.

(4) Overflow zero air at the NMHC probe or into a fitting between the NMHC probe and the transfer line.

(5) Measure the NMHC concentration in the sampling system:

(i) For continuous sampling, record the mean NMHC concentration as overflow zero air flows.

(ii) For batch sampling, fill the sample medium and record its mean concentration.

(6) Record this value as the initial NMHC concentration, $x_{NMHCinit}$ and use it to correct measured values as described in § 1065.660.

(7) If this initial NMHC concentration exceeds the greatest of the following, determine the source of the contamination and take corrective action, such as purging the system or replacing contaminated portions:

(i) 2% of the flow-weighted average concentration expected at the standard or during testing.

(ii) 2 mmol/mol.

(8) If corrective action does not resolve the deficiency, you may request to use the contaminated system as an alternate procedure under § 1065.10.

§ 1065.930 Engine starting, restarting, and shutdown.

(a) Unless the standard-setting part specifies otherwise, follow these steps to start, restart, and shut down the test engine.

(b) Start or restart the engine according to the procedure recommended in the owners manual.

(c) If the engine does not start after 15s of cranking, stop cranking and determine the reason it failed to start. However, you may crank the engine longer than 15s, as long as the owners manual or the service-repair manual describes the longer cranking time as normal.

(d) Respond to engine stalling with the following steps:

(1) If the engine stalls during a required warm-up before emission sampling begins, restart the engine and continue warm-up.

(2) If the engine stalls at any other time after emission sampling begins, restart the engine and continue testing.

(e) Shut down and/or restart the engine according to the manufacturer's specifications, as needed during normal operation in-use, but continue emission sampling until the field test is completed.

§ 1065.935 Emission test sequence.

(a) Time the start of testing as follows:

(1) If the standard-setting part requires only hot-stabilized emission measurements, operate the engine in-use until the engine coolant's absolute temperature is within ±10% of its mean value for the previous 2 min or until the engine thermostat controls engine temperature. For hot-stabilized emission measurements, bring the engine to idle. Start the field test within 10 min of achieving coolant temperature tolerance.

(2) If the standard-setting part requires hot-start emission measurements, shut down the engine after at least 2 min at the temperature tolerance specified in paragraph (a)(1) of this section. Start the field test within 20 min of engine shutdown.

(3) If the standard-setting part requires cold-start emission measurements, you may start the engine and test cycle if the highest temperature of an engine's lubricant, coolant, and aftertreatment systems is within the standard-setting part's ambient temperature limits for field testing.

(b) Take the following steps before emission sampling begins:

(1) For batch sampling, connect clean storage media, such as evacuated bags or tare-weighed PM sample media.

(2) Operate all measurement instruments according to the instrument manufacturer's instructions.

(3) Operate heaters, dilution systems, sample pumps, cooling fans, and the data-collection system.

(4) Preheat any heat exchangers in the measurement system.

(5) Allow heated components such as sample lines, filters, and pumps to stabilize at operating temperature.

(6) Perform vacuum side leak checks as described in § 1065.345.

(7) Using bypass, adjust the sample flow rates to desired levels.

(8) Zero any integrating devices.

(9) Zero and span all constituent analyzers using NIST-traceable gases that meet the specifications of § 1065.750.

(c) Start testing as follows:

(1) If the engine is already running and warmed up and starting is not part of field testing, start the field test by simultaneously sampling exhaust gases, recording data, and integrating measured values.

(2) If engine starting is part of field testing, start field testing by simultaneously sampling exhaust gases, recording data, and integrating measured values. Then start the engine.

(d) Continue the test as follows:

(1) Continue to sample exhaust, record data and integrate measured values throughout normal in-use operation of the engine. The engine may be stopped and started, but continue to sample emissions throughout the entire field test.

(2) Conduct periodic performance checks such as zero and span checks on measurement instruments, as recommended by the instrument manufacturer. Do not include data recorded during performance checks in emission calculations.

(3) You may periodically condition and analyze batch samples in-situ, including PM samples if you use an inertial balance.

(e) Stop testing as follows:

(1) On the last record of the field test, allow sampling system response times to elapse and cease sampling. Stop any integrator and indicate the end of the test cycle on the data-collection medium.

(2) Shut down the engine if it is not already shut down.

(f) Take the following steps after emission sampling is complete:

(1) Unless you weighed PM in-situ, such as by using an inertial PM balance, place any used PM samples into covered or sealed containers and return them to the PM-stabilization environment for subsequent weighing on a gravimetric balance. If you weigh PM samples with a gravimetric balance, weigh PM samples according to § 1065.595.

(2) As soon as practical after the duty cycle is complete, analyze any gaseous batch samples.

(3) Analyze background samples if dilution air was used.

(4) After quantifying exhaust gases, check drift of each analyzer:

(i) Record the mean analyzer value after stabilizing a zero gas to each analyzer. Stabilization may include time to purge an analyzer of any sample gas, plus any additional time to account for analyzer response.

(ii) Record mean analyzer values after stabilizing the span gas to the analyzer. Stabilization may include time to purge the analyzer of any sample gas, plus any additional time to account for analyzer response.

(iii) Use this data to validate and correct for drift as described in § 1065.658.

(5) Drift invalidates a test if the drift correction exceeds ±4% of the flow-weighted average concentration expected at either the standard or during a test interval, whichever is greater. Calculate and correct for drift as described in § 1065.657.

(g) For any proportional batch sample such as a bag sample or PM sample, demonstrate that proportional sampling was maintained using one of the following:

(1) Record the sample flow rate and the total flow rate at 1 Hz or more frequently. Use this data with the statistical calculations in § 1065.602 to determine the standard error of the estimate, SE, of the sample flow rate versus the total flow rate. For each test interval (as defined in subpart K), demonstrate that SE was less than or equal to 2.5% of the mean sample flow rate. You may omit up to 5% of the data points as outliers to improve SE.

(2) Record the sample flow rate and the total flow rate at 1 Hz or more frequently. For each test interval, demonstrate that each flow rate was constant within ±2.5% of its respective mean or target flow rate.

(3) For critical-flow venturis, record venturi-inlet conditions at 1 Hz or more frequently. Demonstrate that the density at the venturi inlet was constant within ±2.5% of the mean or target density over each test interval. For a CVS critical-flow venturi, you may demonstrate this by showing that the absolute temperature at the venturi inlet was constant within ±4% of the mean or target temperature over each test interval.

(4) For positive-displacement pumps, record pump-inlet conditions at 1 Hz or more frequently. Demonstrate that the density at the pump inlet was constant within ±2.5% of the mean or target density over each test interval. For a CVS pump, you may demonstrate this by showing that the absolute temperature at the pump inlet was constant within ±2% of the mean or target temperature over each test interval.

(5) Using good engineering judgment, demonstrate using an engineering analysis that the proportional-flow control system inherently ensures proportional sampling under all circumstances expected during testing. For example, you use CFVs for sample flow and total flow and their inlet pressures and temperatures are always the same as each others, and they always operate under critical-flow conditions.

(h) Check all non-auto-ranging analyzer results to determine if any results indicate that an analyzer ever operated above 100% of its range during the test. If an analyzer operated above 100% of its range, perform the following:

(1) For a batch sample, re-analyze the batch sample using the next higher analyzer range that results in an instrument response less than 100%. Report the result from the lowest range that results in analyzer operation at less than 100% of its range.

(2) For continuous sampling, repeat the field test using the same vehicle, but use the next higher analyzer range that you estimate will not respond greater than 100% of range. If the analyzer still operates above 100% of its range, repeat the field test again using a higher range. Continue to repeat the field test until the analyzer operates at less than 100% of its range for an entire field test. Report all results.

§ 1065.940 Emission calculations.

(a) Follow instructions in the standard-setting part for any other emission calculations.

(b) For each test interval, as determined by information in the standard-setting part, perform emission calculations as described in § 1065.650 to calculate brake-specific emissions, using the field-testing specifications for analyzer noise in Table 1 of § 1065.915.

Subpart K—Definitions and Other Reference Information

§ 1065.1001 Definitions.

The following definitions apply to this part. The definitions apply to all subparts unless we note otherwise. All undefined terms have the meaning the Act gives to them. The definitions follow:

300 series stainless steel means any stainless steel alloy with a Unified Numbering System for Metals and Alloys number designated from S30100 to S39000. For all instances in this part where we specify 300 series stainless steel, such parts must also have a smooth inner-wall construction. We recommend an average roughness, R_a no greater than 4 mm.

Accuracy means the absolute difference between a reference quantity and the arithmetic mean of ten mean measurements of that quantity. Instrument accuracy, repeatability, and noise are determined from the same data set. We specify a procedure for determining accuracy in § 1065.305.

Act means the Clean Air Act, as amended, 42 U.S.C. 7401–7671q.

Adjustable parameter means any device, system, or element of design that someone can adjust (including those which are difficult to access) and that, if adjusted, may affect emissions or engine performance during emission testing or normal in-use operation. This includes, but is not limited to, parameters related to injection timing and fueling rate. In some cases this may exclude a parameter that is difficult to access if it cannot be adjusted to affect emissions without significantly degrading engine performance, or if it will not be adjusted in a way that affects emissions during in-use operation.

Aerodynamic diameter means the diameter of a spherical water droplet which settles at the same constant velocity as the particle being sampled.

Aftertreatment means relating to a catalytic converter, particulate filter, or any other system, component, or technology mounted downstream of the exhaust valve (or exhaust port) whose design function is to decrease emissions in the engine exhaust before it is exhausted to the environment. Exhaust-gas recirculation (EGR) and turbochargers are not aftertreatment.

Allowed procedures means procedures that we either specify in this part 1065 or in the standard-setting part or approve under § 1065.10.

Aqueous condensation means the precipitation of water (H_2O)-containing constituents from a gas phase to a liquid phase. Aqueous condensation is a function of humidity, pressure, temperature, and concentrations of other constituent such as sulfuric acid. These parameters vary as a function of engine intake-air humidity, dilution air humidity, engine air-to-fuel ratio, and fuel composition—including the amount of hydrogen and sulfur in the fuel.

Auto-ranging means a constituent analyzer function that automatically changes the analyzer gain to a higher range as a constituent's concentration approaches 100% of the analyzer's current range.

Auxiliary emission-control device means any element of design that senses temperature, motive speed, engine RPM,

transmission gear, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission-control system.

Barometric pressure means the wet, absolute, atmospheric static pressure. Note that if you measure barometric pressure in a duct, you must ensure that there are negligible pressure losses between the atmosphere and your measurement location, and you must account for changes in the duct's static pressure resulting from the flow.

Brake power has the meaning given in the standard-setting part. If it is not defined in the standard-setting part, brake power means the usable power output of the engine, not including power required to fuel, lubricate, or heat the engine, circulate coolant to the engine, or to operate aftertreatment devices. If these accessories are not powered by the engine during a test, subtract the work required to perform these functions from the total work used in brake-specific emission calculations. Subtract engine fan work from total work only for air-cooled engines.

Calibration means the set of specifications and tolerances specific to a particular design, version, or application of a component or assembly capable of functionally describing its operation over its working range.

Certification means obtaining a certificate of conformity for an engine family that complies with the emission standards and requirements in this part.

Compression-ignition means relating to a type of reciprocating, internal-combustion engine that is not a spark-ignition engine.

Confidence interval means the range associated with a probability that a quantity will be considered statistically equivalent to a reference quantity.

Constant-speed engine means an engine whose certification is limited to constant-speed operation. Engines whose constant-speed governor function is removed or disabled are no longer constant-speed engines.

Constant-speed operation means engine operation with a governor that controls the operator input to maintain an engine at a reference speed, even under changing load. For example, an isochronous governor changes reference speed temporarily during a load change, then returns the engine to its original reference speed after the engine stabilizes. Isochronous governors typically allow speed changes up to 1.0%. Another example is a speed-droop governor, which has a fixed reference speed at zero load and allows the reference speed to decrease as load increases. With speed-droop governors, speed typically decreases (3 to 10)% below the reference speed at zero load, such that the minimum reference speed occurs near the engine's point of maximum power.

Coriolis meter means a flow-measurement instrument that determines the mass flow of a fluid by sensing the vibration and twist of specially designed flow tubes as the flow passes through them. The twisting characteristic is called the Coriolis effect. According to Newton's Second Law of Motion, the amount of sensor tube twist is directly proportional to the mass flow rate of the fluid flowing through the tube. *See* § 1065.220.

Designated Compliance Officer means the Manager, Engine Programs Group (6405-J), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

Discrete-mode means relating to the discrete-mode type of steady-state test described in the standard-setting part.

Drift means the difference between a zero or calibration signal and the respective value reported by a measurement instrument immediately after it was used in an emission test, provided that the instrument was zeroed and spanned just before the test.

Duty cycle means a series of speeds and torques that an engine must follow during a laboratory test. Duty cycles are specified in the standard-setting part. A single duty cycle may consist of one or more test intervals. For example, a duty cycle may be a ramped-modal cycle, which has one test interval; a cold-start plus hot-start transient cycle, which has two test intervals; or a discrete-mode cycle, which has one test interval for each mode.

Electronic control module means an engine's electronic device that uses data from engine sensors to control engine parameters.

Emission-control system means any device, system, or element of design that controls or reduces the regulated emissions from an engine.

Emission-data engine means an engine that is tested for certification. This includes engines tested to establish deterioration factors.

Emission-related maintenance means maintenance that substantially affects emissions or is likely to substantially affect emission deterioration.

Engine means an engine to which this part applies.

Engine family means a group of engines with similar emission characteristics throughout the useful life, as specified in the standard-setting part.

Exhaust-gas recirculation means a technology that reduces emissions by routing exhaust gases that had been exhausted from the combustion chamber(s) back into the engine to be mixed with incoming air before or during combustion. The use of valve timing to increase the amount of residual exhaust gas in the combustion chamber(s) that is mixed with incoming air before or during combustion is not considered exhaust-gas recirculation for the purposes of this part.

Fall time, $t_{90-10,}$ means the time interval from (90 to 10) % of a measurement instrument's response after any step decrease to the input.

Flow-weighted average means the average of a quantity after it is weighted proportional to a corresponding flow rate. For example, if a gas concentration is measured continuously from the raw exhaust of an engine, its flow-weighted average concentration is the sum of the products of each recorded concentration times its respective exhaust flow rate, divided by the number of recorded values. As another example, the bag concentration from a CVS system is the same as the flow-weighted average concentration because the CVS system itself flow-weights the bag concentration.

Fuel system means all components involved in transporting, metering, and mixing the fuel from the fuel tank to the combustion chamber(s), including the fuel tank, fuel tank cap, fuel pump, fuel filters, fuel lines, carburetor or fuel-injection components, and all fuel-system vents.

Fuel type means a general category of fuels such as gasoline or LPG. There can be multiple grades within a single type of fuel, such as summer-grade gasoline and winter-grade gasoline.

Good engineering judgment means judgments made consistent with generally accepted scientific and engineering principles and all available relevant information. See 40 CFR 1068.5 for the administrative process we use to evaluate good engineering judgment.

HEPA filter means high-efficiency particulate air filters that are rated to achieve a minimum particle-removal efficiency of 99.97% using ASTM F 1471–93 (incorporated by reference in § 1065.1010).

Identification number means a unique specification (for example, a model number/serial number combination) that allows someone to distinguish a particular engine from other similar engines.

Idle speed means the lowest engine speed possible with zero load where an engine governor function controls engine speed. For engines without a governor function that controls idle speed, idle speed means the

manufacturer-declared value for lowest engine speed possible with zero load. Note that warm idle speed is the idle speed of a warmed-up engine.

Intermediate test speed has the meaning we give in § 1065.610.

Linearity means the degree to which measured values agree with respective reference values. Linearity is quantified using a linear regression of pairs of measured values and reference values over the range from the minimum to the maximum values expected or observed during testing. Perfect linearity would result in an intercept value of zero and a slope of one. (**Note:** The term ''linearity'' is not used in this part to refer to the shape of a measurement instrument's unprocessed response curve, such as a curve relating emission concentration to voltage output. A properly performing instrument with a nonlinear response curve will meet linearity specifications.)

Manufacturer has the meaning given in section 216(1) of the Act. In general, this term includes any person who manufactures an engine or vehicle for sale in the United States or otherwise introduces a new nonroad engine into commerce in the United States. This includes importers who import engines or vehicles for resale.

Maximum engine speed has the meaning we give in § 1065.610.

Maximum test torque has the meaning we give in § 1065.610.

NIST-traceable means relating to a standard value that can be related to NIST-stated references through an unbroken chain of comparisons, all having stated uncertainties.

Noise means the precision of 25 consecutive samples from a measurement instrument as it quantifies a zero or reference value. Instrument noise, repeatability, and accuracy are determined from the same data set. We specify a procedure for determining noise in § 1065.305.

Nonmethane hydrocarbons means the sum of all hydrocarbon species except methane. Refer to § 1065.660 for NMHC determination.

Nonroad means relating to nonroad engines.

Nonroad engine has the meaning we give in 40 CFR 1068.30. In general this means all internal-combustion engines except motor vehicle engines, stationary engines, engines used solely for competition, or engines used in aircraft.

Operator demand means an engine operator's input to control engine output. The operator may be a person, a governor, or other controller that mechanically or electronically signals an input that demands engine output. Input may be an accelerator pedal or signal, a throttle-control lever or signal, a fuel lever or signal, a speed lever or signal, or a governor setpoint or signal. Output means engine power, P, which is the product of engine speed, f_n, and engine torque, T.

Oxides of nitrogen means compounds containing only nitrogen and oxygen as measured by the procedures specified in this part. Oxides of nitrogen are expressed quantitatively as if the NO is in the form of NO_2, such that you use a molar mass for all oxides of nitrogen equivalent to that of NO_2. We specify a procedure for determining NO_X in § 1065.650.

Oxygenated fuels means fuels composed of oxygen-containing compounds, such as ethanol or methanol. Generally, testing engines that use oxygenated fuels requires the use of the sampling methods in subpart I of this part. However, you should read the standard-setting part and subpart I of this part to determine which sampling methods to use.

Partial pressure means the pressure, p attributable to a constituent in a gas mixture. For an ideal gas the partial pressure divided by the total pressure is equal to the constituent's molar concentration, x.

Precision means the two times the standard deviation of a set of measured values of a single zero or reference quantity.

Procedures means all aspects of engine testing, including the equipment specifications, calibrations, calculations and other protocols and specifications needed to measure emissions, unless we specify otherwise.

PTFE means polytetrafluoroethylene, which is commonly known as Teflon™.

Ramped-modal means relating to the ramped-modal type of steady-state test described in the standard-setting part.

Regression statistics means any of the set of statistics specified in § 1065.602(i) through (l).

Repeatability means the precision of ten mean measurements of a reference quantity. Instrument repeatability, accuracy, and noise must be determined from the same data set. We specify a procedure for determining repeatability in § 1065.305.

Revoke has the meaning we give in 40 CFR 1068.30.

Rise time, $t_{10–90}$ means the time interval from (10 to 90)% of a measurement instrument's response after any step increase to the input.

Roughness (or average roughness, R_a) means the size of finely distributed vertical surface deviations from a smooth surface, as determined when traversing a surface. It is an integral of the absolute value of the roughness profile measured over an evaluation length.

Round means to round numbers according to ASTM E29–02 (incorporated by reference in § 1065.1010), unless otherwise specified.

Scheduled maintenance means adjusting, repairing, removing, disassembling, cleaning, or replacing components or systems periodically to keep a part or system from failing, malfunctioning, or wearing prematurely. It also may mean actions you expect are necessary to correct an overt indication of failure or malfunction for which periodic maintenance is not appropriate.

Span means to adjust an instrument so that it gives a proper response to a calibration standard that represents between 75% and 100% of the maximum value in the instrument range or expected rang of use.

Spark-ignition means relating to a gasoline-fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Spark-ignition engines usually use a throttle to regulate intake air flow to control power during normal operation.

Specified procedures means procedures we specify in this part 1065 or the standard-setting part.

Standard-setting part means the part in the Code of Federal Regulations that defines emission standards for a particular engine. See § 1065.1(a).

Steady-state means relating to emission tests in which engine speed and load are held at a finite set of essentially constant values. Steady-state tests are either discrete-mode tests or ramped-modal tests.

Stoichiometric means the ratio of air and fuel such that if the fuel were fully oxidized, there would be no remaining fuel or oxygen. For example, stoichiometric combustion in a gasoline-fueled engine typically occurs at an air-to-fuel mass ratio of about 14.7.

Test engine means an engine in a test sample.

Test interval means a duration of time over which you determine brake-specific emissions. For example, a standard-setting part may specify a complete laboratory duty cycle as a cold-start test interval, plus a hot-start test interval. As another example, a standard-setting part may specify a field test interval (e.g., an NTE event), as a duration of time over which an engine operates within a certain range of speed and torque. In cases where multiple test intervals occur, the standard-setting parts specify additional calculations

that weight and combine results to arrive at composite values for comparison against the applicable standards.

Test sample means the collection of engines selected from the population of an engine family for emission testing.

Tolerance means the interval in which 95% of a set of recorded values of a certain quantity must lie. Use the specified recording frequencies and time intervals to determine if a quantity is within the applicable tolerance.

Total hydrocarbon means the combined mass of organic compounds measured by the specified procedure for measuring total hydrocarbon, expressed as a hydrocarbon with a hydrogen-to-carbon mass ratio of 1.85:1.

Total hydrocarbon equivalent means the sum of the carbon mass contributions of non-oxygenated hydrocarbons, alcohols and aldehydes, or other organic compounds that are measured separately as contained in a gas sample, expressed as exhaust hydrocarbon from petroleum-fueled engines. The hydrogen-to-carbon ratio of the equivalent hydrocarbon is 1.85:1.

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, and the U.S. Virgin Islands.

Useful life means the period during which a new nonroad engine is required to comply with all applicable emission standards. The standard-setting part defines the specific useful-life periods for individual engines.

Variable-speed engine means an engine that is not a constant-speed engine.

Vehicle means any vehicle, vessel, or type of equipment using engines to which this part applies. For purposes of this part, *vehicle* may include immobile machines.

We (us, our) means the Administrator of the Environmental Protection Agency and any authorized representatives.

Zero means to adjust an instrument so it gives a zero response to a zero calibration standard, such as purified nitrogen or purified air for measuring concentrations of emission constituents.

§ 1065.1005 Symbols, abbreviations, acronyms, and units of measure.

The procedures in this part generally follow the International System of Units (SI), as detailed in NIST Special Publication 811, 1995 Edition, ''Guide for the Use of the International System, of Units (SI),'' which we incorporate by reference in § 1065.1010. *See* § 1065.25 for specific provisions related to these conventions. This section summarizes the way we use symbols, units of measure, and other abbreviations.

(a) *Symbols for quantities.* This part uses the following symbols and units of measure for various quantities:

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Symbol	Quantity	Unit	Unit Symbol	Base SI units
%	percent	0.01	%	10^{-2}
α	atomic hydrogen to carbon ratio	mole per mole	mol/mol	1
A	area	square meter	m^2	m^2
a_0	intercept of least squares regression			
a_1	slope of least squares regression			
β	ratio of diameters	meter per meter	m/m	1
β	atomic oxygen to carbon ratio	mole per mole	mol/mol	1
D	diameter	meter	m	m
DF	dilution air fraction	mole per mol	mol/mol	1
$\hbar$	viscosity, dynamic	pascal second	Pa·s	$m^{-1}·kg·s^{-1}$
ϵ	error between a quantity and its reference			
e	brake-specific emission	gram per kilowatt hour	g/kW·h	$g·3.6^{-1}·10^{6}·m^{2}·kg·s^{2}$
F	F-test statistic			
f	frequency	hertz	Hz	s^{-1}
f_n	rotational frequency (shaft)	revolutions per minute	rev/min	$2·pi·60^{-1}·s^{-1}$
γ	ratio of specific heats	(joule per kilogram kelvin) per (joule per kilogram kelvin)	(J/(kg·K))/(J/(kg·K))	1
K	correction factor			1
l	length	meter	m	m
M	molar mass	gram per mole	g/mol	$10^{-3}·kg·mol^{-1}$
m	mass	kilogram	kg	kg
$\dot{m}$	mass rate	kilogram per second	kg/s	$kg·s^{-1}$

Symbol	Quantity	Unit	Unit Symbol	Base SI units
ν	viscosity, kinematic	meter squared per second	m^2/s	$m^2·s^{-1}$
N	total number in series			
n	amount of substance	mole	mol	mol

$\dot{n}$	amount of substance rate	mole per second	mol/s	$mol \cdot s^{-1}$
P	power	kilowatt	kW	$103 \cdot m^2 \cdot kg \cdot s^{-3}$
PF	penetration fraction			
p	pressure	pascal	Pa	$m^{-1} \cdot kg \cdot s^{-2}$
ρ	mass density	kilogram per cubic meter	kg/m^3	$kg \cdot m^{-3}$
r	ratio of pressures	pascal per pascal	Pa/Pa	1
r^2	coefficient of determination			
R_a	average surface roughness	micrometer	μm	m^{-6}
$Re^{\#}$	Reynolds number			
RF	response factor			
σ	non-biased standard deviation			
SE	standard estimate of error			
T	absolute temperature	kelvin	K	K
T	Celsius temperature	degree Celsius	°C	K-273.15
T	torque (moment of force)	newton meter	N·m	$m^2 \cdot kg \cdot s^{-2}$
t	time	second	s	s
Δt	time interval, period, 1/frequency	second	s	s
V	volume	cubic meter	m^3	m^3
$\dot{V}$	volume rate	cubic meter per second	m^3/s	$m^3 \cdot s^{-1}$
W	work	kilowatt hour	kW·h	$3.6 \cdot 10^{-6} \cdot m^2 \cdot kg \cdot s^{-2}$
x	amount of substance fraction	mole per mole	mol/mol	1
$\overline{x}$	flow-weighted average concentration	mole per mole	mol/mol	1
y	generic variable			

(b) Symbols for chemical species. This part uses the following symbols for chemical species and exhaust constituents:

Symbol	Species
Ar	argon
C	carbon
CH_4	methane
C_2H_6	ethane
C_3H_8	propane
C_4H_{10}	butane
C_5H_{12}	pentane
CO	carbon monoxide
CO_2	carbon dioxide
H	atomic hydrogen

H_2	molecular hydrogen
H_2O	water
He	helium
^{85}Kr	krypton 85
N_2	molecular nitrogen
NMHC	nonmethane hydrocarbon
NMHCE	nonmethane hydrocarbon equivalent
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_2	molecular oxygen
^{210}Po	polonium 210
PM	particulate mass
S	sulfur
THC	total hydrocarbons

(c) Prefixes. This part uses the following prefixes to define a quantity:

Symbol	Quantity	Value
μ	micro	10^{-6}
m	milli	10^{-3}
c	centi	10^{-2}
k	kilo	10^{3}
M	mega	10^{6}

(d) Superscripts. This part uses the following superscripts to define a quantity:

Superscript	Quantity
overbar (such as $\overline{y}$)	arithmetic mean.
overdot (such as $\dot{y}$)	quantity per unit time.

(e) Subscripts. This part uses the following subscripts to define a quantity:

Subscript	Quantity
abs	absolute quantity
act	actual condition
air	air, dry
barom	barometer
cal	calibration quantity
CFV	critical flow venturi
cor	corrected quantity
dil	dilution air
dexh	diluted exhaust
exh	raw exhaust
exp	expected quantity
i	an individual of a series
idle	condition at idle

in	quantity in
j	an individual of a series
max	the maximum (i.e., peak) value expected at the standard over a test interval; not the maximum of an instrument range.
meas	measured quantity
out	quantity out
part	partial quantity
PDP	positive-displacement pump
ref	reference quantity
rev	revolution
sat	saturated condition
slip	PDP slip
span	span quantity
SSV	subsonic venturi
std	standard condition
test	test quantity
uncor	uncorrected quantity
zero	zero quantity

(f) Constants. (1) This part uses the following constants for the composition of dry air:

Symbol	Quantity	mol/mol
x_{Arair}	amount of argon in dry air	0.00934
x_{CO2air}	amount of carbon dioxide in dry air	0.000375
x_{N2air}	amount of nitrogen in dry air	0.78084
x_{O2air}	amount of oxygen in dry air	0.209445

(2) This part uses the following molar masses of chemical species:

Symbol	Quantity	g/mol (10^{-3}·kg·mol^{-1})
M_{air}	molar mass of dry air [1]	28.96559
M_{Ar}	molar mass of argon	39.948
M_C	molar mass of carbon	12.0107
M_{CO}	molar mass of carbon monoxide	28.0101
M_{CO2}	molar mass of carbon dioxide	44.0095
M_H	molar mass of atomic hydrogen	1.00794
M_{H2}	molar mass of molecular hydrogen	2.01588
M_{H2O}	molar mass of water	18.01528
M_{He}	molar mass of helium	4.002602
M_N	molar mass of atomic nitrogen	14.0067
M_{N2}	molar mass of molecular nitrogen	28.0134
M_{NMHC}	molar mass of nonmethane hydrocarbon [2]	13.875389
M_{NMHCE}	molar mass of nonmethane equivalent hydrocarbon [2]	13.875389
M_{NOx}	molar mass of oxides of nitrogen equivalent (NO_2)	46.0055
M_O	molar mass of atomic oxygen	15.9994

M_{O2}	molar mass of molecular oxygen	31.9988
M_{C3H8}	molar mass of propane	44.09562
M_S	molar mass of sulfur	32.065
M_{THC}	molar mass of total hydrocarbon [2]	13.875389
M_{THCE}	molar mass of total hydrocarbon equivalent [2]	13.875389

[1] See paragraph (f)(1) of this section for the composition of dry air.

[2] The molar masses of THC, THCE, NMHC, and NMHCE are defined by an atomic hydrogen-to-carbon ratio, α, of 1.85.

(3) This part uses the following molar gas constant for ideal gases:

Symbol	Quantity	J/mol·K $(m^2 \cdot kg \cdot s^{-2} \cdot mol^{-1} \cdot K^{-1})$
R	molar gas constant	8.314472

(4) This part uses the following ratios of specific heats for dilution air and diluted exhaust:

Symbol	Quantity	[J/(kg·K)]/[J/(kg·K)]
γ_{dil}	ratio of specific heats for diluted exhaust	1.385
γ_{air}	ratio of specific heats for dilution or intake air	1.399

(g) Other acronyms and abbreviations. This part uses the following additional abbreviations and acronyms:

ASTM	American Society for Testing and Materials.
BSFC	brake-specific fuel consumption.
CFR	Code of Federal Regulations.
CFV	critical-flow venturi.
CI	compression-ignition.
CLD	chemiluminescent detector.
CVS	constant-volume sampler.
DF	deterioration factor.
ECM	electronic control module.
EFC	electronic flow control.
EPA	Environmental Protection Agency.
FID	flame ionization detector.
IBP	initial boiling point.
INF	infinity.
ISO	International Organization for Standardization.
LPG	liquefied petroleum gas.
NDIR	nondispersive infrared.
NDUV	nondispersive ultraviolet.
NIST	National Institute for Standards and Technology.
PDP	positive-displacement pump.

PFD	partial-flow dilution.
pt.	a single point at the average value expected at the standard.
PTFE	polytetrafluoroethylene (commonly known as Teflon™).
RMS	root-mean square.
RTD	resistive temperature detector.
SSV	subsonic venturi.
SI	spark-ignition.
UFM	ultrasonic flow meter.
U.S.C.	United States Code.
ZrO_2	Zirconia.

BILLING CODE 6560–50–C

§ 1065.1010 Reference materials.

Documents listed in this section have been incorporated by reference into this part. The Director of the Federal Register approved the incorporation by reference as prescribed in 5 U.S.C. 552(a) and 1 CFR part 51. Anyone may inspect copies at the U.S. EPA, Air and Radiation Docket and Information Center, 1301 Constitution Ave., NW., Room B102, EPA West Building, Washington, DC 20460 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.*

(a) *ASTM material.* Table 1 of this section lists material from the American Society for Testing and Materials that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the American Society for Testing and Materials, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428. Table 1 follows:

TABLE 1 OF § 1065.1010.—ASTM MATERIALS

Document number and name	Part 1065 reference
ASTM D 86–03, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure	1065.73, 1065.710
ASTM D 93–02a, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester	1065.703
ASTM D 287–92, (Reapproved 2000), Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)	1065.703
ASTM D 323–99a, Standard Test Method for Vapor Pressure of Petroleum Products (Reid Method).	1065.710
ASTM D 445–03, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)	1065.703
ASTM D 613–03b, Standard Test Method for Cetane Number of Diesel Fuel Oil	1065.703
ASTM D 1266–98, Standard Test Method for Sulfur in Petroleum Products (Lamp Method)	1065.710
ASTM D 1319–02a, Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption	1065.710
ASTM D 1267–02, Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method)	1065.720
ASTM D 1837–02a, Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases	1065.720
ASTM D 1838–03, (Reapproved 2001), Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases	1065.720
ASTM D 1945–03, (Reapproved 2001), Standard Test Method for Analysis of Natural Gas by Gas Chromatography	1065.715
ASTM D 2158–02, Standard Test Method for Residues in Liquefied Petroleum (LP) Gases.	1065.720
ASTM D 2163–91, (Reapproved 1996), Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propene Concentrates by Gas Chromatography	1065.720
ASTM D 2598–02, Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis	1065.720
ASTM D 2622–03, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry	1065.703
ASTM D 2713–91, (Reapproved 2001), Standard Test Method for Dryness of Propane (Valve Freeze Method)	1065.720
ASTM D 2784–98, Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp)	1065.720
ASTM D 2986–95a, (Reapproved 1999), Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test	1065.170
ASTM D 3231–02, Standard Test Method for Phosphorus in Gasoline	1065.710
ASTM D 3237–02, Standard Test Method for Lead in Gasoline By Atomic Absorption Spectroscopy	1065.710
ASTM D 5186–03, Standard Test Method for Determination of the Aromatic Content and Polynuclear Aromatic Content of Diesel Fuels and Aviation Turbine Fuels By Supercritical Fluid Chromatography	1065.703
ASTM E 617–97, (Reapproved 2003), Standard Specification for Laboratory Weights and Precision Mass Standards	1065.790
ASTM F 1471–93, (Reapproved 2001), Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System	1065.140

(b) *ISO material.* Table 2 of this section lists material from the International Organization for Standardization that we have incorporated by reference. The first column lists the number and name of

the material. The second column lists the section of this part where we reference it. Anyone may purchase copies of these materials from the International Organization for Standardization, Case Postale 56, CH–1211 Geneva 20, Switzerland. Table 2 follows:

TABLE 2 OF § 1065.1010.—ISO MATERIALS

Document number and name	Part 1065 reference
ISO 8178–1, Reciprocating internal combustion engines—Exhaust emission measurement—Part 1: Test-bed measurement of gaseous and particulate exhaust emissions, 2004.	1065.130, 1065.135, 1065.140, 1065.155
ISO 14644–1, Cleanrooms and associated controlled environments.	1065.190

(c) *NIST material.* Table 3 of this section lists material from the National Institute of Standards and Technology that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the section of this part where we reference it. Anyone may request these materials from the National Institute of Standards and Technology, NIST, 100 Bureau Drive, Stop 3460, Gaithersburg, MD 20899–3460. Table 3 follows:

TABLE 3 OF § 1065.1010.—NIST MATERIALS

Document number and name	Part 1065 reference
Special Publication 811, 1995 Edition, Guide for the Use of the International System of Units (SI), Barry N. Taylor, Physics Laboratory.	1065.20, 1065.650, 1065.1005

(d) *SAE material.* Table 4 of this section lists material from the Society of Automotive Engineering that we have incorporated by reference. The first column lists the number and name of the material. The second column lists the sections of this part where we reference it. Anyone may purchase copies of these materials from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096. Table 4 follows:

TABLE 4 OF § 1065.1010.—SAE MATERIALS

Document number and name	Part 1065 reference
''Optimization of Flame Ionization Detector for Determination of Hydrocarbon in Diluted Automotive Exhausts,'' Reschke Glen D., SAE 770141	1065.360
''Relationships Between Instantaneous and Measured Emissions in Heavy Duty Applications,'' Ganesan B. and Clark N. N., West Virginia University, SAE 2001–01–3536	1065.201

PART 1068—GENERAL COMPLIANCE PROVISIONS FOR NONROAD PROGRAMS

260. The authority citation for part 1068 is revised to read as follows:

Authority: 42 U.S.C. 7401–7671q.

261. Section 1068.10 is revised to read as follows:

§ 1068.10 What provisions apply to confidential information?

(a) Clearly show what you consider confidential by marking, circling, bracketing, stamping, or some other method.

(b) We will store your confidential information as described in 40 CFR part 2. Also, we will disclose it only as specified in 40 CFR part 2. This applies both to any information you send us and to any information we collect from inspections, audits, or other site visits.

(c) If you send us a second copy without the confidential information, we will assume it contains nothing confidential whenever we need to release information from it.

(d) If you send us information without claiming it is confidential, we may make it available to the public without further notice to you, as described in 40 CFR 2.204.

262. Section 1068.30 is amended by revising the definition for ''United States'' and adding definitions for ''Days'', ''Defeat device'', ''Exempted'', ''Good engineering judgment'', ''Motor vehicle'', ''Revoke'', ''Suspend'', and ''Void'' in alphabetical order to read as follows:

§ 1068.30 What definitions apply to this part?

* * * * *

Days means calendar days, including weekends and holidays.

Defeat device means has the meaning we give in the standard-setting part.

* * * * *

Exempted means relating to an engine that is not required to meet otherwise applicable standards. Exempted engines must conform to regulatory conditions specified for an exemption in this part 1068 or in the standard-setting part. Exempted engines are deemed to be ''subject to'' the standards of the standard-setting part, even though they are not required to comply with the otherwise applicable requirements. Engines exempted with respect to a certain tier of standards may be required to comply with an earlier tier of standards as a condition of the exemption; for example, engines exempted with respect to Tier 2 standards may be required to comply with Tier 1 standards.

Good engineering judgment means judgments made consistent with generally accepted scientific and engineering principles and all available relevant information. See 40 CFR 1068.5 for the administrative process we use to evaluate good engineering judgment.

* * * * *

Motor vehicle has the meaning we give in 40 CFR 85.1703(a). In general, motor vehicle means any vehicle that EPA deems to be capable of safe and practical use on streets or highways that has a maximum ground speed above 40 kilometers per hour (25 miles per hour) over level, paved surfaces.

* * * * *

Revoke means to terminate the certificate or an exemption for an engine family. If we revoke a certificate or exemption, you must apply for a new certificate or exemption before continuing to introduce the affected engines into commerce. This does not apply to engines you no longer possess.

* * * * *

Suspend means to temporarily discontinue the certificate or an exemption for an engine family. If we suspend a certificate, you may not introduce into commerce engines from that engine family unless we reinstate the certificate or approve a new one. If we suspend an exemption, you may not introduce into commerce engines that were previously covered by the exemption unless we reinstate the exemption.

* * * * *

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, and the U.S. Virgin Islands.

Void means to invalidate a certificate or an exemption *ab initio.* If we void a certificate, all the engines introduced into commerce under that engine family for that model year are considered noncompliant, and you are liable for each engine introduced into commerce under the certificate and may face civil or criminal penalties or both. This applies equally to all engines in the engine family, including engines introduced into commerce before we voided the certificate. If we void an exemption, all the engines introduced into commerce under that exemption are considered uncertified (or nonconforming), and you are liable for each engine introduced into commerce under the exemption and may face civil or criminal penalties or both. You may not introduce into commerce any additional engines using the voided exemption.

* * * * *

263. Section 1068.101 is amended by revising the introductory text and paragraphs (a) and (b) to read as follows:

§ 1068.101 What general actions does this regulation prohibit?

This section specifies actions that are prohibited and the maximum civil penalties that we can assess for each violation. The maximum penalty values listed in paragraphs (a) and (b) of this section are shown for calendar year 2004. As described in paragraph (e) of this section, maximum penalty limits for later years are set forth in 40 CFR part 19.

(a) The following prohibitions and requirements apply to manufacturers of new engines and manufacturers of equipment containing these engines, except as described in subparts C and D of this part:

(1) *Introduction into commerce.* You may not sell, offer for sale, or introduce or deliver into commerce in the United States or import into the United States any new engine or equipment after emission standards take effect for that engine or equipment, unless it has a valid certificate of conformity for its model year and the required label or tag. You also may not take any of the actions listed in the previous sentence with respect to any equipment containing an engine subject to this part's provisions, unless the engine has a valid and appropriate certificate of conformity and the required engine label or tag. For purposes of this paragraph (a)(1), an appropriate certificate of conformity is one that applies for the same model year as the model year of the equipment (except as allowed by § 1068.105(a)), covers the appropriate category of engines (such as locomotive or CI marine), and conforms to all requirements specified for equipment in the standard-setting part. The requirements of this paragraph (a)(1) also cover new engines you produce to replace an older engine in a piece of equipment, unless the engine qualifies for the replacement-engine exemption in § 1068.240. We may assess a civil penalty up to $32,500 for each engine in violation.

(2) *Reporting and recordkeeping.* This chapter requires you to record certain types of information to show that you meet our standards. You must comply with these requirements to make and maintain required records (including those described in § 1068.501). You may not deny us access to your records or the ability to copy your records if we have the authority to see or copy them. Also, you must give us the required reports or information without delay. Failure to comply with the requirements of this paragraph is prohibited. We may assess a civil penalty up to $32,500 for each day you are in violation.

(3) *Testing and access to facilities.* You may not keep us from entering your facility to test engines or inspect if we are authorized to do so. Also, you must perform the tests we require (or have the tests done for you). Failure to perform this testing is prohibited. We may assess a civil penalty up to $32,500 for each day you are in violation.

(b) The following prohibitions apply to everyone with respect to the engines to which this part applies:

(1) *Tampering.* You may not remove or disable a device or element of design that may affect an engine's emission levels. This restriction applies before and after the engine is placed in service. Section 1068.120 describes how this applies to rebuilding engines. For a manufacturer or dealer, we may assess a civil penalty up to $32,500 for each engine in violation. For anyone else, we may assess a civil penalty up to $2,750 for each engine in violation. This prohibition does not apply in any of the following situations:

(i) You need to repair an engine and you restore it to proper functioning when the repair is complete.

(ii) You need to modify an engine to respond to a temporary emergency and you restore it to proper functioning as soon as possible.

(iii) You modify a new engine that another manufacturer has already certified to meet emission standards and recertify it under your own engine family. In this case you must tell the original manufacturer not to include the modified engines in the original engine family.

(2) *Defeat devices.* You may not knowingly manufacture, sell, offer to sell, or install, an engine part that bypasses, impairs, defeats, or disables the engine's control of the emissions of any pollutant. We may assess a civil penalty up to $2,750 for each part in violation.

(3) *Stationary engines.* For an engine that is excluded from any requirements of this chapter because it is a stationary engine, you may not move it or install it in any mobile equipment, except as allowed by the provisions of this chapter. You may not circumvent or attempt to circumvent the residence-time requirements of paragraph (2)(iii) of the nonroad engine definition in § 1068.30. We may assess a civil penalty up to $32,500 for each day you are in violation.

(4) *Competition engines.* For an uncertified engine or piece of equipment that is excluded or exempted from any requirements of this chapter because it is to be used solely for competition, you may not use it in a manner that is inconsistent with use

solely for competition. We may assess a civil penalty up to $32,500 for each day you are in violation.

(5) *Importation.* You may not import an uncertified engine or piece of equipment if it is defined to be new in the standard-setting part and it is built after emission standards start to apply in the United States. We may assess a civil penalty up to $32,500 for each day you are in violation. Note the following:

(i) The definition of new is broad for imported engines; uncertified engines and equipment (including used engines and equipment) are generally considered to be new when imported.

(ii) Engines that were originally manufactured before applicable EPA standards were in effect are generally not subject to emission standards.

(6) *Warranty.* You must meet your obligation to honor your emission-related warranty under § 1068.115 and to fulfill any applicable responsibilities to recall engines under § 1068.505. Failure to meet these obligations is prohibited. We may assess a civil penalty up to $32,500 for each engine in violation.

* * * * *

264. Section 1068.105 is amended by revising paragraph (a) to read as follows:

§ 1068.105 What other provisions apply to me specifically if I manufacture equipment needing certified engines?

* * * * *

(a) *Transitioning to new engine-based standards.* If new emission standards apply in a given model year, your equipment in that model year must have engines that are certified to the new standards, except that you may use up your normal inventory of earlier engines that were built before the date of the new or changed standards. For example, if your normal inventory practice is to keep on hand a one-month supply of engines based on your upcoming production schedules, and a new tier of standard starts to apply for the 2015 model year, you may order engines based on your normal inventory requirements late in the engine manufacturer's 2014 model year and install those engines in your equipment, regardless of the date of installation. Also, if your model year starts before the end of the calendar year preceding new standards, you may use engines from the previous model year for those units you produce before January 1 of the year that new standards apply. If emission standards do not change in a given model year, you may continue to install engines from the previous model year without restriction. You may not circumvent the provisions of § 1068.101(a)(1) by stockpiling engines that were built before new or changed standards take effect. Note that this allowance does not apply for equipment subject to equipment-based standards.

* * * * *

265. Section 1068.110 is amended by revising paragraph (e) to read as follows:

§ 1068.110 What other provisions apply to engines in service?

* * * * *

(e) *Warranty and maintenance.* Owners are responsible for properly maintaining their engines; however, owners may make warranty claims against the manufacturer for all expenses related to diagnosing and repairing or replacing emission-related parts, as described in § 1068.115. The warranty period begins when the engine is first placed into service. See the standard-setting part for specific requirements. It is a violation of the Act for anyone to disable emission controls; see § 1068.101(b)(1) and the standard-setting part.

266. Section 1068.115 is amended by revising paragraph (a) to read as follows:

§ 1068.115 When must manufacturers honor emission-related warranty claims?

* * * * *

(a) As a certifying manufacturer, you may deny warranty claims only for failures that have been caused by the owner's or operator's improper maintenance or use, by accidents for which you have no responsibility, or by acts of God. For example, you would not need to honor warranty claims for failures that have been directly caused by the operator's abuse of an engine or the operator's use of the engine in a manner for which it was not designed, and are not attributable to you in any way.

* * * * *

267. Section 1068.125 is amended by revising paragraph (b) introductory text to read as follows:

§ 1068.125 What happens if I violate the regulations?

* * * * *

(b) *Administrative penalties.* Instead of bringing a civil action, we may assess administrative penalties if the total is less than $270,000 against you individually. This maximum penalty may be greater if the Administrator and the Attorney General jointly determine that is appropriate for administrative penalty assessment, or if the limit is adjusted under 40 CFR part 19. No court may review such a determination. Before we assess an administrative penalty, you may ask for a hearing (subject to 40 CFR part 22). The Administrator may compromise or remit, with or without conditions, any administrative penalty that may be imposed under this section.

* * * * *

268. Section 1068.201 is amended by revising paragraph (i) to read as follows:

§ 1068.201 Does EPA exempt or exclude any engines from the prohibited acts?

* * * * *

(i) If you want to take an action with respect to an exempted or excluded engine that is prohibited by the exemption or exclusion, such as selling it, you need to certify the engine. We will issue a certificate of conformity if you send us an application for certification showing that you meet all the applicable requirements from the standard-setting part and pay the appropriate fee. Also, in some cases, we may allow manufacturers to modify the engine as needed to make it identical to engines already covered by a certificate. We would base such an approval on our review of any appropriate documentation. These engines must have emission control information labels that accurately describe their status.

269. Section 1068.240 is amended by revising paragraph (d) to read as follows:

§ 1068.240 What are the provisions for exempting new replacement engines?

* * * * *

(d) If the engine being replaced was certified to emission standards less stringent than those in effect when you produce the replacement engine, add a permanent label with your corporate name and trademark and the following language:

THIS ENGINE COMPLIES WITH U.S. EPA NONROAD EMISSION REQUIREMENTS FOR [APPLICABLE MODEL YEAR] ENGINES UNDER 40 CFR 1068.240. SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE A NONROAD ENGINE BUILT BEFORE JANUARY 1, [Insert appropriate year reflecting when the next tier of emission standards began to apply] MAY BE A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY.

* * * * *

270. Section 1068.245 is amended by revising paragraphs (a)(4) and (f)(4) to read as follows:

§ 1068.245 What temporary provisions address hardship due to unusual circumstances?

(a) * * *

(4) No other allowances are available under the regulations in this chapter to avoid the impending violation, including the provisions of § 1068.250.

* * * * *

(f) * * *

(4) One of the following statements:

(i) If the engine does not meet any emission standards: ''THIS ENGINE IS EXEMPT UNDER 40 CFR 1068.245 FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.''.

(ii) If the engine meets alternate emission standards as a condition of an exemption under this section: ''THIS ENGINE COMPLIES WITH U.S. EPA NONROAD EMISSION REQUIREMENTS UNDER 40 CFR 1068.245.''.

271. Section 1068.250 is amended by revising paragraph (k)(4) to read as follows:

§ 1068.250 What are the provisions for extending compliance deadlines for small-volume manufacturers under hardship?

* * * * *

(f) * * *

(4) One of the following statements:

(i) If the engine does not meet any emission standards: ''THIS ENGINE IS EXEMPT UNDER 40 CFR 1068.250 FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.''.

(ii) If the engine meets alternate emission standards as a condition of an exemption under this section: ''THIS ENGINE COMPLIES WITH U.S. EPA NONROAD EMISSION REQUIREMENTS UNDER 40 CFR 1068.250.''.

272. Section 1068.255 is amended by revising paragraphs (a) introductory text and (b)(4) to read as follows:

§ 1068.255 What are the provisions for exempting engines for hardship for equipment manufacturers and secondary engine manufacturers?

* * * * *

(a) *Equipment exemption.* As an equipment manufacturer, you may ask for approval to produce exempted equipment for up to 12 months. We will generally limit this to the first year that new or revised emission standards apply. Send the Designated Officer a written request for an exemption before you are in violation. In your request, you must show you are not at fault for the impending violation and that you would face serious economic hardship if we do not grant the exemption. This exemption is not available under this paragraph (a) if you manufacture the engine you need for your own equipment or if complying engines are available from other engine manufacturers that could be used in your equipment, unless we allow it elsewhere in this chapter. We may impose other conditions, including provisions to use an engine meeting less stringent emission standards or to recover the lost environmental benefit. In determining whether to grant the exemptions, we will consider all relevant factors, including the following:

* * * * *

(b) * * *

(4) One of the following statements:

(i) If the engine does not meet any emission standards: ''THIS ENGINE IS EXEMPT UNDER 40 CFR 1068.255 FROM EMISSION STANDARDS AND RELATED REQUIREMENTS.''.

(ii) If the engine meets alternate emission standards as a condition of an exemption under this section: ''THIS ENGINE COMPLIES WITH U.S. EPA NONROAD EMISSION REQUIREMENTS UNDER 40 CFR 1068.255.''.

* * * * *

273. Section 1068.260 is amended by revising paragraphs (a)(4), (a)(6)(i), and (f) and adding paragraph (g) to read as follows:

§ 1068.260 What are the provisions for temporarily exempting engines for delegated final assembly?

(a) * * *

(4) Include the cost of all aftertreatment components (including shipping costs) in the cost of the engine.

* * * * *

(6) * * *

(i) Obtain annual affidavits from every equipment manufacturer to whom you sell engines under this section. Include engines that you sell through distributors or dealers. The affidavits must list the part numbers of the aftertreatment devices that equipment manufacturers install on each engine they purchase from you under this section.

* * * * *

(f) You are liable for the in-use compliance of any engine that is exempt under this section.

(g) It is a violation of the Act for any person to complete assembly of the exempted engine without complying fully with the installation instructions.

274. A new § 1068.265 is added to subpart C to read as follows:

§ 1068.265 What provisions apply to engines that are conditionally exempted from certification?

Engines produced under an exemption for replacement engines (§ 1068.240) or for hardship (§ 1068.245, § 1068.250, or § 1068.255) may need to meet alternate emission standards as a condition of the exemption. The standard-setting part may similarly exempt engines from all certification requirements, or allow us to exempt engines from all certification requirements for certain cases, but require the engines to meet alternate standards. In these cases, all the following provisions apply:

(a) Your engines must meet the alternate standards we specify in (or pursuant to) the exemption section, and all other requirements applicable to engines that are subject to such standards.

(b) You need not apply for and receive a certificate for the exempt engines. However, you must comply with all the requirements and obligations that would apply to the engines if you had received a certificate of conformity for them, unless we specifically waive certain requirements.

(c) You must have emission data from test engines using the appropriate procedures that demonstrate compliance with the alternate standards, unless the engines are identical in all material respects to engines that you have previously certified to standards that are the same as, or more stringent than, the alternate standards.

(d) Unless we specify otherwise elsewhere in this part or in the standard-setting part, you must meet the labeling requirements in the standard-setting part, with the following exceptions:

(1) Instead of an engine family designation, use a modified designation to identify the group of engines that would otherwise be included in the same engine family.

(2) Instead of the compliance statement required in the standard-setting part, add the following statement: ''THIS ENGINE MEETS U.S. EPA EMISSION STANDARDS UNDER 40 CFR 1068.265.''.

(e) You may not generate emission credits for averaging, banking, or trading with engines meeting requirements under the provisions of this section.

(f) Keep records to show that you meet the alternate standards, as follows:

(1) If your exempted engines are identical to previously certified engines, keep your most recent application for certification for the certified engine family.

(2) If you previously certified a similar engine family, but have modified the exempted engine in a way that changes it from its previously certified configuration, keep your most recent application for certification for the certified engine family, a description of the relevant changes, and any test data or engineering evaluations that support your conclusions.

(3) If you have not previously certified a similar engine family, keep all the records we specify for the application for certification and any additional

records the standard-setting part requires you to keep.

(g) We may require you to send us an annual report of the engines you produce under this section.

275. Section 1068.315 is amended by revising paragraphs (f)(2)(i) and (f)(2)(iii) to read as follows:

§ 1068.315 What are the permanent exemptions for imported engines?

* * * * *

(f) * * *

(2) * * *

(i) You have owned the engine for at least six months.

* * * * *

(iii) You use data or evidence sufficient to show that the engine is in a configuration that is identical to an engine the original manufacturer has certified to meet emission standards that apply at the time the manufacturer finished assembling or modifying the engine in question. If you modify the engine to make it identical, you must completely follow the original manufacturer's written instructions.

* * * * *

276. Section 1068.410 is amended by adding paragraph (j) to read as follows:

§ 1068.410 How must I select and prepare my engines?

* * * * *

(j) *Retesting after reaching a fail decision.* You may retest your engines once a fail decision for the audit has been reached based on the first test on each engine under § 1068.420(c). You may test each engine up to a total of three times, but you must perform the same number of tests on each engine. You may further operate the engine to stabilize emission levels before testing, subject to the provisions of paragraph (f) of this section. We may approve retesting at other times if you send us a request with satisfactory justification.

277. Section 1068.510 is amended by revising paragraph (a)(10) and adding paragraph (i) to read as follows:

§ 1068.510 How do I prepare and apply my remedial plan?

(a)* * *

(10) If your employees or authorized warranty agents will not be doing the work, state who will and describe their qualifications.

* * * * *

(i) For purposes of recall, *owner* means someone who owns an engine affected by a remedial plan or someone who owns a piece of equipment that has one of these engines.

§ 1068.540 [Removed]

278. Remove § 1068.540.

[FR Doc. 04–19223 Filed 9–9–04; 8:45 am]

BILLING CODE 6560–50–P