

**DRAFT PROPOSED REGULATION TO PROVIDE CERTIFICATION FLEXIBILITY
FOR INNOVATIVE HEAVY-DUTY ENGINES, AND CERTIFICATION AND
INSTALLATION PROCEDURES FOR MEDIUM- AND HEAVY-DUTY VEHICLE
HYBRID CONVERSION SYSTEMS
(INNOVATIVE TECHNOLOGY REGULATION)**

The draft language in this document is only intended to encourage stakeholder feedback and should not be construed as a formal regulatory proposal. Any stakeholder feedback submitted prior to the '45-day' formal comment period will not be considered part of the official rulemaking record. If you would like any feedback submitted to be considered part of the record, you must re-submit it during the formal public comment period.

SECTION 2208: Purpose, Applicability, and Definitions

(a) *Purpose*

This regulation sets forth optional on-road heavy-duty engine and vehicle certification flexibility to encourage market launch of innovative new truck and bus technologies. This article also defines protocols for certification of innovative medium- and heavy-duty vehicle hybrid conversion systems (also commonly referred to as hybrid aftermarket systems or conversion kits) to encourage deployment of robust hybrid technology in California's existing truck and bus fleet.

(b) *Applicability*

(1) Section 2208.1 applies to the certification process of the following:

- (A) 2017 through 2021 model year (MY) heavy-duty spark-ignition engines and 2017 through 2024 MY compression-ignition engines certifying to one of California's optional low oxides of nitrogen (NO_x) engine emission standards, as set forth in California Code of Regulations, title 13, section 1956.8(a)(2)(A) or 1956.8(c)(1)(B), as amended on December 5, 2014. These standards are 0.10 grams per brake-horsepower-hour (g/bhp-hr), 0.05 g/bhp-hr, and 0.02 g/bhp-hr NO_x. This regulation does not apply to spark-ignition engines meeting the 0.10 g/bhp-hr NO_x standard;
- (B) 2017 through 2024 MY heavy-duty engines certifying for use in a heavy-duty vehicle (hybrid engine); and
- (C) 2017 through 2027 MY high-efficiency heavy-duty engines certifying to the Optional Low CO₂ Emission Standards pursuant to California Code of Regulations, title 13, section 1956.8(a)(7). Qualifying engines may not be certified using the provision in 40 CFR 1036.705(d), which allows CO₂

emission credits to demonstrate compliance with methane and/or nitrous oxide family emission limits or emission standards..

- (2) Section 2208.2 applies to the approval of hybrid conversion systems for installation on:
- (A) 2007 and subsequent MY California-certified Class 2a non-hybrid base vehicles, where the conversion achieves at least 35 miles all-electric range (AER);
 - (B) 2007 and subsequent MY California-certified medium-duty non-hybrid base engines or vehicles; and
 - (C) 2010 and subsequent MY California-certified heavy-duty non-hybrid base vehicles.

(c) *Definitions*

- (1) "All-electric range" or "AER" means the total miles driven electrically (with the engine off) before the engine turns on for the first time, after the battery has been fully charged, when tested pursuant to the requirements identified in Section 7 of the "Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems".
- (2) "Applicant" or "manufacturer" means any person who manufactures an engine, hybrid drivetrain or vehicle for sale in California.
- (3) "Average" means the arithmetic mean.
- (4) "Base engine" means the California-certified configuration of a pre-converted, non-hybrid conventional engine.
- (5) "Base vehicle" means the California-certified configuration of a pre-converted, non-hybrid conventional vehicle.
- (6) "Carbon dioxide" or "CO₂" means the most common of the six primary greenhouse gases, consisting on a molecular level of a single carbon atom and two oxygen atoms.
- (7) "Class 2a vehicle" means a motor vehicle having a manufacturer's gross vehicle weight rating between 6,001 and 8,500 pounds.

- (8) “Class 8 vehicle” means an on-road motor vehicle over 33,000 pounds gross vehicle weight rating.
- (9) “Class 8 tractor” means a Class 8 vehicle designed to pull a 53-foot or longer semitrailer on a highway by means of a fifth wheel mounted over the rear axle(s).
- (10) “Common ownership or control” means being owned or managed day to day by the same person, corporation, partnership, or association, public or private. Entities managed by the same directors, officers, or managers, or by corporations controlled by the same majority stockholders are considered to be under common ownership or control even if their title is held by different business entities.
- (11) “Compression ignition engine” means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle. The regulation of power by controlling fuel supply in lieu of a throttle is indicative of a compression ignition engine.
- (12) “Days” when computing any period of time, means calendar days.
- (13) “Engine family” means a grouping of vehicles or engines in a manufacturer’s product line, determined in accordance with section 86.098-24, title 40, Code of Federal Regulations (CFR).
- (14) “Executive Officer” means the Executive Officer of the ARB or the Executive Officer’s designee.
- (15) “Family emission limit” or “FEL” means an emission level that is declared by the manufacturer to serve in lieu of an emission standard for certification purposes and for the averaging, banking, and trading program, as defined in California Code of Regulations, title 13, section 2423 or Code of Federal Regulations, Part 89.112(d).
- (16) “Gross vehicle weight rating” or “GVWR” has the same definition as that in California Vehicle Code section 350.
- (17) “Heavy-duty engine” means an engine used to propel a heavy-duty vehicle. For purposes of this definition, the term “engine” includes internal combustion engines and other devices that convert chemical fuel into motive power. For example, a fuel cell used in a heavy-duty vehicle is a heavy-duty engine.
- (18) “Heavy-duty vehicle” means any motor vehicle having a manufacturer’s GVWR greater than 14,000 pounds.
- (19) “Hybrid engine” means an engine certified by ARB for use in a hybrid heavy-duty vehicle.

- (20) “Hybrid vehicle” means a vehicle that has both of the following on-vehicle sources of stored energy and can draw propulsion energy from the source mentioned in 2): 1) a consumable fuel and 2) an energy storage device, such as a battery, capacitor, pressure reservoir, or flywheel.
- (21) “Hydrocarbon” or “HC” means the hydrocarbon group on which the emission standards are based for each fuel type. For alcohol-fueled engines, HC means non-methane hydrocarbon equivalent (NMHCE). For all other engines, HC means non-methane hydrocarbon (NMHC).
- (22) “Low-NOx engine” or “optional low-NOx engine” means an on-road heavy-duty engine that is certified to the 0.10 g/bhp-hr, 0.05 g/bhp-hr or 0.02 g/bhp-hr NOx emission standard, pursuant to California Code of Regulations, title 13 1956.8(a)(2)(A), as amended on December 5, 2014.
- (23) “Medium-duty vehicle” has the definition identified in California Code of Regulations, title 13, section 1900(b)(16).
- (24) “Model year” or “MY” means the manufacturer’s annual new model production period, except as restricted under this definition. It must include January 1 of the calendar year for which the model year is named, may not begin before January 2 of the previous calendar year, and it must end by December 31 of the named calendar year. Manufacturers may not adjust model years to circumvent or delay compliance with emission standards or to avoid the obligation to certify annually.
- (25) “Oxides of nitrogen” or “NOx” has the meaning given in 40 CFR 1065.1001.
- (26) “Passenger car” means any motor vehicle designed primarily for transportation of persons and having a design capacity of 12 persons or less.
- (27) “Spark-ignition” means 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.
- (28) “Steady-state” has the meaning given in 40 CFR 1065.1001.
- (29) “Tractor” means a vehicle meeting the definition of “tractor” in 40 CFR 1037.801, but not classified as a “vocational tractor” under 40 CFR 1037.630.
- (30) “Tractor engine” means an engine certified for use in tractors. Where an engine family is certified for use in both tractors and vocational vehicles, “tractor engine” means an engine that the engine manufacturer designed specifically for installation in a tractor. Note that the provisions of this part may require a manufacturer to document how it determines that an engine is a tractor engine.

- (31) "Transit bus" means a passenger-carrying vehicle owned or operated by a public transit agency, that is typically 35 feet or longer and greater than 33,000 pounds GVWR.

SECTION 2208.1: Certification Flexibility for Innovative Heavy-Duty Engine Technology

(a) General Requirements

(1) Heavy-Duty Engine Family Certification Requirements.

With the exception of a heavy-duty engine family certified to meet alternative emission standards pursuant to section 2208.1(c)(3), a heavy-duty engine family must be certified pursuant to California Code of Regulation, title 13, section 1956.8, subdivision (b), or California Code of Regulations, title 13, section 1956.8, subdivision (d), and meet the requirements of California Code of Regulations, title 13, section 1971.1, to be eligible for the provisions of sections 2208.1(b), (c), and (d). For such engines, the manufacturer must demonstrate compliance through the certification application process, and comply with all reporting and recordkeeping requirements, of California Code of Regulations, title 13, sections 1969, 1971.1, 1971.5, 2065, other than the exceptions outlined in this regulation.

(2) Surplus Emission Reductions.

(A) *Low-NOx Heavy-Duty Engines.* The 0.05 g/bhp-hr or 0.02 g/bhp-hr NOx emission standard to which a spark-ignition engine family is certified in a given MY, or the 0.10 g/bhp-hr, 0.05 g/bhp-hr or 0.02 /bhp-hr NOx emission standard to which a compression-ignition engine family is certified in a given MY must be more stringent than the mandatory new engine or vehicle NOx emission standard for the given MY to be eligible for the certification flexibility in section 2208.1(b). Averaging, banking or trading of NOx emission reductions or credits achieved by any such engine family is prohibited.

(B) *Other Engines.* The CO₂ emission level to which an engine family is certified in a given MY must be more stringent than required by any new engine standard(s) for that MY to be eligible for the certification flexibility identified in sections 2208.1(c). Any CO₂ credit generated must be immediately retired. Averaging, banking or trading of CO₂ emission reductions or credits achieved by any such engine family is prohibited under any regulation.

(C) Notwithstanding the sunset dates set forth in sections 2208.1(b)(1), (c)(1), or (d)(3), eligibility of an engine family for the provisions of this regulation in a given MY sunsets if the emission levels to which the engine family is certified are no longer surplus to existing regulations in that MY due to adoption of a rule, regulation or other air quality mandate.

- (3) *Anti-Backsliding Provisions.* A hybrid engine is not eligible for the OBD compliance flexibility provision(s) of this regulation if an engine family from the same engine manufacturer that is functionally equivalent, is of the same power rating and intended service class, utilizes the same fuel and emission control system, and meets the same durability requirements and emission standards, complies or has complied with such OBD provision(s) when certified by ARB or the United States Environmental Protection Agency (U.S. EPA) in any MY.
- (A) For a hybrid engine family that has been deemed ineligible for the provisions of section 2208.1(c)(2)(A) or (c)(2)(B) pursuant to section 2208.1(a)(3), the manufacturer shall not be subject to the fines for a deficiency set forth in section 1971.1(k)(2) through the 2020 MY. Further, any such deficiency shall not be included in the determination of the number of allowable deficiencies subject to fines set forth in section 1971.1(k)(2) through the 2020 MY.
- (B) A hybrid engine family that has been deemed ineligible for the provisions of sections 2208.1(c)(2)(A) or (c)(2)(B) pursuant to section 2208.1(a)(3) is exempt from the requirements of section 1971.1(k)(4) through the 2020 MY.
- (4) *Hybrid Engine Emission Testing.* To be eligible for the provisions of section 2208.1(c)(2)(A) or 2208.1(c)(2)(B), a hybrid engine family must demonstrate no increase in NO_x, HC, CO, or PM emissions and at least a ten percent reduction in CO₂ emissions pursuant to Section 7 of the “*Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems*”, or be installed in a heavy-duty hybrid vehicle that is certified pursuant to the *California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes* (December 2013). Emission testing of a hybrid heavy-duty engine conducted pursuant to Section 7 of the “*Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems*” shall also meet the following criteria :
1. *Vehicle Selection and Preparation.* When selecting vehicles for testing, the baseline and hybrid vehicle shall be of the same vehicle class and intended vocation, and be identical or as closely matched as possible in MY, engine power and displacement, number of axles and real axle ratios, electrical and mechanical accessories (such as power steering, brakes, etc...), body style and external surface contours, aerodynamic configuration, wheel circumference, rear differential, transmission type (automatic, automated manual, etc...), and accessories. To be comparable, the baseline and hybrid vehicle must be able to accomplish the same function, with similar performance, utility, and durability attributes. Vehicles shall be tested with the normal appendages (mirrors, bumpers, etc...) and with the same mechanical and electrical accessories

in operation that are reflective of the vehicle's anticipated typical power needs. The power and displacement of the base and hybrid vehicle may differ if this difference is directly related to the more efficient functioning of the hybrid system, such use of a smaller engine in the hybrid configuration. A baseline engine or vehicle may be from a different MY relative to the hybrid vehicle if the engine, after-treatment, and on-board diagnostics system is functionally unchanged between the two MYs and if all other vehicle characteristics are substantially similar, with the exception of the hybrid system.

2. *Fuel Specifications.* Both base and hybrid vehicles shall use an identical gaseous or liquid fuel, unless a base vehicle using a different fuel is approved in advance by the Executive Officer. If an appropriate base vehicle that utilizes the same fuel type as the hybrid vehicle is unavailable, the Executive Officer may approve use of an alternate base vehicle fuel type that best represents the typical fuel used by a newly manufactured vehicle in the intended vehicle class and vocation. For example, a gasoline powered Class 6 hybrid truck may warrant use of a diesel-fueled Class 6 base truck for the purposes of emission testing, since Class 6 vehicles are typically diesel fueled.
3. *Post-Transmission Powertrain Vehicle Simulation.* In lieu of conducting emission testing pursuant to Section 7 of the "California Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems", part (c) or (d), a hybrid engine certifying to meet Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles – Phase 1 pursuant to 40 CFR, 1037.555 may use the post-transmission powertrain vehicle simulation emissions data derived pursuant to said certification testing to demonstrate CO₂ emission compliance for the purposes of demonstrating compliance with the requirements of section 2208.1 (c)(1)(a). Such a vehicle that concurrently measures and calculates NO_x, CO, and HC in the identical fashion as done for CO₂ emissions pursuant to 40 CFR, 1037.555 may use the NO_x, CO, and HC emissions data derived pursuant to said certification testing to also demonstrate NO_x, CO, and HC emission compliance for the purposes of section 2208.1 (c)(1)(a). In such case, the percent CO₂ reduction is calculated as follows:

$$\text{Percent CO}_2 \text{ reduction} = \text{IF} * 100$$

Where

IF = the CO₂ Improvement Factor calculated pursuant to 40 CFR 1037.615.

For each required pollutant, if $(\text{Emission Rate A} * 1.10) \geq \text{Emission Rate B}$, where Emission Rates A and B have the meanings described in 40 CFR, 1037.615(b)(2)(iii), then the hybrid vehicle is found to not increase emissions of that pollutant.

(5) Severability. See California Code of Regulations, title 13 2449(m).

Note: Authority Cited [HSC: §§ 39500, 39600, 39601, 43009.5, 43011, 43012, 43013, 43100, 43101, 43102, 43103, 43105, 43106, 43204, 43205, 43205.5, 43806].

Reference: [HSC §§ 39002, 39003, 39667, 43000, 43010, 43101.5, 43018, need GHG references].

(b) *Certification Flexibility for Early Market Introduction of Low NOx Engines*

(1) *Eligibility.*

(A) *Spark-ignition Low-NOx Engines.* Through MY 2021, a manufacturer shall be eligible to certify a heavy-duty spark-ignition engine family meeting the 0.05 or 0.02 g/bhp-hr NOx heavy-duty engine emission standard pursuant to the provisions of section 2208.1(b)(2), with the following restrictions:

1. A manufacturer is eligible to certify a spark-ignition engine family to the 0.05 or 0.02 g/bhp-hr NOx standard pursuant to the provisions of section 2208.1(b)(2) only for three consecutive MY's, beginning with the MY the manufacturer first certifies any low-NOx spark-ignition engine family to the 0.05 g/bhp-hr NOx standard pursuant to section 2208.1(b)(2) or (b)(3).

(B) *Compression-ignition Low-NOx Engines.* Through MY 2024, a manufacturer shall be eligible to certify a heavy-duty compression-ignition engine family meeting the 0.10, 0.05 or 0.02 g/bhp-hr NOx emission standard pursuant to the provisions of section 2208.1(b)(2), with the following restrictions:

1. A manufacturer is eligible to certify a compression-ignition engine family to the 0.10 g/bhp-hr NOx standard pursuant to the provisions of section 2208.1(b)(2) for three consecutive MYs, beginning with the MY the manufacturer first certifies any low-NOx compression-ignition engine family to the 0.10 g/bhp-hr NOx standard pursuant to section 2208.1(b)(2) or (b)(3).
2. A manufacturer is eligible to certify a compression-ignition engine family to the 0.05 g/bhp-hr NOx standard pursuant to the provisions of section 2208.1(b)(2) for three consecutive MYs, beginning with the MY the manufacturer first certifies any low-NOx compression-ignition engine family to the 0.05 g/bhp-hr NOx standard pursuant to section 2208.1(b)(2) or (b)(3).

3. A manufacturer is eligible to certify a compression-ignition engine family to the 0.02 g/bhp-hr NO_x standard pursuant the provisions of section 2208.1(b)(2) for three consecutive MYs, beginning with the MY the manufacturer first certifies any low-NO_x compression-ignition engine family to the 0.02 g/bhp-hr NO_x standard pursuant to section 2208.1(b)(2) or (b)(3).

(2) *Low NO_x Engines: Certification Flexibility Provisions.* A heavy-duty low-NO_x engine family for which a manufacturer has demonstrated eligibility and compliance pursuant to sections 2208.1(a) and (b)(1) is eligible for the following flexibility when certified by ARB to meet criteria pollutant heavy-duty engine emission standards.

(A) Deterioration factors (DF) to determine compliance with applicable emission standards may be used in lieu of intermediate or high mileage emission tests. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the assigned DF's, as published by the U.S. EPA National Vehicle and Fuel Emissions Laboratory guidance letter CD-12-07 (Revised) dated March 30, 2012 and incorporated by reference herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF the retrofit system manufacturer must demonstrate using test data, that the proposed DF is appropriate for use in determining compliance with the applicable emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

(B) *OBD System Requirements.* All vehicles in which applicable engines are installed are required to comply with the OBD system requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, as modified, approved and filed on July 31, 2013, except for the allowances described in sections (b)(2)(B)(1) through (4) below.

1. *OBD System Demonstration.* A manufacturer is allowed to exclude up to three low-NO_x engine families per MY from the calculation of a manufacturer's total number of engine families for the purposes of California Code of Regulations, title 13, section 1971.1, subdivision (i)(2.2.3).
2. *Production Engine Evaluation Testing.* For production evaluation testing described in California Code of Regulations, title 13, section 1971.1, subdivisions (l)(1) through (l)(3), a manufacturer must collect and report the data to ARB, in a format approved by the Executive Officer, within twelve months after the production vehicles are first introduced into commerce.

- a. Verification of Standardized Requirements. In lieu of the test vehicle selection criteria specified in California Code of Regulations, title 13, section 1971.1, subdivisions (l)(1.2.1) through (1.2.3), the manufacturer must test up to five unique production vehicles within an engine family.
 - b. Verification and Reporting of In-use Monitoring Performance. For testing described in California Code of Regulations, title 13 1971.1, subdivision (l)(3), manufacturers must submit a plan, in a format approved by the Executive Officer, to the Executive Officer for review and approval that details the types and number of production vehicles to be tested, the sampling method, the data collection timeline, and the reporting format. The Executive Officer may approve such plan upon determining that: i) it provides for effective collection of data from a sample of vehicles that, at a minimum, represents ten percent of the total vehicles produced for sale in California per monitoring performance group; ii) it will likely result in the collection and submittal of data within the required time frame; iii) it will generate data that are representative of California drivers and exhaust temperatures; and iv) it does not, by design, exclude or include specific vehicles in an attempt to collect data only from vehicles with the highest in-use performance ratios.
3. *Calculation of Fines for Deficiencies.* Up to four allowable deficiencies per engine family to determine the number of deficiencies subject to fines related to monitoring of a technology needed to meet an engine's low-NOx emission level shall be excluded from the calculation of allowable deficiencies used in California Code of Regulations, title 13, section 1971.1, section (k)(2).
 4. *Ordered Remedial Action-Mandatory Recall for Emission Thresholds.* In lieu of the requirements for major monitors to indicate a malfunction before emissions exceed a certain emission threshold, as specified in California Code of Regulations, title 13 1971.5, section (d)(3)(A)(ii), the recall threshold shall instead be three times the applicable major monitor malfunction criteria. For example, if the malfunction criteria is 2.5 times the applicable standard, recall would be required when emissions exceed 7.5 times the applicable standard, or if the malfunction criteria is the particulate matter (PM) emission standard plus 0.02 g/bhp-hr and the PM emission standard is 0.01 g/bhp-hr, recall would be required when emissions exceeded 0.09 g/bhp-hr.

(3) *Multiple Low-NOx Engine Option.*

- (A) For every two low-NOx engine families that a manufacturer certifies with ARB that would otherwise have been eligible for section 2208.1(b)(2) in a given

MY, the manufacturer may apply for certification flexibility pursuant to section 2208.1(b)(3) in that given MY. One of these two engines must meet all criteria and requirements for an “early compliance” engine family and the other engine must meet all criteria and requirements for an “enhanced flexibility” engine family as identified in this section.

1. Both the early compliance and enhanced flexibility engine families must meet this regulation’s eligibility criteria and requirements set forth in sections 2208.1(a)(1) and 2208.1(a)(2).
2. Neither the early compliance or enhanced flexibility engine family may be functionally equivalent to (i.e, of the same power rating and intended service class, utilizing the same fuel and emission control system, and meeting the same durability requirements and emission standards) an engine family from the same manufacturer that received the certification flexibility identified in sections (b)(2) or (b)(3) of section 2208.1 in any previous MY.
3. An engine family that is functionally equivalent to (i.e, of the same power rating and intended service class, utilizing the same fuel and emission control system, and meeting the same durability requirements and emission standards), and from the same manufacturer as, an engine family that has been certified pursuant to section 2208.1(b)(3) is ineligible for the provisions of section 2208.1(b)(2).

(B) For three consecutive MYs, beginning with the first MY for which they are certified by ARB, any NO_x credit generated by an early compliance engine family, enhanced flexibility engine family, and their carryover engine families must be immediately retired. Averaging, banking or trading of NO_x emission reductions or credits achieved by these engine families during this time period is prohibited under any regulation.

(C) Upon a determination by the Executive Officer that all criteria and requirements set forth in this section are met, the “enhanced flexibility” engine family:

1. is exempt from meeting emission threshold monitoring requirements identified in California Code of Regulations, title 13, 1971.1 subdivisions (e) through (f) for the first MY for which they receive certification flexibility pursuant to this regulation; and
2. must comply with engine labeling requirements of section 2208.1(c)(2)(A)3 in the first MY for which it receives certification flexibility pursuant to this regulation, but is exempt from engine labeling requirements of section 2208.1(c)(2)(A)3. in subsequent MYs.

(D) 2020 and subsequent MY spark-ignition engine families and 2023 and subsequent MY compression-ignition engine families are ineligible for the provisions of section 2208.1(b)(3)(C)1.

(c) Certification Flexibility for Early Market Introduction of Heavy-Duty Hybrid Engines

(1) Eligibility.

(A) Hybrids that achieve less than 35 miles AER.

1. Tier 1: A manufacturer of a hybrid engine family that does not demonstrate achievement of at least 35 miles AER shall be eligible to certify such an engine family pursuant to the provisions of section 2208.1(c)(2)(A) (Tier 1 Provisions) for up to two consecutive MYs or through the 2021 MY, whichever comes first.
2. Tier 2: A manufacturer of a hybrid engine family that does not demonstrate achievement of at least 35 miles AER shall be eligible to certify such an engine family pursuant to the provisions of section 2208.1(c)(2)(B) (Tier 2 Provisions) for up to two consecutive MYs subsequent to the two MYs in which the manufacturer receives Tier 1 flexibility, or through the 2021 MY, whichever comes first.

(B) Hybrids that achieve at least 35 miles AER.

1. Tier 1: A manufacturer of a hybrid engine family that does demonstrate achievement of at least 35 miles AER shall be eligible to certify such an engine family pursuant to the provisions of section 2208.1(c)(2)(A) (Tier 1 Provisions) for up to four consecutive MYs, or through the 2024 MY, whichever comes first.
2. Tier 2: A manufacturer of a hybrid engine family that does demonstrate achievement of at least 35 miles AER shall be eligible to certify such an engine family pursuant to the provisions of section 2208.1(c)(2)(B) (Tier 2 Provisions) for up to two consecutive MYs subsequent to the four MYs in which the manufacturer receives Tier 1 flexibility, or through the 2024 MY, whichever comes first.

(2) ITR Hybrid Technology Certification Provisions.

(A) Tier 1 Provisions.

1. DFs to determine compliance with applicable emission standards may be used in lieu of intermediate or high mileage emission tests. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the assigned DF's, as published by the U.S. EPA National Vehicle and Fuel Emissions Laboratory guidance letter CD-12-07 (Revised) dated March 30, 2012 and incorporated by reference

herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF the retrofit system manufacturer must demonstrate using test data, that the proposed DF is appropriate for use in determining compliance with the applicable emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

2. *Diagnostic System Requirements.* A heavy-duty engine family may implement an Engine Manufacturer's Diagnostic (EMD) system that meets the requirements described in California Code of Regulations, title 13, section 1971.1, subdivision (d)(7.1.4).
3. *Labeling Requirements.* An engine belonging to an engine family certified pursuant to this section must be clearly and permanently labeled with the following language in a location where it can be seen by a person viewing the Engine Emission Control Information Label. In cases where this label may not be visible with the engine installed in the vehicle, a duplicate label shall be applied to the vehicle next to the Vehicle Emissions Control Information label saying the following:

This engine has received certification flexibility from the California Air Resources Board because it is classified as an innovative technology pursuant to California Health and Safety Code, sections 2208 and 2208.1 and may be subject to alternate diagnostic requirements pursuant to California Code of Regulations, title 13, section 2208.1. [insert ARB engine Executive Order number here].

- a. The label and any adhesives used shall be designed to withstand, for the engine's total expected life, environmental conditions in the area where the label is attached. Environmental conditions shall include, but are not limited to, exposure to engine fuels, lubricants, and coolants.

(B) *Tier 2 Provisions.*

1. DFs to determine compliance with applicable emission standards may be used in lieu of intermediate or high mileage emission tests. ARB shall provide assigned DFs to manufacturers. If no ARB assigned DFs are available, manufacturers may use the assigned DF's, as published by the U.S. EPA National Vehicle and Fuel Emissions Laboratory guidance letter CD-12-07 (Revised) dated March 30, 2012 and incorporated by reference herein, where applicable or may propose another DF in the absence of a U.S. EPA assigned DF. In proposing a DF the retrofit system manufacturer must demonstrate using test data, that the proposed DF is appropriate for use in determining compliance with the applicable

emission standards. All such demonstrations must be approved in advance by the Executive Officer. The Executive Officer shall base his or her determination upon all information submitted by a manufacturer and upon good engineering judgment.

2. *OBD System Requirements.* An engine family must implement an OBD system that meets the requirements described in California Code of Regulations, title 13, section 1971.1 and California Code of Regulations, title 13, section 1971.5, as modified, approved and filed on July 31, 2013, except for the differences described in sections (c)(2)(B)2.a. through c., below
 - a. *OBD System Demonstration.*
 - i. One hybrid engine family per engine manufacturer may be excluded from calculation of a manufacturer's total number of engine families for the purposes of California Code of Regulations, title 13, section 1971.1, subdivision (i)(2.2.3).
 - ii. Except as provided in section (c)(2)(B)2.a.iii., below, a hybrid engine that has been previously certified as a non-hybrid engine to the full HD OBD system monitoring requirements of California Code of Regulations, title 13, section 1971.1 is exempt from the OBD system demonstration testing requirements of California Code of Regulations, title 13, section 1971.1, subdivision (i)(3) as long as the hybrid engine is certified to the same standard as the base engine.
 - iii. Any modifications that are made to a previously-certified HD OBD or OBD II engine or OBD system shall invalidate the OBD system demonstration testing exemptions described in section 2208.1(c)(2)(B)2.a.ii. The manufacturer may request Executive Officer approval to be exempt from implementing monitors that are not impacted by the modifications. The Executive Officer may approve the exemption based on review of data and/or analysis submitted by the manufacturer that demonstrates that the originally calibrated emission thresholds are unaffected.
 - b. *Production Engine Evaluation Testing.*

For production evaluation testing described in California Code of Regulations, title 13, section 1971.1, subdivisions (l)(1) through (l)(3), manufacturers shall collect and report the data to ARB, in a format to be approved by the Executive Officer, within twelve months after the production vehicles are first introduced into commerce.

 - i. Verification of Standardized Requirements: In lieu of the test vehicle selection criteria specified in California Code of Regulations, title 13, section 1971.1, subdivisions (1.2.1) through (1.2.3) for heavy-duty engines, the manufacturer shall test up to five unique production vehicles within an engine family.
 - ii. Verification and Reporting of In-use Monitoring Performance. For testing described in California Code of Regulations, title 13, section

1971.1, subdivision (l)(3), manufacturers shall submit a plan in a format to be approved by the Executive Officer to the Executive Officer for review and approval that details the types and number of production vehicles to be tested, the sampling method, the data collection timeline, and the reporting format. The Executive Officer may approve the plan upon determining that it: i) provides for effective collection of data from a sample of vehicles that, at a minimum, is ten percent of the total vehicle produced for sale in California; ii) will likely result in the collection and submittal of data within the required time frame; iii) will generate data that are representative of California drivers and temperatures; and iv) does not, by design, exclude or include specific vehicles in an attempt to collect data only from vehicles with the highest in-use performance ratios.

- c. *Calculation of Fines for Deficiencies.* For allowable deficiencies related to issues with the implementation of the hybrid system, up to three additional allowable deficiencies shall not be subject to the specified fines described in California Code of Regulations, title 13, section 1971.1, subdivision (k)(3), and the deficiencies shall not be included in the count of allowable deficiencies used in California Code of Regulations, title 13, section 1971.1, subdivision (k)(2) to determine the number of deficiencies subject to fines.

(3) *Dual Executive Order*

1. For the 2017 through 2020 MYs, both the engine, microturbine or fuel cell manufacturer and the hybrid drive manufacturer shall be eligible, if so requested by both parties, to be jointly identified on a “dual” Executive Order as the parties responsible for complying with the terms of the Executive Order.
2. For the 2021 through 2024 MYs, both the engine, microturbine or fuel cell manufacturer and the hybrid drive manufacturer shall be eligible, if so requested by both parties, to be jointly identified on a dual Executive Order as the parties responsible for complying with the terms of the Executive Order, but only if the applicable engine, turbine or fuel cell and hybrid drive system demonstrate no increase in NO_x, CO, HC or PM emissions pursuant to Section 7 of the “California Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems”.
3. For 2025 and subsequent MYs, a single Executive Order shall be granted for each engine family and hybrid drive system combination, and shall require a single entity to be responsible for compliance with its provisions.
4. An engine family receiving a dual Executive Order pursuant to section 2208.1(c)(2)(C), but not that is not certified pursuant to sections 2208.1(c)(2)(A) or (c)(2)(B), shall be exempt from the requirements of section 2208.1(a).

5. Notwithstanding the provisions of this section, ARB reserves the right to not issue a dual Executive Order in a given MY, if U.S. EPA has issued a Certificate of Conformity to the same engine, microturbine or fuel cell and hybrid drivetrain manufacturer in the same or the previous MY that identifies one of these parties as solely responsible for complying with the terms of the Certificate of Conformity.

(4) *Alternate Emission Standards for Heavy-Duty Hybrids with at Least 35 Miles AER.*

An engine family that meets the requirements of section 2208.1(c)(4)(A) shall be eligible to be certified to alternate emission standards, as described in sections 2208.1(c)(4)(B) and 2208.1(c)(4)(C), through the 2024 MY.

(A) *Eligibility Criteria.* The engine family must:

1. be installed in a vehicle capable of achieving at least 35 miles AER;
2. be electronically-controlled with a fully functional electronic control module (ECM);
3. not be mechanically connected to the drivetrain, and not be capable of directly propelling the vehicle in which it is installed;
4. be a newly manufactured engine of the same MY of the vehicle in which it is to be installed;
5. be ARB-certified with a diesel particulate filter, if a diesel engine;
6. be installed in a heavy-duty hybrid vehicle that is certified pursuant to the *California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes* (December 2013).

(B) *Requirements for Off-Road-Equivalent Engines.* An engine meeting the requirements of section 2208.1(c)(4)(A) that is identical to one that is certified under California Code of Regulations, title 13, sections 2403, 2423 or 2433 is eligible to be certified pursuant to this section for use on a heavy-duty hybrid vehicle. For such engines, the following requirements apply.

1. The engines must be of a configuration that is identical to one that is certified under California Code of Regulations, title 13, sections 2403, 2423 or 2433;
2. ARB will treat engines that are part of the corresponding engine family as off-road engines for compliance purposes, including selective enforcement audits, in-use testing, defect reporting, and recall. The engines must meet all the requirements that apply under California Code of Regulations, title 13, sections 2403, 2423 or 2433, as applicable, instead of the comparable requirements of California Code of Regulations, title 13, section 1956.8, with the following exceptions:

- a. The engine must demonstrate compliance with the useful life requirements applicable to the heavy-duty vehicle class in which it will be installed, as identified in 40 C.F.R. 86.004-2.
 - b. The engine must include a warranty that covers the minimum warranty period for the original off-road engine certification, but that shall cover the engine when operated and properly maintained as intended in the on-road, hybrid heavy-duty vehicle. The owner's manual for the heavy-duty vehicle in which the engine shall be installed must include a listing of any required service and service intervals, recommended maintenance practices for the engine when used in the intended on-road, hybrid heavy-duty vehicle application, which differ from the service requirements or recommended practices for the engine as originally certified for off-road operation.
 - c. Diagnostic Requirements.
 - i. Tier 1: An engine family certified pursuant to section 2208.1(c)(3) may meet the OBD requirements of section 2208.1(c)(2)(A)2., instead of implementing an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, for a maximum of four consecutive MYs per manufacturer. The California sales volumes for such an engine family is limited to 100 units per manufacturer per MY.
 - ii. Tier 2: An engine family certified pursuant to section 2208.1(c)(3) may meet the OBD requirements of section 2208.1(c)(2)(B)2., instead of implementing an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, for a maximum of six consecutive MYs per manufacturer. However, a manufacturer may not certify an engine meeting the OBD requirements of section 2208.1(c)(2)(A)2 or 2208.1(c)(3)(B)2 for more than six total MYs, after which a manufacturer's engines must meet the diagnostic requirements of California Code of Regulations, title 13, 1971.1 and 1971.5. The California sales volumes for an engine meeting the Tier 2 OBD requirements identified in section 2208.1(c)(2)(B)2., or that implements an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, is limited to 200 units per manufacturer per MY.
3. The engine must meet the most stringent applicable emission standards for NOx and PM for its MY, size, and classification, and may not be certified pursuant to flexibility provisions of California Code of Regulations, title 13, section 2423, subdivision (d);

4. Before shipping engines certified under this section, an engine manufacturer must have written assurances from the hybrid vehicle manufacturer that the hybrid vehicle manufacturer needs a certain number of exempted engines under this section; and
5. The engine must meet the following engine labeling requirements:
 - a. The engine with a configuration that is identical to one that is certified under California Code of Regulations, title 13, sections 2403, 2423, or 2433 must meet labeling requirements of California Code of Regulations, title 13, sections 2404, 2424, or 2434, respectively, and may not have any label specifying it as an off-road engine;
 - b. The engine must include a supplemental label that meets the requirements of section 2208.1, subsection (c)(2)3.

(C.) *Requirements for Light- or Medium-Duty Equivalent Engines.* An engine meeting the requirements of section 2208.1(c)(4)(A) that is of a configuration that is identical to one installed in a light- or medium-duty vehicle certified pursuant to California Code of Regulations, title 13, sections 1961 or 1961.2 is eligible to be certified pursuant to this section for use on a heavy-duty hybrid vehicle. For such engines, the following requirements apply:

1. The engine, including its emission control system, must be of a configuration that is identical to one installed in a light- or medium-duty vehicle that is certified pursuant to California Code of Regulations, title 13, sections 1961 or 1961.2;
2. ARB will treat engines certified as part of the corresponding engine family as light- and medium-duty engines for compliance purposes, such as selective enforcement audits, in-use testing, defect reporting, and recall. The engine must meet all the requirements that apply under California Code of Regulations, title 13, sections 1961 or 1961.2, as applicable, instead of the comparable requirements of California Code of Regulations, title 13, section 1956.8, with the following exceptions:
 - a. The engine must demonstrate compliance with the useful life requirements applicable to the heavy-duty vehicle class in which it will be installed, as identified in 40 C.F.R. 86.004-2.
 - b. The engine must include a warranty that covers the minimum warranty period for the original off-road engine certification, but that shall cover the engine when operated and properly maintained as intended in the on-road, hybrid heavy-duty vehicle. The owner's manual for the heavy-duty vehicle in which the engine shall be installed must include

a listing of any required service and service intervals, recommended maintenance practices for the engine when used in the intended on-road, hybrid heavy-duty vehicle application, which differ from the service requirements or recommended practices for the engine as originally certified for off-road operation.

- c. Diagnostic Requirements.
 - i. Tier 1: An engine family certified pursuant to section 2208.1(c)(3) may meet the OBD requirements of section 2208.1(c)(2)(A)2., instead of implementing an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, for a maximum of four consecutive MYs per manufacturer. The California sales volumes for such an engine family is limited to 100 units per manufacturer per MY.
 - ii. Tier 2: An engine family certified pursuant to section 2208.1(c)(3) may meet the OBD requirements of section 2208.1(c)(2)(B)2., instead of implementing an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, for a maximum of six consecutive MYs per manufacturer. However, a manufacturer may not certify an engine meeting the OBD requirements of section 2208.1(c)(2)(A)2 or 2208.1(c)(3)(B)2 for more than six total MYs, after which a manufacturer's engines must meet the diagnostic requirements of California Code of Regulations, title 13, 1971.1 and 1971.5. The California sales volumes for an engine meeting the Tier 2 OBD requirements identified in section 2208.1(c)(2)(B)2., or that implements an OBD system that meets the requirements described in California Code of Regulations, title 13, sections 1971.1 and 1971.5, is limited to 200 units per manufacturer per MY.
6. Before shipping engines under this section, a light-duty engine or vehicle manufacturer must have written assurances from the hybrid vehicle manufacturer that the hybrid vehicle manufacturer needs a certain number of exempted engines under this section;
4. The engine must meet the following engine labeling requirements:
 - a. The engine must meet the requirements of California Code of Regulations, title 13 1965, and may not have any label identifying it as a light- or medium-duty engine;
 - b. The engine must include a supplemental label that meets the requirements of section 2208.1, subsection (c)(2)3.

(D) *Data Collection and Reporting.* Each engine family that receives certification flexibility pursuant to section 2208.1(c)(4), and any vehicle in which such engine is installed, must have a datalogger or the ECM must be able to collect the following data on a second-by-second interval for a minimum of three calendar years from the time that engine or vehicle is first deployed in a California fleet.

1. The following data must be presented as the average and mean among all vehicles, must include a histogram distribution of such data (at ten percent intervals), must be segregated by calendar year and engine/hybrid drivetrain combination, and must be up to date as of no more than 90 days prior to each subsequent MY engine certification application date for that hybrid engine family or its potential carryover engine families. The manufacturer must also provide all raw data supporting the data summaries to the Executive Order in a format to be determined by the Executive Officer within thirty days, upon ARB request.
 - a. Total miles traveled;
 - b. Daily miles traveled (miles/day);
 - c. Speed without idle (miles/hour);
 - d. Percent time operating in the following mile per hour intervals: (0+ to 10; 10+ to 20; 20+ to 30; 30+ to 40; 40+ to 50; 50+ to 60; 60+);
 - e. Fuel economy (miles/gallon);
 - f. Percent zero-emission operation (plug-in vehicles only); and
 - g. Miles of continuous zero-emission operation at full charge (plug-in vehicles only)
2. The manufacturer shall keep all records related to engine and hybrid drivetrain maintenance and repair that occur during the first three years the vehicle is in service, including description and cost of repairs, and number of days the vehicle is out of service for said maintenance and repairs. The manufacturer shall keep such records for each vehicle for a minimum of five years from the date the vehicle is entered into service, and shall provide this information to ARB in a format to be determined by the Executive Officer, within thirty days, upon ARB request.

(d) High-Efficiency Heavy-Duty Engine

(1) Eligibility and Certification Flexibility.

A manufacturer shall be eligible, when certifying an engine family to the Low CO₂ Emission Standards pursuant to California Code of Regulations, title 13, section 1956.8(a)(7), for the provisions of section 2208.1(c)(2)(A) for up to four consecutive MYs, followed by the provisions of section 2208.1(c)(2)(B) for up to two consecutive additional MYs, through the 2027 MY.

(2) Allowable Sales Volumes.

(A) California sales volumes for an engine, certified to the Low CO₂ Emission Standards, receiving certification flexibility identified in section 2208.1(c)(2)(A) shall be limited to 100 per manufacturer per MY.

(B) California sales volumes for an engine, certified to the Low CO₂ Emission Standards, receiving certification flexibility identified in section 2208.1(c)(2)(B) shall be limited to 200 per manufacturer per MY.

Note: Authority cited [Insert subsections]:. Reference: [Insert references].

SECTION 2208.2: Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems

(a) Applicable Test Procedures

The certification and installation procedures that shall apply for approval of systems that convert the following non-hybrid base vehicles to operate as a hybrid are contained in the “Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems,” which are incorporated herein by reference.

- (1) California-certified 2007 and subsequent MY Class 2a vehicles that, once converted, achieve at least 35 miles AER;
- (2) California-certified 2007 and subsequent MY medium-duty vehicles; and
- (3) California-certified 2010 and subsequent MY heavy-duty engines.

NOTE: Authority cited: Sections 39515, 39600, 39601, 43000, 43006, and 43013, Health and Safety Code. Reference: sections 43000, 43004, 43006, 43008.6, and 43013, Health and Safety Code; and Section 27156 and 38391, Vehicle Code.

ATTACHMENT A

Amendments to Section 1956.8, Title 13, California Code of Regulations

Note: Set forth below are the proposed amendments to title 13, California Code of Regulations (CCR), section 1956.8. Proposed amendments to existing sections are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. Subsections for which no changes are proposed in this rulemaking are indicated with [No change] or “* * * *”.

§ 1956.8. Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

* * * *

(a)(7) Greenhouse Gas Emission Standards for new 2014 and Subsequent Model Heavy-Duty Diesel Engines, Heavy-Duty Natural Gas-Fueled and Liquefied-Petroleum-Gas-Fueled Engines Derived from Diesel-Cycle Engines, and Heavy-Duty Methanol-Fueled Diesel Engines.

(A) The CO₂ emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed:

CO₂ Emission Standards for 2014 and Subsequent Model Heavy-Duty Diesel Engines^{A, B, C}
(in g/hp-hr)

| <i>Model Years</i> | <i>Light heavy-duty – vocational</i> | <i>Medium heavy-duty – vocational</i> | <i>Heavy heavy-duty – vocational</i> | <i>Medium heavy-duty – tractor</i> | <i>Heavy heavy-duty – tractor</i> |
|---|--------------------------------------|---------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|
| 2014-2016 | 600 | 600 | 567 | 502 | 475 |
| 2017 and later | 576 | 576 | 555 | 487 | 460 |
| <u>2017-2027 (Optional)^E</u> | <u>490</u> | <u>490</u> | <u>472</u> | <u>414</u> | <u>391</u> |

^A *Family Certification Levels.* A Family Certification Level (FCL) must be specified for each engine family, which may not be less than the certified emission level for the engine family. The Family Emission Limit (FEL) for the engine family is equal to the FCL multiplied by 1.03. The FCL serves as the CO₂ emission standard for the engine family with respect to certification and confirmatory testing instead of the standards specified in this subsection (a)(7)(A). The FEL serves as the emission standard for the engine family with respect to all other testing.

^B *Averaging, Banking, and Trading Program and Credits.* The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in subsection (b).

^C *Alternate Phase-in Emission Standards.* Alternate phase-in emission standards may be used in lieu of the required CO₂ emission standards in the table above. To qualify for these alternate phase-in emission standards, the manufacturer must begin certifying all of its model year 2013 diesel engines within a given primary intended service class to the applicable alternate emission standards of this footnote (c) and continue through model year 2016. This means that once a manufacturer chooses to certify a primary intended service class to the alternate emission standards of this footnote (c), it is not allowed to opt out of these standards. Engines certified to these alternate emission standards are not eligible for early credits. Note that these alternate emission standards for 2016 and later are the same as the otherwise applicable required emission standards for model year 2017 and later.

| Alternate Phase-in CO₂ Emission Standards (in g/hp-hr) | | | | | |
|--|--------------------------------------|---------------------------------------|--------------------------------------|------------------------------------|-----------------------------------|
| <i>Model Years</i> | <i>Light heavy-duty – vocational</i> | <i>Medium heavy-duty – vocational</i> | <i>Heavy heavy-duty – vocational</i> | <i>Medium heavy-duty – tractor</i> | <i>Heavy heavy-duty – tractor</i> |
| 2013-2015 | 618 | 618 | 577 | 512 | 485 |
| 2016 | 576 | 576 | 555 | 487 | 460 |

^D *Alternate Emission Standards Based on 2011 Model Year Engines.* For model years 2014 through 2016, heavy-duty diesel engines may be certified to these alternate emission standards based on 2011 model year engines, if they are not part of an averaging set in which a balance of banked credits remain. These alternate standards are determined from the measured emission rate of the test engine of the applicable baseline 2011 engine family(ies) as described in the “California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles,” as incorporated by reference in section (b). The alternate CO₂ standard for light and medium heavy-duty vocational-certified engines is equal to the baseline 2011 emission rate multiplied by 0.975. The alternative CO₂ standard for tractor-certified engines and all other heavy heavy-duty engines is equal to the baseline 2011 emission rate multiplied by 0.970.

^E *Optional Low-CO₂ Emission Standards.* Heavy-duty diesel engines participating in the Innovative Technology Regulation set forth in section 2208 may be certified to the Optional Low-CO₂ Emission Standard. Engines certified to the Optional Low-CO₂ Emission Standards shall also comply with the applicable methane and nitrous oxide emission standards set forth in subsections (a)(7)(B) and (a)(7)(C), respectively. In addition, engines certified to the Optional Low-CO₂ Emission Standards are not eligible to participate in the averaging, banking, and trading program for certification.

(B) The methane (CH₄) emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(C) The nitrous oxide (N₂O) emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(b) *Test Procedures.* The test procedures for determining compliance with standards applicable to 1985 and subsequent model heavy-duty diesel engines and vehicles and the requirements for participating in the averaging, banking and trading programs, are set forth in the “California Exhaust Emission Standards and Test Procedures for 1985 through 2003 Model Heavy-Duty Diesel-Engines and Vehicles,”

adopted April 8, 1985, as last amended December 12, 2002, the “California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles,” adopted December 12, 2002, as last amended ~~September 2, 2015~~ _____, and the “California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles in the Urban Bus and Heavy-Duty Vehicle Classes,” adopted October 24, 2002, as last amended October 21, 2014, which are incorporated by reference herein.

* * * *

(c)(4) Greenhouse Gas Emission Standards for New 2016 and Subsequent Model Heavy-Duty Otto-Cycle Engines.

(A) The CO₂ emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 627 g/hp-hr. An FCL must be specified for each engine family, which may not be less than the certified emission level for the engine family. The FEL for the engine family is equal to the FCL multiplied by 1.03. The FCL serves as the CO₂ emission standard for the engine family with respect to certification and confirmatory testing instead of the standard specified in this subsection (c)(4)(A). The FEL serves as the emission standard for the engine family with respect to all other testing. The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in subsection (d).

1. As an option, 2017 through 2027 model year heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, participating in the Innovative Technology Regulation set forth in section 2208 may be certified to the Optional Low-CO₂ Emission Standard. The CO₂ emissions from Optional Low-CO₂ Emission Standard engines shall not exceed 490 g/hp-hr. Engines certified to the Optional Low-CO₂ Emission Standard shall also comply with the applicable CH₄ and N₂O emission standards set forth in subsections (c)(4)(B) and (c)(4)(C), respectively. In addition, engines certified to the Optional Low-CO₂ Emission Standard are not eligible to participate in the averaging, banking, and trading program for certification.

(B) The CH₄ emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(C) The N₂O emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(d) *Test Procedures.* The test procedures for determining compliance with standards applicable to 1987 and subsequent model heavy-duty Otto-cycle engines and vehicles are set forth in the “California Exhaust Emission Standards and Test Procedures for 1987 through 2003 Model Heavy-Duty Otto-Cycle Engines and Vehicles,” adopted April 25, 1986, as last amended December 27, 2000, the “California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles,” adopted December 27, 2000, as last amended ~~September 2, 2015~~ _____, and the “California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes,” adopted October 24, 2002, as last amended October 21, 2014, which are incorporated by reference herein; and the “California Non-Methane Organic Gas Test Procedures for 1993 through 2016 Model Year Vehicles” and the “California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles,” which are incorporated by reference in section 1961.2.

* * * *

NOTE: Authority cited: Sections 38501, 38510, 38560, 38580, 39500, 39600, 39601, 40000, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43107 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 38501, 38505, 38510, 38560, 39002, 39003, 39010, 39017, 39033, 39500, 39650, 39657, 39667, 39701, 43000, 43000.5, 43009, 43009.5, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204, 43205, 43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

ATTACHMENT B

**PROPOSED AMENDMENTS TO
CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 2004 AND SUBSEQUENT MODEL
HEAVY-DUTY DIESEL ENGINES AND VEHICLES**

Adopted: December 12, 2002
Amended: July 24, 2003
Amended: September 1, 2006
Amended: July 26, 2007
Amended: October 17, 2007
Amended: October 14, 2008
Amended: September 27, 2010
Amended: October 12, 2011
Amended: March 22, 2012
Amended: December 6, 2012
Amended: April 18, 2013 (Corrected by Section 100)
Amended: October 21, 2014
Amended: September 2, 2015
Amended: _____

Note: The proposed amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as last amended September 2, 2015. [No change] indicates proposed federal provisions that are also proposed for incorporation herein without change. Existing intervening text that is not amended in this rulemaking is indicated by “* * * *”.

* * * *

1. PART 1036 – CONTROL OF EMISSIONS FROM NEW AND IN-USE HEAVY-DUTY HIGHWAY ENGINES

* * * *

B.

C. 1036.108 Greenhouse gas emission standards. September 15, 2011.

1. Add the following section to the introductory paragraph: Optional Compliance Via the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program. For the 2014 through 2022 model years, a manufacturer may elect to demonstrate compliance with this section, §1036.108, for all of its applicable heavy-duty engines by demonstrating compliance with the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program, if it meets the criteria identified below.

(1) A manufacturer that selects compliance with this option must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or December 1, 2014, whichever is later;

(2) The manufacturer must submit to ARB all data that it submitted to U.S. Environmental Protection Agency in accordance with the reporting requirements as required under 40 CFR §1036.205, §1036.250, and §1036.730, for demonstrating compliance with the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program and the U.S. Environmental Protection Agency determination of compliance. With the exception of the 2014 model year, all such data must be submitted within 30 days of receipt of the U.S. Environmental Protection Agency Certificate of Conformity or of the date of submission to the U.S. Environmental Protection Agency, whichever is later, for each model year that a manufacturer selects compliance with this option;

(3) The manufacturer must provide to the Executive Officer separate numbers for each engine family of heavy-duty engines produced and delivered for sale in California each model year and all values used in calculating positive or negative emission credits in §1036.730.

2. ~~Subparagraphs (a) through (f). [No change.]~~ Subparagraphs (a) through (a)(1)(i). [No change.]

3. Add the following language to subparagraph (a)(1)(ii): As an option, 2017 through 2027 model year heavy-duty diesel engines, except in all cases engines used in medium-duty vehicles, participating in the Innovative Technology Regulation

set forth in title 13, CCR, §2208 may be certified to the Optional Low-CO2 Emission Standards. The CO2 emissions from Optional Low-CO2 Emission Standards engines shall not exceed the following standards:

| <p align="center"><u>Optional Low-CO2 Emission Standards for 2017 through 2027 Model Year Heavy-Duty Diesel Engines (grams per horsepower-hour or g/hp-hr)</u></p> | | | | |
|---|--|---|---|--|
| <p align="center"><i><u>Light heavy-duty – vocational</u></i></p> | <p align="center"><i><u>Medium heavy-duty – vocational</u></i></p> | <p align="center"><i><u>Heavy heavy-duty – vocational</u></i></p> | <p align="center"><i><u>Medium heavy-duty – tractor</u></i></p> | <p align="center"><i><u>Heavy heavy-duty – tractor</u></i></p> |
| 490 | 490 | 472 | 414 | 391 |

Engines certified to the Optional Low-CO2 Emission Standards shall also comply with the applicable CH4 and N2O emission standards set forth in subparagraphs (a)(2) and (a)(3), respectively. In addition, engines certified to the Optional Low-CO2 Emission Standards are not eligible to participate in the averaging, banking, and trading program for certification.

4. Subparagraphs (a)(2) through (f). [No change.]

* * * *

Subpart H – Averaging, Banking, and Trading for Certification

1036.701 General provisions. September 15, 2011.

1. Add the following language to subparagraph (a): Engines certified to the Optional Low-CO2 Emission Standards pursuant to 40 CFR §1036.108, as modified by these test procedures, shall not participate in the averaging, banking, and trading provisions of this subpart.

2. Subparagraphs (b) through (j). [No change.]

* * * *

ATTACHMENT C

**PROPOSED AMENDMENTS TO
CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR
2004 AND SUBSEQUENT MODEL
HEAVY-DUTY OTTO-CYCLE ENGINES AND VEHICLES**

Adopted: December 27, 2000
Amended: December 12, 2002
Amended: July 26, 2007
Amended: October 17, 2007
Amended: September 27, 2010
Amended: March 22, 2012
Amended: December 6, 2012
Amended: April 18, 2013 (Corrected by Section 100)
Amended: October 21, 2014
Amended: September 2, 2015
Amended: _____

Note: The proposed amendments to this document are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions compared to the test procedures as last amended September 2, 2015. [No change] indicates proposed federal provisions that are also proposed for incorporation herein without change. Existing intervening text that is not amended in this rulemaking is indicated by “* * * *”.

* * * *

I. PART 1036 – CONTROL OF EMISSIONS FROM NEW AND IN-USE HEAVY-DUTY HIGHWAY ENGINES

* * * *

1036.108 Greenhouse gas emission standards. September 15, 2011.

1. Add the following section to the introductory paragraph: Optional Compliance Via the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program. For the 2014 through 2022 model years, a manufacturer may elect to demonstrate compliance with this section, §1036.108, for all of its applicable heavy-duty engines by demonstrating compliance with the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program, if it meets the criteria identified below.

(1) A manufacturer that selects compliance with this option must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or December 1, 2014, whichever is later;

(2) The manufacturer must submit to ARB all data that it submitted to U.S. Environmental Protection Agency in accordance with the reporting requirements as required under 40 CFR §1036.205, §1036.250, and §1036.730, for demonstrating compliance with the 2014 MY National Heavy-Duty Engine and Vehicle Greenhouse Gas Program and the U.S. Environmental Protection Agency determination of compliance. With the exception of the 2014 model year, all such data must be submitted within 30 days of receipt of the U.S. Environmental Protection Agency Certificate of Conformity or of the date of submission to the U.S. Environmental Protection Agency, whichever is later, for each model year that a manufacturer selects compliance with this option;

(3) The manufacturer must provide to the Executive Officer separate numbers for each engine family of heavy-duty engines produced and delivered for sale in California each model year and all values used in calculating positive or negative emission credits in §1036.730.

2. Subparagraphs (a) through (a)(1). [No change.]

3. Add the following language to subparagraph (a)(1)(i): As an option, 2017 through 2027 model year heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, participating in the Innovative Technology Regulation set forth in title 13, CCR, §2208 may be certified to the Optional Low-

CO2 Emission Standard. The CO2 emissions from Optional Low-CO2 Emission Standard engines shall not exceed 490 g/hp-hr. Engines certified to the Optional Low-CO2 Emission Standard shall also comply with the applicable CH4 and N2O emission standards set forth in subparagraphs (a)(2) and (a)(3), respectively. In addition, engines certified to the Optional Low-CO2 Emission Standard are not eligible to participate in the averaging, banking, and trading program for certification.

4. Subparagraphs (a)(1)(ii) through (f). [No change.]

* * * *

1036.701 General provisions. September 15, 2011.

1. Add the following language to subparagraph (a): Engines certified to the Optional Low-CO2 Emission Standards pursuant to 40 CFR §1036.108, as modified by these test procedures, shall not participate in the averaging, banking, and trading provisions of this subpart.

2. Subparagraphs (b) through (j). [No change.]

* * * *