

APPENDIX D-1

PROPOSED REGULATION ORDER

Regulation to Provide Certification Flexibility for Innovative Heavy-Duty Engines and Certification and Installation Procedures for Medium- and Heavy-Duty Motor Vehicle Hybrid Conversion Systems

Amendments to California Code of Regulations, title 13, section 1956.8

Note: Set forth below are the proposed amendments to California Code of Regulations title 13, 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.

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(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>474</u> | <u>446</u> | <u>409</u> | <u>387</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 certified to these Optional Low-CO₂ Emission Standards must 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 these Optional Low-CO₂ Emission Standards and participating in the Innovative Technology Regulation set forth in sections 2208 and 2208.1 are not eligible to participate in the averaging, banking, and trading program, or to generate credits 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~~ [Insert New Date], 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.

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(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, may be certified

to the Optional Low-CO₂ Emission Standard. The CO₂ emissions from engines certified to the Optional Low-CO₂ Emission Standard may not exceed 490 g/hp-hr. Engines certified to the Optional Low-CO₂ Emission Standard must 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 and participating in the Innovative Technology Regulation set forth in sections 2208 and 2208.1 are not eligible to participate in the averaging, banking, and trading program, or to generate credits 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~~ [Insert New Date], 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.

APPENDIX D-2

State of California AIR RESOURCES BOARD

Regulation to Provide Certification Flexibility for Innovative Heavy-Duty Engines and Certification and Installation Procedures for Medium- and Heavy-Duty Motor Vehicle Hybrid Conversion Systems

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: [Insert New Date]

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 “* * *”.

NOTE: This document is incorporated by reference in sections 1956.8(b), title 13, California Code of Regulations (“CCR”) and also incorporates by reference various sections of Title 40, Part 86 of the Code of Federal Regulations, with some modifications. It contains the majority of the requirements necessary for certification of heavy-duty diesel engines for sale in California, in addition to containing the exhaust emissions standards and test procedures for these diesel engines.¹ The section numbering conventions for this document are set forth in subparagraph 4 on page 6. Reference is also made in this document to other California-specific requirements that are necessary to complete an application for certification. These other documents are designed to be used in conjunction with this document. They include:

1. “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” (incorporated by reference in section 1976, title 13, CCR);
2. Warranty requirements (sections 2035, et seq., title 13, CCR);
3. OBD II (section 1968, et seq., title 13, CCR, as applicable);
4. “California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels through 2014,” (incorporated by reference in section 2317, title 13, CCR); and
5. “California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years,” (incorporated by reference in section 2317, title 13, CCR).

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¹ The requirements for diesel engines used in complete vehicles up to 14,000 pounds GVW are contained in the “California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” (incorporated by reference in §1961(d), title 13, CCR) and the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” (incorporated by reference in section 1961.2, title 13, CCR).

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

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**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 ~~(f)~~ (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, may be certified to the Optional Low-CO₂ Emission Standards. The CO₂ emissions from engines certified to the Optional Low-CO₂ Emission Standards may not exceed the following standards:

| <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> | | | | |
|--|--|---|---|--|
| <i><u>Light heavy-duty – vocational</u></i> | <i><u>Medium heavy-duty – vocational</u></i> | <i><u>Heavy heavy-duty – vocational</u></i> | <i><u>Medium heavy-duty – tractor</u></i> | <i><u>Heavy heavy-duty – tractor</u></i> |
| <u>490</u> | <u>474</u> | <u>446</u> | <u>409</u> | <u>387</u> |

Engines certified to the Optional Low-CO₂ Emission Standards must 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 these Optional Low-CO₂ Emission Standards and participating in the Innovative Technology Regulation set forth in §§2208 and 2208.1 of title 13, CCR are not eligible to participate in the averaging, banking, and trading program, or to generate credits for certification.

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

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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 amended September 15, 2011, which is hereby incorporated herein, as modified by these test procedures, and participating in the Innovative Technology Regulation set forth in §§2208 and 2208.1 of title 13, CCR may not generate credits or participate in the averaging, banking, and trading provisions of this subpart.

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

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APPENDIX D-3

State of California
AIR RESOURCES BOARD

Regulation to Provide Certification Flexibility for Innovative Heavy-Duty Engines and Certification and Installation Procedures for Medium- and Heavy-Duty Motor Vehicle Hybrid Conversion Systems

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 |
| <u>Amended:</u> | <u>[Insert New Date]</u> |

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 “* * *”.

NOTE: This document is incorporated by reference in sections 1956.8(d), title 13, California Code of Regulations (“CCR”) and also incorporates by reference various sections of Title 40, Part 86 of the Code of Federal Regulations, with some modifications. It contains the majority of the requirements necessary for certification of heavy-duty Otto-cycle engines for sale in California, in addition to containing the exhaust emissions standards and test procedures for these Otto-cycle engines.¹ The section numbering conventions for this document are set forth in subparagraph 4 on page 4. Reference is also made in this document to other California-specific requirements that are necessary to complete an application for certification. These other documents are designed to be used in conjunction with this document. They include:

1. “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” (incorporated by reference in section 1976, title 13, CCR);
2. Warranty requirements (sections 2035, et seq., title 13, CCR);
3. OBD II (section 1968, et seq., title 13, CCR, as applicable);
4. “California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels through 2014,” (incorporated by reference in section 2317, title 13, CCR); and
5. “California Test Procedures for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years,” (incorporated by reference in section 2317, title 13, CCR).

¹ The requirements for Otto-cycle engines used in complete vehicles up to 14,000 pounds GVW are contained in the “California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” (incorporated by reference in §1961(d), title 13, CCR) and the “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” (incorporated by reference in section 1961.2, title 13, CCR).

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

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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, may be certified to the Optional Low-CO₂ Emission Standard. The CO₂ emissions from engines certified to the Optional Low- CO₂ Emission Standard may not exceed 490 g/hp-hr. Engines certified to

the Optional Low-CO₂ Emission Standard must 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 and participating in the Innovative Technology Regulation set forth in §§2208 and 2208.1 of title 13, CCR are not eligible to participate in the averaging, banking, and trading program, or to generate credits for certification.

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

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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 amended September 15, 2011, which is hereby incorporated herein, as modified by these test procedures, and participating in the Innovative Technology Regulation set forth in §§2208 and 2208.1 of title 13, CCR may not generate credits or participate in the averaging, banking, and trading provisions of this subpart.

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

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