



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF AIR AND RADIATION  
NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY  
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February 2026

MEMORANDUM

SUBJECT: Redline Version of EPA's Final Regulations for Rescission of the Greenhouse Gas Endangerment Finding and Motor Vehicle Greenhouse Gas Emission Standards Under the Clean Air Act

FROM: Transportation Sector Impacts and Standards Division,  
Office of Transportation and Air Quality

TO: Docket EPA-HQ-OAR-2025-0194

EPA is removing regulations that require light-duty, medium-duty, and heavy-duty motor vehicle manufacturers and heavy-duty motor vehicle engine manufacturers to measure, report, or comply with EPA standards for greenhouse gas emissions. The attachments contain redline versions of the final amendments showing the changes relative to the current *Code of Federal Regulations*.

The regulatory text in the following attachments is intended to be the same as what will be published in the *Federal Register*. However, there may be some minor differences. The document published in the *Federal Register* is the official copy. One important difference to note is that the *Federal Register* will in many cases include an instruction to remove text, without publishing the text being removed. This document shows all removed text in strikeout font.

Attachments:

- PART 85—CONTROL OF AIR POLLUTION FROM MOBILE SOURCES
- PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES
- PART 600—FUEL ECONOMY AND GREENHOUSE GAS EXHAUST EMISSIONS OF MOTOR VEHICLES
- PART 1036—CONTROL OF EMISSIONS FROM NEW AND IN-USE HEAVYDUTY HIGHWAY ENGINES
- PART 1037—CONTROL OF EMISSIONS FROM NEW HEAVY-DUTY MOTOR VEHICLES
- PART 1039—CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES

## ATTACHMENT 1

### PART 85—CONTROL OF AIR POLLUTION FROM MOBILE SOURCES

1. The authority citation for part 85 continues to read as follows:

Authority: 42 U.S.C. 7401-7671q.

#### Subpart F—Exemption of Clean Alternative Fuel Conversions From Tampering Prohibition

##### § 85.525 [Amended]

2. Amend § 85.525 by removing and reserving paragraph (b).

##### § 85.525 Applicable standards.

\* \* \* \* \*

(b) ~~[Reserved] Compliance with greenhouse gas emission standards is demonstrated as follows:~~

~~(1) Subject to the following exceptions and special provisions, compliance with light-duty vehicle greenhouse gas emission standards is demonstrated by complying with the N<sub>2</sub>O and CH<sub>4</sub> standards and provisions set forth in 40 CFR 86.1818-12(f)(1) and the in-use CO<sub>2</sub> exhaust emission standard set forth in 40 CFR 86.1818-12(d) as determined by the OEM for the subconfiguration that is identical to the fuel conversion emission data vehicle (EDV):~~

~~(i) If the OEM complied with the light-duty greenhouse gas standards using the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub>, as allowed under 40 CFR 86.1818-12(f)(2), the calculations of the carbon-related exhaust emissions require the input of grams/mile values for N<sub>2</sub>O and CH<sub>4</sub>, and you are not required to demonstrate compliance with the standalone CH<sub>4</sub> and N<sub>2</sub>O standards.~~

~~(ii) If the OEM complied with alternate standards for N<sub>2</sub>O and/or CH<sub>4</sub>, as allowed under 40 CFR 86.1818-12(f)(3), you may demonstrate compliance with the same alternate standards.~~

~~(iii) If the OEM complied with the nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) standards and provisions set forth in 40 CFR 86.1818-12(f)(1) or (3), and the fuel conversion CO<sub>2</sub> measured value is lower than the in-use CO<sub>2</sub> exhaust emission standard, you also have the option to convert the difference between the in-use CO<sub>2</sub> exhaust emission standard and the fuel conversion CO<sub>2</sub> measured value into GHG equivalents of CH<sub>4</sub> and/or N<sub>2</sub>O, using 298 g CO<sub>2</sub> to represent 1 g N<sub>2</sub>O and 25 g CO<sub>2</sub> to represent 1 g CH<sub>4</sub>. You may then subtract the applicable converted values from the fuel conversion measured values of CH<sub>4</sub> and/or N<sub>2</sub>O to demonstrate compliance with the CH<sub>4</sub> and/or N<sub>2</sub>O standards.~~

~~(iv) Optionally, compliance with greenhouse gas emission requirements may be demonstrated by comparing emissions from the vehicle prior to the fuel conversion to the emissions after the fuel conversion. This comparison must be based on FTP test results from the emission data vehicle (EDV) representing the pre-conversion test group. The sum of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O shall be calculated for pre- and post-conversion FTP test results, where CH<sub>4</sub> and N<sub>2</sub>O are weighted by their global warming potentials of 25 and 298, respectively. The post-conversion sum of these emissions must be lower than the pre-conversion conversion greenhouse gas emission results. CO<sub>2</sub> emissions are calculated as specified in 40 CFR 600.113-12. If statements of compliance are applicable and accepted in lieu of measuring N<sub>2</sub>O, as permitted by EPA regulation, the comparison of the greenhouse gas results also need not measure or include N<sub>2</sub>O in the before and after emission comparisons.~~

~~(2) Compliance with heavy-duty engine greenhouse gas emission standards is demonstrated by complying with the CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> standards (or FELs, as applicable) and provisions set~~

forth in 40 CFR 1036.108 for the engine family that is represented by the fuel conversion emission data engine (EDE). The following additional provisions apply:

(i) If the fuel conversion CO<sub>2</sub> measured value is lower than the CO<sub>2</sub> standard (or FEL, as applicable), you have the option to convert the difference between the CO<sub>2</sub> standard (or FEL, as applicable) and the fuel conversion CO<sub>2</sub> measured value into GHG equivalents of CH<sub>4</sub> and/or N<sub>2</sub>O, using 298 g/hp-hr CO<sub>2</sub> to represent 1 g/hp-hr N<sub>2</sub>O. Similarly, you may use 34 g/hp-hr CO<sub>2</sub> to represent 1 g/hp-hr CH<sub>4</sub> for model year 2021 and later engines, and you may use 25 g/hp-hr CO<sub>2</sub> to represent 1 g/hp-hr CH<sub>4</sub> for earlier engines. You may then subtract the applicable converted values from the fuel conversion measured values of CH<sub>4</sub> and/or N<sub>2</sub>O to demonstrate compliance with the CH<sub>4</sub> and/or N<sub>2</sub>O standards (or FEL, as applicable).

(ii) Small volume conversion manufacturers may demonstrate compliance with N<sub>2</sub>O standards based on an engineering analysis.

(iii) For conversions of engines installed in vocational vehicles subject to Phase 2 standards under 40 CFR 1037.105 or in tractors subject to Phase 2 standards under 40 CFR 1037.106, conversion manufacturers may omit a demonstration related to the vehicle-based standards, as long as they have a reasonable technical basis for believing that the modified vehicle continues to meet those standards.

(3) Subject to the following exceptions and special provisions, compliance with greenhouse gas emission standards for medium-duty vehicles and heavy-duty vehicles subject to 40 CFR 86.1819-14 is demonstrated by complying with the N<sub>2</sub>O and CH<sub>4</sub> standards and provisions set forth in 40 CFR 86.1819-14 and the in-use CO<sub>2</sub> exhaust emission standard set forth in 40 CFR 86.1819-14(b) as determined by the OEM for the subconfiguration that is identical to the fuel conversion emission data vehicle (EDV):

(i) If the OEM complied with alternate standards for N<sub>2</sub>O and/or CH<sub>4</sub>, as allowed under 40 CFR 86.1819-14(e) you may demonstrate compliance with the same alternate standards.

(ii) If you are unable to meet either the N<sub>2</sub>O or CH<sub>4</sub> standards and your fuel conversion CO<sub>2</sub> measured value is lower than the in-use CO<sub>2</sub> exhaust emission standard, you may also convert the difference between the in-use CO<sub>2</sub> exhaust emission standard and the fuel conversion CO<sub>2</sub> measured value into GHG equivalents of CH<sub>4</sub> and/or N<sub>2</sub>O, using 298 g CO<sub>2</sub> to represent 1 g N<sub>2</sub>O. Similarly, you may use 34 g CO<sub>2</sub> to represent 1 g CH<sub>4</sub> for model year 2021 and later vehicles, and you may use 25 g CO<sub>2</sub> to represent 1 g CH<sub>4</sub> for earlier vehicles. You may then subtract the applicable converted values from the fuel conversion measured values of CH<sub>4</sub> and/or N<sub>2</sub>O to demonstrate compliance with the CH<sub>4</sub> and/or N<sub>2</sub>O standards.

(iii) You may alternatively comply with the greenhouse gas emission requirements by comparing emissions from the vehicle before and after the fuel conversion. This comparison must be based on FTP test results from the emission data vehicle (EDV) representing the pre-conversion test group. The sum of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O shall be calculated for pre- and post-conversion FTP test results, where CH<sub>4</sub> and N<sub>2</sub>O are weighted by their global warming potentials as described in paragraph (b)(3)(ii) of this section. The post-conversion sum of these emissions must be lower than the pre-conversion greenhouse gas emission result. Calculate CO<sub>2</sub> emissions as specified in 40 CFR 600.113. If we waive N<sub>2</sub>O measurement requirements based on a statement of compliance, disregard N<sub>2</sub>O for all measurements and calculations under this paragraph (b)(3)(iii).

\* \* \* \* \*

## Subpart P—Importation of Motor Vehicles and Motor Vehicle Engines

3. Amend § 85.1515 by revising paragraph (d) to read as follows:

**§ 85.1515 Emission standards and test procedures applicable to imported nonconforming motor vehicles and motor vehicle engines.**

\* \* \* \* \*

(d) An ICI may not certify using nonconformance penalties ~~and may not participate in the averaging, banking, and trading program for GHG emissions.~~

**Subpart S—Recall Regulations**

**§ 85.1803 [Amended]**

4. Amend § 85.1803 by removing paragraph (e).

**§ 85.1803 Remedial Plan.**

\* \* \* \* \*

~~(e) A remedial plan for an alternative remedy under 40 CFR 86.1865-12(j)(3) that does not involve vehicle repairs may omit items from this section that do not apply. For example, such a remedial plan will generally omit information related to proper maintenance, vehicle repairs, and vehicle labeling.~~

\* \* \* \* \*

**§ 85.1805 [Amended]**

5. Amend § 85.1805 by removing and reserving paragraph (b).

**§ 85.1805 Notification to vehicle or engine owners.**

\* \* \* \* \*

~~(b) [Reserved] In the case of manufacturers submitting an alternative remedy under 40 CFR 86.1865-12(j)(3) that does not involve vehicle repairs, the proposed remedy must also include a proposal for notifying owners of the nonconformity. The notification must contain the following:~~

~~(1) The statement: “The Administrator of the U.S. Environmental Protection Agency has determined that your vehicle or engine may be emitting pollutants in excess of the Federal emission standards as defined in 40 CFR part 86. These emission standards were established to protect the public health or welfare from the dangers of air pollution.”~~

~~(2) A clear description of the measures to be taken to correct the nonconformity.~~

\* \* \* \* \*

**Subpart T—Emission Defect Reporting Requirements**

6. Amend § 86.1902 by removing and reserving paragraph (b)(2) and revising paragraph (d). The revision reads as follows:

**§ 85.1902 Definitions.**

\* \* \* \* \*

(b) *Emission-related defect* means:

- (1) A defect in design, materials, or workmanship in a device, system, or assembly described in the approved Application for Certification that affects any parameter or specification enumerated in appendix VIII of this part; or

(2) ~~[Reserved] A defect in the design, materials, or workmanship in one or more emission-related parts, components, systems, software, or elements of design which must function~~

~~properly to ensure continued compliance with greenhouse gas emission standards in 40 CFR part 86.~~

\* \* \* \* \*

(d) *Voluntary emissions recall* means a repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to remedy any emission-related defect for which direct notification of vehicle or engine owners has been provided, ~~including programs to remedy defects related to emissions standards for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and/or carbon-related exhaust emissions.~~

\* \* \* \* \*

## **Subpart V—Warranty Regulations and Voluntary Aftermarket Part Certification Program**

7. Amend § 85.2103 by revising paragraph (d)(1)(v) and removing paragraph (d)(3). The revision reads as follows:

### **§ 85.2103 Emission warranty.**

\* \* \* \* \*

(d) \* \* \*

(1) \* \* \*

(v) Batteries serving as a Renewable Energy Storage System for electric vehicles and plug-in hybrid electric vehicles, along with all components needed to charge the system, store energy, and transmit power to move the vehicle. This paragraph (d)(1)(v) is optional before model year 2027 for light-duty vehicles and light-duty trucks at or below 6,000 pounds GVWR. This paragraph (d)(1)(v) is optional for vehicles above 6,000 pounds GVWR until they are first certified to Tier 4 NMOG+NOx bin standards under 40 CFR 86.1811-27(b), not later than model year 2031~~for vehicles not yet subject to battery monitoring requirements under 40 CFR 86.1815-27.~~

\* \* \* \* \*

~~(3) An electric vehicle or plug-in hybrid electric vehicle fails to meet the manufacturer-defined value for percentage usable battery energy for the specified period as determined by the State of Certified Energy monitor required under 40 CFR 86.1815-27, subject to the warranty claim procedures in § 85.2106.~~

## ATTACHMENT 2

### PART 86—CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES

8. The authority citation for part 86 continues to read as follows:

Authority: 42 U.S.C. 7401-7671q.

#### § 86.1 [Amended]

9. Amend § 86.1 by removing and reserving paragraphs (c)(2) and (3) and (f)(3), (17), (21), and (22) and removing paragraph (h).

#### § 86.1 Incorporation by reference.

\* \* \* \* \*

(c) California Air Resources Board (California ARB). California Air Resources Board, 1001 I Street, Sacramento, CA 95812; (916) 322-2884; [www.arb.ca.gov](http://www.arb.ca.gov).

(1) California Requirements Applicable to the LEV III Program, including the following documents:

(i) LEV III exhaust emission standards are in Title 13 Motor Vehicles, Division 3 Air Resources Board, Chapter 1 Motor Vehicle Pollution Control Devices, Article 2 Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1961.2 Exhaust Emission Standards and Test Procedures—2015 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, effective as of December 31, 2012; IBR approved for § 86.1803-01.

(ii) LEV III evaporative emission standards for model year 2015 and later vehicles are in Title 13 Motor Vehicles, Division 3 Air Resources Board, Chapter 1 Motor Vehicle Pollution Control Devices, Article 2 Approval of Motor Vehicle Pollution Control Devices (New Vehicles) § 1976 Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions, effective as of December 31, 2012; IBR approved for § 86.1803-01.

(2) ~~[Reserved]13 CCR 1962.5, Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1962.5 Data Standardization Requirements for 2026 and Subsequent Model Year Light-Duty Zero Emission Vehicles and Plug-in Hybrid Electric Vehicles; Operative November 30, 2022; IBR approved for § 86.1815-27(h).~~

(3) ~~[Reserved]13 CCR 1962.7, Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1962.7 In-Use Compliance, Corrective Action and Recall Protocols for 2026 and Subsequent Model Year Zero Emission and Plug-in Hybrid Electric Passenger Cars and Light-Duty Trucks; Operative November 30, 2022; IBR approved for § 86.1815-27(h).~~

(4) 13 CCR 1968.2 (known as Onboard Diagnostics II (OBD-II)), Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1968.2 Malfunction and Diagnostic System Requirements—2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines, effective as of July 31, 2013; IBR approved for § 86.1806-17(a).



(5) 13 CCR 1968.2 (known as Onboard Diagnostics II (OBD-II)), Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1968.2 Malfunction and Diagnostic System Requirements—2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines; Operative November 30, 2022; IBR approved for § 86.1806-27(a).

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(f) SAE International (SAE). SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001; (877) 606-7323 (U.S. and Canada) or (724) 776-4970 (outside the U.S. and Canada); www.sae.org.

(1) SAE J1151, Methane Measurement Using Gas Chromatography, stabilized September 2011; IBR approved for § 86.111-94(b).

(2) SAE J1349, Engine Power Test Code—Spark Ignition and Compression Ignition—As Installed Net Power Rating, revised September 2011; IBR approved for § 86.1803-01.

(3) ~~[Reserved]SAE J1711 FEB2023, Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid-Electric Vehicles, Including Plug-In Hybrid Vehicles; Revised February 2023; IBR approved for § 86.1866-12(b).~~

(4) SAE J1877, Recommended Practice for Bar-Coded Vehicle Identification Number Label, July 1994; IBR approved for § 86.1807-01(f).

(5) SAE J1930, Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms, Revised May 1998; IBR approved for § 86.1808-01(f); 86.1808-07(f).

(6) SAE J1930, Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms—Equivalent to ISO/TR 15031-2, April 30, 2002, Revised April 2002; IBR approved for § 86.010-18(k).

(7) SAE J1939, Recommended Practice for a Serial Control and Communications Vehicle Network, Revised October 2007; IBR approved for § 86.010-18(k).

(8) SAE J1939-13, Off-Board Diagnostic Connector, Revised March 2004; IBR approved for § 86.010-18(k).

(9) SAE J1939-71, Vehicle Application Layer (Through February 2007), Revised January 2008; IBR approved for § 86.010-38(j).

(10) SAE J1939-73, Application Layer—Diagnostics, Revised September 2006; IBR approved for § 86.010-18(k); 86.010-38(j).

(11) SAE J1939-81, Network Management, Revised May 2003; IBR approved for § 86.010-38(j).

(12) SAE J1962, Diagnostic Connector Equivalent to ISO/DIS 15031-3, December 14, 2001, Revised April 2002; IBR approved for § 86.010-18(k).

(13) SAE J1978, OBD II Scan Tool—Equivalent to ISO/DIS 15031-4, December 14, 2001, Revised April 2002; IBR approved for § 86.010-18(k).

(14) SAE J1979, E/E Diagnostic Test Modes, Revised September 1997; IBR approved for § 86.1808-01(f) and 86.1808-07(f).

(15) SAE J1979, (R) E/E Diagnostic Test Modes, Revised May 2007; IBR approved for § 86.010-18(k).

(16) SAE J2012, (R) Diagnostic Trouble Code Definitions Equivalent to ISO/DIS 15031-6, April 30, 2002, Revised April 2002; IBR approved for § 86.010-18(k).

(17) ~~[Reserved]SAE J2064 FEB2011, R134a Refrigerant Automotive Air-Conditioned Hose, Revised February 2011; IBR approved for § 86.1867-12(a).~~

(18) SAE J2284-3, High Speed CAN (HSC) for Vehicle Applications at 500 KBPS, May 2001; IBR approved for § 86.1808-01(f); 86.1808-07(f).

(19) SAE J2403, Medium/Heavy-Duty E/E Systems Diagnosis Nomenclature—Truck and Bus; Revised August 2007; IBR approved for § 86.010-18(k); 86.010-38(j).

(20) SAE J2534, Recommended Practice for Pass-Thru Vehicle Programming, February 2002; IBR approved for § 86.1808-01(f); 86.1808-07(f).

(21) ~~[Reserved]SAE J2727 FEB2012, Mobile Air Conditioning System Refrigerant Emission Charts for R-134a and R-1234yf, Revised February 2012; IBR approved for § 86.1867-12(a).~~

(22) ~~[Reserved]SAE J2727 SEP2023, Mobile Air Conditioning System Refrigerant Emissions Estimate for Mobile Air Conditioning Refrigerants, Revised September 2023; IBR approved for § 86.1819-14(h); 86.1867-12(a); 86.1867-31(a).~~

(23) SAE J2765 OCT2008, Procedure for Measuring System COP [Coefficient of Performance] of a Mobile Air Conditioning System on a Test Bench, Issued October 2008; IBR approved for § 86.1868-12(h).

(24) SAE J2807 FEB2020, Performance Requirements for Determining Tow-Vehicle Gross Combination Weight Rating and Trailer Weight Rating, Revised February 2020; IBR approved for § 86.1845-04(h).

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~~(h) UN Economic Commission for Europe (UNECE). UN Economic Commission for Europe, Information Service, Palais des Nations, CH-1211 Geneva 10, Switzerland; [unece\\_info@un.org](mailto:unece_info@un.org); [www.unece.org](http://www.unece.org).~~

~~(1) ECE/TRANS/180/Add.22, Addendum 22: United Nations Global Technical Regulation, No. 22, United Nations Global Technical Regulation on In-vehicle Battery Durability for Electrified Vehicles; Adopted April 14, 2022, (“GTR No. 22”); IBR approved for § 86.1815-27.~~

~~(2) [Reserved]~~

## Subpart A—General Provisions for Heavy-Duty Engines and Heavy-Duty Vehicles

10. Amend § 86.007-11 by revising paragraphs (g)(1) and (6) to read as follows:

### § 86.007-11 Emission standards and supplemental requirements for 2007 and later model year diesel heavy-duty engines and vehicles.

\* \* \* \* \*

(g) \* \* \*

(1) The engines must be of a configuration that is identical to one that is certified under 40 CFR part 1039, and must be certified with a Family Emission Limit for PM of 0.020 g/kW-hr ~~meet the following additional standards~~ using the same duty cycles that apply under 40 CFR part 1039.÷

~~(i) The engines must be certified with a Family Emission Limit for PM of 0.020 g/kW-hr.~~

~~(ii) Diesel-fueled engines using selective catalytic reduction must meet an emission standard of 0.1 g/kW-hr for N2O.~~

\* \* \* \* \*

(6) Engines certified under this paragraph (g) may not generate or use emission credits under this part or under 40 CFR part 1039. ~~The vehicles in which these engines are installed may generate or use emission credits as described in 40 CFR part 1037.~~

\* \* \* \* \*



11. Amend § 86.008-10 by revising paragraph (g)(6) to read as follows:

**§ 86.008-10 Emission standards for 2008 and later model year Otto-cycle heavy-duty engines and vehicles.**

\* \* \* \* \*

(g) \* \* \*

(6) Engines certified under this paragraph (g) may not generate or use emission credits under this part. ~~The vehicles in which these engines are installed may generate or use emission credits as described in 40 CFR part 1037.~~

\* \* \* \* \*

**Subpart S—General Compliance Provisions for Control of Air Pollution From New and In-Use Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Vehicles**

12. Amend § 86.1801-12 by:

- a. Removing and reserving paragraph (a)(2)(ii)(B);
- b. Revising paragraphs (a)(3), (b), and (i); and
- c. Removing paragraphs (j) and (k).

The revisions read as follows:

**§ 86.1801-12 Applicability.**

(a) *Applicability.* The provisions of this subpart apply to certain types of new vehicles as described in this paragraph (a). Where the provisions apply for a type of vehicle, they apply for vehicles powered by any fuel, unless otherwise specified. In cases where a provision applies only to a certain vehicle group based on its model year, vehicle class, motor fuel, engine type, or other distinguishing characteristics, the limited applicability is cited in the appropriate section. Testing references in this subpart generally apply to Tier 2 and older vehicles, while testing references to 40 CFR part 1066 generally apply to Tier 3 and newer vehicles; see § 86.101 for detailed provisions related to this transition. The provisions of this subpart apply to certain vehicles as follows:

(1) The provisions of this subpart apply for light-duty vehicles and light-duty trucks.

(2) The provisions of this subpart apply for medium-duty passenger vehicles. The provisions of this subpart also apply for medium-duty vehicles at or below 14,000 pounds GVWR, except as follows:

(i) The provisions of this subpart are optional for diesel-cycle vehicles through model year 2017; however, if you are using the provisions of § 86.1811-17(b)(9) or § 86.1816-18(b)(8) to transition to the Tier 3 exhaust emission standards, the provisions of this subpart are optional for those diesel-cycle vehicles until the start of the Tier 3 phase-in for those vehicles.

(ii) The exhaust emission standards of this part are optional for vehicles above 22,000 pounds GCWR and for all incomplete medium-duty vehicles. Certain requirements in this subpart apply for such vehicles even if they are not certified to the exhaust emission standards of this subpart as follows:

(A) Such vehicles remain subject to the evaporative and refueling emission standards of this subpart.

(B) ~~[Reserved] Such vehicles may remain subject to the greenhouse gas standards in § 86.1819-14 as specified in 40 CFR 1036.635.~~

(C) Such vehicles may remain subject to onboard diagnostic requirements as specified in 40 CFR 1036.110.

(iii) The provisions of this subpart are optional for diesel-fueled Class 3 heavy-duty vehicles in a given model year if those vehicles are equipped with engines certified to the appropriate standards in § 86.007-11 or 40 CFR 1036.104 for which less than half of the engine family's sales for the model year in the United States are for complete Class 3 heavy-duty vehicles. This includes engines sold to all vehicle manufacturers. If you are the original manufacturer of the engine and the vehicle, base this showing on your sales information. If you manufacture the vehicle but are not the original manufacturer of the engine, you must use your best estimate of the original manufacturer's sales information.

(3) The provisions of this subpart do not apply to heavy-duty vehicles above 14,000 pounds GVWR (see § 86.016-1 and 40 CFR parts 1036 and 1037), except as follows:

(i) Heavy-duty vehicles above 14,000 pounds GVWR and at or below 19,500 pounds GVWR may be optionally certified to the exhaust emission standards in this subpart, ~~including the greenhouse gas emission standards,~~ if they are properly included in a test group with similar vehicles at or below 14,000 pounds GVWR. Emission standards apply to these vehicles as if they were Class 3 medium-duty vehicles. ~~The work factor for these vehicles may not be greater than the largest work factor that applies for vehicles in the test group that are at or below 14,000 pounds GVWR (see § 86.1819-14).~~

(ii) ~~[Reserved] The greenhouse gas standards apply for certain vehicles above 14,000 pounds GVWR as specified in § 86.1819-14.~~

(iii) Evaporative and refueling emission standards apply for heavy-duty vehicles above 14,000 pounds GVWR as specified in 40 CFR 1037.103.

(4) If you optionally certify vehicles to standards under this subpart, those vehicles are subject to all the regulatory requirements as if the standards were mandatory.

(b) *Relationship to 40 CFR parts 1036 and 1037.* If any heavy-duty vehicle is not subject to standards and certification requirements under this subpart, the vehicle and its installed engine are instead subject to standards and certification requirements under 40 CFR parts 1036 and 1037, as applicable. If you optionally certify engines or vehicles to standards under 40 CFR part 1036 or 40 CFR part 1037, respectively, those engines or vehicles are subject to all the regulatory requirements in 40 CFR parts 1036 and 1037 as if they were mandatory. ~~Note that heavy-duty engines subject to greenhouse gas standards under 40 CFR part 1036 before model year 2027 are also subject to standards and certification requirements under subpart A of this part 86.~~

\* \* \* \* \*

(i) *Types of pollutants.* ~~Emission standards and related requirements apply for different types of pollutants as follows: (1) Criteria pollutants.~~ Criteria pollutant standards apply for NO<sub>x</sub>, NMOG, HC, formaldehyde, PM, and CO, including exhaust, evaporative, and refueling emission standards. These pollutants are sometimes described collectively as “criteria pollutants” because they are either criteria pollutants under the Clean Air Act or precursors to the criteria pollutants ozone and PM.

~~(2) Greenhouse gas emissions. This subpart contains standards and other regulations applicable to the emission of the air pollutant defined as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.~~

(3) *Nomenclature.* Numerous sections in this subpart refer to requirements relating to “exhaust emissions.” Unless otherwise specified or otherwise determined by the Administrator, the term “exhaust emissions” refers at a minimum to emissions of all pollutants described by emission standards in this subpart, including carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>).

~~(j) *Exemption from greenhouse gas emission standards for small businesses.* Manufacturers that qualify as a small business under the Small Business Administration regulations in 13 CFR part 121 are exempt from certain standards and associated provisions as specified in § 86.1815, 86.1818, and 86.1819 and in 40 CFR part 600. This exemption applies to both U.S.-based and non-U.S.-based businesses. The following categories of businesses (with their associated NAICS codes) may be eligible for exemption based on the Small Business Administration size standards in 13 CFR 121.201:~~

~~(1) Vehicle manufacturers (NAICS code 336111).~~

~~(2) Independent commercial importers (NAICS codes 811111, 811112, 811198, 423110, 424990, and 441120).~~

~~(3) Alternate fuel vehicle converters (NAICS codes 335312, 336312, 336322, 336399, 454312, 485310, and 811198).~~

~~(k) *Conditional exemption from greenhouse gas emission standards.* Manufacturers may request a conditional exemption from compliance with the emission standards described in § 86.1818-12(e) through (e) and associated provisions in this part and in part 600 of this chapter for model years 2012 through 2016. For the purpose of determining eligibility the sales of related companies shall be aggregated according to the provisions of § 86.1838-01(b)(3) or, if a manufacturer has been granted operational independence status under § 86.1838-01(d), eligibility shall be based on that manufacturer's vehicle production:~~

~~(1) [Reserved]~~

~~(2) *Maintaining eligibility for exemption from greenhouse gas emission standards.* To remain eligible for exemption under this paragraph (k) the manufacturer's average sales for the three most recent consecutive model years must remain below 5,000. If a manufacturer's average sales for the three most recent consecutive model years exceeds 4999, the manufacturer will no longer be eligible for exemption and must meet applicable emission standards according to the provisions in this paragraph (k)(2):~~

~~(i) If a manufacturer's average sales for three consecutive model years exceeds 4999, and if the increase in sales is the result of corporate acquisitions, mergers, or purchase by another manufacturer, the manufacturer shall comply with the emission standards described in § 86.1818-12(e) through (e), as applicable, beginning with the first model year after the last year of the three consecutive model years.~~

~~(ii) If a manufacturer's average sales for three consecutive model years exceeds 4999 and is less than 50,000, and if the increase in sales is solely the result of the manufacturer's expansion in vehicle production, the manufacturer shall comply with the emission standards described in § 86.1818-12(e) through (e), as applicable, beginning with the second model year after the last year of the three consecutive model years.~~

~~(iii) If a manufacturer's average sales for three consecutive model years exceeds 49,999, the manufacturer shall comply with the emission standards described in § 86.1818-12(e) through (e), as applicable, beginning with the first model year after the last year of the three consecutive model years.~~

13. Amend § 86.1803-01 by:

- a. Removing the definitions of “AC1”, “AC2”, “Air Conditioning Idle Test”, “Base level”, “Base tire”, “Base vehicle”, “Combined CO<sub>2</sub>”, “Combined CREE”, and “Configuration”;
- b. Revising the definition of “Defeat device”;
- c. Removing and reserving paragraph (1) of the definition of “Emergency vehicle”;
- d. Revising the definition of “Engine code”;
- e. Removing the definition of “Footprint”, “Full size pickup truck”, “Mild hybrid electric vehicle”, “Strong hybrid electric vehicle”, “Subconfiguration”, “Track width”, and “Transmission class”; and
- f. Adding a definition of “Work factor” in alphabetical order.

The revisions and addition read as follows:

### **§ 86.1803-01 Definitions.**

\* \* \* \* \*

~~*AC1* means a test procedure as described in § 86.162-00 which simulates testing with air conditioning operating in an environmental test cell by adding the air conditioning compressor load to the normal dynamometer forces.~~

~~*AC2* means a test procedure as described in § 86.162-00 which simulates testing with air conditioning operating in an environmental test cell by adding a heat load to the passenger compartment.~~

\* \* \* \* \*

~~*Air Conditioning Idle Test* means the test procedure specified in § 86.165-12.~~

\* \* \* \* \*

~~*Base level* has the meaning given in 40 CFR 600.002 for LDV, LDT, and MDPV. See § 86.1819-14 for heavy-duty vehicles.~~

~~*Base tire* has the meaning given in 40 CFR 600.002 for LDV, LDT, and MDPV.~~

~~*Base vehicle* has the meaning given in 40 CFR 600.002 for LDV, LDT, and MDPV.~~

\* \* \* \* \*

~~*Combined CO<sub>2</sub>* means the CO<sub>2</sub> value determined for a vehicle (or vehicles) by averaging the city and highway CO<sub>2</sub> values, weighted 0.55 and 0.45 respectively.~~

~~*Combined CREE* means the CREE value determined for a vehicle (or vehicles) by averaging the city and highway fuel CREE values, weighted 0.55 and 0.45 respectively.~~

~~*Configuration* means one of the following:~~

- ~~(1) For LDV, LDT, and MDPV, *configuration* means a subclassification within a test group which is based on engine code, inertia weight class, transmission type and gear ratios, final drive ratio, and other parameters which may be designated by the Administrator.~~

~~(2) For HDV, configuration has the meaning given in § 86.1819-14(d)(12).~~

\* \* \* \* \*

*Defeat device* means an auxiliary emission control device (AECD) that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use, unless:

(1) Such conditions are substantially included in driving cycles specified in this subpart, or the fuel economy test procedures in 40 CFR part 600, ~~and the air conditioning efficiency test in 40 CFR 1066.845;~~

(2) The need for the AECD is justified in terms of protecting the vehicle against damage or accident;

(3) The AECD does not go beyond the requirements of engine starting; or

(4) The AECD applies only for emergency vehicles and the need is justified in terms of preventing the vehicle from losing speed, torque, or power due to abnormal conditions of the emission control system, or in terms of preventing such abnormal conditions from occurring, during operation related to emergency response. Examples of such abnormal conditions may include excessive exhaust backpressure from an overloaded particulate trap, and running out of diesel exhaust fluid for engines that rely on urea-based selective catalytic reduction.

\* \* \* \* \*

*Emergency vehicle* means one of the following:

(1) ~~[Reserved] For the greenhouse gas emission standards in § 86.1818, emergency vehicle means a motor vehicle manufactured primarily for use as an ambulance or combination ambulance hearse or for use by the United States Government or a State or local government for law enforcement.~~

(2) For the OBD requirements in § 86.1806, emergency vehicle means a motor vehicle manufactured primarily for use in medical response or for use by the U.S. Government or a State or local government for law enforcement or fire protection.

(3) For other provisions under this subpart, *emergency vehicle* means a motor vehicle that is either—

(i) An ambulance or a fire truck; or

(ii) A vehicle that we have determined will likely be used in emergency situations where emission control function or malfunction may cause a significant risk to human life. For example, we would consider a pickup truck that is certain to be retrofitted with a slip-on firefighting module to be an emergency vehicle, even though it was not initially designed to be a fire truck. Also, a mobile command center that is unable to manually regenerate its DPF while on duty could be an emergency vehicle. In making this determination, we may consider any factor that has an effect on the totality of the actual risk to human life. For example, we may consider how frequently a vehicle will be used in emergency situations or how likely it is that the emission controls will cause a significant risk to human life when the vehicle is used in emergency situations. We would not consider the pickup truck in the example above to be an emergency vehicle if there is merely a

possibility (rather than a certainty) that the vehicle will be retrofitted with a slip-on firefighting module.

\* \* \* \* \*

*Engine code* means ~~one of the following:~~(1) For LDV, LDT, and MDPV, ~~engine code means~~ a unique combination within a test group of displacement, fuel injection (or carburetor) calibration, choke calibration, distributor calibration, auxiliary emission control devices, and other engine and emission control system components specified by the Administrator. For electric vehicles, engine code means a unique combination of manufacturer, electric traction motor, motor configuration, motor controller, and energy storage device.~~(2) For HDV, engine code has the meaning given in § 86.1819-14(d)(12).~~

\* \* \* \* \*

~~*Footprint* is the product of average track width (rounded to the nearest tenth of an inch) and wheelbase (measured in inches and rounded to the nearest tenth of an inch), divided by 144 and then rounded to the nearest tenth of a square foot, where the average track width is the average of the front and rear track widths, where each is measured in inches and rounded to the nearest tenth of an inch.~~

\* \* \* \* \*

~~*Full size pickup truck* means a light truck which has a passenger compartment and an open cargo box and which meets the following specifications:~~

~~(1) A minimum cargo bed width between the wheelhouses of 48 inches, measured as the minimum lateral distance between the limiting interferences (pass through) of the wheelhouses. The measurement shall exclude the transitional arc, local protrusions, and depressions or pockets, if present. An open cargo box means a vehicle where the cargo box does not have a permanent roof or cover. Vehicles produced with detachable covers are considered "open" for the purposes of these criteria.~~

~~(2) A minimum open cargo box length of 60 inches, where the length is defined by the lesser of the pickup bed length at the top of the body or the pickup bed length at the floor, where the length at the top of the body is defined as the longitudinal distance from the inside front of the pickup bed to the inside of the closed endgate as measured at the height of the top of the open pickup bed along vehicle centerline, and the length at the floor is defined as the longitudinal distance from the inside front of the pickup bed to the inside of the closed endgate as measured at the cargo floor surface along vehicle centerline.~~

~~(3)~~

~~(i) A minimum towing capability of 5,000 pounds, where minimum towing capability is determined by subtracting the gross vehicle weight rating from the gross combined weight rating; or~~

~~(ii) A minimum payload capability of 1,700 pounds, where minimum payload capability is determined by subtracting the curb weight from the gross vehicle weight rating.~~

\* \* \* \* \*

~~*Mild hybrid electric vehicle* means a hybrid electric vehicle that has start/stop capability and~~



~~regenerative braking capability, where the recovered energy over the Federal Test Procedure is at least 15 percent but less than 65 percent of the total braking energy, as measured and calculated according to 40 CFR 600.116-12(d).~~

\* \* \* \* \*

~~*Strong hybrid electric vehicle* means a hybrid electric vehicle that has start/stop capability and regenerative braking capability, where the recovered energy over the Federal Test Procedure is at least 65 percent of the total braking energy, as measured and calculated according to 40 CFR 600.116-12(d).~~

~~*Subconfiguration* means one of the following:~~

- ~~(1) For LDV, LDT, and MDPV, *subconfiguration* has the meaning given in 40 CFR 600.002.~~
- ~~(2) For HDV, *subconfiguration* has the meaning given in § 86.1819-14(d)(12).~~

\* \* \* \* \*

~~*Track width* is the lateral distance between the centerlines of the base tires at ground, including the camber angle.~~

\* \* \* \* \*

~~*Transmission class* has the meaning given in 40 CFR 600.002 for LDV, LDT, and MDPV.~~

\* \* \* \* \*

~~*Work factor, WF, means the characteristic value representing a vehicle's work potential, calculated to the nearest pound using the following equation:*~~

$$~~WF = 0.75 \times (GVWR - \text{Curb Weight} + xwd) + 0.25 \times (GCWR - GVWR)~~$$

~~*Where:*~~

~~*xwd = 500 pounds if the vehicle has four-wheel drive or all-wheel drive; xwd = 0 pounds for all other vehicles.*~~

\* \* \* \* \*

14. Amend § 86.1805-12 by revising paragraph (a) to read as follows:

#### **§ 86.1805-12 Useful life.**

(a) Except as permitted under paragraph (b) of this section or required under paragraphs (c) and (d) of this section, the full useful life for all LDVs and LLDTs is a period of use of 10 years or 120,000 miles, whichever occurs first. The full useful life for all HLDTs, MDPVs, and complete heavy-duty vehicles is a period of 11 years or 120,000 miles, whichever occurs first. These full useful life values apply to all exhaust, evaporative and refueling emission requirements except for standards which are specified to only be applicable at the time of certification. ~~These full useful life requirements also apply to all air conditioning leakage credits, air conditioning efficiency credits, and other credit programs used by the manufacturer to comply with the fleet average CO<sub>2</sub> emission standards in § 86.1818-12.~~

\* \* \* \* \*

15. Revise § 86.1805-17 to read as follows:

**§ 86.1805-17 Useful life.**

(a) *General provisions.* The useful life values specified in this section apply for all exhaust, evaporative, refueling, and OBD emission requirements described in this subpart, except for standards that are specified to apply only at certification. ~~These useful life requirements also apply to all air conditioning leakage credits, air conditioning efficiency credits, and other credit programs used by the manufacturer to comply with the fleet average CO<sub>2</sub> emission standards in § 86.1818.~~ Useful life values are specified as a given number of calendar years or miles of driving, whichever comes first.

(b) ~~[Reserved] Greenhouse gas pollutants. The emission standards in § 86.1818 apply for a useful life of 10 years or 120,000 miles for LDV and LLDT and 11 years or 120,000 miles for HLDT and MDPV. For non-MDPV heavy-duty vehicles, the emission standards in § 86.1819 apply for a useful life of 11 years or 120,000 miles through model year 2020, and for a useful life of 15 years or 150,000 miles in model year 2021 and later. Manufacturers may certify based on the useful life as specified in paragraph (d) of this section if it is different than the useful life specified in this paragraph (b).~~

(c) *Cold temperature emission standards.* The cold temperature NMHC emission standards in § 86.1811-17 apply for a useful life of 10 years or 120,000 miles for LDV and LLDT, and 11 years or 120,000 miles for HLDT and HDV. The cold temperature CO emission standards in § 86.1811-17 apply for a useful life of 5 years or 50,000 miles.

(d) *Criteria pollutants.* The useful life provisions of this paragraph (d) apply for all emission standards not covered by paragraph ~~(b)~~ or (c) of this section. This paragraph (d) applies for the cold temperature emission standards in § 86.1811-27(c). Except as specified in paragraph (f) of this section and in § § 86.1811, 86.1813, and 86.1816, the useful life for LDT2, HLDT, MDPV, and HDV is 15 years or 150,000 miles. The useful life for LDV and LDT1 is 10 years or 120,000 miles. Manufacturers may optionally certify LDV and LDT1 to a useful life of 15 years or 150,000 miles, in which case the longer useful life would apply for all the standards and requirements covered by this paragraph (d).

(e) *Intermediate useful life.* Where exhaust emission standards are specified for an intermediate useful life, these standards apply for five years or 50,000 miles.

16. Amend § 86.1806-27 by adding paragraphs (a)(9) through (13) to read as follows:

**§ 86.1806-27 Onboard diagnostics.**

\* \* \* \* \*

(a) \* \* \*

(9) The definition of “Active Off-Cycle Credit Technology” in 13 CCR 1968.2(c) does not apply.

(10) The vehicle operations and control strategies standardization requirements in 13 CCR 1968.2 (g)(6.3), (6.4), (6.5), (6.8), (6.9), (6.10), and (6.11) do not apply.

(11) The data reporting and storage requirements in 13 CCR 1968.2(h)(6.1) related to the standardization requirements in 13 CCR 1968.2(g)(8.1) do not apply.

(12) The certification documentation requirement related to “Active Off-Cycle Credit Technologies” in 13 CCR 1968.2(i)(2.28) does not apply.

(13) The monitoring system demonstration requirements in 13 CCR 1968.2(h)(5.3.1)(D) and (5.3.2)(A)(iii) related to CO<sub>2</sub> emission data does not apply.

\* \* \* \* \*

**§ 86.1807-01 [Amended]**

17. Amend § 86.1807-01 by removing and reserving paragraph (a)(3)(iv).

**§ 86.1807-01 Vehicle labeling.**

(a) The manufacturer of any motor vehicle subject to the applicable emission standards of this subpart, shall, at the time of manufacture, affix a permanent legible label, of the type and in the manner described in this section, containing the information prescribed in this section, to all production models of such vehicles available for sale to the public and covered by a Certificate of Conformity under § 86.1848-01.

(1) A permanent, legible label shall be affixed in a readily visible position in the engine compartment.

(2) The label shall be affixed by the vehicle manufacturer who has been issued the Certificate of Conformity for such vehicle, in such manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such vehicle.

(3) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(i) The label heading: Vehicle Emission Control Information;

(ii) Full corporate name and trademark of manufacturer;

(iii) Engine displacement (in cubic inches or liters), test group identification and evaporative/refueling family identification;

(iv) ~~[Reserved] Monitor family and battery durability family as specified in § 86.1815-27, if applicable;~~

(v) An unconditional statement of compliance with the appropriate model year U.S. EPA regulations which apply to light-duty vehicles, light-duty trucks, medium-duty passenger vehicles, or complete heavy-duty vehicles;

(vi) The exhaust emission standards (or FEL, as applicable) to which the test group is certified, and for test groups having different in-use standards, the corresponding exhaust emission standards that the test group must meet in use. In lieu of this requirement, manufacturers may use the standardized test group name designated by EPA;

(vii) [Reserved]

(viii) Vehicles granted final admission under 40 CFR 85.1505 must comply with the labeling requirements contained in 40 CFR 85.1510;

(ix) [Reserved]

(x) For vehicles designed to be capable of operating on fuels other than gasoline or diesel, the statement "This vehicle is certified to operate on [specify fuel(s)]".

\* \* \* \* \*

18. Amend § 86.1809-12 by revising paragraph (d)(1) to read as follows:

**§ 86.1809-12 Prohibition of defeat devices.**

\* \* \* \* \*

(d) \* \* \*

(1) The manufacturer must show to EPA's satisfaction that the vehicle design does not incorporate strategies that unnecessarily reduce emission control effectiveness exhibited over the driving cycles specified in this subpart; or the fuel economy test procedures in 40 CFR part 600; ~~or the air conditioning efficiency test in 40 CFR 1066.845;~~ when the vehicle is operated under conditions that may reasonably be expected to be encountered in normal operation and use.

\* \* \* \* \*

19. Amend § 86.1810-09 by revising paragraph (f)(2) to read as follows:

**§ 86.1810-09 General standards; increase in emissions; unsafe condition; waivers.**

\* \* \* \* \*

(f) \* \* \*

(2) For vehicles that comply with the cold temperature NMHC standards described in § 86.1811-10(g) ~~and the CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> exhaust emission standards described in § 86.1818-12,~~ manufacturers must submit an engineering evaluation indicating that common calibration approaches are utilized at high altitudes (except when there are specific high altitude calibration needs to deviate from low altitude emission control practices). Any deviation from low altitude emission control practices must be included in the auxiliary emission control device (AECD) descriptions submitted at certification. Any AECD specific to high altitude must require engineering emission data for EPA evaluation to quantify any emission impact and validity of the AECD.

\* \* \* \* \*

20. Amend § 86.1810-17 by revising paragraph (j) to read as follows:

**§ 86.1810-17 General requirements.**

\* \* \* \* \*

(j) Small-volume manufacturers that modify a vehicle already certified by a different company may recertify that vehicle under this subpart S based on the vehicle supplier's compliance with fleet average standards for criteria exhaust emissions; and evaporative emissions; ~~and greenhouse gas emissions~~ as follows:

(1) The recertifying manufacturer must certify the vehicle at bin levels and family emission limits that are the same as or more stringent than the corresponding bin levels and family emission limits for the vehicle supplier.

(2) The recertifying manufacturer must meet all the standards and requirements described in this subpart S, except for the fleet average standards for criteria exhaust emissions; and evaporative emissions; ~~and greenhouse gas emissions.~~

(3) The vehicle supplier must send the small-volume manufacturer a written statement accepting responsibility to include the subject vehicles in the vehicle supplier's exhaust and evaporative fleet average calculations in §§ 86.1860-17; and 86.1864-10; ~~and 86.1865-12.~~

(4) The small-volume manufacturer must describe in the application for certification how the two companies are working together to demonstrate compliance for the subject vehicles. The application must include the statement from the vehicle supplier described in paragraph (j)(3) of this section.

(5) The vehicle supplier must include a statement that the vehicle supplier is including the small volume manufacturer's sales volume and emissions levels in the vehicle supplier's fleet average reports under §§ 86.1860-17; and 86.1864-10; ~~and 86.1865-12.~~

\* \* \* \* \*

21. Amend § 86.1811-17 by revising paragraph (a) to read as follows:

**§ 86.1811-17 Exhaust emission standards for light-duty vehicles, light-duty trucks and medium-duty passenger vehicles.**

(a) *Applicability and general provisions.* This section describes exhaust emission standards that apply for model year 2017 and later light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles. MDPVs are subject to all the same emission standards and certification provisions that apply to LDT4. Some of the provisions of this section also apply to heavy-duty vehicles as specified in § 86.1816. ~~See § 86.1818 for greenhouse gas emission standards.~~ See § 86.1813 for evaporative and refueling emission standards. This section may apply to vehicles from model years earlier than 2017 as specified in paragraph (b)(11) of this section.

\* \* \* \* \*

**§ 86.1811-27 [Amended]**

22. Amend § 86.1811-27 by removing paragraph (a)(4).

**§ 86.1811-27 Criteria exhaust emission standards.**

(a) *Applicability and general provisions.* The criteria exhaust emission standards of this section apply for both light-duty program vehicles and medium-duty vehicles, starting with model year 2027.

(1) A vehicle meeting all the requirements of this section is considered a Tier 4 vehicle meeting the Tier 4 standards. Vehicles meeting some but not all requirements are considered interim Tier 4 vehicles as described in paragraph (b)(6)(iv) of this section.

(2) The Tier 4 standards include testing over a range of driving schedules and ambient temperatures. The standards for 25 °C or 35 °C testing in paragraph (b) of this section apply separate from the -7 °C testing in paragraph (c) of this section. We may identify these standards based on nominal ambient test temperatures. Note that -7 °C testing is also identified as cold temperature testing elsewhere in this subpart.

(3) See § 86.1813 for evaporative and refueling emission standards.

~~(4) See § 86.1818 for greenhouse gas emission standards.~~

\* \* \* \* \*

**§ 86.1815-27 [Removed]**

23. Remove § 86.1815-27.

~~**§ 86.1815-27 Battery-related requirements for battery electric vehicles and plug-in hybrid electric vehicles.**~~

~~Except as specified in paragraph (h) of this section, battery electric vehicles and plug-in hybrid electric vehicles must meet requirements related to batteries serving as a Rechargeable Energy Storage System from GTR No. 22 (incorporated by reference, see § 86.1). Manufacturers may meet alternative specifications as described in paragraph (h) of this section. The requirements of this section apply starting in model year 2027 for vehicles at or below 6,000 pounds GVWR. The requirements of this section start to apply for vehicles above 6,000 pounds GVWR when they are~~

first certified to Tier 4 NMOG+NO<sub>x</sub> bin standards under § 86.1811-27(b), not later than model year 2031. The following clarifications and adjustments to GTR No. 22 apply for vehicles subject to this section:

(a) Manufacturers must install an operator-accessible display that monitors, estimates, and communicates the vehicle's State of Certified Energy (SOCE) and include information in the application for certification as described in § 86.1844. Display SOCE as a percentage expressed at least to the nearest whole number. Manufacturers that qualify as small businesses under § 86.1801-12(j)(1) must meet the requirements of this paragraph (a) but are not subject to the requirements in paragraphs (c) through (g) of this section; however, small businesses may trade credits they generate from battery electric vehicles and plug-in hybrid electric vehicles for a given model year only if they meet requirements in paragraphs (c) through (g) of this section.

(b) Requirements in GTR No. 22 related to State of Certified Range do not apply.

(c) Evaluate SOCE based on measured Usable Battery Energy (UBE) values. Use the Multi-Cycle Range and Energy Consumption Test described in 40 CFR 600.116-12(a) for battery electric vehicles and either the UDDS Full Charge Test (FCT) or the HFET FCT as described in 40 CFR 600.116-12(e)(11) for plug-in hybrid electric vehicles. For medium-duty vehicles, perform testing with test weight set to Adjusted Loaded Vehicle Weight.

(d) In-use vehicles must display SOCE values that are accurate within 5 percent of measured values as calculated in GTR No. 22.

(e) Batteries installed in light-duty program vehicles must meet a Minimum Performance Requirement such that measured usable battery energy is at least 80 percent of the vehicle's certified usable battery energy after 5 years or 62,000 miles, and at least 70 percent of certified usable battery energy at 8 years or 100,000 miles.

(f) Manufacturers must divide test groups into families and perform testing and submit reports as follows:

(1) Identify battery durability families and monitor families as specified in Section 6.1 of GTR No. 22. Include vehicles in the same battery durability family only if there are no chemistry differences that would be expected to influence durability, such as proportional metal composition of the cathode, composition of the anode, or differences in particle size or morphology of cathode or anode active materials.

(2) Perform Part A testing to verify that SOCE monitors meet accuracy requirements as described in § 86.1845-04. Test the number of vehicles and determine a pass or fail result as specified in Section 6.3 of GTR No. 22.

(3) For light-duty program vehicles, perform Part B verification for each battery durability family included in a monitor family subject to Part A testing to verify that batteries have SOCE meeting the Minimum Performance Requirement. Determine performance by reading SOCE monitors with a physical inspection, remote inspection using wireless technology, or any other appropriate means.

(i) Randomly select test vehicles from at least 10 different U.S. states or territories, with no more than 50 percent of selected vehicles coming from any one state or territory. Select vehicles to represent a wide range of climate conditions and operating characteristics.

(ii) Select at least 500 test vehicles per year from each from each battery durability family, except that we may approve your request to select fewer vehicles for a given battery durability family based on limited production volumes. If you test fewer than 500 vehicles, you may exclude up to 5 percent of the tested vehicles to account for the limited



sample size. Test vehicles may be included from year to year, or test vehicles may change over the course of testing for the battery durability family.

(iii) A battery durability family passes if 90 percent or more of sampled vehicles have reported values at or above the Minimum Performance Requirement.

(iv) Continue testing for eight years after the end of production for vehicles included in the battery durability family. Note that testing will typically require separate testing from multiple model years in a given calendar year.

(4) You may request our approval to group monitors and batteries differently, or to adjust testing specifications. Submit your request with your proposed alternative specifications, along with technical justification. In the case of broadening the scope of a monitor family, include data demonstrating that differences within the proposed monitor family do not cause error in estimating SOCE.

(5) Submit electronic reports to document the results of testing as described in § 86.1847.

(g) If vehicles do not comply with monitor accuracy requirements under this section, the recall provisions in 40 CFR part 85, subpart S, apply for each affected monitor family. If battery electric and plug-in hybrid electric vehicles do not comply with battery durability requirements under this section, the manufacturer must account for the nonconformity by forfeiting GHG credits calculated for all the vehicles within the battery durability group (see § 86.1865-12(j)(3)). Manufacturers must similarly adjust NMOG+NO<sub>x</sub> credits for battery electric vehicles (see § 86.1861-17(f)).

(h) Manufacturers may meet the requirements of this section for battery electric vehicles by instead complying with monitor accuracy and battery durability requirements based on the procedures specified in 13 CCR 1962.7 (incorporated by reference, see § 86.1), subject to the following exceptions and clarifications:

(1) References to the California ARB Executive Officer are deemed to mean the EPA Administrator. References to California are deemed to mean the United States. Test vehicles may be registered in any U.S. state or territory.

(2) Model year 2027 through 2029 vehicles must be designed to maintain 70 percent or more of the certification range value for at least 70 percent of the vehicles in a test group. Model year 2030 and later vehicles must be designed to maintain 80 percent or more of the certification range value as an average value for all vehicles in a test group. These requirements apply for a useful life of 10 years or 150,000 miles, whichever occurs first. If vehicles do not comply with these battery durability requirements, the manufacturer must adjust all credit balances to account for the nonconformity by forfeiting GHG credits calculated for all the vehicles within the test group (see § 86.1865-12(j)(3)). Manufacturers must similarly adjust NMOG+NO<sub>x</sub> credits (see § 86.1861-17(f)).

(3) EPA may perform compliance and enforcement testing to support a finding of nonconformity as described in 13 CCR 1962.7(e).

(4) A minimum nationwide sampling rate of 500 in-use vehicles applies under 13 CCR 1962.7(d)(1). Select vehicles as described in paragraph (f)(3)(i) of this section.

(5) Manufacturers must meet the data standardization requirements in 13 CCR 1962.5 (incorporated by reference, see § 86.1).

(6) Vehicles continue to be subject to warranty requirements as specified in 40 CFR part 85, subpart V.

(7) Meeting requirements under this paragraph (h) does not depend on creating battery durability families and monitor families. The Part A testing requirements for monitor accuracy also do not apply.

~~(8) Include the following information in the application for certification for each test group instead of the information specified in § 86.1844-01(d)(19):~~

~~(i) The worst case certified range value to represent the test group, instead of certified usable battery energy.~~

~~(ii) A statement attesting that the SOCE monitor meets the accuracy requirement appropriate for the model year.~~

~~(iii) A statement that each test group meets the design targets in paragraph (h)(2) of this section.~~

24. Amend § 86.1816-18 by revising paragraph (a) to read as follows:

**§ 86.1816-18 Emission standards for heavy-duty vehicles.**

(a) *Applicability and general provisions.* This section describes Tier 3 exhaust emission standards for complete heavy-duty vehicles. These standards are optional for incomplete heavy-duty vehicles and for heavy-duty vehicles above 14,000 pounds GVWR as described in § 86.1801. ~~Greenhouse gas emission standards are specified in § 86.1818 for MDPV and in § 86.1819 for other HDV.~~ See § 86.1813 for evaporative and refueling emission standards. This section starts to apply in model year 2018, except that the provisions may apply to vehicles before model year 2018 as specified in paragraph (b)(11) of this section. This section applies for model year 2027 and later vehicles only as specified in § 86.1811-27. Separate requirements apply for MDPV as specified in § 86.1811. See subpart A of this part for requirements that apply for incomplete heavy-duty vehicles and for heavy-duty engines certified independent of the chassis. The following general provisions apply:

(1) Test all vehicles as described in this section using a chassis dynamometer; establish appropriate load settings based on adjusted loaded vehicle weight (see § 86.1803).

(2) Some provisions apply differently depending on the vehicle's power-to-weight ratio. Determine a vehicle's power-to-weight ratio by dividing the engine's rated power by the vehicle's GVWR (in hp/pound). For purposes of this section, if a test group includes multiple ~~vehicle~~ configurations, use the vehicle with the highest power-to-weight ratio to characterize the test group.

(3) Use E10 test fuel as required in § 86.113, except as specified in this section.

(4) Measure emissions from hybrid electric vehicles (including plug-in hybrid electric vehicles) as described in 40 CFR part 1066, subpart F, except that these procedures do not apply for plug-in hybrid electric vehicles during charge-depleting operation.

\* \* \* \* \*

**§§ 86.1818-12 and 86.1819-14 [Removed]**

25. Remove §§ 86.1818-12 and 86.1819-14.

~~**§ 86.1818-12 Greenhouse gas emission standards for light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles.**~~

~~(a) *Applicability.*~~

~~(1) The greenhouse gas standards and related requirements in this section apply to 2012 and later model year LDV, LDT, and MDPV, including multi-fuel vehicles, vehicles fueled with alternative fuels, hybrid electric vehicles, plug-in hybrid electric vehicles, electric vehicles,~~

and fuel cell vehicles. Unless otherwise specified, multi-fuel vehicles must comply with all requirements established for each consumed fuel.

(2) The standards specified in this section apply for testing at both low-altitude conditions and high-altitude conditions. However, manufacturers must submit an engineering evaluation indicating that common calibration approaches are utilized at high altitude instead of performing testing for certification, consistent with § 86.1829. Any deviation from low altitude emission control practices must be included in the auxiliary emission control device (AECD) descriptions submitted at certification. Any AECD specific to high altitude requires engineering emission data for EPA evaluation to quantify any emission impact and determine the validity of the AECD.

(3) A manufacturer that qualifies as a small business according to § 86.1801-12(j) is exempt from the emission standards in this section and the associated provisions in 40 CFR part 600; however, manufacturers may trade emission credits generated in a given model year only by certifying to emission standards that apply for that model year. Starting in model year 2027, manufacturers may produce no more than 500 exempt vehicles in any model year under this paragraph (a)(3). This limit applies for vehicles with engines, including plug-in hybrid electric vehicles; this limit does not apply for electric vehicles. Vehicles that are not exempt under this paragraph (a)(3) must meet emission standards as specified in this section.

(4) Emergency vehicles may be excluded from the emission standards described in this section. The manufacturer must notify the Administrator that they are making such an election in the model year reports required under 40 CFR 600.512-12. Exclude such vehicles from both the calculation of the fleet average standard for a manufacturer under paragraph (c) of this section and from the calculation of the fleet average carbon-related exhaust emissions in 40 CFR 600.510-12.

(b) *Definitions.* The following definitions apply for this section:

(1) *Passenger automobile* means a motor vehicle that is a passenger automobile as that term is defined in 49 CFR 523.4.

(2) *Light truck* means a motor vehicle that is a non-passenger automobile as that term is defined in 49 CFR 523.5.

(3) *Manufacturer* has the meaning given by the Department of Transportation at 49 CFR 531.4.

(c) *Fleet average CO<sub>2</sub> standards.* Fleet average CO<sub>2</sub> standards apply as follows for passenger automobiles and light trucks:

(1) Each manufacturer must comply with separate fleet average CO<sub>2</sub> standards for passenger automobiles and light trucks. To calculate the fleet average CO<sub>2</sub> standards for passenger automobiles for a given model year, multiply each CO<sub>2</sub> target value by the production volume of passenger automobiles for the corresponding model type-footprint combination, then sum those products and divide the sum by the total production volume of passenger automobiles in that model year. Repeat this calculation using production volumes of light trucks to determine the separate fleet average CO<sub>2</sub> standards for light trucks. Round the resulting fleet average CO<sub>2</sub> emission standards to the nearest whole gram per mile. Averaging calculations and other compliance provisions apply as described in § 86.1865.

(2) A CO<sub>2</sub> target value applies for each unique combination of model type and footprint. The CO<sub>2</sub> target serves as the emission standard that applies throughout the useful life for each vehicle. Determine the CO<sub>2</sub> target values from the following table for model year 2032 and later, or from paragraph (h) of this section for model year 2031 and earlier:

TABLE 1 TO PARAGRAPH (C)(2)—FOOTPRINT-BASED CO<sub>2</sub> TARGET VALUES

Vehicle type	Footprint outpoints (ft <sup>2</sup> )		CO <sub>2</sub> -target value (g/mile)		
	Low	High	Below low outpoint	Between outpoints <sup>a</sup>	Above high outpoint
Passenger automobile	45	56	71.8	$0.35 \times f + 56.2$	75.6
Light truck	45	70.0	75.7	$1.38 \times f + 13.8$	110.1

<sup>a</sup> Calculate the CO<sub>2</sub>-target value for vehicles between the footprint outpoints as shown, using vehicle footprint,  $f$ , and rounding the result to the nearest 0.1 g/mile.

(d) *In-use CO<sub>2</sub> exhaust emission standards.* The in-use CO<sub>2</sub> exhaust emission standard shall be the combined city/highway carbon-related exhaust emission value calculated for the appropriate vehicle earline/subconfiguration according to the provisions of § 600.113-12(g)(4) of this chapter adjusted by the deterioration factor from § 86.1823-08(m). Multiply the result by 1.1 and round to the nearest whole gram per mile. For in-use vehicle earlines/subconfigurations for which a combined city/highway carbon-related exhaust emission value was not determined under § 600.113-12(g)(4) of this chapter, the in-use CO<sub>2</sub> exhaust emission standard shall be the combined city/highway carbon-related exhaust emission value calculated according to the provisions of § 600.208 of this chapter for the vehicle model type (except that total model year production data shall be used instead of sales projections) adjusted by the deterioration factor from § 86.1823-08(m). Multiply the result by 1.1 and round to the nearest whole gram per mile. For vehicles that are capable of operating on multiple fuels, except plug-in hybrid electric vehicles, a separate in-use standard shall be determined for each fuel that the vehicle is capable of operating on. The standards in this paragraph (d) apply to in-use testing performed by the manufacturer pursuant to regulations at §§ 86.1845 and 86.1846 and to in-use testing performed by EPA.

(e) [Reserved]

(f) *Nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) exhaust emission standards for passenger automobiles and light trucks.* Each manufacturer's fleet of combined passenger automobiles and light trucks must comply with N<sub>2</sub>O and CH<sub>4</sub> standards using either the provisions of paragraph (f)(1), (2), or (3) of this section. Except with prior EPA approval, a manufacturer may not use the provisions of both paragraphs (f)(1) and (2) of this section in a model year. For example, a manufacturer may not use the provisions of paragraph (f)(1) of this section for their passenger automobile fleet and the provisions of paragraph (f)(2) for their light truck fleet in the same model year. The manufacturer may use the provisions of both paragraphs (f)(1) and (3) of this section in a model year. For example, a manufacturer may meet the N<sub>2</sub>O standard in paragraph (f)(1)(i) of this section and an alternative CH<sub>4</sub> standard determined under paragraph (f)(3) of this section.

(1) *Standards applicable to each test group.*

- (i) Exhaust emissions of nitrous oxide (N<sub>2</sub>O) shall not exceed 0.010 grams per mile at full useful life, as measured according to the Federal Test Procedure (FTP) described in subpart B of this part. Manufacturers may optionally determine an alternative N<sub>2</sub>O standard under paragraph (f)(3) of this section.
- (ii) Exhaust emissions of methane (CH<sub>4</sub>) shall not exceed 0.030 grams per mile at full useful life, as measured according to the Federal Test Procedure (FTP) described in subpart B of this part. Manufacturers may optionally determine an alternative CH<sub>4</sub> standard under paragraph (f)(3) of this section.

~~(2) Include N<sub>2</sub>O and CH<sub>4</sub> in fleet averaging program.~~ Manufacturers may elect to not meet the emission standards in paragraph (f)(1) of this section. Manufacturers making this election shall include N<sub>2</sub>O and CH<sub>4</sub> emissions in the determination of their fleet average carbon-related exhaust emissions, as calculated in 40 CFR part 600, subpart F. Manufacturers using this option must include both N<sub>2</sub>O and CH<sub>4</sub> full useful life values in the fleet average calculations for passenger automobiles and light trucks. Use of this option will account for N<sub>2</sub>O and CH<sub>4</sub> emissions within the carbon-related exhaust emission value determined for each model type according to the provisions of 40 CFR part 600. This option requires the determination of full useful life emission values for both the Federal Test Procedure and the Highway Fuel Economy Test. Manufacturers selecting this option are not required to demonstrate compliance with the standards in paragraph (f)(1) of this section.

~~(3) Optional use of alternative N<sub>2</sub>O and/or CH<sub>4</sub> standards.~~ Manufacturers may select an alternative standard applicable to a test group, for either N<sub>2</sub>O or CH<sub>4</sub>, or both. For example, a manufacturer may choose to meet the N<sub>2</sub>O standard in paragraph (f)(1)(i) of this section and an alternative CH<sub>4</sub> standard in lieu of the standard in paragraph (f)(1)(ii) of this section. The alternative standard for each pollutant must be greater than the applicable exhaust emission standard specified in paragraph (f)(1) of this section. Alternative N<sub>2</sub>O and CH<sub>4</sub> standards apply to emissions measured according to the Federal Test Procedure (FTP) described in Subpart B of this part for the full useful life, and become the applicable certification and in-use emission standard(s) for the test group. Manufacturers using an alternative standard for N<sub>2</sub>O and/or CH<sub>4</sub> must calculate emission debits according to the provisions of paragraph (f)(4) of this section for each test group/alternative standard combination. Debits must be included in the calculation of total credits or debits generated in a model year as required under § 86.1865-12(k)(5). For flexible fuel vehicles (or other vehicles certified for multiple fuels) you must meet these alternative standards when tested on any applicable test fuel type.

~~(4) CO<sub>2</sub>-equivalent debits.~~ CO<sub>2</sub>-equivalent debits for test groups using an alternative N<sub>2</sub>O and/or CH<sub>4</sub> standard as determined under paragraph (f)(3) of this section shall be calculated according to the following equation and rounded to the nearest whole megagram:

$$\text{Debits} = [\text{GWP} \times (\text{Production}) \times (\text{AltStd} - \text{Std}) \times \text{VLM}] \div 1,000,000$$

Where:

Debits = CO<sub>2</sub>-equivalent debits for N<sub>2</sub>O or CH<sub>4</sub>, in Megagrams, for a test group using an alternative N<sub>2</sub>O or CH<sub>4</sub> standard, rounded to the nearest whole Megagram;

GWP = 25 if calculating CH<sub>4</sub> debits and 298 if calculating N<sub>2</sub>O debits;

Production = The number of vehicles of that test group domestically produced plus those imported as defined in § 600.511 of this chapter;

AltStd = The alternative standard (N<sub>2</sub>O or CH<sub>4</sub>) selected by the manufacturer under paragraph (f)(3) of this section;

Std = The exhaust emission standard for N<sub>2</sub>O or CH<sub>4</sub> specified in paragraph (f)(1) of this section; and

VLM = 195,264 for passenger automobiles and 225,865 for light trucks.

~~(g) Alternative fleet average standards for manufacturers with limited sales.~~ Manufacturers meeting the criteria in this paragraph (g) may request alternative fleet average CO<sub>2</sub> standards for model year 2031 and earlier vehicles.

~~(1) Eligibility for alternative standards.~~ Eligibility as determined in this paragraph (g) shall be based on the total nationwide sales of combined passenger automobiles and light trucks. The terms “sales” and “sold” as used in this paragraph (g) shall mean vehicles produced for sale in the states and territories of the United States. For the purpose of determining



eligibility the sales of related companies shall be aggregated according to the provisions of § 86.1838-01(b)(3), or, if a manufacturer has been granted operational independence status under § 86.1838-01(d), eligibility shall be based on that manufacturer's vehicle sales. To be eligible for alternative standards established under this paragraph (g), the manufacturer's average sales for the three most recent consecutive model years must remain below 5,000. If a manufacturer's average sales for the three most recent consecutive model years exceeds 4999, the manufacturer will no longer be eligible for exemption and must meet applicable emission standards starting with the model year according to the provisions in this paragraph (g)(1).

(i) If a manufacturer's average sales for three consecutive model years exceeds 4999, and if the increase in sales is the result of corporate acquisitions, mergers, or purchase by another manufacturer, the manufacturer shall comply with the emission standards described in paragraph (e) of this section, as applicable, beginning with the first model year after the last year of the three consecutive model years.

(ii) If a manufacturer's average sales for three consecutive model years exceeds 4999 and is less than 50,000, and if the increase in sales is solely the result of the manufacturer's expansion in vehicle production (not the result of corporate acquisitions, mergers, or purchase by another manufacturer), the manufacturer shall comply with the emission standards described in paragraph (e), of this section, as applicable, beginning with the second model year after the last year of the three consecutive model years.

(2) *Requirements for new entrants into the U.S. market.* New entrants are those manufacturers without a prior record of automobile sales in the United States and without prior certification to greenhouse gas emission standards in this section. In addition to the eligibility requirements stated in paragraph (g)(1) of this section, new entrants must meet the following requirements:

(i) In addition to the information required under paragraph (g)(4) of this section, new entrants must provide documentation that shows a clear intent by the company to actually enter the U.S. market in the years for which alternative standards are requested. Demonstrating such intent could include providing documentation that shows the establishment of a U.S. dealer network, documentation of work underway to meet other U.S. requirements (e.g., safety standards), or other information that reasonably establishes intent to the satisfaction of the Administrator.

(ii) Sales of vehicles in the U.S. by new entrants must remain below 5,000 vehicles for the first three model years in the U.S. market, and in subsequent years the average sales for any three consecutive years must remain below 5,000 vehicles. Vehicles sold in violation of these limits within the first five model years will be considered not covered by the certificate of conformity and the manufacturer will be subject to penalties on an individual vehicle basis for sale of vehicles not covered by a certificate. In addition, violation of these limits will result in loss of eligibility for alternative standards until such point as the manufacturer demonstrates two consecutive model years of sales below 5,000 automobiles. After the first five model years, the eligibility provisions in paragraph (g)(1) of this section apply, where violating the sales thresholds is no longer a violation of the condition on the certificate, but is instead grounds for losing eligibility for alternative standards.

(iii) A manufacturer with sales in the most recent model year of less than 5,000 automobiles, but where prior model year sales were not less than 5,000 automobiles, is eligible to request alternative standards under this paragraph (g). However, such a



manufacturer will be considered a new entrant and subject to the provisions regarding new entrants in this paragraph (g), except that the requirement to demonstrate an intent to enter the U.S. market in paragraph (g)(2)(i) of this section shall not apply.

(3) How to request alternative fleet average standards. Eligible manufacturers may petition for alternative standards for up to five consecutive model years if sufficient information is available on which to base such standards.

(i) To request alternative standards starting with the 2017 model year, eligible manufacturers must submit a completed application no later than July 30, 2013.

(ii) To request alternative standards starting with a model year after 2017, eligible manufacturers must submit a completed request no later than 36 months prior to the start of the first model year to which the alternative standards would apply.

(iii) The request must contain all the information required in paragraph (g)(4) of this section, and must be signed by a chief officer of the company. If the Administrator determines that the content of the request is incomplete or insufficient, the manufacturer will be notified and given an additional 30 days to amend the request.

(4) *Data and information submittal requirements.* Eligible manufacturers requesting alternative standards under this paragraph (g) must submit the following information to the Environmental Protection Agency. The Administrator may request additional information as she deems appropriate. The completed request must be sent to the Environmental Protection Agency at the following address: Director, Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, Michigan 48105.

(i) *Vehicle model and fleet information.*

(A) The model years to which the requested alternative standards would apply, limited to five consecutive model years.

(B) Vehicle models and projections of sales volumes for each model year.

(C) Detailed description of each model, including the vehicle type, vehicle mass, power, footprint, powertrain, and expected pricing.

(D) The expected production cycle for each model, including new model introductions and redesign or refresh cycles.

(ii) *Technology evaluation information.*

(A) The CO<sub>2</sub> reduction technologies employed by the manufacturer on each vehicle model, or projected to be employed, including information regarding the cost and CO<sub>2</sub> reducing effectiveness. Include technologies that improve air conditioning efficiency and reduce air conditioning system leakage, and any “off-cycle” technologies that potentially provide benefits outside the operation represented by the Federal Test Procedure and the Highway Fuel Economy Test.

(B) An evaluation of comparable models from other manufacturers, including CO<sub>2</sub> results and air conditioning credits generated by the models. Comparable vehicles should be similar, but not necessarily identical, in the following respects: vehicle type, horsepower, mass, power-to-weight ratio, footprint, retail price, and any other relevant factors. For manufacturers requesting alternative standards starting with the 2017 model year, the analysis of comparable vehicles should include vehicles from the 2012 and 2013 model years, otherwise the analysis should at a minimum include vehicles from the most recent two model years.

(C) A discussion of the CO<sub>2</sub> reducing technologies employed on vehicles offered outside of the U.S. market but not available in the U.S., including a discussion as to

~~why those vehicles and/or technologies are not being used to achieve CO<sub>2</sub> reductions for vehicles in the U.S. market.~~

~~(D) An evaluation, at a minimum, of the technologies projected by the Environmental Protection Agency in a final rulemaking as those technologies likely to be used to meet greenhouse gas emission standards and the extent to which those technologies are employed or projected to be employed by the manufacturer. For any technology that is not projected to be fully employed, explain why this is the case.~~

~~(iii) *Alternative fleet average CO<sub>2</sub> standards.*~~

~~(A) The most stringent CO<sub>2</sub> level estimated to be feasible for each model, in each model year, and the technological basis for this estimate.~~

~~(B) For each model year, a projection of the lowest feasible sales-weighted fleet average CO<sub>2</sub> value, separately for passenger automobiles and light trucks, and an explanation demonstrating that these projections are reasonable.~~

~~(C) A copy of any application, data, and related information submitted to NHTSA in support of a request for alternative Corporate Average Fuel Economy standards filed under 49 CFR part 525.~~

~~(iv) *Information supporting eligibility.*~~

~~(A) U.S. sales for the three previous model years and projected sales for the model years for which the manufacturer is seeking alternative standards.~~

~~(B) Information regarding ownership relationships with other manufacturers, including details regarding the application of the provisions of § 86.1838-01(b)(3) regarding the aggregation of sales of related companies.~~

~~(5) *Alternative standards.* Alternative standards apply as follows:~~

~~(i) Where EPA has exercised its regulatory authority to administratively specify alternative standards, those alternative standards approved for model year 2021 continue to apply through model year 2026. Starting in model year 2027, manufacturers must certify to the standards in paragraph (h) of this section on a delayed schedule, as follows:~~

<del>In model year . . .</del>	<del>Manufacturers must certify to the standards that would otherwise apply in . . .</del>
<del>(A) 2027</del>	<del>2025</del>
<del>(B) 2028</del>	<del>2025</del>
<del>(C) 2029</del>	<del>2027</del>
<del>(D) 2030</del>	<del>2028</del>
<del>(E) 2031</del>	<del>2030</del>

~~(ii) EPA may approve a request from other manufacturers for alternative fleet average CO<sub>2</sub> standards under this paragraph (g). The alternative standards for those manufacturers will apply by model year as specified in paragraph (g)(5)(i) of this section.~~

~~(6) *Restrictions on credit trading.* Manufacturers subject to alternative standards approved by the Administrator under this paragraph (g) may not trade credits to another manufacturer. Transfers between car and truck fleets within the manufacturer are allowed, and the carry-forward provisions for credits and deficits apply. Manufacturers may generate credits in a given model year for trading to another manufacturer by certifying to the standards in paragraph (h) of this section for the current model year across the manufacturer's full product~~

line. A manufacturer certifying to the standards in paragraph (h) of this section will no longer be eligible to certify to the alternative standards under this paragraph (g) in later model years. (7) Starting in model year 2032, all manufacturers must certify to the standards in paragraph (e) of this section.

(h) *Historical and interim standards.* The following CO<sub>2</sub> target values apply for model year 2031 and earlier vehicles:

(1) CO<sub>2</sub> target values apply as follows for passenger automobiles:

TABLE 2 TO PARAGRAPH (H)(1)—HISTORICAL AND INTERIM CO<sub>2</sub> TARGET VALUES FOR PASSENGER AUTOMOBILES

Model year	Footprint cutpoints (ft <sup>2</sup> )		CO <sub>2</sub> target value (g/mile)		
	Low	High	Below low endpoint	Between endpoints <sup>a</sup>	Above high endpoint
2012	41	56	244.0	$4.72 \times f + 50.5$	315.0
2013	41	56	237.0	$4.72 \times f + 43.3$	307.0
2014	41	56	228.0	$4.72 \times f + 34.8$	299.0
2015	41	56	217.0	$4.72 \times f + 23.4$	288.0
2016	41	56	206.0	$4.72 \times f + 12.7$	277.0
2017	41	56	195.0	$4.53 \times f + 8.9$	263.0
2018	41	56	185.0	$4.35 \times f + 6.5$	250.0
2019	41	56	175.0	$4.17 \times f + 4.2$	238.0
2020	41	56	166.0	$4.01 \times f + 1.9$	226.0
2021	41	56	161.8	$3.94 \times f + 0.2$	220.9
2022	41	56	159.0	$3.88 \times f - 0.1$	217.3
2023	41	56	145.6	$3.56 \times f - 0.4$	199.1
2024	41	56	138.6	$3.39 \times f - 0.4$	189.5
2025	41	56	130.5	$3.26 \times f - 3.2$	179.4
2026	41	56	114.3	$3.11 \times f - 13.1$	160.9
2027	42	56	135.9	$0.66 \times f + 108.0$	145.2
2028	43	56	123.8	$0.60 \times f + 97.9$	131.6
2029	44	56	110.6	$0.54 \times f + 87.0$	117.0
2030	45	56	98.2	$0.47 \times f + 76.9$	103.4
2031	45	56	85.3	$0.41 \times f + 66.8$	89.8

<sup>a</sup> Calculate the CO<sub>2</sub> target value for vehicles between the footprint cutpoints as shown, using vehicle footprint,  $f$ , and rounding the result to the nearest 0.1 g/mile.

(2) CO<sub>2</sub> target values apply as follows for light trucks:

TABLE 3 TO PARAGRAPH (H)(2)—HISTORICAL AND INTERIM CO<sub>2</sub> TARGET VALUES FOR LIGHT TRUCKS

Model year	Footprint endpoints (ft <sup>2</sup> )		CO <sub>2</sub> target value (g/mile)		
	Low	High	Below low endpoint	Between endpoints <sup>a</sup>	Above high endpoint
2012	41	66.0	294.0	$4.04 \times f + 128.6$	395.0
2013	41	66.0	284.0	$4.04 \times f + 118.7$	385.0
2014	41	66.0	275.0	$4.04 \times f + 109.4$	376.0
2015	41	66.0	261.0	$4.04 \times f + 95.1$	362.0
2016	41	66.0	247.0	$4.04 \times f + 81.1$	348.0
2017	41	50.7	238.0	$4.87 \times f + 38.3$	—
2017	50.8	66.0	—	$4.04 \times f + 80.5$	347.0
2018	41	60.2	227.0	$4.76 \times f + 31.6$	—
2018	60.3	66.0	—	$4.04 \times f + 75.0$	342.0
2019	41	66.4	220.0	$4.68 \times f + 27.7$	339.0
2020	41	68.3	212.0	$4.57 \times f + 24.6$	337.0
2021	41	68.3	206.5	$4.51 \times f + 21.5$	329.4
2022	41	68.3	203.0	$4.44 \times f + 20.6$	324.1
2023	41	74.0	181.1	$3.97 \times f + 18.4$	312.1
2024	41	74.0	172.1	$3.77 \times f + 17.4$	296.5
2025	41	74.0	159.3	$3.58 \times f + 12.5$	277.4
2026	41	74.0	141.8	$3.41 \times f + 1.9$	254.4
2027	42	73.0	150.3	$2.89 \times f + 28.9$	239.9
2028	43	72.0	136.8	$2.58 \times f + 25.8$	211.7
2029	44	71.0	122.7	$2.27 \times f + 22.7$	184.0
2030	45	70.0	108.8	$1.98 \times f + 19.8$	158.3
2031	45	70.0	91.8	$1.67 \times f + 16.7$	133.5

<sup>a</sup> Calculate the CO<sub>2</sub> target value for vehicles between the footprint endpoints as shown, using vehicle footprint,  $f$ , and rounding the result to the nearest 0.1 g/mile.

**~~§ 86.1819-14 Greenhouse gas emission standards for medium-duty and heavy-duty vehicles.~~**

~~This section describes exhaust emission standards for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O for medium-duty vehicles. The standards of this section apply for model year 2014 and later vehicles that are chassis-certified with respect to criteria pollutants under this subpart S. Additional medium-duty and heavy-duty vehicles may be subject to the standards of this section as specified in paragraph (j) of this section. Any medium-duty or heavy-duty vehicles not subject to standards under this section are instead subject to greenhouse gas standards under 40 CFR part 1037, and engines installed in these vehicles are subject to standards under 40 CFR part 1036. If you are not the engine manufacturer, you must notify the engine manufacturer that its engines are subject to~~

40 CFR part 1036 if you intend to use their engines in vehicles that are not subject to standards under this section. Vehicles produced by small businesses may be exempted from the standards of this section as described in paragraph (k)(5) of this section.

(a) *Fleet-average CO<sub>2</sub> emission standards.* Fleet-average CO<sub>2</sub> emission standards apply for the full useful life for each manufacturer as follows:

(1) Calculate a work factor, *WF*, for each vehicle subconfiguration (or group of subconfigurations as allowed under paragraph (a)(4) of this section), rounded to the nearest pound, using the following equation:

$$WF = 0.75 \times (GVWR - \text{Curb Weight} + xwd) + 0.25 \times (GCWR - GVWR)$$

Where:

*xwd* = 500 pounds if the vehicle has four wheel drive or all wheel drive; *xwd* = 0 pounds for all other vehicles.

(2) CO<sub>2</sub> target values apply as described in this paragraph (a)(2) for model year 2032 and later. See paragraph (k)(4) of this section for model year 2031 and earlier:

(i) For vehicles with work factor at or below 5,500 pounds, use the appropriate work factor in the following equation to calculate a target value for each vehicle subconfiguration (or group of subconfigurations as allowed under paragraph (a)(4) of this section), rounding to the nearest whole g/mile:

$$CO_2\text{Target} = 0.0221 \times WF + 170$$

(ii) For vehicles with work factor above 5,500 pounds, the CO<sub>2</sub> target value is 292 g/mile.

(3) Calculate a production-weighted average of the target values and round it to the nearest whole g/mile. This is your fleet-average standard. All vehicles subject to the standards of this section form a single averaging set. Use the following equation to calculate your fleet-average standard from the target value for each vehicle subconfiguration (*Target<sub>i</sub>*) and U.S.-directed production volume of each vehicle subconfiguration for the given model year (*Volume<sub>i</sub>*):

$$\text{Fleet Average Standard} = \frac{\sum [\text{Target}_i \times \text{Volume}_i]}{\sum [\text{Volume}_i]}$$

(4) You may group subconfigurations within a configuration together for purposes of calculating your fleet-average standard as follows:

(i) You may group together subconfigurations that have the same equivalent test weight (ETW), GVWR, and GCWR. Calculate your work factor and target value assuming a curb weight equal to two times ETW minus GVWR.

(ii) You may group together other subconfigurations if you use the lowest target value calculated for any of the subconfigurations.

(5) The standards specified in this section apply for testing at both low-altitude conditions and high-altitude conditions. However, manufacturers must submit an engineering evaluation indicating that common calibration approaches are utilized at high altitude instead of performing testing for certification, consistent with § 86.1829. Any deviation from low altitude emission control practices must be included in the auxiliary emission control device (AECDD) descriptions submitted at certification. Any AECDD specific to high altitude requires engineering emission data for EPA evaluation to quantify any emission impact and determine the validity of the AECDD.

(b) *Production and in-use CO<sub>2</sub> standards.* Each vehicle you produce that is subject to the standards of this section has an “in-use” CO<sub>2</sub> standard that is calculated from your test result and

that applies for selective enforcement audits and in-use testing. This in-use CO<sub>2</sub> standard for each vehicle is equal to the applicable deteriorated emission level multiplied by 1.10 and rounded to the nearest whole g/mile.

(e) *N<sub>2</sub>O* and *CH<sub>4</sub>* standards. Except as allowed under this paragraph (e), all vehicles subject to the standards of this section must comply with an N<sub>2</sub>O standard of 0.05 g/mile and a CH<sub>4</sub> standard of 0.05 g/mile when calculated according to the provisions of paragraph (d)(4) of this section. You may specify CH<sub>4</sub> and/or N<sub>2</sub>O alternative standards using CO<sub>2</sub> emission credits instead of these otherwise applicable emission standards for one or more test groups. To do this, calculate the CH<sub>4</sub> and/or N<sub>2</sub>O emission credits needed (negative credits) using the equation in this paragraph (e) based on the FEL(s) you specify for your vehicles during certification. You must adjust the calculated emissions by the global warming potential (*GWP*): *GWP* equals 34 for CH<sub>4</sub> from model year 2021 and later vehicles, 25 for CH<sub>4</sub> from earlier vehicles, and 298 for N<sub>2</sub>O. This means, for example, that you must use 298 Mg of positive CO<sub>2</sub> credits to offset 1 Mg of negative N<sub>2</sub>O credits. Note that § 86.1818-12(f) does not apply for vehicles subject to the standards of this section. Calculate credits using the following equation, rounded to the nearest whole number:

$$\text{CO}_2 \text{ Credits Needed (Mg)} = [(FEL - Std) \times (U.S. \text{ directed production volume}) \times (Useful Life)] \times (GWP) \div 1,000,000$$

(d) *Compliance provisions.* The following compliance provisions apply instead of other provisions described in this subpart S:

(1) The CO<sub>2</sub> standards of this section apply with respect to CO<sub>2</sub> emissions, not with respect to carbon related exhaust emissions (CREE).

(2) The following general credit provisions apply:

(i) Credits you generate under this section may be used only to offset credit deficits under this section. You may bank credits for use in a future model year in which your average CO<sub>2</sub> level exceeds the standard. You may trade credits to another manufacturer according to § 86.1865-12(k)(8). Before you bank or trade credits, you must apply any available credits to offset a deficit if the deadline to offset that credit deficit has not yet passed.

(ii) Vehicles subject to the standards of this section are included in a single greenhouse gas averaging set separate from any averaging set otherwise included in this subpart S.

(iii) Banked CO<sub>2</sub> credits keep their full value for five model years after the year in which they were generated. Unused credits may not be used for more than five model years after the model year in which the credits are generated.

(3) Special credit and incentive provisions related to air conditioning in §§ 86.1867 and 86.1868 do not apply for vehicles subject to the standards of this section.

(4) Measure emissions using the procedures of subpart B of this part and 40 CFR part 1066. Determine separate emission results for the Federal Test Procedure (FTP) described in 40 CFR 1066.801(c)(1) and the Highway Fuel Economy Test (HFET) described in 40 CFR 1066.801(c)(3). Calculate composite emission results from these two test cycles for demonstrating compliance with the CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> standards based on a weighted average of the FTP (55%) and HFET (45%) emission results. Note that this differs from the way the criteria pollutant standards apply.

(5) Apply an additive deterioration factor of zero to measured CO<sub>2</sub> emissions unless good engineering judgment indicates that emissions are likely to deteriorate in use. Use good engineering judgment to develop separate deterioration factors for N<sub>2</sub>O and CH<sub>4</sub>.

(6) Credits are calculated using the useful life value (in miles) in place of “vehicle lifetime miles” as specified in § 86.1865. Calculate a total credit or debit balance in a model year by adding credits and debits from § 86.1865-12(k)(4), subtracting any CO<sub>2</sub>-equivalent debits for



N<sub>2</sub>O or CH<sub>4</sub> calculated according to paragraph (c) of this section, and adding any of the following credits:

- (i) Off-cycle technology credits according to paragraph (d)(13) of this section.
- (ii) Early credits from vehicles certified under paragraph (k)(2) of this section.
- (iii) Advanced technology credits according to paragraph (k)(7) of this section.

~~(7) [Reserved]~~

~~(8) The provisions of § 86.1818 do not apply.~~

~~(9) Calculate your fleet average emission rate consistent with good engineering judgment and the provisions of § 86.1865. The following additional provisions apply:~~

~~(i) Unless we approve a lower number, you must test at least ten subconfigurations. If you produce more than 100 subconfigurations in a given model year, you must test at least ten percent of your subconfigurations. For purposes of this paragraph (d)(9)(i), count carryover tests, but do not include analytically derived CO<sub>2</sub> emission rates, data substitutions, or other untested allowances. We may approve a lower number of tests for manufacturers that have limited product offerings, or low sales volumes. Note that good engineering judgment and other provisions of this part may require you to test more subconfigurations than these minimum values.~~

~~(ii) The provisions of paragraph (g) of this section specify how you may use analytically derived CO<sub>2</sub> emission rates.~~

~~(iii) At least 90 percent of final production volume at the configuration level must be represented by test data (real, data substituted, or analytical).~~

~~(iv) Perform fleet average CO<sub>2</sub> calculations as described in § 86.1865 and 40 CFR part 600, with the following exceptions:~~

~~(A) Use CO<sub>2</sub> emissions values for all test results, intermediate calculations, and fleet average calculations instead of the carbon related exhaust emission (CREE) values specified in this subpart S and 40 CFR part 600.~~

~~(B) Perform intermediate CO<sub>2</sub> calculations for subconfigurations within each configuration using the subconfiguration and configuration definitions in paragraph (d)(12) of this section.~~

~~(C) Perform intermediate CO<sub>2</sub> calculations for configurations within each test group and transmission type (instead of configurations within each base level and base levels within each model type). Use the configuration definition in paragraph (d)(12)(i) of this section.~~

~~(D) Do not perform intermediate CO<sub>2</sub> calculations for each base level or for each model type. Base level and model type CO<sub>2</sub> calculations are not applicable to heavy-duty vehicles subject to standards in this section.~~

~~(E) Determine fleet average CO<sub>2</sub> emissions for heavy-duty vehicles subject to standards in this section as described in 40 CFR 600.510-12(j), except that the calculations must be performed on the basis of test group and transmission type (instead of the model type basis specified in the light-duty vehicle regulations), and the calculations for dual-fuel, multi-fuel, and flexible-fuel vehicles must be consistent with the provisions of paragraph (d)(10)(i) of this section.~~

~~(10) For dual-fuel, multi-fuel, and flexible-fuel vehicles, perform exhaust testing on each fuel type (for example, gasoline and E85).~~

~~(i) Use either the conventional-fueled CO<sub>2</sub> emission rate or a weighted average of your emission results as specified in 40 CFR 600.510-12(k) for light-duty trucks.~~

- (ii) If you certify to an alternate standard for N<sub>2</sub>O or CH<sub>4</sub> emissions, you may not exceed the alternate standard when tested on either fuel.
- (11) Test your vehicles with an equivalent test weight based on its Adjusted Loaded Vehicle Weight (ALVW). Determine equivalent test weight from the ALVW as specified in 40 CFR 1066.805; round ALVW values above 14,000 pounds to the nearest 500 pound increment.
- (12) The following definitions apply for the purposes of this section:
- (i) *Configuration* means a subclassification within a test group based on engine code, transmission type and gear ratios, final drive ratio, and other parameters we designate. Engine code means the combination of both “engine code” and “basic engine” as defined for light duty vehicles in 40 CFR 600.002.
  - (ii) *Subconfiguration* means a unique combination within a vehicle configuration (as defined in this paragraph (d)(12)) of equivalent test weight, road load horsepower, and any other operational characteristics or parameters that we determine may significantly affect CO<sub>2</sub> emissions within a vehicle configuration. Note that for vehicles subject to standards of this section, equivalent test weight (ETW) is based on the ALVW of the vehicle as outlined in paragraph (d)(11) of this section.
- (13) This paragraph (d)(13) applies for CO<sub>2</sub> reductions resulting from technologies that were not in common use before 2010 that are not reflected in the specified test procedures. While you are not required to prove that such technologies were not in common use with heavy-duty vehicles before model year 2010, we will not approve your request if we determine they do not qualify. These may be described as off cycle or innovative technologies. We may allow you to generate emission credits consistent with the provisions of § 86.1869-12(c) and (d), but only through model year 2026. The 5-cycle methodology is not presumed to be preferred over alternative methodologies described in § 86.1869-12(d).
- (14) You must submit pre-model year reports before you submit your applications for certification for a given model year. Unless we specify otherwise, include the information specified for pre-model year reports in 49 CFR 535.8.
- (15) You must submit a final report within 90 days after the end of the model year. Unless we specify otherwise, include applicable information identified in § 86.1865-12(l), 40 CFR 600.512, and 49 CFR 535.8(e). The final report must include at least the following information:
- (i) Model year.
  - (ii) Applicable fleet average CO<sub>2</sub> standard.
  - (iii) Calculated fleet average CO<sub>2</sub> value and all the values required to calculate the CO<sub>2</sub> value.
  - (iv) Number of credits or debits incurred and all values required to calculate those values.
  - (v) Resulting balance of credits or debits.
  - (vi) N<sub>2</sub>O emissions.
  - (vii) CH<sub>4</sub> emissions.
  - (viii) Total and percent leakage rates under paragraph (h) of this section (through model year 2026 only).
- (16) You may apply the provisions for delegated assembly as described in 40 CFR 1037.621.
- (17) You may calculate emission rates for weight increments less than the 500 pound increment specified for test weight. This does not change the applicable test weights.
- (i) Use the ADC equation in paragraph (g) of this section to adjust your emission rates for vehicles in increments of 50, 100, or 250 pounds instead of the 500 pound test weight

increments. Adjust emissions to the midpoint of each increment. This is the equivalent emission weight. For example, vehicles with a test weight basis of 11,751 to 12,250 pounds (which have an equivalent test weight of 12,000 pounds) could be regrouped into 100-pound increments as follows:

TABLE 1 TO PARAGRAPH (D)(17)(i) — EXAMPLE OF TEST WEIGHT GROUPINGS

Test weight basis	Equivalent emission weight	Equivalent test weight
11,751–11,850	11,800	12,000
11,851–11,950	11,900	12,000
11,951–12,050	12,000	12,000
12,051–12,150	12,100	12,000
12,151–12,250	12,200	12,000

(ii) You must use the same increment for all equivalent test weight classes across your whole product line in a given model year. You must also specify curb weight for calculating the work factor in a way that is consistent with your approach for determining test weight for calculating ADCs under this paragraph (d)(17).

(e) *Useful life.* The exhaust emission standards of this section apply for the full useful life, as described in § 86.1805.

(f) [Reserved]

(g) *Analytically derived CO<sub>2</sub> emission rates (ADCs).* This paragraph (g) describes an allowance to use estimated (*i.e.*, analytically derived) CO<sub>2</sub> emission rates based on baseline test data instead of measured emission rates for calculating fleet average emissions. Note that these ADCs are similar to ADFEs used for light-duty vehicles. Note also that *F* terms used in this paragraph (g) represent coefficients from the following road load equation:

$$Force = F_0 + F_1 \cdot (velocity) + F_2 \cdot (velocity)^2$$

(1) Except as specified in paragraph (g)(2) of this section, use the following equation to calculate the ADC of a new vehicle from road load force coefficients (*F*<sub>0</sub>, *F*<sub>1</sub>, *F*<sub>2</sub>), axle ratio, and test weight:

$$ADC = CO_{2\text{base}} + 2.18 \cdot \Delta F_0 + 37.4 \cdot \Delta F_1 + 2257 \cdot \Delta F_2 + 189 \cdot \Delta AR + 0.0222 \cdot \Delta ETW$$

Where:

*ADC* = Analytically derived combined city/highway CO<sub>2</sub> emission rate (g/mile) for a new vehicle.

*CO<sub>2</sub>base* = Combined city/highway CO<sub>2</sub> emission rate (g/mile) of a baseline vehicle.

$\Delta F_0$  = *F*<sub>0</sub> of the new vehicle – *F*<sub>0</sub> of the baseline vehicle.

$\Delta F_1$  = *F*<sub>1</sub> of the new vehicle – *F*<sub>1</sub> of the baseline vehicle.

$\Delta F_2$  = *F*<sub>2</sub> of the new vehicle – *F*<sub>2</sub> of the baseline vehicle.

$\Delta AR$  = Axle ratio of the new vehicle – axle ratio of the baseline vehicle.

$\Delta ETW$  = *ETW* of the new vehicle – *ETW* of the baseline vehicle.

(2) The purpose of this section is to accurately estimate CO<sub>2</sub> emission rates.

(i) You must apply the provisions of this section consistent with good engineering judgment. For example, do not use the equation in paragraph (g)(1) of this section where good engineering judgment indicates that it will not accurately estimate emissions. You may ask us to approve alternate equations that allow you to estimate emissions more accurately.

(ii) The analytically derived CO<sub>2</sub> equation in paragraph (g)(1) of this section may be periodically updated through publication of an EPA guidance document to more

~~accurately characterize CO<sub>2</sub> emission levels for example, changes may be appropriate based on new test data, future technology changes, or to changes in future CO<sub>2</sub> emission levels. Any EPA guidance document will determine the model year that the updated equation takes effect. We will issue guidance no later than eight months before the effective model year. For example, model year 2014 may start January 2, 2013, so guidance for model year 2014 would be issued by May 1, 2012.~~

(3) You may select baseline test data without our advance approval if they meet all the following criteria:

~~(i) Vehicles considered for the baseline test must comply with all applicable emission standards in the model year associated with the ADC.~~

~~(ii) You must include in the pool of tests considered for baseline selection all official tests of the same or equivalent basic engine, transmission class, engine code, transmission code, engine horsepower, dynamometer drive wheels, and compression ratio as the ADC subconfiguration. Do not include tests in which emissions exceed any applicable standard.~~

~~(iii) Where necessary to minimize the CO<sub>2</sub> adjustment, you may supplement the pool with tests associated with worst case engine or transmission codes and carryover or carry across test groups. If you do, all the data that qualify for inclusion using the elected worst case substitution (or carryover or carry across) must be included in the pool as supplemental data (*i.e.*, individual test vehicles may not be selected for inclusion). You must also include the supplemental data in all subsequent pools, where applicable.~~

~~(iv) Tests previously used during the subject model year as baseline tests in ten other ADC subconfigurations must be eliminated from the pool.~~

~~(v) Select the tested subconfiguration with the smallest absolute difference between the ADC and the test CO<sub>2</sub> emission rate for combined emissions. Use this as the baseline test for the target ADC subconfiguration.~~

~~(4) You may ask us to allow you to use baseline test data not fully meeting the provisions of paragraph (g)(3) of this section.~~

~~(5) Calculate the ADC rounded to the nearest whole g/mile. Except with our advance approval, the downward adjustment of ADC from the baseline is limited to ADC values 20 percent below the baseline emission rate. The upward adjustment is not limited.~~

~~(6) You may not submit an ADC if an actual test has been run on the target subconfiguration during the certification process or on a development vehicle that is eligible to be declared as an emission data vehicle.~~

~~(7) No more than 40 percent of the subconfigurations tested in your final CO<sub>2</sub> submission may be represented by ADCs.~~

~~(8) Keep the following records for at least five years, and show them to us if we ask to see them:~~

~~(i) The pool of tests.~~

~~(ii) The vehicle description and tests chosen as the baseline and the basis for the selection.~~

~~(iii) The target ADC subconfiguration.~~

~~(iv) The calculated emission rates.~~

~~(9) We may perform or order a confirmatory test of any subconfiguration covered by an ADC.~~

~~(10) Where we determine that you did not fully comply with the provisions of this paragraph (g), we may require that you comply based on actual test data and that you recalculate your fleet average emission rate.~~

~~(h) **Air conditioning leakage.** Loss of refrigerant from your air conditioning systems may not exceed a total **leakage** rate of 11.0 grams per year or a percent **leakage** rate of 1.50 percent per year, whichever is greater. This applies for all refrigerants. Calculate the annual rate of refrigerant **leakage** according to the procedures specified in SAE J2727 SEP2023 (incorporated by reference, see § 86.1) or as specified in § 86.1867-12(a). Calculate the percent **leakage** rate as:  $[\text{total leakage rate (g/yr)}] \div [\text{total refrigerant capacity (g)}] \times 100$ . Round your percent **leakage** rate to the nearest one-hundredth of a percent.~~

~~For purpose of this requirement, “refrigerant capacity” is the total mass of refrigerant recommended by the vehicle manufacturer as representing a full charge. Where full charge is specified as a pressure, use good engineering judgment to convert the pressure and system volume to a mass.~~

~~(i) [Reserved]~~

~~(j) **GHG certification of additional vehicles under this subpart.** You may certify certain complete or cab-complete vehicles to the GHG standards of this section. Certain high-GCWR vehicles may also be subject to the GHG standards of this section. All vehicles optionally certified under this paragraph (j) are deemed to be subject to the GHG standards of this section. Note that for vehicles above 14,000 pounds GVWR and at or below 26,000 pounds GVWR, GHG certification under this paragraph (j) does not affect how you may or may not certify with respect to criteria pollutants.~~

~~(1) For GHG compliance, you may certify any complete or cab-complete spark-ignition vehicles above 14,000 pounds GVWR and at or below 26,000 pounds GVWR to the GHG standards of this section even though this section otherwise specifies that you may certify vehicles to the GHG standards of this section only if they are chassis-certified for criteria pollutants. This paragraph (j)(1) also applies for vehicles at or below 14,000 pounds GVWR with GCWR above 22,000 pounds with installed engines that have been certified under 40 CFR part 1036 as described in 40 CFR 1036.635.~~

~~(2) You may apply the provisions of this section to cab-complete vehicles based on a complete sister vehicle. In unusual circumstances, you may ask us to apply these provisions to Class 2b or Class 3 incomplete vehicles that do not meet the definition of cab-complete.~~

~~(i) Except as specified in paragraph (j)(3) of this section, for purposes of this section, a complete sister vehicle is a complete vehicle of the same vehicle configuration as the cab-complete vehicle. You may not apply the provisions of this paragraph (j) to any vehicle configuration that has a four-wheel rear axle if the complete sister vehicle has a two-wheel rear axle.~~

~~(ii) Calculate the target value for fleet average CO<sub>2</sub> emissions under paragraph (a) or (k)(4) of this section based on the work factor value that applies for the complete sister vehicle.~~

~~(iii) Test these cab-complete vehicles using the same equivalent test weight and other dynamometer settings that apply for the complete vehicle from which you used the work factor value (the complete sister vehicle). For GHG certification, you may submit the test data from that complete sister vehicle instead of performing the test on the cab-complete vehicle.~~

~~(iv) You are not required to produce the complete sister vehicle for sale to use the provisions of this paragraph (j)(2). This means the complete sister vehicle may be a~~

carryover vehicle from a prior model year or a vehicle created solely for the purpose of testing.

(3) For GHG purposes, if a cab-complete vehicle is not of the same vehicle configuration as a complete sister vehicle due only to certain factors unrelated to coastdown performance, you may use the road-load coefficients from the complete sister vehicle for certification testing of the cab-complete vehicle, but you may not use emission data from the complete sister vehicle for certifying the cab-complete vehicle.

(4) The GHG standards of this section and related provisions apply for vehicles above 22,000 pounds GCWR as described in 40 CFR 1036.635.

(k) *Interim provisions.* The following provisions apply instead of other provisions in this subpart:

(1) *Incentives for early introduction.* Manufacturers may voluntarily certify in model year 2013 (or earlier model years for electric vehicles) to the greenhouse gas standards that apply starting in model year 2014 as specified in 40 CFR 1037.150(a).

(2) *Early credits.* To generate early credits under this paragraph (k)(2) for any vehicles other than electric vehicles, you must certify your entire U.S.-directed fleet to these standards. If you calculate a separate fleet average for advanced technology vehicles under paragraph (k)(7) of this section, you must certify your entire U.S.-directed production volume of both advanced and conventional vehicles within the fleet. If some test groups are certified after the start of the model year, you may generate credits only for production that occurs after all test groups are certified. For example, if you produce three test groups in an averaging set and you receive your certificates for those test groups on January 4, 2013, March 15, 2013, and April 24, 2013, you may not generate credits for model year 2013 for vehicles from any of the test groups produced before April 24, 2013. Calculate credits relative to the standard that would apply in model year 2014 using the applicable equations in this subpart and your model year 2013 U.S.-directed production volumes. These credits may be used to show compliance with the standards of this subpart for 2014 and later model years. We recommend that you notify us of your intent to use this provision before submitting your applications.

(3) *Compliance date.* Compliance with the standards of this section was optional before January 1, 2014 as specified in 40 CFR 1037.150(g).

(4) *Historical and interim standards.* The following CO<sub>2</sub> target values apply for model year 2031 and earlier vehicles:

(i) CO<sub>2</sub> target values apply as follows for model years 2014 through 2027, except as specified in paragraph (k)(4)(ii) of this section:

TABLE 2 TO PARAGRAPH (K)(4)(i)—CO<sub>2</sub> TARGET VALUES FOR MODEL YEARS 2014 THROUGH 2027

Model year	CO <sub>2</sub> target (g/mile) <sup>a</sup>	
	Spark-ignition	Compression-ignition
2014	$0.0482 \times WF + 371$	$0.0478 \times WF + 368$
2015	$0.0479 \times WF + 369$	$0.0474 \times WF + 366$
2016	$0.0469 \times WF + 362$	$0.0460 \times WF + 354$
2017	$0.0460 \times WF + 354$	$0.0445 \times WF + 343$
2018-2020	$0.0440 \times WF + 339$	$0.0416 \times WF + 320$
2021	$0.0429 \times WF + 331$	$0.0406 \times WF + 312$



Model year	CO <sub>2</sub> -target (g/mile) <sup>a</sup>	
	Spark ignition	Compression ignition
2022	$0.0418 \times WF + 322$	$0.0395 \times WF + 304$ .
2023	$0.0408 \times WF + 314$	$0.0386 \times WF + 297$ .
2024	$0.0398 \times WF + 306$	$0.0376 \times WF + 289$ .
2025	$0.0388 \times WF + 299$	$0.0367 \times WF + 282$ .
2026	$0.0378 \times WF + 291$	$0.0357 \times WF + 275$ .
2027	$0.0348 \times WF + 268$	$0.0348 \times WF + 268$ .

<sup>a</sup> Electric vehicles are subject to the compression ignition CO<sub>2</sub>-target values.

(ii) The following optional alternative CO<sub>2</sub>-target values apply for model years 2014 through 2020:

TABLE 3 TO PARAGRAPH (K)(4)(II) — ALTERNATIVE CO<sub>2</sub>-TARGET VALUES FOR MODEL YEARS 2014 THROUGH 2020

Model year	CO <sub>2</sub> -target (g/mile)	
	Spark ignition	Compression ignition.
2014	$0.0482 \times WF + 371$	$0.0478 \times WF + 368$ .
2015	$0.0479 \times WF + 369$	$0.0474 \times WF + 366$ .
2016–2018	$0.0456 \times WF + 352$	$0.0440 \times WF + 339$ .
2019–2020	$0.0440 \times WF + 339$	$0.0416 \times WF + 320$ .

(iii) CO<sub>2</sub>-target values apply as follows for all engine types for model years 2028 through 2031:

TABLE 4 TO PARAGRAPH (K)(4)(III) — CO<sub>2</sub>-TARGET VALUES FOR MODEL YEARS 2028 THROUGH 2031

Model year	Work factor cutpoint (pounds)	CO <sub>2</sub> -target value (g/mile)	
		Below cutpoint	Above cutpoint
2028	8,000	$0.0339 \times WF + 270$	541
2029	6,800	$0.0310 \times WF + 246$	457
2030	5,500	$0.0280 \times WF + 220$	374
2031	5,500	$0.0251 \times WF + 195$	333

(5) *Provisions for small manufacturers.* Standards apply on a delayed schedule for manufacturers meeting the small business criteria specified in 13 CFR 121.201 (NAICS code 336111); the employee and revenue limits apply to the total number employees and total revenue together for affiliated companies. Qualifying small manufacturers are not subject to the greenhouse gas standards of this section for vehicles with a date of manufacture before January 1, 2022, as specified in 40 CFR 1037.150(c). In addition, small manufacturers producing vehicles that run on any fuel other than gasoline, E85, or diesel fuel may delay complying with every later standard under this part by one model year through model year 2026. The following provisions apply starting with model year 2027:

(i) Qualifying small manufacturers remain subject to the model year 2026 greenhouse gas standards; however, small manufacturers may trade emission credits generated in a given model year only by certifying to standards that apply for that model year.

(ii) Small manufacturers may produce no more than 500 exempt vehicles in any model year under paragraph (k)(5)(i) of this section. This limit applies for vehicles with engines, including plug-in hybrid electric vehicles; this limit does not apply for electric vehicles. Vehicles that are not exempt under this paragraph (k)(5) must meet emission standards as specified in this section.

~~(6) Alternate N<sub>2</sub>O standards.~~ Manufacturers may show compliance with the N<sub>2</sub>O standards using an engineering analysis. This allowance also applies for model year 2015 and later test groups carried over from model 2014 consistent with the provisions of § 86.1839. You may not certify to an N<sub>2</sub>O FEL different than the standard without measuring N<sub>2</sub>O emissions.

~~(7) Advanced technology credits.~~ Provisions for advanced technology credits apply as described in 40 CFR 1037.615. If you generate credits from Phase 1 vehicles certified with advanced technology (in model years 2014 through 2020), you may multiply these credits by 1.50. If you generate credits from model year 2021 through 2026 vehicles certified with advanced technology, you may multiply these credits by 3.5 for plug-in hybrid electric vehicles, 4.5 for battery electric vehicles, and 5.5 for fuel cell vehicles. Advanced technology credits from Phase 1 vehicles may be used to show compliance with any standards of this part or 40 CFR part 1036 or part 1037, subject to the restrictions in 40 CFR 1037.740. Similarly, you may use up to 60,000 Mg per year of advanced technology credits generated under 40 CFR 1036.615 or 1037.615 (from Phase 1 vehicles) to demonstrate compliance with the CO<sub>2</sub> standards in this section. Include vehicles generating credits in separate fleet average calculations (and exclude them from your conventional fleet average calculation). You must first apply these advanced technology vehicle credits to any deficits for other vehicles in the averaging set before applying them to other averaging sets. The provisions of this paragraph (k)(7) do not apply for credits generated from model year 2027 and later vehicles.

~~(8) Loose engine sales.~~ This paragraph (k)(8) applies for model year 2023 and earlier spark-ignition engines with identical hardware compared with engines used in vehicles certified to the standards of this section, where you sell such engines as loose engines or as engines installed in incomplete vehicles that are not cab-complete vehicles. You may include such engines in a test group certified to the standards of this section, subject to the following provisions:

(i) Engines certified under this paragraph (k)(8) are deemed to be certified to the standards of 40 CFR 1036.108 as specified in 40 CFR 1036.150(j).

(ii) For 2020 and earlier model years, the maximum allowable U.S.-directed production volume of engines you sell under this paragraph (k)(8) in any given model year is ten percent of the total U.S.-directed production volume of engines of that design that you produce for heavy-duty applications for that model year, including engines you produce for complete vehicles, cab-complete vehicles, and other incomplete vehicles. The total number of engines you may certify under this paragraph (k)(8), of all engine designs, may not exceed 15,000 in any model year. Engines produced in excess of either of these limits are not covered by your certificate. For example, if you produce 80,000 complete model year 2017 Class 2b pickup trucks with a certain engine and 10,000 incomplete model year 2017 Class 3 vehicles with that same engine, and you do not apply the provisions of this paragraph (k)(8) to any other engine designs, you may produce up to

~~10,000 engines of that design for sale as loose engines under this paragraph (k)(8). If you produced 11,000 engines of that design for sale as loose engines, the last 1,000 of them that you produced in that model year 2017 would be considered uncertified.~~

~~(iii) For model years 2021 through 2023, the U.S.-directed production volume of engines you sell under this paragraph (k)(8) in any given model year may not exceed 10,000 units.~~

~~(iv) This paragraph (k)(8) does not apply for engines certified to the standards of 40 CFR 1036.108.~~

~~(v) Label the engines as specified in 40 CFR 1036.135 including the following compliance statement: "THIS ENGINE WAS CERTIFIED TO THE ALTERNATE GREENHOUSE GAS EMISSION STANDARDS OF 40 CFR 1036.150(j)." List the test group name instead of an engine family name.~~

~~(vi) Vehicles using engines certified under this paragraph (k)(8) are subject to the emission standards of 40 CFR 1037.105.~~

~~(vii) For certification purposes, your engines are deemed to have a CO<sub>2</sub> target value and test result equal to the CO<sub>2</sub> target value and test result for the complete vehicle in the applicable test group with the highest equivalent test weight, except as specified in paragraph (k)(8)(vii)(B) of this section. Use these values to calculate your target value, fleet average emission rate, and in-use emission standard. Where there are multiple complete vehicles with the same highest equivalent test weight, select the CO<sub>2</sub> target value and test result as follows:~~

~~(A) If one or more of the CO<sub>2</sub> test results exceed the applicable target value, use the CO<sub>2</sub> target value and test result of the vehicle that exceeds its target value by the greatest amount.~~

~~(B) If none of the CO<sub>2</sub> test results exceed the applicable target value, select the highest target value and set the test result equal to it. This means that you may not generate emission credits from vehicles certified under this paragraph (k)(8).~~

~~(viii) Production and in-use CO<sub>2</sub> standards apply as described in paragraph (b) of this section.~~

~~(ix) N<sub>2</sub>O and CH<sub>4</sub> standards apply as described in paragraph (c) of this section.~~

~~(x) State in your applications for certification that your test group and engine family will include engines certified under this paragraph (k)(8). This applies for your greenhouse gas vehicle test group and your criteria pollutant engine family. List in each application the name of the corresponding test group/engine family.~~

~~(9) Credit adjustment for useful life. For credits that you calculate based on a useful life of 120,000 miles, multiply any banked credits that you carry forward for use in model year 2021 and later by 1.25.~~

~~(10) CO<sub>2</sub> rounding. For model year 2014 and earlier vehicles, you may round measured and calculated CO<sub>2</sub> emission levels to the nearest 0.1 g/mile, instead of the nearest whole g/mile as specified in paragraphs (a), (b), and (g) of this section.~~

26. Amend § 86.1822-01 by revising paragraph (b) to read as follows:

**§ 86.1822-01 Durability data vehicle selection.**

\* \* \* \* \*

(b) The manufacturer may select, using good engineering judgment, an equivalent or worst-case vehicle configuration in lieu of testing the vehicle selected in paragraph (a) of this section.

Carryover data satisfying the provisions of § 86.1839-01 may also be used in lieu of testing the vehicle configuration selected in paragraph (a) of this section.

#### § 86.1823-08 [Amended]

27. Amend § 86.1823-08 by removing and reserving paragraph (m).

\* \* \* \* \*

#### § 86.1823-08 Durability demonstration procedures for exhaust emissions.

\* \* \* \* \*

(m) ~~[Reserved] Durability demonstration procedures for vehicles subject to the greenhouse gas exhaust emission standards specified in § 86.1818. Determine a deterioration factor for each exhaust constituent as described in this paragraph (m) and in 40 CFR 600.113-12(h) through (m) to calculate the composite CREE DF value.~~

~~(1) CO<sub>2</sub>.~~

~~(i) Unless otherwise specified under paragraph (m)(1)(ii) or (iii) of this section, manufacturers may use a multiplicative CO<sub>2</sub> deterioration factor of one or an additive deterioration factor of zero to determine full useful life emissions for the FTP and HFET tests.~~

~~(ii) Based on an analysis of industry wide data, EPA may periodically establish and/or update the deterioration factor for CO<sub>2</sub> emissions, including air conditioning and other credit related emissions. Deterioration factors established and/or updated under this paragraph (m)(1)(ii) will provide adequate lead time for manufacturers to plan for the change.~~

~~(iii) For plug-in hybrid electric vehicles and any other vehicle model the manufacturer determines will experience increased CO<sub>2</sub> emissions over the vehicle's useful life, consistent with good engineering judgment, manufacturers must either install aged batteries and other relevant components on test vehicles as provided in paragraph (f)(2) of this section, determine a deterioration factor based on testing, or provide an engineering analysis that the vehicle is designed such that CO<sub>2</sub> emissions will not increase over the vehicle's useful life. Manufacturers may test using the whole vehicle mileage accumulation procedures in § 86.1823-08 (c) or (d)(1), or manufacturers may request prior EPA approval for an alternative durability procedure based on good engineering judgment. For the testing option, each FTP test performed on the durability data vehicle selected under § 86.1822 must also be accompanied by an HFET test, and combined FTP/HFET CO<sub>2</sub> results determined by averaging the city (FTP) and highway (HFET) CO<sub>2</sub> values, weighted 0.55 and 0.45 respectively. The deterioration factor will be determined for this combined CO<sub>2</sub> value. Calculated multiplicative deterioration factors that are less than one shall be set to equal one, and calculated additive deterioration factors that are less than zero shall be set to zero.~~

~~(2) N<sub>2</sub>O and CH<sub>4</sub>.~~

~~(i) For manufacturers complying with the FTP emission standards for N<sub>2</sub>O and CH<sub>4</sub> specified in § 86.1818-12(f)(1) or determined under § 86.1818-12(f)(3), FTP-based deterioration factors for N<sub>2</sub>O and CH<sub>4</sub> shall be determined according to the provisions of paragraphs (a) through (l) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818-12(f)(2), deterioration factors based on FTP testing shall be determined and may be used to determine full useful life emissions for the FTP and~~

HFET tests. The manufacturer may at its option determine separate deterioration factors for the FTP and HFET test cycles, in which case each FTP test performed on the durability data vehicle selected under § 86.1822 of this part must also be accompanied by an HFET test.

(iii) For the 2012 through 2016 model years only, manufacturers may use alternative deterioration factors. For N<sub>2</sub>O, the alternative deterioration factor to be used to adjust FTP and HFET emissions is the deterioration factor determined for (or derived from, using good engineering judgment) NO<sub>x</sub> emissions according to the provisions of this section. For CH<sub>4</sub>, the alternative deterioration factor to be used to adjust FTP and HFET emissions is the deterioration factor determined for (or derived from, using good engineering judgment) NMOG or NMHC emissions according to the provisions of this section.

(3) ~~Other carbon-related exhaust emissions.~~ FTP-based deterioration factors shall be determined for carbon-related exhaust emissions (CREE), hydrocarbons, and CO according to the provisions of paragraphs (a) through (l) of this section. The FTP-based deterioration factor shall be used to determine full useful life emissions for both the FTP (city) and HFET (highway) test cycles. The manufacturer may at its option determine separate deterioration factors for the FTP and HFET test cycles, in which case each FTP test performed on the durability data vehicle selected under § 86.1822 must also be accompanied by an HFET test. In lieu of determining emission-specific deterioration factors for the specific hydrocarbons of CH<sub>3</sub>OH (methanol), HCHO (formaldehyde), C<sub>2</sub>H<sub>5</sub>OH (ethanol), and C<sub>2</sub>H<sub>4</sub>O (acetaldehyde) as may be required for some alternative fuel vehicles, manufacturers may use the additive or multiplicative deterioration factor determined for (or derived from, using good engineering judgment) NMOG or NMHC emissions according to the provisions of this section.

(4) ~~Air Conditioning leakage and efficiency or other emission credit requirements to comply with exhaust CO<sub>2</sub> standards.~~ Manufacturers will attest to the durability of components and systems used to meet the CO<sub>2</sub> standards. Manufacturers may submit engineering data to provide durability demonstration. Deterioration factors do not apply to emission-related components and systems used to generate air conditioning leakage and/or efficiency credits.

\* \* \* \* \*

28. Amend § 86.1827-01 by revising paragraph (a)(5) to read as follows:

**§ 86.1827-01 Test group determination.**

\* \* \* \* \*

(a) \* \* \*

(5) Subject to the same emission standards ~~(except for CO<sub>2</sub>)~~, or FEL in the case of cold temperature NMHC or NMOG+NO<sub>x</sub> standards, except that a manufacturer may request to group vehicles into the same test group as vehicles subject to more stringent standards, so long as all the vehicles within the test group are certified to the most stringent standards applicable to any vehicle within that test group. For example, manufacturers may include medium-duty vehicles at or below 22,000 pounds GCWR in the same test group with medium-duty vehicles above 22,000 pounds GCWR, but all vehicles included in the test group are then subject to the off-cycle emission standards and testing requirements described in § 86.1811-27(e). Light-duty trucks and light-duty vehicles may be included in the same test group if all vehicles in the test group are subject to the same criteria exhaust emission standards.

\* \* \* \* \*

29. Amend § 86.1828-01 by revising paragraph (e) to read as follows:

**§ 86.1828-01 Emission data vehicle selection.**

\* \* \* \* \*

(e) *Alternative vehicle configurations.* The manufacturer may use good engineering judgment to select an equivalent or worst-case vehicle configuration in lieu of testing the vehicle selected in paragraphs (a) through (c) of this section. Carryover data satisfying the provisions of § 86.1839 may also be used in lieu of testing the vehicle configuration selected in paragraphs (a) through (c) of this section.

\* \* \* \* \*

30. Amend § 86.1829-15 by:

- a. Removing and reserving paragraph (a)(2).
- b. Revising paragraph (d)(3); and
- c. Removing and reserving paragraph (d)(6).

The revisions read as follows:

**§ 86.1829-15 Durability and emission testing requirements; waivers.**

\* \* \* \* \*

(a) \* \* \*

~~(2) [Reserved]Manufacturers may provide a statement in the application for certification that vehicles comply with the monitor accuracy and battery durability requirements of § 86.1815-27 instead of submitting test data for certification. The following durability testing requirements apply for battery electric vehicles and plug-in hybrid electric vehicles after certification:~~

~~(i) Manufacturers must perform monitor accuracy testing on in-use vehicles as described in § 86.1845-04(g) for each monitor family. Carryover provisions apply as described in § 86.1839-01(e).~~

~~(ii) Manufacturers must perform battery durability testing as described in § 86.1815-27.~~

\* \* \* \* \*

(d) \* \* \*

(3) Manufacturers may omit PM measurements for fuel economy ~~and GHG~~ testing conducted in addition to the testing needed to demonstrate compliance with the PM emission standards.

\* \* \* \* \*

~~(6) [Reserved]For model years 2012 through 2016, a manufacturer may provide a statement in its application for certification that vehicles comply with the applicable standards instead of measuring N<sub>2</sub>O emissions. Such a statement may also be used for model year 2017 and 2018 vehicles only if the application for certification for those vehicles is based upon data carried over from a prior model year, as allowed under this subpart. No model year 2019 and later vehicles may be waived from testing for N<sub>2</sub>O emissions. Vehicles certified to N<sub>2</sub>O standards using a compliance statement instead of submitting test data are not required to collect and submit N<sub>2</sub>O emission data under the in-use testing requirements of § 86.1845.~~

\* \* \* \* \*



31. Amend § 86.1830-01 by revising paragraphs (a)(3) and (c)(2) to read as follows:

**§ 86.1830-01 Acceptance of vehicles for emission testing.**

(a) \* \* \*

(3) Test vehicles must have air conditioning installed and operational if that vehicle configuration is available with air conditioning. Optional equipment must be installed or represented on test vehicles according to the provisions of § 86.1832-01.

\* \* \* \* \*

(c) \* \* \*

(2) Within a durability group, the manufacturer may alter any emission data vehicle (or other vehicles such as current or previous model year emission data vehicles, running change vehicles, fuel economy data vehicles, and development vehicles) in lieu of building a new test vehicle providing that the modification will not impact the representativeness of the vehicle's test results. Manufacturers shall use good engineering judgment in making such determinations. Development vehicles which were used to develop the calibration selected for emission data testing may not be used as the EDV for that vehicle configuration. Vehicles from outside the durability group may be altered with advance approval of the Administrator.

\* \* \* \* \*

32. Amend § 86.1835-01 by revising paragraphs (a)(4), (b)(3), and (c) to read as follows:

**§ 86.1835-01 Confirmatory certification testing.**

(a) \* \* \*

(4) Retesting for fuel economy ~~reasons or for compliance with greenhouse gas exhaust emission standards in § 86.1818-12~~ may be conducted under the provisions of 40 CFR 600.008-08.

(b) \* \* \*

(3) For light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles the manufacturer shall conduct a retest of the FTP or highway test if the difference between the fuel economy of the confirmatory test and the original manufacturer's test equals or exceeds three percent (or such lower percentage to be applied consistently to all manufacturer conducted confirmatory testing as requested by the manufacturer and approved by the Administrator).

(i) For use in the fuel economy ~~and exhaust greenhouse gas fleet averaging~~ program described in 40 CFR parts ~~86 and~~ 600, the manufacturer may, in lieu of conducting a retest, accept as official the lower of the original and confirmatory test fuel economy results, ~~and by doing so will also accept as official the calculated CREE value associated with the lower fuel economy test results.~~

(ii) The manufacturer shall conduct a second retest of the FTP or highway test if the fuel economy difference between the second confirmatory test and the original manufacturer test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator) and the fuel economy difference between the second confirmatory test and the first confirmatory test equals or exceeds three percent (or such lower percentage as requested by the manufacturer and approved by the Administrator). In lieu of conducting a second retest, the manufacturer may accept as official (for use in the fuel economy program ~~and the exhaust greenhouse gas fleet averaging program~~) the lowest fuel economy of the original test, the first confirmatory

test, and the second confirmatory test fuel economy results, ~~and by doing so will also accept as official the calculated CREE value associated with the lowest fuel economy test results.~~

(c) *Official test determination.* (1) Whenever the Administrator or the manufacturer conducts a confirmatory test segment on a test vehicle, the results of that test segment, unless subsequently invalidated by the Administrator, shall comprise the official data for that test segment for the vehicle at the prescribed test point and the manufacturer's original test data for that test segment for that prescribed test point shall not be used in determining compliance with emission standards.

(i) If the Administrator or the manufacturer conducts more than one passing, valid, confirmatory test, the results from the first passing, valid confirmatory test shall be considered official and used in determining compliance with emission standards.

(ii) Official test results for fuel economy ~~and exhaust CO<sub>2</sub> emission purposes~~ are determined in accordance with the provisions of § 600.008-08 of this chapter.

(iii) The Administrator may stop a test after any evaporative test segment and use as official data any valid results obtained up to that point in the test, as described in subpart B of this part.

(2) Whenever the Administrator or the manufacturer does not conduct a confirmatory test on a test vehicle at a test point, the manufacturer's original test data will be accepted as the official data for that point.

(i) If the Administrator makes a determination based on testing under paragraph (a) of this section (or other appropriate correlation test data), that there is a lack of correlation between the manufacturer's test equipment or procedures and the test equipment or procedures used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer.

(ii) If the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provisions of this subpart, the Administrator may refuse to accept that data as the official data pending retesting or submission of further information.

(iii) If the manufacturer conducts more than one test on an emission data vehicle in the same vehicle configuration (excluding confirmatory tests run under paragraph (b) of this section), the data from the last test in that series of tests on that vehicle, will constitute the official data.

\* \* \* \* \*

#### **§ 86.1838-01 [Amended]**

33. Amend § 86.1838-01 by removing and reserving paragraph (b)(1)(i)(B).

#### **§ 86.1838-01 Small-volume manufacturer certification procedures.**

\* \* \* \* \*

(b) *Eligibility requirements* —

(1) *Small-volume manufacturers.*

(i) Optional small-volume manufacturer certification procedures apply for vehicles produced by manufacturers with the following number of combined sales of vehicles subject to standards under this subpart in all states and territories of the United States in

the model year for which certification is sought, including all vehicles and engines imported under the provisions of 40 CFR 85.1505 and 85.1509:

- (A) At or below 5,000 units for the Tier 3 standards described in § 86.1811-17, 86.1813-17, and 86.1816-18 and the Tier 4 standards described in § 86.1811-27. This volume threshold applies for phasing in the Tier 3 and Tier 4 standards and for determining the corresponding deterioration factors.
- (B) ~~[Reserved] No small volume sales threshold applies for the heavy-duty greenhouse gas standards; alternative small volume criteria apply as described in § 86.1819-14(k)(5).~~
- (C) At or below 15,000 units for all other requirements. See § 86.1845 for separate provisions that apply for in-use testing.
- (ii) If a manufacturer's aggregated sales in the United States, as determined in paragraph (b)(3) of this section are fewer than the number of units specified in paragraph (b)(1)(i) of this section, the manufacturer (or each manufacturer in the case of manufacturers in an aggregated relationship) may certify under the provisions of paragraph (c) of this section.
- (iii) A manufacturer that qualifies as a small business under the Small Business Administration regulations in 13 CFR part 121 is eligible for all the provisions that apply for small-volume manufacturers under this subpart. See § 86.1801-12(j) to determine whether companies qualify as small businesses.
- (iv) The sales volumes specified in this section are based on actual sales, unless otherwise specified.
- (v) Except for delayed implementation of new emission standards, an eligible manufacturer must transition out of the special provisions that apply for small-volume manufacturers as described in § 86.1801-12(k)(2)(i) through (iii) if sales volumes increase above the applicable threshold.

\* \* \* \* \*

34. Revise § 86.1839-01 to read as follows:

**§ 86.1839-01 Carryover of certification ~~and battery monitoring data.~~**

(a) In lieu of testing an emission-data or durability vehicle selected under § 86.1822, § 86.1828, or § 86.1829, and submitting data therefrom, a manufacturer may submit exhaust emission data, evaporative emission data and/or refueling emission data, as applicable, on a similar vehicle for which certification has been obtained or for which all applicable data required under § 86.1845 has previously been submitted. To be eligible for this provision, the manufacturer must use good engineering judgment and meet the following criteria:

- (1) In the case of durability data, the manufacturer must determine that the previously generated durability data represent a worst case or equivalent rate of deterioration for all applicable emission constituents compared to the vehicle configuration selected for durability demonstration. Prior to certification, the Administrator may require the manufacturer to provide data showing that the distribution of catalyst temperatures of the selected durability vehicle configuration is effectively equivalent or lower than the distribution of catalyst temperatures of the vehicle configuration which is the source of the previously generated data.
- (2) In the case of emission data, the manufacturer must determine that the previously generated emissions data represent a worst case or equivalent level of emissions for all

applicable emission constituents compared to the vehicle configuration selected for emission compliance demonstration.

(b) In lieu of using newly aged hardware on an EDV as allowed under the provisions of § 86.1823-08(f)(2), a manufacturer may use similar hardware aged for an EDV previously submitted, provided that the manufacturer determines that the previously aged hardware represents a worst case or equivalent rate of deterioration for all applicable emission constituents for durability demonstration.

~~(c) In lieu of testing battery electric vehicles or plug-in hybrid electric vehicles for monitor accuracy under § 86.1822-01(a) and submitting the test data, a manufacturer may rely on previously conducted testing on a similar vehicle for which such test data have previously been submitted to demonstrate compliance with monitor accuracy requirements. For vehicles to be eligible for this provision, they must have designs for battery monitoring that are identical in all material respects to the vehicles tested under § 86.1845-04(g). If a monitor family fails to meet accuracy requirements, repeat the testing under § 86.1845-04(g) as soon as practicable.~~

#### **§ 86.1841-01 [Amended]**

35. Amend § 86.1841-01 by removing and reserving paragraph (a)(3).

#### **§ 86.1841-01 Compliance with emission standards for the purpose of certification.**

(a) Certification levels of a test vehicle will be calculated for each emission constituent applicable to the test group for both full and intermediate useful life as appropriate.

(1) If the durability demonstration procedure used by the manufacturer under the provisions of § 86.1823, § 86.1824, or § 86.1825 requires a DF to be calculated, the DF shall be applied to the official test results determined in § 86.1835-01(c) for each regulated emission constituent and for full and intermediate useful life, as appropriate, using the following procedures:

(i) For additive DF's, the DF will be added to the emission result. The sum will be rounded to the same level of precision as the standard for the constituent at full and/or intermediate useful life, as appropriate. This rounded sum is the certification level for that emission constituent and for that useful life mileage.

(ii) For multiplicative DFs, the DF will be multiplied by the emission result for each regulated constituent. The product will be rounded to the same level of precision as the standard for the constituent at full and intermediate useful life, as appropriate. This rounded product is the certification level for that emission constituent and for that useful life mileage.

(iii) For a composite standard of NMHC+NO<sub>x</sub>, the measured results of NMHC and NO<sub>x</sub> must each be adjusted by their corresponding deterioration factors before the composite NMHC + NO<sub>x</sub> certification level is calculated. Where the applicable FTP exhaust hydrocarbon emission standard is an NMOG standard, the applicable NMOG deterioration factor must be used in place of the NMHC deterioration factor, unless otherwise approved by the Administrator.

(2) If the durability demonstration procedure used by the manufacturer under the provisions of § 86.1823, § 86.1824, or § 86.1825, as applicable, requires testing of the EDV with aged emission components, the official results of that testing determined under the provisions of § 86.1835-01(c) shall be rounded to the same level of precision as the standard for each regulated constituent at full and intermediate useful life, as appropriate. This rounded

emission value is the certification level for that emission constituent at that useful life mileage.

(3) ~~[Reserved] Compliance with full useful life CO<sub>2</sub> exhaust emission standards shall be demonstrated at certification by the certification levels on the duty cycles specified for carbon related exhaust emissions according to § 600.113 of this chapter.~~

(4) The rounding required in paragraph (a) of this section shall be conducted in accordance with the provisions of § 86.1837-01.

\* \* \* \* \*

36. Amend § 86.1844-01 by:

- a. Removing and reserving paragraph (d)(7)(iv);
- b. Revising paragraph (d)(15);
- c. Removing and reserving paragraphs (d)(19) and (20); and
- d. Revising paragraphs (e)(1) and (3).

The revisions read as follows:

**§ 86.1844-01 Information requirements: Application for certification and submittal of information upon request.**

\* \* \* \* \*

(d) \* \* \*

(7) A comprehensive list of all test results, including official certification levels, and the applicable intermediate and full useful life emission standards to which the test group is to be certified as required in § 86.1829. Include the following additional information related to testing:

- (i) For vehicles certified to any Tier 3 or Tier 4 emission standards, include a comparison of drive-cycle metrics as specified in 40 CFR 1066.425(j) for each drive cycle or test phase, as appropriate.
- (ii) For gasoline-fueled vehicles subject to Tier 3 evaporative emission standards, identify the method of accounting for ethanol in determining evaporative emissions, as described in § 86.1813.
- (iii) Identify any aspects of testing for which the regulations obligate EPA testing to conform to your selection of test methods.
- (iv) ~~[Reserved] For heavy duty vehicles subject to air conditioning standards under § 86.1819, include the refrigerant leakage rates (leak scores), describe the type of refrigerant, and identify the refrigerant capacity of the air conditioning systems. If another company will install the air conditioning system, also identify the corporate name of the final installer.~~
- (v) For vehicles with pressurized fuel tanks, attest that vehicles subject to EPA testing with the partial refueling test will meet the refueling emission standard for that testing. Include engineering analysis showing that canister capacity is adequate to account for the increased vapor load from venting the pressurized fuel tank upon fuel cap removal.

\* \* \* \* \*

(15) For vehicles with fuel-fired heaters, describe the control system logic of the fuel-fired heater, including an evaluation of the conditions under which it can be operated and an evaluation of the possible operational modes and conditions under which evaporative emissions can exist. Use good engineering judgment to establish an estimated exhaust emission rate from the fuel-fired heater in grams per mile for each pollutant subject to a fleet

average standard. Adjust fleet average compliance calculations in §§ 86.1861, ~~and 86.1864, and 86.1865~~ as appropriate to account for emissions from fuel-fired heaters. Describe the testing used to establish the exhaust emission rate.

\* \* \* \* \*

(19) ~~[Reserved] For battery electric vehicles and plug-in hybrid electric vehicles, a description of each monitor family and battery durability family as described in § 86.1815-27(f)(1). Note that a single test group may include multiple monitor families and battery durability families, and conversely that individual monitor families and battery durability families may be associated with multiple test groups. Note also that provisions related to monitor families and battery durability families do not apply for certain vehicles as specified in § 86.1815-27(h)(8). Include the following information for each monitor family:~~

- ~~(i) The monitor, battery, and other specifications that are relevant to establishing monitor families and battery durability families to comply with the requirements of this section.~~
- ~~(ii) The certified usable battery energy for each battery durability family. For plug-in hybrid electric vehicles, identify whether the UDDS Full Charge Test or HFET Full Charge Test was used for battery measurements.~~
- ~~(iii) A statement attesting that the SOCE monitor meets the 5 percent accuracy requirement.~~
- ~~(iv) For light-duty program vehicles, a statement that each battery durability family meets the Minimum Performance Requirement.~~

(20) ~~[Reserved] Acknowledgement, if applicable, that you are including vehicles with engines certified under 40 CFR part 1036 in your calculation to demonstrate compliance with the fleet average CO<sub>2</sub> standard in this subpart as described in § 86.1819-14(j).~~

\* \* \* \* \*

(e) \* \* \*

(1) Identify all emission-related components, ~~including those that can affect GHG emissions.~~ Also identify software, AECs, and other elements of design that are used to control criteria, ~~GHG, exhaust~~ or evaporative/refueling emissions. Identify the emission-related components by part number. Identify software by part number or other convention, as appropriate. Organize part numbers by engine code or other similar classification scheme.

\* \* \* \* \*

(3) Identification and description of all vehicles covered by each certificate of conformity to be produced and sold within the U.S. The description must be sufficient to identify whether any given in-use vehicle is, or is not, covered by a given certificate of conformity, the test group and the evaporative/refueling family to which it belongs and the standards that are applicable to it, by matching readily observable vehicle characteristics and information given in the emission control information label (and other permanently attached labels) to indicators in the Part 1 Application. For example, the description must include any components or features that contribute to measured or demonstrated control of emissions for meeting criteria, ~~GHG, exhaust~~ or evaporative/refueling standards under this subpart. In addition, the description must be sufficient to determine for each vehicle covered by the certificate, all appropriate test parameters and any special test procedures necessary to conduct an official certification exhaust or evaporative emission test as was required by this subpart to demonstrate compliance with applicable emission standards. The description shall include, but is not limited to, information such as model name, vehicle classification (light-duty vehicle, light-duty truck, or complete heavy-duty vehicle), sales area, engine displacement, engine code, transmission type, tire size and parameters necessary to conduct



exhaust emission tests such as equivalent test weight, curb and gross vehicle weight, test horsepower (with and without air conditioning adjustment), coast down time, shift schedules, cooling fan configuration, etc. and evaporative tests such as canister working capacity, canister bed volume, and fuel temperature profile. Actual values must be provided for all parameters.

\* \* \* \* \*

37. Amend § 86.1845-04 by:

- a. Revising paragraphs (b)(5)(i) and (c)(5)(i);
- b. Removing and reserving paragraph (g); and
- c. Revising paragraph (h)(6) introductory text.

The revisions read as follows:

**§ 86.1845-04 Manufacturer in-use verification testing requirements.**

\* \* \* \* \*

(b) \* \* \*

(5) *Testing.* (i) Each test vehicle of a test group shall be tested in accordance with the FTP and the US06 as described in subpart B of this part, when such test vehicle is tested for compliance with applicable exhaust emission standards under this subpart. ~~Test vehicles subject to applicable exhaust CO<sub>2</sub> emission standards under this subpart shall also be tested in accordance with the HFET as described in 40 CFR 1066.840.~~

\* \* \* \* \*

(c) \* \* \*

(5) *Testing.* (i) Each test vehicle shall be tested in accordance with the FTP and the US06 as described in subpart B of this part when such test vehicle is tested for compliance with applicable exhaust emission standards under this subpart. ~~Test vehicles subject to applicable exhaust CO<sub>2</sub> emission standards under this subpart shall also be tested in accordance with the HFET as described in 40 CFR 1066.840.~~ One test vehicle from each test group shall be tested over the FTP at high altitude. The test vehicle tested at high altitude is not required to be one of the same test vehicles tested at low altitude. The test vehicle tested at high altitude is counted when determining the compliance with the requirements shown in Table S04-06 and Table S04-07 (tables 1 and 2 to paragraph (b)(3) of this section) or the expanded sample size as provided for in this paragraph (c).

\* \* \* \* \*

(g) ~~[Reserved] Battery testing. Manufacturers of battery electric vehicles and plug-in hybrid electric vehicles must perform in-use testing related to battery monitor accuracy and battery durability for those vehicles as described in § 86.1815-27. Except as otherwise provided in § 86.1815-27(h), perform Part A testing for each monitor family as follows to verify that SOCE monitors meet accuracy requirements:~~

~~(1) Determine accuracy by measuring SOCE from in-use vehicles using the procedures specified in § 86.1815-27(c) and comparing the measured values to the SOCE value displayed on the monitor at the start of testing.~~

~~(2) Perform low-mileage testing of the vehicles in a monitor family within 24 months of the end of production of that monitor family for that model year. All test vehicles must have a minimum odometer mileage of 20,000 miles.~~

~~(3) Perform high-mileage testing of the vehicles in a monitor family by starting the test program within 4 years of the end of production of the monitor family and completing the~~

test program within 5 years of the end of production of the monitor family. All test vehicles must have a minimum odometer mileage of 40,000 miles.

~~(4) Select test vehicles as described in paragraphs (b)(6), (c)(6), and (d)(1) and (3) of this section from the United States. Send notification regarding test location as described in paragraph (c)(2) of this section.~~

~~(5) You may perform diagnostic maintenance as specified in paragraph (b)(7) and (c)(7) of this section.~~

~~(6) See § 86.1838-01(b)(2) for a testing exemption that applies for small volume monitor families.~~

(h) \* \* \*

(6) Determine a reference CO<sub>2</sub> emission rate,  $e_{CO_2FTPFL}$ , as described in 40 CFR 1036.530635(a)(1) or based on measured values from any chassis FTP driving cycles under 40 CFR part 1066, subpart I, that is used for reporting data from an emission data vehicle or a fuel economy data vehicle, as follows:

\* \* \* \* \*

38. Amend § 86.1846-01 by:

a. Revising paragraph (a); and

b. Removing and reserving paragraph (b)(2).

The revision read as follows:

#### § 86.1846-01 Manufacturer in-use confirmatory testing requirements.

(a) *General requirements.*

(1) Manufacturers must test, or cause testing to be conducted, under this section when the emission levels shown by a test group sample from testing under § 86.1845 exceeds the criteria specified in paragraph (b) of this section. The testing required under this section applies separately to each test group and at each test point (low and high mileage) that meets the specified criteria. The testing requirements apply separately for each model year. ~~These provisions do not apply to emissions of CH<sub>4</sub> or N<sub>2</sub>O.~~

(2) The provisions of § 86.1845-04(a)(3) regarding fuel sulfur effects apply equally to testing under this section.

(b) \* \* \*

~~(2) [Reserved]-A manufacturer shall test a test group, or a subset of a test group, as described in paragraph (j) of this section when the results from testing conducted under § 86.1845 show mean exhaust emissions of CO<sub>2</sub> (City-highway combined CREE) for that test group to be at or above the applicable in-use standard for at least 50 percent of vehicles tested from the test group.~~

\* \* \* \* \*

#### § 86.1847-01 [Amended]

39. Amend § 86.1847-01 by removing and reserving paragraph (g).

#### § 86.1847-01 Manufacturer in-use verification and in-use confirmatory testing; submittal of information and maintenance of records.

\* \* \* \* \*

(g) ~~[Reserved]]~~ Manufacturers of battery electric vehicles and plug-in hybrid electric vehicles certified under this subpart must meet the following reporting and recordkeeping requirements related to testing performed under §§ 86.1815-27(f)(2) and (3):

(1) ~~Submit the following records organized by monitor family and battery durability family related to Part A testing to verify accuracy of SOCE monitors within 30 days after completing low mileage, intermediate mileage, or high mileage testing:~~

- ~~(i) A complete record of all tests performed, the dates and location of testing, measured SOCE values for each vehicle, along with the corresponding displayed SOCE values at the start of testing.~~
- ~~(ii) Test vehicle information, including model year, make, model, and odometer reading.~~
- ~~(iii) A summary of statistical information showing whether the testing shows a pass or fail result.~~

~~(2) Keep the following records related to testing under paragraph (g)(1) of this section:~~

- ~~(i) Test reports submitted under paragraph (g)(1) of this section.~~
- ~~(ii) Test facility information.~~
- ~~(iii) Routine testing records, such as dynamometer trace, and temperature and humidity during testing.~~

~~(3) Submit an annual report related to Part B testing to verify compliance with the Minimum Performance Requirement for SOCE, as applicable. Submit the report by October 1 for testing you perform over the preceding year or ask us to approve a different annual reporting period based on your practice for starting a new model year. Include the following information in your annual reports, organized by monitor family and battery durability family:~~

- ~~(i) Displayed values of SOCE for each sampled vehicle, along with a description of each vehicle to identify its model year, make, model, odometer reading, and state of registration. Also include the date for assessing each selected vehicle.~~
- ~~(ii) A summary of results to show whether 90 percent of sampled vehicles from each battery durability family meet the Minimum Performance Requirement.~~
- ~~(iii) A description of how you randomly selected vehicles for testing, including a demonstration that you meet the requirement to select test vehicles from different U.S. states or territories. Provide a more detailed description of your random selection if you test more than 500 vehicles.~~
- ~~(iv) A description of any selected vehicles excluded from the test results and the justification for excluding them.~~
- ~~(v) Information regarding warranty claims and statistics on repairs for batteries and for other components or systems for each battery durability family that might influence a vehicle's electric energy consumption.~~

~~(4) Keep the following records related to testing under paragraph (g)(3) of this section:~~

- ~~(i) Test reports submitted under paragraph (g)(3) of this section.~~
- ~~(ii) Documentation related to the method of selecting vehicles.~~

~~(5) Keep records required under this paragraph (g) for eight years after submitting reports to EPA.~~

\* \* \* \* \*

40. Amend § 86.1848-10 by revising paragraphs (c)(2) and (5) and removing paragraphs (c)(9) and (10).

**§ 86.1848-10 Compliance with emission standards for the purpose of certification.**

\* \* \* \* \*

(c) \* \* \*  
\* \* \* \* \*

(2) The manufacturer must comply with all certification and in-use emission standards contained in ~~subpart S of this subpart~~ both during and after model year production. ~~This includes monitor accuracy and battery durability requirements for battery electric vehicles and plug-in hybrid electric vehicles as described in § 86.1815.~~

\* \* \* \* \*

(5) The manufacturer must meet the in-use testing and reporting requirements contained in §§ ~~86.1815~~, 86.1845, 86.1846, and 86.1847, as applicable.

\* \* \* \* \*

~~(9) Manufacturers must meet all the provisions of §§ 86.1818, 86.1819, and 86.1865 both during and after model year production, including compliance with the applicable fleet average standard. The manufacturer bears the burden of establishing to the satisfaction of the Administrator that the terms and conditions upon which the certificate(s) was (were) issued were satisfied. For recall and warranty purposes, vehicles not covered by a certificate of conformity will continue to be held to the standards stated or referenced in the certificate that otherwise would have applied to the vehicles. A manufacturer may not sell credits it has not generated.~~

~~(i) Manufacturers that are determined to be operationally independent under § 86.1838-01(d) must report a material change in their status within 60 days as required by § 86.1838-01(d)(2).~~

~~(ii) Manufacturers subject to an alternative fleet average greenhouse gas emission standard approved under § 86.1818-12(g) must comply with the annual sales thresholds that are required to maintain use of those standards, including the thresholds required for new entrants into the U.S. market.~~

~~(10) Manufacturers must meet all the provisions of § 86.1815 both during and after model year production. The manufacturer bears the burden of establishing to the satisfaction of the Administrator that the terms and conditions related to issued certificates were satisfied.~~

\* \* \* \* \*

41. Amend § 86.1854-12 by revising paragraph (a)(2)(iv) to read as follows:

**§ 86.1854-12 Prohibited acts.**

(a) \* \* \*

(2) \* \* \*

(iv) For a person to fail to establish or maintain records as required under §§ 86.1844, 86.1862, and 86.1864, ~~and 86.1865~~ with regard to vehicles.

\* \* \* \* \*

42. Revise and republish § 86.1861-17 to read as follows:

**§ 86.1861-17 How do the NMOG + NO<sub>x</sub> and evaporative emission credit programs work?**

You may use emission credits for purposes of certification to show compliance with the applicable fleet average NMOG+NO<sub>x</sub> standards from § 86.1811 and 86.1816 and the fleet average evaporative emission standards from § 86.1813 as described in 40 CFR part ~~1036~~~~1037~~, subpart H, with certain exceptions and clarifications as specified in this section. MDPVs are subject to the same provisions of this section that apply to LDT4.

(a) Calculate emission credits as described in this paragraph (a) instead of using the provisions of 40 CFR ~~1037~~~~1036~~.705. Calculate positive or negative emission credits relative to the applicable fleet average standard. Calculate positive emission credits if your fleet average level is below the standard. Calculate negative emission credits if your fleet average value is above the standard. Calculate credits separately for each applicable fleet average standard and calculate total credits for each averaging set as specified in paragraph (b) of this section. Convert units from mg/mile to g/mile as needed for performing calculations. Calculate emission credits using the following equation, rounded to the nearest whole number:

Equation 1 to Paragraph (a)

$$\text{Emission credit} = \text{Volume} \cdot [\text{Fleet average standard} - \text{Fleet average value}]$$

Where:

*Emission credit* = The positive or negative credit for each discrete fleet average standard, in units of vehicle-grams per mile for NMOG+NO<sub>x</sub> and vehicle-grams per test for evaporative emissions.

*Volume* = Sales volume in a given model year from the collection of test groups or evaporative families covered by the fleet average value, as described in § 86.1860.

(b) The following restrictions apply instead of those specified in 40 CFR ~~1037~~~~1036~~.740:

(1) Except as specified in paragraph (b)(2) of this section, emission credits may be exchanged only within an averaging set, as follows:

- (i) HDV represent a separate averaging set with respect to all emission standards.
- (ii) Except as specified in paragraph (b)(1)(iii) of this section, light-duty program vehicles represent a single averaging set with respect to all emission standards. Note that FTP and SFTP credits for Tier 3 vehicles are not interchangeable.
- (iii) LDV and LDT1 certified to standards based on a useful life of 120,000 miles and 10 years together represent a single averaging set with respect to NMOG+NO<sub>x</sub> emission standards. Note that FTP and SFTP credits for Tier 3 vehicles are not interchangeable.
- (iv) The following separate averaging sets apply for evaporative emission standards:
  - (A) LDV and LDT1 together represent a single averaging set.
  - (B) LDT2 represents a single averaging set.
  - (C) HLDT represents a single averaging set.
  - (D) HDV represents a single averaging set.

(2) You may exchange evaporative emission credits across averaging sets as follows if you need additional credits to offset a deficit after the final year of maintaining deficit credits as allowed under paragraph (c) of this section:

- (i) You may exchange LDV/LDT1 and LDT2 emission credits.
- (ii) You may exchange HLDT and HDV emission credits.

(3) Except as specified in paragraph (b)(4) of this section, credits expire after five years. For example, credits you generate in model year 2018 may be used only through model year 2023.

(4) For the Tier 3 declining fleet average FTP and SFTP emission standards for NMOG+NO<sub>x</sub> described in § 86.1811-17(b)(8), credits generated in model years 2017 through 2024 expire after eight years, or after model year 2030, whichever comes first; however, these credits may not be traded after five years. This extended credit life also applies for small-volume manufacturers generating credits under § 86.1811-17(h)(1) in model years 2022 through 2024. Note that the longer credit life does not apply for heavy-duty vehicles, for vehicles certified under the alternate phase-in described in § 86.1811-17(b)(9), or for vehicles generating early Tier 3 credits under § 86.1811-17(b)(11) in model year 2017.

(5) Tier 3 credits for NMOG+NO<sub>x</sub> may be used to demonstrate compliance with Tier 4 standards without adjustment, except as specified in § 86.1811-27(b)(6)(ii).

(6) A manufacturer may generate NMOG+NO<sub>x</sub> credits from model year 2027 through 2032 electric vehicles that qualify as MDPV and use those credits for certifying medium-duty vehicles, as follows:

(i) Calculate generated credits separately for qualifying vehicles. Calculate generated credits by multiplying the applicable standard for light-duty program vehicles by the sales volume of qualifying vehicles in a given model year.

(ii) Apply generated credits to eliminate any deficit for light-duty program vehicles before using them to certify medium-duty vehicles.

(iii) Apply the credit provisions of this section as specified, except that you may not buy or sell credits generated under this paragraph (b)(6).

(iv) Describe in annual credit reports how you are generating certain credit quantities under this paragraph (b)(6). Also describe in your end of year credit report how you will use those credits for certifying light-duty program vehicles or medium-duty vehicles in a given model year.

(c) The credit-deficit provisions 40 CFR ~~1037.1036~~.745 apply to the NMOG+NO<sub>x</sub> and evaporative emission standards for Tier 3 and Tier 4 vehicles. Credit-deficit provisions are not affected by the transition from Tier 3 to Tier 4 standards.

(d) The reporting and recordkeeping provisions of § 86.1862 apply instead of those specified in 40 CFR ~~1037.1036~~.730 and ~~1037.1036~~.735.

(e) The provisions of 40 CFR ~~1036.625~~~~1037.645~~ do not apply.

~~(f) The enforcement provisions described in § 86.1865-12(j)(3) apply with respect to NMOG+NO<sub>x</sub> emission credits under this section for battery electric vehicles that do not conform to battery durability requirements in § 86.1815-27.~~

## **§§ 86.1865-12, 86.1866-12, 86.1867-12, and 86.1867-31 [Removed]**

43. Remove §§ 86.1865-12, 86.1866-12, 86.1867-12, and 86.1867-31.

## **~~§ 86.1865-12 How to comply with the fleet average CO<sub>2</sub> standards.~~**

### **~~(a) Applicability.~~**

~~(1) Unless otherwise exempted under the provisions of paragraph (d) of this section, CO<sub>2</sub> fleet average exhaust emission standards of this subpart apply to:~~

~~(i) 2012 and later model year passenger automobiles and light trucks.~~

~~(ii) Heavy-duty vehicles subject to standards under § 86.1819.~~

~~(iii) Vehicles imported by ICIs as defined in 40 CFR 85.1502.~~



(2) The terms “passenger automobile” and “light truck” as used in this section have the meanings given in § 86.1818-12.

~~(b) *Useful life requirements.* Full useful life requirements for CO<sub>2</sub> standards are defined in § 86.1818 and 86.1819. There is not an intermediate useful life standard for CO<sub>2</sub> emissions.~~

~~(c) *Altitude.* Greenhouse gas emission standards apply for testing at both low altitude conditions and at high altitude conditions, as described in § 86.1818 and 86.1819.~~

~~(d) *Small volume manufacturer certification procedures.*~~

~~(1) *Passenger automobiles and light trucks.* Certification procedures for small volume manufacturers are provided in § 86.1838. Small businesses meeting certain criteria may be exempted from the greenhouse gas emission standards in § 86.1818 according to the provisions of § 86.1801-12(j) or (k).~~

~~(2) *Heavy duty vehicles.* HDV manufacturers that qualify as small businesses are not subject to the Phase 1 greenhouse gas standards of this subpart as specified in § 86.1819-14(k)(5).~~

~~(e) *CO<sub>2</sub> fleet average exhaust emission standards.* The fleet average standards referred to in this section are the corporate fleet average CO<sub>2</sub> standards for passenger automobiles and light trucks set forth in § 86.1818-12(e) and (e), and for HDV in § 86.1819. Each manufacturer must comply with the applicable CO<sub>2</sub> fleet average standard on a production-weighted average basis, for each separate averaging set, at the end of each model year, using the procedure described in paragraph (j) of this section. The fleet average CO<sub>2</sub> standards applicable in a given model year are calculated separately for passenger automobiles and light trucks for each manufacturer and each model year according to the provisions in § 86.1818. Calculate the HDV fleet average CO<sub>2</sub> standard in a given model year as described in § 86.1819-14(a).~~

~~(f) *In-use CO<sub>2</sub> standards.* In-use CO<sub>2</sub> exhaust emission standards are provided in § 86.1818-12(d) for passenger automobiles and light trucks and in § 86.1819-14(b) for HDV.~~

~~(g) *Durability procedures and method of determining deterioration factors (DFs).* Deterioration factors for CO<sub>2</sub> exhaust emission standards are provided in § 86.1823-08(m) for passenger automobiles and light trucks and in § 86.1819-14(d)(5) for HDV.~~

~~(h) *Vehicle test procedures.*~~

~~(1) The test procedures for demonstrating compliance with CO<sub>2</sub> exhaust emission standards are described at § 86.101 and 40 CFR part 600, subpart B. Note that these test procedures involve measurement of carbon-related exhaust emissions to demonstrate compliance with the fleet average CO<sub>2</sub> standards in § 86.1818-12.~~

~~(2) Testing to determine compliance with CO<sub>2</sub> exhaust emission standards must be on a loaded vehicle weight (LVW) basis for passenger automobiles and light trucks (including MDPV), and on an adjusted loaded vehicle weight (ALVW) basis for non-MDPV heavy-duty vehicles.~~

~~(3) Testing for the purpose of providing certification data is required only at low altitude conditions. If hardware and software emission control strategies used during low altitude condition testing are not used similarly across all altitudes for in-use operation, the manufacturer must include a statement in the application for certification, in accordance with § 86.1844-01(d)(11), stating what the different strategies are and why they are used.~~

~~(i) *Calculating fleet average carbon-related exhaust emissions for passenger automobiles and light trucks.* (1) Manufacturers must compute separate production-weighted fleet average carbon-related exhaust emissions at the end of the model year for passenger automobiles and light trucks, using actual production, where production means vehicles produced and delivered for sale, and certifying model types to standards as defined in § 86.1818-12. The model type carbon-related exhaust emission results determined according to 40 CFR part~~

600, subpart F (in units of grams per mile rounded to the nearest whole number) become the certification standard for each model type.

(2) Manufacturers must separately calculate production-weighted fleet average carbon-related exhaust emissions levels for the following averaging sets according to the provisions of 40 CFR part 600, subpart F:

(i) Passenger automobiles subject to the fleet average CO<sub>2</sub> standards specified in § 86.1818-12(e)(2);

(ii) Light trucks subject to the fleet average CO<sub>2</sub> standards specified in § 86.1818-12(e)(3);

(iii) Passenger automobiles subject to the Temporary Leadtime Allowance Alternative Standards specified in § 86.1818-12(e), if applicable; and

(iv) Light trucks subject to the Temporary Leadtime Allowance Alternative Standards specified in § 86.1818-12(e), if applicable.

(j) *Certification compliance and enforcement requirements for CO<sub>2</sub> exhaust emission standards:*

(1) Compliance and enforcement requirements are provided in this section and § 86.1848-10.

(2) The certificate issued for each test group requires all model types within that test group to meet the in-use emission standards to which each model type is certified. The in-use standards for passenger automobiles and light trucks (including MDPV) are described in § 86.1818-12(d). The in-use standards for medium-duty vehicles are described in § 86.1819-14(b).

(3) EPA will issue a notice of nonconformity as described in 40 CFR part 85, subpart S, if EPA or the manufacturer determines that a substantial number of a class or category of vehicles produced by that manufacturer, although properly maintained and used, do not conform to in-use CO<sub>2</sub> emission standards, or do not conform to the monitor accuracy and battery durability requirements in § 86.1815-27. The manufacturer must submit a remedial plan in response to a notice of nonconformity as described in 40 CFR 85.1803. The manufacturer's remedial plan would generally be a recall intended to remedy repairable problems to bring nonconforming vehicles into compliance; however, if there is no demonstrable, repairable problem that could be remedied to bring the vehicles into compliance, the manufacturer must submit an alternative plan to address the noncompliance and notify owners. For example, manufacturers may need to calculate a correction to its emission credit balance based on the GHG emissions of the actual number of vehicles produced. Manufacturers may voluntarily recall vehicles to remedy a noncompliance and submit a voluntary recall report as described in 40 CFR part 85, subpart T. Manufacturers may also voluntarily pursue a credit-based or other alternative approach to remedy a noncompliance where appropriate.

(4) Any remedial plan under paragraph (j)(3) of this section, whether voluntary or in response to a notice of nonconformity, must fully correct the difference between the measured in-use CREE of the affected class or category of vehicles and the reported CREE used to calculate the manufacturer's fleet average and credit balances.

(5) The manufacturer may request a hearing under 40 CFR part 1068, subpart G, regarding any voiding of credits or adjustment of debits under paragraph (j)(3) of this section. Manufacturers must submit such a request in writing describing the objection and any supporting data within 30 days after we make a decision.

(6) Each manufacturer must comply with the applicable CO<sub>2</sub> fleet average standard on a production-weighted average basis, at the end of each model year. Use the procedure described in paragraph (i) of this section for passenger automobiles and light trucks

(including MDPV). Use the procedure described in § 86.1819-14(d)(9)(iv) for medium-duty vehicles.

(7) Each manufacturer must comply on an annual basis with the fleet average standards as follows:

(i) Manufacturers must report in their annual reports to the Agency that they met the relevant corporate average standard by showing that the applicable production-weighted average CO<sub>2</sub> emission levels are at or below the applicable fleet average standards; or

(ii) If the production-weighted average is above the applicable fleet average standard, manufacturers must obtain and apply sufficient CO<sub>2</sub> credits as authorized under paragraph (k)(8) of this section. A manufacturer must show that they have offset any exceedance of the corporate average standard via the use of credits. Manufacturers must also include their credit balances or deficits in their annual report to the Agency.

(iii) If a manufacturer fails to meet the corporate average CO<sub>2</sub> standard for four consecutive years, the vehicles causing the corporate average exceedance will be considered not covered by the certificate of conformity (see paragraph (k)(8) of this section). A manufacturer will be subject to penalties on an individual vehicle basis for sale of vehicles not covered by a certificate.

(iv) EPA will review each manufacturer's production to designate the vehicles that caused the exceedance of the corporate average standard. EPA will designate as nonconforming those vehicles in test groups with the highest certification emission values first, continuing until reaching a number of vehicles equal to the calculated number of noncomplying vehicles as determined in paragraph (k)(8) of this section. In a group where only a portion of vehicles would be deemed nonconforming, EPA will determine the actual nonconforming vehicles by counting backwards from the last vehicle produced in that test group. Manufacturers will be liable for penalties for each vehicle sold that is not covered by a certificate.

*(k) Requirements for the CO<sub>2</sub> averaging, banking and trading (ABT) program:*

(1) A manufacturer whose CO<sub>2</sub> fleet average emissions exceed the applicable standard must complete the calculation in paragraph (k)(4) of this section to determine the size of its CO<sub>2</sub> deficit. A manufacturer whose CO<sub>2</sub> fleet average emissions are less than the applicable standard may complete the calculation in paragraph (k)(4) of this section to generate CO<sub>2</sub> credits. In either case, the number of credits or debits must be rounded to the nearest whole number.

(2) There are no property rights associated with CO<sub>2</sub> credits generated under this subpart. Credits are a limited authorization to emit the designated amount of emissions. Nothing in this part or any other provision of law shall be construed to limit EPA's authority to terminate or limit this authorization through a rulemaking.

(3) Each manufacturer must comply with the reporting and recordkeeping requirements of paragraph (l) of this section for CO<sub>2</sub> credits, including early credits. The averaging, banking and trading program is enforceable as provided in paragraphs (k)(7)(ii), (k)(9)(iii), and (l)(1)(vi) of this section through the certificate of conformity that allows the manufacturer to introduce any regulated vehicles into U.S. commerce.

(4) Credits are earned on the last day of the model year. Manufacturers must calculate, for a given model year and separately for passenger automobiles, light trucks, and heavy-duty vehicles, the number of credits or debits it has generated according to the following equation rounded to the nearest megagram:

$$\text{CO}_2\text{-Credits or Debits (Mg)} = [(\text{CO}_2\text{-Standard} - \text{Manufacturer's Production-Weighted Fleet Average CO}_2\text{-Emissions}) \times (\text{Total Number of Vehicles Produced}) \times (\text{Mileage})] \div 1,000,000$$

Where:

~~CO<sub>2</sub>-Standard~~ = the applicable standard for the model year as determined in ~~§ 86.1818 or § 86.1819~~;

~~Manufacturer's Production-Weighted Fleet Average CO<sub>2</sub>-Emissions~~ = average calculated according to paragraph (i) of this section;

~~Total Number of Vehicles Produced~~ = the number of vehicles domestically produced plus those imported as defined in § 600.511-08 of this chapter; and

~~Mileage~~ = useful life value (in miles) for HDV, and vehicle lifetime miles of 195,264 for passenger automobiles and 225,865 for light trucks.

(5) Determine total HDV debits and credits for a model year as described in § 86.1819-

14(d)(6). Determine total passenger car and light truck debits and credits for a model year as described in this paragraph (k)(5). Total credits or debits generated in a model year, maintained and reported separately for passenger automobiles and light trucks, shall be the sum of the credits or debits calculated in paragraph (k)(4) of this section and any of the following credits, if applicable, minus any CO<sub>2</sub>-equivalent debits for N<sub>2</sub>O and/or CH<sub>4</sub> calculated according to the provisions of § 86.1818-12(f)(4):

(i) Air conditioning leakage credits earned according to the provisions of § 86.1867-12(b).

(ii) Air conditioning efficiency credits earned according to the provisions of § 86.1868-12(e).

(iii) Off-cycle technology credits earned according to the provisions of § 86.1869-12(d).

(iv) Full size pickup truck credits earned according to the provisions of § 86.1870-12(e).

(v) Advanced technology vehicle credits earned according to the provisions of § 86.1866-12(b)(3).

(vi) CO<sub>2</sub>-equivalent debits for N<sub>2</sub>O and/or CH<sub>4</sub> accumulated according to the provisions of § 86.1818-12(f)(4).

(6) Unused CO<sub>2</sub>-credits generally retain their full value through five model years after the model year in which they were generated; credits remaining at the end of the fifth model year after the model year in which they were generated may not be used to demonstrate compliance for later model years. However, in the case of model year 2017 and 2018 passenger cars and light trucks, unused CO<sub>2</sub>-credits retain their full value through six model years after the year in which they were generated.

(7) Credits may be used as follows:

(i) Credits generated and calculated according to the method in paragraphs (k)(4) and (5) of this section may not be used to offset deficits other than those deficits accrued within the respective averaging set, except that credits may be transferred between the passenger automobile and light truck fleets of a given manufacturer. Credits may be banked and used in a future model year in which a manufacturer's average CO<sub>2</sub>-level exceeds the applicable standard. Credits may also be traded to another manufacturer according to the provisions in paragraph (k)(8) of this section. Before trading or carrying over credits to the next model year, a manufacturer must apply available credits to offset any deficit, where the deadline to offset that credit deficit has not yet passed. This paragraph (k)(7)(i) applies for MDPV, but not for other HDV.

- ~~(ii) The use of credits shall not change Selective Enforcement Auditing or in-use testing failures from a failure to a non-failure. The enforcement of the averaging standard occurs through the vehicle's certificate of conformity as described in paragraph (k)(8) of this section. A manufacturer's certificate of conformity is conditioned upon compliance with the averaging provisions. The certificate will be void ab initio if a manufacturer fails to meet the corporate average standard and does not obtain appropriate credits to cover its shortfalls in that model year or subsequent model years (see deficit carry-forward provisions in paragraph (k)(8) of this section).~~
- ~~(iii) [Reserved]~~
- ~~(iv) Credits generated in the 2017 through 2020 model years under the provisions of § 86.1818-12(e)(3)(ii) may not be traded or otherwise provided to another manufacturer.~~
- ~~(v) Credits generated under any alternative fleet average standards approved under § 86.1818-12(g) may not be traded or otherwise provided to another manufacturer.~~
- ~~(8) The following provisions apply if a manufacturer calculates that it has negative credits (also called "debits" or a "credit deficit") for a given model year:~~
- ~~(i) The manufacturer may carry the credit deficit forward into the next three model years. Such a carry-forward may only occur after the manufacturer exhausts any supply of banked credits. The deficit must be covered with an appropriate number of credits that the manufacturer generates or purchases by the end of the third model year. Any remaining deficit is subject to a voiding of the certificate ab initio, as described in this paragraph (k)(8). Manufacturers are not permitted to have a credit deficit for four consecutive years.~~
- ~~(ii) If the credit deficit is not offset within the specified time period, the number of vehicles not meeting the fleet average CO<sub>2</sub> standards (and therefore not covered by the certificate) must be calculated:~~
- ~~(A) Determine the negative credits for the noncompliant vehicle category by multiplying the total megagram deficit by 1,000,000 and then dividing by the mileage specified in paragraph (k)(4) of this section.~~
- ~~(B) Divide the result by the fleet average standard applicable to the model year in which the debits were first incurred and round to the nearest whole number to determine the number of vehicles not meeting the fleet average CO<sub>2</sub> standards.~~
- ~~(iii) EPA will determine the vehicles not covered by a certificate because the condition on the certificate was not satisfied by designating vehicles in those test groups with the highest carbon-related exhaust emission values first and continuing until reaching a number of vehicles equal to the calculated number of non-complying vehicles as determined in this paragraph (k)(8). The same approach applies for HDV, except that EPA will make these designations by ranking test groups based on CO<sub>2</sub> emission values. If these calculations determines that only a portion of vehicles in a test group contribute to the debit situation, then EPA will designate actual vehicles in that test group as not covered by the certificate, starting with the last vehicle produced and counting backwards.~~
- ~~(iv)~~
- ~~(A) If a manufacturer ceases production of passenger automobiles, light trucks, or heavy-duty vehicles, the manufacturer continues to be responsible for offsetting any debits outstanding within the required time period. Any failure to offset the debits will be considered a violation of paragraph (k)(8)(i) of this section and may subject~~



- the manufacturer to an enforcement action for sale of vehicles not covered by a certificate, pursuant to paragraphs (k)(8)(ii) and (iii) of this section.
- (B) If a manufacturer is purchased by, merges with, or otherwise combines with another manufacturer, the controlling entity is responsible for offsetting any debits outstanding within the required time period. Any failure to offset the debits will be considered a violation of paragraph (k)(8)(i) of this section and may subject the manufacturer to an enforcement action for sale of vehicles not covered by a certificate, pursuant to paragraphs (k)(8)(ii) and (iii) of this section.
- (v) For purposes of calculating the statute of limitations, a violation of the requirements of paragraph (k)(8)(i) of this section, a failure to satisfy the conditions upon which a certificate(s) was issued and hence a sale of vehicles not covered by the certificate, all occur upon the expiration of the deadline for offsetting debits specified in paragraph (k)(8)(i) of this section.
- (9) The following provisions apply to CO<sub>2</sub> credit trading:
- (i) EPA may reject CO<sub>2</sub> credit trades if the involved manufacturers fail to submit the credit trade notification in the annual report.
  - (ii) A manufacturer may not sell credits that are no longer valid for demonstrating compliance based on the model years of the subject vehicles, as specified in paragraph (k)(6) of this section.
  - (iii) In the event of a negative credit balance resulting from a transaction, both the buyer and seller are liable for the credit shortfall. EPA may void ab initio the certificates of conformity of all test groups that generate or use credits in such a trade.
  - (iv)
    - (A) If a manufacturer trades a credit that it has not generated pursuant to this paragraph (k) or acquired from another party, the manufacturer will be considered to have generated a debit in the model year that the manufacturer traded the credit. The manufacturer must offset such debits by the deadline for the annual report for that same model year.
    - (B) Failure to offset the debits within the required time period will be considered a failure to satisfy the conditions upon which the certificate(s) was issued and will be addressed pursuant to paragraph (k)(8) of this section.
  - (v) A manufacturer may only trade credits that it has generated pursuant to paragraphs (k)(4) and (5) of this section or acquired from another party.
- (10) A manufacturer may generate CO<sub>2</sub> credits from model year 2027 through 2032 electric vehicles that qualify as MDPV and use those credits for certifying medium-duty vehicles, as follows:
- (i) Determine the emission standards from § 86.1818-12 for qualifying vehicles based on the CO<sub>2</sub> target values for light trucks and the footprint for each vehicle.
  - (ii) Calculate generated credits separately for qualifying vehicles as described in paragraph (k)(4) of this section based on the emission standards from paragraph (k)(10)(i) of this section, the mileage values for light trucks, and the total number of qualifying vehicles produced, with fleet average CO<sub>2</sub> emissions set to 0.
  - (iii) Apply generated credits to eliminate any deficit for light trucks before using them to certify medium-duty vehicles.
  - (iv) Apply the credit provisions of this section as specified, except that you may not buy or sell credits generated under this paragraph (k)(10).



~~(v) Describe in the annual credit reports how you are generating certain credit quantities under this paragraph (k)(10). Also describe in your end of year credit report how you will use those credits for certifying light trucks or medium-duty vehicles in a given model year.~~

~~(1) Maintenance of records and submittal of information relevant to compliance with fleet average CO<sub>2</sub> standards—~~

~~(1) Maintenance of records:~~

~~(i) Manufacturers producing any light-duty vehicles, light-duty trucks, medium-duty passenger vehicles, or other heavy-duty vehicles subject to the provisions in this subpart must establish, maintain, and retain all the following information in adequately organized records for each model year:~~

~~(A) Model year.~~

~~(B) Applicable fleet average CO<sub>2</sub> standards for each averaging set as defined in paragraph (i) of this section.~~

~~(C) The calculated fleet average CO<sub>2</sub> value for each averaging set as defined in paragraph (i) of this section.~~

~~(D) All values used in calculating the fleet average CO<sub>2</sub> values.~~

~~(ii) Manufacturers must establish, maintain, and retain all the following information in adequately organized records for each vehicle produced that is subject to the provisions in this subpart:~~

~~(A) Model year.~~

~~(B) Applicable fleet average CO<sub>2</sub> standard.~~

~~(C) EPA test group.~~

~~(D) Assembly plant.~~

~~(E) Vehicle identification number.~~

~~(F) Carbon-related exhaust emission standard (automobile and light truck only), N<sub>2</sub>O emission standard, and CH<sub>4</sub> emission standard to which the vehicle is certified.~~

~~(G) In-use carbon-related exhaust emission standard for passenger automobiles and light truck, and in-use CO<sub>2</sub> standard for HDV.~~

~~(H) Information on the point of first sale, including the purchaser, city, and state.~~

~~(iii) Manufacturers must retain all required records for a period of eight years from the due date for the annual report. Records may be stored in any format and on any media, as long as manufacturers can promptly send EPA organized written records in English if requested by the Administrator. Manufacturers must keep records readily available as EPA may review them at any time.~~

~~(iv) The Administrator may require the manufacturer to retain additional records or submit information not specifically required by this section.~~

~~(v) Pursuant to a request made by the Administrator, the manufacturer must submit to the Administrator the information that the manufacturer is required to retain.~~

~~(vi) EPA may void ab initio a certificate of conformity for vehicles certified to emission standards as set forth or otherwise referenced in this subpart for which the manufacturer fails to retain the records required in this section or to provide such information to the Administrator upon request, or to submit the reports required in this section in the specified time period.~~

~~(2) Reporting:~~

~~(i) Each manufacturer must submit an annual report. The annual report must contain for each applicable CO<sub>2</sub> standard, the calculated fleet average CO<sub>2</sub> value, all values required~~

to calculate the CO<sub>2</sub> emissions value, the number of credits generated or debits incurred, all the values required to calculate the credits or debits, and the resulting balance of credits or debits. For each applicable alternative N<sub>2</sub>O and/or CH<sub>4</sub> standard selected under the provisions of § 86.1818-12(f)(3) for passenger automobiles and light trucks (or § 86.1819-14(e) for HDV), the report must contain the CO<sub>2</sub>-equivalent debits for N<sub>2</sub>O and/or CH<sub>4</sub> calculated according to § 86.1818-12(f)(4) (or § 86.1819-14(e) for HDV) for each test group and all values required to calculate the number of debits incurred.

(ii) For each applicable fleet average CO<sub>2</sub> standard, the annual report must also include documentation on all credit transactions the manufacturer has engaged in since those included in the last report. Information for each transaction must include all of the following:

- (A) Name of credit provider.
- (B) Name of credit recipient.
- (C) Date the trade occurred.
- (D) Quantity of credits traded in megagrams.
- (E) Model year in which the credits were earned.

(iii) Manufacturers calculating air conditioning leakage and/or efficiency credits under paragraph § 86.1871-12(b) shall include the following information for each model year and separately for passenger automobiles and light trucks and for each air conditioning system used to generate credits:

- (A) A description of the air conditioning system.
- (B) The leakage credit value and all the information required to determine this value.
- (C) The total credits earned for each averaging set, model year, and region, as applicable.

(iv) Manufacturers calculating advanced technology vehicle credits under paragraph § 86.1871-12(e) shall include the following information for each model year and separately for passenger automobiles and light trucks:

- (A) The number of each model type of eligible vehicle sold.
- (B) The cumulative model year production of eligible vehicles starting with the 2009 model year.
- (C) The carbon related exhaust emission value by model type and model year.

(v) Manufacturers calculating off cycle technology credits under paragraph § 86.1871-12(d) shall include, for each model year and separately for passenger automobiles and light trucks, all test results and data required for calculating such credits.

(vi) Unless a manufacturer reports the data required by this section in the annual production report required under § 86.1844-01(e) or the annual report required under § 600.512-12 of this chapter, a manufacturer must submit an annual report for each model year after production ends for all affected vehicles produced by the manufacturer subject to the provisions of this subpart and no later than May 1 of the calendar year following the given model year. Annual reports must be submitted to: Director, Compliance Division, U.S. Environmental Protection Agency, 2000 Traverwood Dr., Ann Arbor, Michigan 48105.

(vii) Failure by a manufacturer to submit the annual report in the specified time period for all vehicles subject to the provisions in this section is a violation of section 203(a)(1) of the Clean Air Act (42 U.S.C. 7522 (a)(1)) for each applicable vehicle produced by that manufacturer.

(viii) If EPA or the manufacturer determines that a reporting error occurred on an annual report previously submitted to EPA, the manufacturer's credit or debit calculations will be recalculated. EPA may void erroneous credits, unless traded, and will adjust erroneous debits. In the case of traded erroneous credits, EPA must adjust the selling manufacturer's credit balance to reflect the sale of such credits and any resulting credit deficit.

~~(3) Notice of opportunity for hearing. Any voiding of the certificate under paragraph (1)(1)(vi) of this section will be made only after EPA has offered the affected manufacturer an opportunity for a hearing conducted in accordance with 40 CFR part 1068, subpart G, and, if a manufacturer requests such a hearing, will be made only after an initial decision by the Presiding Officer.~~

[81 FR 73992, Oct. 25, 2016, as amended at 85 FR 22620, Apr. 23, 2020; 86 FR 74524, Dec. 30, 2021; 89 FR 28193, Apr. 18, 2024]

**~~§ 86.1866-12 CO<sub>2</sub> credits for advanced technology vehicles.~~**

~~This section describes how to apply CO<sub>2</sub> credits for advanced technology passenger automobiles and light trucks (including MDPV). This section does not apply for heavy-duty vehicles that are not MDPV.~~

~~(a) Battery electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles that are certified and produced for sale in the states and territories of the United States may use a value of zero grams CO<sub>2</sub> per mile to represent the proportion of electric operation of a vehicle that is derived from electricity generated from sources that are not onboard the vehicle.~~

~~(b) For electric vehicles, plug-in hybrid electric vehicles, fuel cell vehicles, dedicated natural gas vehicles, and dual-fuel natural gas vehicles as those terms are defined in § 86.1803-01, that are certified and produced for U.S. sale in the specified model years and that meet the additional specifications in this section, the manufacturer may use the production multipliers in this paragraph (b) when determining additional credits for advanced technology vehicles. Full-size pickup trucks eligible for and using a production multiplier are not eligible for the strong hybrid-based credits described in § 86.1870-12(a)(2) or the performance-based credits described in § 86.1870-12(b).~~

~~(1) The following production multipliers apply for model year 2017 through 2025 vehicles:~~

**TABLE 1 TO PARAGRAPH (B)(1)**

Model year	Electric vehicles and fuel cell vehicles	Plug-in hybrid electric vehicles	Dedicated and dual-fuel natural gas vehicles
2017	2.0	1.6	1.6
2018	2.0	1.6	1.6
2019	2.0	1.6	1.6
2020	1.75	1.45	1.45
2021	1.5	1.3	1.3
2022			2.0
2023-2024	1.5	1.3	

~~(2) The minimum all-electric driving range that a plug-in hybrid electric vehicle must have in order to qualify for use of a production multiplier is 10.2 miles on its nominal storage~~

capacity of electricity when operated on the highway fuel economy test cycle. Alternatively, a plug-in hybrid electric vehicle may qualify for use of a production multiplier by having an equivalent all-electric driving range greater than or equal to 10.2 miles during its actual charge-depleting range as measured on the highway fuel economy test cycle and tested according to the requirements of SAE J1711 (incorporated by reference in § 86.1). The equivalent all-electric range of a PHEV is determined from the following formula:

$$EAER = R_{CDA} \times (CO_{2CS} - CO_{2CD} / CO_{2CS})$$

Where:

EAER—the equivalent all-electric range attributed to charge-depleting operation of a plug-in hybrid electric vehicle on the highway fuel economy test cycle.

$R_{CDA}$ —The actual charge-depleting range determined according to SAE J1711 (incorporated by reference in § 86.1).

$CO_{2CS}$ —The charge-sustaining  $CO_2$  emissions in grams per mile on the highway fuel economy test determined according to SAE J1711 (incorporated by reference in § 86.1).

$CO_{2CD}$ —The charge-depleting  $CO_2$  emissions in grams per mile on the highway fuel economy test determined according to SAE J1711 (incorporated by reference in § 86.1).

(3) The actual production of qualifying vehicles may be multiplied by the applicable value according to the model year, and the result, rounded to the nearest whole number, may be used to represent the production of qualifying vehicles when calculating average carbon-related exhaust emissions under § 600.512 of this chapter.

(c) Calculating multiplier-based credits for advanced technology vehicles: This paragraph (c) describes the method for calculating credits using the production multipliers in paragraph (b) of this section. Production multipliers must be used according to this paragraph (c) and must not be used in calculating fleet average carbon-related exhaust emissions under 40 CFR part 600 or § 86.1865-12(i), or in any elements of the equation used for the calculation of  $CO_2$  credits or debits in § 86.1865-12(k)(4). Calculate credits for advanced technology vehicles for a given model year, and separately for passenger automobiles and light trucks, using the following equation, subtracting the credits calculated for the base fleet from the credits calculated for the fleet with multipliers applied. No credits are earned if the result is a negative value. All values expressed in megagrams shall be rounded to the nearest whole number.

$$Credits [Mg] = [Credits_{adj}] - [Credits_{base}]$$

(1) For model year 2017–2021 multipliers, determine adjusted fleet credits ( $Credits_{adj}$ ) in megagrams using one of the following methods, where the resulting  $Credits_{adj}$  is rounded to the nearest whole number. Use the method that returns the highest total megagrams. For 2022 and later model years, determine adjusted fleet credits ( $Credits_{adj}$ ) in megagrams using only Method 1 in paragraph (e)(1)(i) of this section, where the resulting  $Credits_{adj}$  is rounded to the nearest whole number. Note that the adjusted  $CO_2$  standard ( $S_{adj}$ ) and the adjusted fleet average carbon-related exhaust emissions ( $E_{adj}$ ) are determined solely for the purpose of calculating advanced technology vehicle credits in this section; the official  $CO_2$  standard applicable to the fleet will continue to be the value calculated and rounded according to § 86.1818-12(e), and the official fleet average carbon-related exhaust emissions applicable to the fleet will continue to be the value calculated and rounded according to 40 CFR 600.510-12(j). In addition, note that the rounding requirements in this section differ from those specified for the official fleet standards calculated under § 86.1818-12 and for the official fleet average carbon-related exhaust emissions calculated under 40 CFR 600.510-12.

(i) Method 1: All values that determine fleet credits are adjusted using the applicable multipliers.

$$\text{Credits}_{adj} [Mg] = \left[ \frac{(S_{adj} - E_{adj}) \times P_{adj} \times VLM}{1,000,000} \right]$$

Where:

$S_{adj}$  = adjusted  $\text{CO}_2$  standard calculated according to the method described in § 86.1818-12(e), except that the actual production of qualifying vehicles under this section shall be multiplied by the applicable production multiplier, and no rounding shall be applied to the result.

$E_{adj}$  = adjusted production-weighted fleet average carbon-related exhaust emissions calculated according to the method described in 40 CFR 600.510-12(j), except that the actual production of qualifying vehicles under this section shall be multiplied by the applicable production multiplier, and no rounding shall be applied to the result.

$P_{adj}$  = total adjusted production of passenger automobiles or light trucks, except that the actual production of qualifying vehicles under this section shall be multiplied by the applicable production multiplier, and no rounding shall be applied to the result.

VLM = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.

(ii) Method 2: Multipliers are applied only to calculation of the fleet average carbon-related exhaust emissions.

$$\text{Credits}_{adj} [Mg] = \left[ \frac{(S_{base} - E_{adj}) \times P_{base} \times VLM}{1,000,000} \right]$$

$S_{base}$  =  $\text{CO}_2$  standard calculated according to the method described in § 86.1818-12(e), except that no rounding shall be applied to the result.

$E_{adj}$  = adjusted production-weighted fleet average carbon-related exhaust emissions calculated according to the method described in 40 CFR 600.510-12(j), except that the actual production of qualifying vehicles under this section shall be multiplied by the applicable production multiplier, and no rounding shall be applied to the result.

$P_{base}$  = total production of passenger automobiles or light trucks.

VLM = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.

(2) Determine base fleet credits in megagrams using the following equation and rounding the result to the nearest whole number. Do not adjust any production volume values with a multiplier. Note that the  $\text{CO}_2$  standard ( $S_{base}$ ) and the fleet average carbon-related exhaust emissions ( $E_{base}$ ) are determined solely for the purpose of calculating advanced technology vehicle credits in this section and do not replace the official fleet values; the official  $\text{CO}_2$  standard applicable to the fleet will continue to be the value calculated and rounded according to § 86.1818-12(e), and the official fleet average carbon-related exhaust emissions applicable to the fleet will continue to be the value calculated and rounded according to 40 CFR 600.510-12(j). In addition, note that the rounding requirements in this section differ from those specified for the official fleet standards calculated under § 86.1818-12 and for the official fleet average carbon-related exhaust emissions calculated under 40 CFR 600.510-12.

$$\text{Credits}_{base} [Mg] = \left[ \frac{(S_{base} - E_{base}) \times P_{base} \times VLM}{1,000,000} \right]$$

$S_{base}$  =  $\text{CO}_2$  standard calculated according to the method described in § 86.1818-12(e), except that no rounding shall be applied to the result.

~~E<sub>base</sub> = production-weighted fleet average carbon-related exhaust emissions calculated according to the method described in 40 CFR 600.510-12(j), except that no rounding shall be applied to the result.~~

~~P<sub>base</sub> = total production of passenger automobiles or light trucks.~~

~~VLM = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.~~

~~(3) Multiplier-based credits for model years 2022 through 2024 may not exceed credit caps, as follows:~~

~~(i) Calculate a nominal annual credit cap in Mg using the following equation, rounded to the nearest whole number:~~

$$\text{CAP}_{\text{annual}} = 5.0 \frac{\text{g}}{\text{mile}} \cdot [195,264 \text{ miles} \cdot P_{\text{auto}} + 225,865 \cdot P_{\text{truck}}] \cdot 10^{-6} \frac{\text{tonne}}{\text{g}}$$

~~Where:~~

~~P<sub>auto</sub> = total number of certified passenger automobiles the manufacturer produced in a given model year for sale in any state or territory of the United States.~~

~~P<sub>truck</sub> = total number of certified light trucks (including MDPV) the manufacturer produced in a given model year for sale in any state or territory of the United States.~~

~~(ii) Calculate an annual g/mile equivalent value for the multiplier-based credits using the following equation, rounded to the nearest 0.1 g/mile:~~

$$\text{annual g per mile equivalent value} = 5.0 \cdot \frac{\text{annual credits}}{\text{CAP}_{\text{annual}}}$$

~~Where:~~

~~annual credits = a manufacturer's total multiplier-based credits in a given model year from all passenger automobiles and light trucks as calculated under this paragraph (c).~~

~~(iii) Calculate a cumulative g/mile equivalent value for the multiplier-based credits in each year by adding the annual g/mile equivalent values calculated under paragraph (c)(3)(ii) of this section.~~

~~(iv) The cumulative g/mile equivalent value may not exceed 10.0 in any year.~~

~~(v) For every year of certifying with multiplier-based credits, the annual credit report must include the calculated values for the nominal annual credit cap in Mg and the cumulative g/mile equivalent value.~~

~~[77 FR 63164, Oct. 15, 2012, as amended at 81 FR 73996, Oct. 25, 2016; 85 FR 22620, Apr. 23, 2020; 85 FR 25269, Apr. 30, 2020; 86 FR 74524, Dec. 30, 2021; 89 FR 28194, Apr. 18, 2024]~~

#### **§ 86.1867-12 CO<sub>2</sub> credits for reducing leakage of air conditioning refrigerant.**

Manufacturers may generate credits applicable to the CO<sub>2</sub> fleet average program described in § 86.1865-12 by implementing specific air conditioning system technologies designed to reduce air conditioning refrigerant leakage over the useful life of their passenger automobiles and/or light trucks (including MDPV); only the provisions of paragraph (a) of this section apply for non-MDPV heavy-duty vehicles. Credits shall be calculated according to this section for each air conditioning system that the manufacturer is using to generate CO<sub>2</sub> credits.

(a) Calculate an annual rate of refrigerant leakage from an air conditioning system as follows, expressed to the nearest 0.1 grams per year:

(1) Through model year 2026, calculate leakage rates according to the procedures specified in SAE J2727 FEB2012 (incorporated by reference, see § 86.1). In doing so, the refrigerant permeation rates for hoses shall be determined using the procedures specified in SAE J2064 (incorporated by reference, § 86.1). The procedures of SAE J2727 may be used to determine



leakage rates for HFC-134a and HFO-1234yf; manufacturers should contact EPA regarding procedures for other refrigerants.

(2) For model years 2027 through 2030, calculate leakage rates according to the procedures specified in SAE J2727 SEP2023 (incorporated by reference, § 86.1).

(b) The CO<sub>2</sub>-equivalent gram per mile leakage reduction used to calculate the total leakage credits generated by an air conditioning system shall be determined according to this paragraph (b), separately for passenger automobiles and light trucks, and rounded to the nearest tenth of a gram per mile:

(1) Passenger automobile leakage credit for an air conditioning system:

Equation 1 to Paragraph (b)(1)

$$\text{Leakage Credit} = \text{MaxCredit} \left[ 1 - \frac{\text{LeakScore}}{16.6} \times \frac{\text{GWP}_{\text{REF}}}{1430} \right] - \text{HiLeakDis}$$

Where:

*MaxCredit* is 12.6 (grams CO<sub>2</sub>-equivalent/mile) for air conditioning systems using HFC-134a, and 13.8 (grams CO<sub>2</sub>-equivalent/mile) for air conditioning systems using a refrigerant with a lower global warming potential.

*LeakScore* means the annual refrigerant leakage rate determined according to paragraph (a) of this section. If the calculated rate is less than 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors), the rate for the purpose of this formula shall be 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors).

*GWP<sub>REF</sub>* means the global warming potential of the refrigerant as indicated in paragraph (e) of this section or as otherwise determined by the Administrator.

*HiLeakDis* means the high leak disincentive, which is determined using the following equation, except that if *GWP<sub>REF</sub>* is greater than 150 or if the calculated result of the equation is less than zero, *HiLeakDis* shall be set equal to zero, or if the calculated result of the equation is greater than 1.8 g/mi, *HiLeakDis* shall be set to 1.8 g/mi:

Equation 2 to Paragraph (b)(1)

$$\text{HiLeakDis} = 1.8 \times \frac{(\text{LeakScore} - \text{LeakThreshold})}{3.3}$$

Where:

*LeakThreshold* = 11.0 for air conditioning systems with a refrigerant capacity less than or equal to 733 grams; or *LeakThreshold* = [*Refrigerant Capacity* × 0.015] for air conditioning systems with a refrigerant capacity greater than 733 grams, where *Refrigerant Capacity* is the maximum refrigerant capacity specified for the air conditioning system, in grams.

(2) Light truck leakage credit for an air conditioning system:

Equation 3 to Paragraph (b)(2)

$$\text{Leakage Credit} = \text{MaxCredit} \left[ 1 - \frac{\text{LeakScore}}{20.7} \times \frac{\text{GWP}_{\text{REF}}}{1430} \right] - \text{HiLeakDis}$$

Where:

*MaxCredit* is 15.6 (grams CO<sub>2</sub>-equivalent/mile) for air conditioning systems using HFC-134a, and 17.2 (grams CO<sub>2</sub>-equivalent/mile) for air conditioning systems using a refrigerant with a lower global warming potential.

*LeakScore* means the annual refrigerant leakage rate determined according to paragraph (a) of this section. If the calculated rate is less than 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors), the rate for the purpose of this formula shall be 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors).

~~*GWP<sub>REF</sub>* means the global warming potential of the refrigerant as indicated in paragraph (e) of this section or as otherwise determined by the Administrator.~~

~~*HiLeakDis* means the high leak disincentive, which is determined using the following equation, except that if *GWP<sub>REF</sub>* is greater than 150 or if the calculated result of the equation is less than zero, *HiLeakDis* shall be set equal to zero, or if the calculated result of the equation is greater than 2.1 g/mi, *HiLeakDis* shall be set to 2.1 g/mi:~~

~~Equation 4 to Paragraph (b)(2)~~

~~$$HiLeakDis = 2.1 \cdot \frac{(LeakScore - LeakThreshold)}{3.3}$$~~

~~Where:~~

~~*LeakThreshold* = 11.0 for air conditioning systems with a refrigerant capacity less than or equal to 733 grams; or *LeakThreshold* = [*Refrigerant Capacity* × 0.015] for air conditioning systems with a refrigerant capacity greater than 733 grams, where *Refrigerant Capacity* is the maximum refrigerant capacity specified for the air conditioning system, in grams.~~

~~(c) Calculate the total leakage credits generated by the air conditioning system as follows:~~

~~(1) Calculate a total leakage credit in megagrams separately for passenger automobiles and light trucks using the following equation:~~

~~Equation 5 to Paragraph (c)(1)~~

~~$$Total\ Credits = \frac{Leakage \cdot Production \cdot VLM}{1,000,000}$$~~

~~Where:~~

~~*Leakage* = the CO<sub>2</sub>-equivalent leakage credit value in grams per mile determined in paragraph (b) of this section, subject to the maximum values specified in paragraph (c)(2) of this section.~~

~~*Production* = The total number of passenger automobiles or light trucks, whichever is applicable, produced with the air conditioning system to which to the leakage credit value from paragraph (b)(1) or (2) of this section applies.~~

~~*VLM* = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.~~

~~(2) Total leakage credits may not exceed the following maximum per vehicle values in model years 2027 through 2030:~~

~~TABLE 1 TO PARAGRAPH (C)(2) — MAXIMUM LEAKAGE CREDIT VALUES  
[G/MILE]~~

Model year	Passenger automobiles	Light trucks
2027	11.0	13.8
2028	8.3	10.3
2029	5.5	6.9
2030	2.8	3.4

~~(d) The results of paragraph (c) of this section, rounded to the nearest whole number, shall be included in the manufacturer's credit/debit totals calculated in § 86.1865-12(k)(5).~~

~~(e) The following values for refrigerant global warming potential (*GWP<sub>REF</sub>*), or alternative values as determined by the Administrator, shall be used in the calculations of this section. The Administrator will determine values for refrigerants not included in this paragraph (e) upon request by a manufacturer.~~

- (1) For HFC-134a,  $GWP_{REF}=1430$ ;
- (2) For HFC-152a,  $GWP_{REF}=124$ ;
- (3) For HFO-1234yf,  $GWP_{REF}=1$ ; and
- (4) For CO<sub>2</sub>,  $GWP_{REF}=1$ .

[89 FR 28196, Apr. 18, 2024]

#### **~~§ 86.1867-31 CO<sub>2</sub> credits for reducing leakage of air conditioning refrigerant.~~**

~~Manufacturers may generate credits applicable to the CO<sub>2</sub> fleet average program described in § 86.1865-12 by implementing specific air conditioning system technologies designed to reduce air conditioning refrigerant leakage over the useful life of their passenger automobiles and light trucks (including MDPV). Calculate credits for each air conditioning system used to generate CO<sub>2</sub> credits. This section applies starting with model year 2031.~~

~~(a) Calculate an annual rate of refrigerant leakage from an air conditioning system in grams per year for refrigerants with GWP at or below 150 according to the procedures specified in SAE J2727 SEP2023 (incorporated by reference, see § 86.1).~~

~~(b) Determine the CO<sub>2</sub>-equivalent gram per mile leakage reduction separately for passenger automobiles and light trucks, as follows:~~

~~(1) Calculate the leakage credit to the nearest 0.1 g/mile using the following equation:~~

~~Equation 1 to Paragraph (b)(1)~~

$$\text{Leakage Credit} = \text{MaxCredit} \left[ 1 - \frac{GWP_{REF}}{150} \right] - \text{HiLeakDis}$$

~~Where:~~

~~MaxCredit is the maximum per vehicle value of the leakage credit. Use 1.6 g/mile for passenger automobiles and 2.0 g/mile for light trucks.~~

~~$GWP_{REF}$  means the global warming potential of the refrigerant as indicated in paragraph (c) of this section.~~

~~$HiLeakDis$  is the high leak disincentive, as determined in paragraph (b)(2) of this section.~~

~~(2) Calculate the high leak disincentive,  $HiLeakDis$ , using the following equation, except that if the calculated result is less than zero, set  $HiLeakDis$  equal to zero:~~

~~Equation 2 to Paragraph (b)(2)~~

$$\text{HiLeakDis} = K \frac{(\text{LeakScore} - \text{LeakThreshold})}{3.3}$$

~~Where:~~

~~$K$  = a constant. Use 1.6 for passenger automobiles and 2.0 for light trucks.~~

~~$LeakScore$  means the annual refrigerant leakage rate as described in paragraph (a) of this section, expressed to the nearest 0.1 grams per year. If the calculated rate for passenger automobiles is less than 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors), use 8.3 grams/year (or 4.1 grams/year for systems using only electric compressors). If the calculated rate for light trucks is less than 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors), use 10.4 grams/year (or 5.2 grams/year for systems using only electric compressors).~~

~~$LeakThreshold = 11.0$  or  $[Refrigerant Capacity \times 0.015]$ , whichever is greater, where  $Refrigerant Capacity$  is the maximum refrigerant capacity specified for the air conditioning system, in grams.~~

~~(c) Calculate the total leakage reduction credits generated by the air conditioning system separately for passenger automobiles and light trucks to the nearest whole megagram using the following equation:~~

Equation 3 to Paragraph (c)

$$\text{Total Credits} = \frac{\text{Leakage} \cdot \text{Production} \cdot \text{VLM}}{1,000,000}$$

Where:

**Leakage**—the CO<sub>2</sub>-equivalent **leakage** credit value in grams per mile determined in paragraph (b) of this section for passenger automobiles or light trucks.

**Production**—The total number of passenger automobiles or light trucks, produced with the air conditioning system to which to the **leakage** credit value from paragraph (b) of this section applies.

**VLM**—vehicle lifetime miles. Use 195,264 for passenger automobiles and 225,865 for light trucks.

(d) Include the results of paragraph (c) of this section in your credit totals calculated in § 86.1865-12(k)(5).

(e) Calculate leakage credits using values for refrigerant global warming potential ( $GWP_{REF}$ ) as follows:

(1) Use the following values for the specific refrigerants:

(i) For HFC-152a,  $GWP_{REF}=124$ .

(ii) For HFO-1234yf,  $GWP_{REF}=1$ .

(iii) For CO<sub>2</sub>,  $GWP_{REF}=1$ .

(2) EPA will assign values for  $GWP_{REF}$ , up to a value of 150, for other refrigerants upon request.

[89 FR 28196, Apr. 18, 2024]

44. Amend § 86.1868-12 by:

a. Revising the introductory text and paragraph (c);

b. Removing and reserving paragraph (d); and

c. Revising paragraphs (g) introductory text and (g)(3) introductory text.

The revisions read as follows:

### § 86.1868-12 CO<sub>2</sub> credits for improving the efficiency of air conditioning systems.

The regulation at 40 CFR 600.510 describes how ~~M~~anufacturers may calculate fuel consumption improvement values based on improvements to air conditioning efficiency. This section describes how to calculate credits to determine the average fuel economy for comparing to the Corporate Average Fuel Economy standard. generate credits applicable to the CO<sub>2</sub> fleet average program described in § 86.1865-12 by implementing specific air conditioning system technologies designed to reduce air conditioning related CO<sub>2</sub> emissions over the useful life of their passenger automobiles and light trucks (including MDPV). The provisions of this section

do not apply for medium-duty vehicles. Credits shall be calculated according to this section for each air conditioning system that the manufacturer is using to generate CO<sub>2</sub> credits.

Manufacturers must validate credits under this section based on testing as described in paragraph (g) of this section. Starting in model year 2027, manufacturers may generate credits under this section only for vehicles propelled by internal combustion engines.

\* \* \* \* \*

(c) The total efficiency credits generated by an air conditioning system shall be calculated in megagrams separately for passenger automobiles and light trucks according to the following formula:

Equation 1 to Paragraph (c)

$$\text{Total Credits} = \frac{\text{Credit} \cdot \text{Production} \cdot \text{VLM}}{1,000,000}$$

Where:

*Credit* = the CO<sub>2</sub>-air conditioning efficiency credit ~~value~~ in grams per mile determined in paragraph (b) of this section, ~~whichever is applicable~~. Starting in model year 2027, multiply the credit value for PHEV by (1-UF), where *UF* = the fleet utility factor established under 40 CFR 600.116-12(c)(1) or (c)(10)(iii) (weighted 55 percent city, 45 percent highway).

*Production* = The total number of passenger automobiles or light trucks, whichever is applicable, produced with the air conditioning system to which the efficiency credit value from paragraph (b) of this section applies.

*VLM* = vehicle lifetime miles, which for passenger automobiles shall be 195,264 and for light trucks shall be 225,865.

~~(d) The results of paragraph (e) of this section, rounded to the nearest whole number, shall be included in the manufacturer's credit/debit totals calculated in § 86.1865-12(k)(5).~~

~~(e)~~-(f) [Reserved]

(g) For AC17 validation testing and reporting requirements, manufacturers must validate air conditioning efficiency credits by using the AC17 Test Procedure in 40 CFR 1066.845 as follows:

\* \* \* \* \*

(3) For the first model year for which an air conditioning system is expected to generate credits, the manufacturer must select for testing the projected highest-selling vehicle configuration within each combination of vehicle platform and air conditioning system (as those terms are defined in § 86.1803). The manufacturer must test at least one unique air conditioning system within each vehicle platform in a model year, unless all unique air conditioning systems within a vehicle platform have been previously tested. A unique air conditioning system design is a system with unique or substantially different component designs or types and/or system control strategies (*e.g.*, fixed-displacement vs. variable displacement compressors, orifice tube vs. thermostatic expansion valve, single vs. dual evaporator, etc.). In the first year of such testing, the tested vehicle configuration shall be the highest production vehicle configuration within each platform. In subsequent model years the manufacturer must test other unique air conditioning systems within the vehicle platform, proceeding from the highest production untested system until all unique air conditioning systems within the platform have been tested, or until the vehicle platform experiences a major redesign. Whenever a new unique air conditioning system is tested, the highest production vehicle configuration using that system shall be the vehicle selected for testing. Credits may continue to be generated by the air conditioning system installed in a vehicle platform provided that:

\* \* \* \* \*

45. Amend § 86.1869-12 by revising the introductory text and paragraphs (a), (b)(1) introductory text, (b)(2) introductory text, (b)(2)(v), (c) introductory text, and (e)(2)(i) to read as follows:

**§ 86.1869-12 CO<sub>2</sub> credits for off-cycle CO<sub>2</sub> reducing technologies.**

The regulation at 40 CFR 600.510 describes how manufacturers may calculate fuel consumption improvement values based on vehicle improvements that are not reflected in testing to demonstrate compliance with exhaust emission standards. This section describes how to



~~calculate credits to determine the average fuel economy for comparing to the Corporate Average Fuel Economy standard. This section describes how manufacturers may generate credits for off-cycle CO<sub>2</sub>-reducing technologies through model year 2032. The provisions of this section do not apply for medium-duty vehicles, except that § 86.1819-14(d)(13) describes how to apply paragraphs (c) and (d) of this section for those vehicles.~~ Manufacturers may no longer generate credits under this section starting in model year 2027 for vehicles deemed to have zero tailpipe emissions and in model year 2033 for all other vehicles. Manufacturers may no longer generate credits under paragraphs (c) and (d) of this section for any type of vehicle starting in model year 2027.

(a) Manufacturers may generate credits for CO<sub>2</sub>-reducing technologies where the CO<sub>2</sub> reduction benefit of the technology is not adequately captured on the Federal Test Procedure and/or the Highway Fuel Economy Test such that the technology would not be otherwise installed for purposes of ~~meeting Corporate Average Fuel Economy standards reducing emissions (directly or indirectly) over those test cycles for compliance with the GHG standards.~~ These technologies must have a measurable, demonstrable, and verifiable real-world CO<sub>2</sub> reduction that occurs outside the conditions of the Federal Test Procedure and the Highway Fuel Economy Test. These optional credits are referred to as “off-cycle” credits. The technologies must not be integral or inherent to the basic vehicle design, such as engine, transmission, mass reduction, passive aerodynamic design, and tire technologies. Technologies installed for non-off-cycle emissions related reasons are also not eligible as they would be considered part of the baseline vehicle design. The technology must not be inherent to the design of occupant comfort and entertainment features except for technologies related to reducing passenger air conditioning demand and improving air conditioning system efficiency. Notwithstanding the provisions of this paragraph (a), off-cycle menu technologies included in paragraph (b) of this section remain eligible for credits. Off-cycle technologies used to generate emission credits are considered emission-related components subject to applicable requirements and must be demonstrated to be effective for the full useful life of the vehicle. Unless the manufacturer demonstrates that the technology is not subject to in-use deterioration, the manufacturer must account for the deterioration in their analysis. Durability evaluations of off-cycle technologies may occur at any time throughout a model year, provided that the results can be factored into the data provided in the model year report. Off-cycle credits may not be approved for crash-avoidance technologies, safety critical systems or systems affecting safety-critical functions, or technologies designed for the purpose of reducing the frequency of vehicle crashes. Off-cycle credits may not be earned for technologies installed on a motor vehicle to attain compliance with any vehicle safety standard or any regulation set forth in Title 49 of the Code of Federal Regulations. The manufacturer must use one of the three options specified in this section to ~~establish off-cycle credits under this section. determine the CO<sub>2</sub>-gram per mile credit applicable to an off-cycle technology. Note that the option provided in paragraph (b) of this section applies only to the 2014 and later model years. The manufacturer should notify EPA in their pre-model year report of their intention to generate any credits under this section.~~

(b) \* \* \*

(1) The manufacturer may generate ~~a CO<sub>2</sub>-gram/mile off-cycle credits~~ for certain technologies as specified in this paragraph (b)(1). Technology definitions are in paragraph (b)(4) of this section. Calculated credit values shall be rounded to the nearest 0.1 grams/mile.  
\* \* \* \* \*

(2) The maximum allowable ~~off-cycle credit for the decrease in the manufacturer's~~ combined passenger automobile and light truck fleet ~~average CO<sub>2</sub> emissions~~ attributable to use of the



default credit values in paragraph (b)(1) of this section is specified in paragraph (b)(2)(v) of this section. If the total of the ~~off-cycle CO<sub>2</sub>-g/mi~~ credit values from paragraph (b)(1) of this section does not exceed the specified off-cycle credit cap for any passenger automobile or light truck in a manufacturer's fleet, then the total off-cycle credits may be calculated according to paragraph (f) of this section. If the total of the ~~off-cycle CO<sub>2</sub>-g/mi~~ credit values from paragraph (b)(1) of this section exceeds the specified off-cycle credit cap for any passenger automobile or light truck in a manufacturer's fleet, then the gram per mile decrease for the combined passenger automobile and light truck fleet must be determined according to paragraph (b)(2)(ii) of this section to determine whether the applicable limitation has been exceeded.

\* \* \* \* \*

(v) The manufacturer's combined passenger automobile and light truck fleet average ~~off-cycle credits CO<sub>2</sub>-emissions~~ attributable to use of the default credit values in paragraph (b)(1) of this section may not exceed the following specific values:

Model year	Off-cycle credit cap (g/mile)
(A) 2023-2026	15
(B) 2027-2030	10
(C) 2031	8.0
(D) 2032	6.0

\* \* \* \* \*

(c) *Technology demonstration using EPA 5-cycle methodology.* To demonstrate an off-cycle technology and to determine ~~a CO<sub>2</sub>-off-cycle~~ credits using the EPA 5-cycle methodology, the manufacturer shall determine the off-cycle city/highway combined carbon-related exhaust emissions benefit by using the EPA 5-cycle methodology described in 40 CFR part 600. This method may not be used for technologies that include elements (e.g., driver-selectable systems) that require additional analyses, data collection, projections, or modeling, or other assessments to determine a national average benefit of the technology. Testing shall be performed on a representative vehicle, selected using good engineering judgment, for each model type for which the credit is being demonstrated. The emission benefit of a technology is determined by testing both with and without the off-cycle technology operating. If a specific technology is not expected to change emissions on one of the five test procedures, the manufacturer may submit an engineering analysis to the EPA that demonstrates that the technology has no effect. If EPA concurs with the analysis, then multiple tests are not required using that test procedure; instead, only one of that test procedure shall be required—either with or without the technology installed and operating—and that single value will be used for all of the 5-cycle weighting calculations. Multiple off-cycle technologies may be demonstrated on a test vehicle. The manufacturer shall conduct the following steps and submit all test data to the EPA.

\* \* \* \* \*

(e) *Review and approval process for off-cycle credits.*

(1) *Initial steps required.*

- (i) A manufacturer requesting off-cycle credits under the provisions of paragraph (c) of this section must conduct the testing and/or simulation described in that paragraph.
- (ii) A manufacturer requesting off-cycle credits under the provisions of paragraph (d) of this section must develop a methodology for demonstrating and determining the benefit

of the off-cycle technology, and carry out any necessary testing and analysis required to support that methodology.

(iii) A manufacturer requesting off-cycle credits under paragraphs (b), (c), or (d) of this section must conduct testing and/or prepare engineering analyses that demonstrate the in-use durability of the technology for the full useful life of the vehicle.

(2) *Data and information requirements.* The manufacturer seeking off-cycle credits must submit an application for off-cycle credits determined under paragraphs (c) and (d) of this section. The application must contain the following:

(i) A detailed description of the off-cycle technology and how it functions to improve fuel economy ~~reduce CO<sub>2</sub> emissions~~ under conditions not represented on the FTP and HFET.

(ii) A list of the vehicle model(s) which will be equipped with the technology.

(iii) A detailed description of the test vehicles selected and an engineering analysis that supports the selection of those vehicles for testing.

(iv) All testing and/or simulation data required under paragraph (c) or (d) of this section, as applicable, plus any other data the manufacturer has considered in the analysis.

(v) For credits under paragraph (d) of this section, a complete description of the methodology used to estimate the off-cycle benefit of the technology and all supporting data, including vehicle testing and in-use activity data.

(vi) An estimate of the off-cycle benefit by vehicle model and the fleetwide benefit based on projected sales of vehicle models equipped with the technology.

(vii) An engineering analysis and/or component durability testing data or whole vehicle testing data demonstrating the in-use durability of the off-cycle technology components.

(3) *EPA review of the off-cycle credit application.* Upon receipt of an application from a manufacturer, EPA will do the following:

(i) Review the application for completeness and notify the manufacturer within 30 days if additional information is required.

(ii) Review the data and information provided in the application to determine if the application supports the level of credits estimated by the manufacturer.

(iii) For credits under paragraph (d) of this section, EPA will make the application available to the public for comment, as described in paragraph (d)(2) of this section, within 60 days of receiving a complete application. The public review period will be specified as 30 days, during which time the public may submit comments. Manufacturers may submit a written rebuttal of comments for EPA consideration or may revise their application in response to comments. A revised application should be submitted after the end of the public review period, and EPA will review the application as if it was a new application submitted under this paragraph (e)(3).

(4) *EPA decision.*

(i) For credits under paragraph (c) of this section, EPA will notify the manufacturer of its decision within 60 days of receiving a complete application.

(ii) For credits under paragraph (d) of this section, EPA will notify the manufacturer of its decision after reviewing and evaluating the public comments. EPA will make the decision and rationale available to the public.

(iii) EPA will notify the manufacturer in writing of its decision to approve or deny the application, and will provide the reasons for the decision. EPA will make the decision and rationale available to the public.

\* \* \* \* \*

## § 86.1870-12 [Removed]

46. Remove § 86.1870-12.

### ~~§ 86.1870-12 CO<sub>2</sub> credits for qualifying full-size pickup trucks.~~

~~Full-size pickup trucks may be eligible for additional credits based on the implementation of hybrid technologies or on exhaust emission performance, as described in this section. Credits may be generated under either paragraph (a) or (b) of this section for a qualifying pickup truck, but not both. The provisions of this section do not apply for heavy-duty vehicles.~~

~~(a) Credits for implementation of hybrid electric technology. Full-size pickup trucks that implement hybrid electric technologies may be eligible for an additional credit under this paragraph (a). Pickup trucks earning the credits under this paragraph (a) may not earn the credits described in paragraph (b) of this section. To claim this credit, the manufacturer must measure the recovered energy over the Federal Test Procedure according to 40 CFR 600.116-12(d) to determine whether a vehicle is a mild or strong hybrid electric vehicle. To provide for EPA testing, the vehicle must be able to broadcast battery pack voltage via an on-board diagnostics parameter ID channel.~~

~~(1) Full-size pickup trucks that are mild hybrid electric vehicles and that are produced in the 2017 through 2021 model years are eligible for a credit of 10 grams/mile. To receive this credit in a model year, the manufacturer must produce a quantity of mild hybrid electric full-size pickup trucks such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than the amount specified in the table below for that model year.~~

Model year	Required minimum percent of full-size pickup trucks (percent)
2017	20
2018	30
2019	55
2020	70
2021	80

~~(2) Full-size pickup trucks that are strong hybrid electric vehicles and that are produced in 2017 through 2021 model years are eligible for a credit of 20 grams/mile. This same credit is available again for those vehicles produced in 2023 and 2024 model years. To receive this credit in a model year, the manufacturer must produce a quantity of strong hybrid electric full-size pickup trucks such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than 10 percent in that model year. Full-size pickup trucks earning credits under this paragraph (a)(2) may not earn credits based on the production multipliers described in § 86.1866-12(b).~~

~~(b) Credits for emission reduction performance. Full-size pickup trucks that achieve carbon-related exhaust emission values below the applicable target value determined in § 86.1818-12(e)(3) may be eligible for an additional credit. For the purposes of this paragraph (b), carbon-related exhaust emission values may include any applicable air conditioning leakage and/or efficiency credits as determined in § 86.1867 and § 86.1868. Pickup trucks earning the credits under this paragraph (b) may not earn credits described in paragraph (a) of this section and may not earn credits based on the production multipliers described in § 86.1866-12(b).~~

~~(1) Full-size pickup trucks that are produced in the 2017 through 2021 model years and that achieve carbon-related exhaust emissions less than or equal to the applicable target value~~

determined in § 86.1818-12(c)(3) multiplied by 0.85 (rounded to the nearest gram/mile) and greater than the applicable target value determined in § 86.1818-12(c)(3) multiplied by 0.80 (rounded to the nearest gram/mile) in a model year are eligible for a credit of 10 grams/mile. A pickup truck that qualifies for this credit in a model year may claim this credit for subsequent model years through the 2021 model year if the carbon-related exhaust emissions of that pickup truck do not increase relative to the emissions in the model year in which the pickup truck qualified for the credit. To qualify for this credit in a model year, the manufacturer must produce a quantity of full-size pickup trucks that meet the initial emission eligibility requirements of this paragraph (b)(1) such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than the amount specified in the table below for that model year.

Model year	Required minimum percent of full size pickup truck (percent)
2017	15
2018	20
2019	28
2020	35
2021	40

(2) Full-size pickup trucks that are produced in 2017 through 2021 model years and that achieve carbon-related exhaust emissions less than or equal to the applicable target value determined in § 86.1818-12(c)(3) multiplied by 0.80 (rounded to the nearest gram/mile) in a model year are eligible for a credit of 20 grams/mile. This same credit is available again for qualifying vehicles produced in 2023 and 2024 model years. A pickup truck that qualifies for this credit in a model year may claim this credit for a maximum of four subsequent model years (a total of five consecutive model years) if the carbon-related exhaust emissions of that pickup truck do not increase relative to the emissions in the model year in which the pickup truck first qualified for the credit. This credit may not be claimed in model year 2022 or in any model year after 2024. To qualify for this credit in a model year, the manufacturer must produce a quantity of full-size pickup trucks that meet the emission requirements of this paragraph (b)(2) such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than 10 percent in that model year. A pickup truck that qualifies for this credit in a model year and is subject to a major redesign in a subsequent model year such that it qualifies for the credit in the model year of the redesign may be allowed to qualify for an additional five years with EPA approval (not to go beyond the 2024 model year). Use good engineering judgment to determine whether a pickup truck has been subject to a major redesign.

(c) *Calculation of total full size pickup truck credits.* Total credits in Megagrams of CO<sub>2</sub> (rounded to the nearest whole number) shall be calculated for qualifying full-size pickup trucks according to the following formula:

$$\text{Total Credits (Megagrams)} = [(10 \times \text{Production}_{\text{MHEV}}) + (10 \times \text{Production}_{\text{T15}}) + (20 \times \text{Production}_{\text{SHEV}}) + (20 \times \text{Production}_{\text{T20}})] \times 225,865 \div 1,000,000$$

Where:

Production<sub>MHEV</sub> = The total number of mild hybrid electric full-size pickup trucks produced with a credit value of 10 grams per mile from paragraph (a)(1) of this section.

Production<sub>T15</sub> = The total number of full-size pickup trucks produced with a performance-based credit value of 10 grams per mile from paragraph (b)(1) of this section.

~~Production<sub>SHEV</sub> = The total number of strong hybrid electric full-size pickup trucks produced with a credit value of 20 grams per mile from paragraph (a)(2) of this section.~~  
~~Production<sub>T20</sub> = The total number of full-size pickup trucks produced with a performance-based credit value of 20 grams per mile from paragraph (b)(2) of this section.~~

## ATTACHMENT 3

### PART 600—FUEL ECONOMY AND GREENHOUSE GAS EXHAUST EMISSIONS OF MOTOR VEHICLES

47. The authority citation for part 600 continues to read as follows:  
Authority:49 U.S.C. 32901—23919q, Pub. L. 109-58.

#### Subpart A—General Provisions

48. Amend § 600.001 by revising paragraphs (a) and (c) to read as follows:

##### § 600.001 General applicability.

(a) The provisions of this part apply to 2008 and later model year automobiles that are not medium duty passenger vehicles (MDPV<sub>FE</sub>), and to 2011 and later model year automobiles including MDPV<sub>FE</sub>. The test procedures in subpart B of this part also describe how manufacturers can test larger vehicles to meet fuel consumption standards under 49 CFR part 535. apply to 2014 and later heavy-duty vehicles subject to standards under 40 CFR part 86, subpart S.

\* \* \* \* \*

(c) Unless stated otherwise, references to fuel economy or fuel economy data in this part shall also be interpreted to mean the related exhaust emissions of CO<sub>2</sub>, HC, and CO, and where applicable for alternative fuel vehicles, CH<sub>3</sub>OH, C<sub>2</sub>H<sub>5</sub>OH, C<sub>2</sub>H<sub>4</sub>O, HCHO, NMHC and CH<sub>4</sub>. References to average fuel economy shall be interpreted to also mean average carbon-related exhaust emissions and average CO<sub>2</sub> emissions. References to fuel economy data vehicles shall also be meant to refer to vehicles tested for carbon-related exhaust emissions for the purpose of demonstrating compliance with fleet average CO<sub>2</sub> standards in § 86.1818 of this chapter.

\* \* \* \* \*

49. Amend § 600.002 by:

- a. Revising the definitions of “Carbon-related exhaust emissions (CREE)” and “Engine code”;
- b. Removing the definition of “Footprint”; and
- c. Revising the definitions of “Medium-duty passenger vehicle (MDPV<sub>FE</sub>)”, “Subconfiguration”, and “Vehicle configuration”.

The revisions read as follows:

##### § 600.002 Definitions.

\* \* \* \* \*

*Carbon-related exhaust emissions (CREE)* means the summation of the carbon-containing constituents of the exhaust emissions, with each constituent adjusted by a coefficient representing the carbon weight fraction of each constituent relative to the CO<sub>2</sub> carbon weight fraction, as specified in § 600.113. For example, carbon-related exhaust emissions (weighted 55 percent city and 45 percent highway) are used to demonstrate compliance with fleet average CO<sub>2</sub> emission standards outlined in § 86.1818 of this chapter.

\* \* \* \* \*

*Engine code* means one of the following:

- (1) For LDV, LDT, and MDPV<sub>FE</sub>, *engine code* means a unique combination, within a test group (as defined in § 86.1803 of this chapter), of displacement, fuel injection (or carburetion or other fuel delivery system), calibration, distributor calibration, choke calibration, auxiliary emission



control devices, and other engine and emission control system components specified by the Administrator. For electric vehicles, *engine code* means a unique combination of manufacturer, electric traction motor, motor configuration, motor controller, and energy storage device.

(2) For ~~MDVHDV~~, *engine code* means the combination of both “engine code” and “basic engine” as defined for light-duty vehicles in this section~~has the meaning given in § 86.1819-14(d)(12) of this chapter.~~

\* \* \* \* \*

~~*Footprint* has the meaning given in § 86.1803 of this chapter.~~

\* \* \* \* \*

*Medium-duty passenger vehicle (MDPV<sub>FE</sub>)* means any motor vehicle rated at more than 8,500 pounds GVWR and less than 10,000 pounds GVWR that is designed primarily to transport passengers, but does not include a vehicle that—

(1) Is an “incomplete truck,” meaning any truck which does not have the primary load carrying device or container attached when it is first sold as a vehicle; or

(2) Has a seating capacity of more than 12 persons; or

(3) Is designed for more than 9 persons in seating rearward of the driver's seat; or

(4) Is equipped with an open cargo area (for example, a pick-up truck box or bed) of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area for purposes of this definition. (See paragraph (1) of the definition of medium-duty passenger vehicle at 40 CFR 86.1803-01).~~a vehicle that would satisfy the criteria for light trucks as defined by the Secretary of Transportation at 49 CFR 523.5 but for its gross vehicle weight rating or its curb weight, is rated at more than 8,500 lbs GVWR or has a vehicle curb weight of more than 6,000 pounds or has a basic vehicle frontal area in excess of 45 square feet, and is designed primarily to transport passengers, but does not include a vehicle that—~~

~~(1) Is an “incomplete truck” as defined in 40 CFR 86.1803-01; or~~

~~(2) Has a seating capacity of more than 12 persons; or~~

~~(3) Is designed for more than 9 persons in seating rearward of the driver's seat; or~~

~~(4) Is equipped with an open cargo area (for example, a pick-up truck box or bed) of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area for purposes of this definition.~~

\* \* \* \* \*

*Subconfiguration* means one of the following:

(1) For LDV, LDT, and MDPV<sub>FE</sub>, *subconfiguration* means a unique combination within a vehicle configuration of equivalent test weight, road-load horsepower, and any other operational characteristics or parameters which the Administrator determines may significantly affect fuel economy or CO<sub>2</sub> emissions within a vehicle configuration.

(2) For ~~MDVHDV~~, *subconfiguration* means a unique combination within a vehicle configuration of equivalent test weight, road-load horsepower, and any other operational characteristics or parameters that may significantly affect CO<sub>2</sub> emissions within a vehicle configuration~~has the meaning given in § 86.1819-14(d)(12) of this chapter. Note that equivalent test weight is based on a vehicle's Adjusted Loaded Vehicle Weight (rounded to the nearest 500-pound increment for values above 14,000 pounds); see 40 CFR 1066.805.~~

\* \* \* \* \*

*Vehicle configuration* means one of the following:

(1) For LDV, LDT, and MDPV<sub>FE</sub>, *vehicle configuration* means a unique combination of basic engine, engine code, inertia weight class, transmission configuration, and axle ratio within a base level.

(2) For MDVHDV, vehicle configuration means a subclassification within a test group based on a unique combination of basic engine, engine code, transmission type and gear ratios, final drive ratio, and other parameters we designate~~has the meaning given for “configuration” in § 86.1819-14(d)(12) of this chapter.~~

\* \* \* \* \*

50. Amend § 600.006 by revising paragraphs (c)(5), (e), and (g)(3)(ii) to read as follows:

**§ 600.006 Data and information requirements for fuel economy data vehicles.**

\* \* \* \* \*

(c) \* \* \*

(5) Starting with the 2012 model year, the data submitted according to paragraphs (c)(1) through (4) of this section shall include total HC, CO, CO<sub>2</sub>, and, where applicable for alternative fuel vehicles, CH<sub>3</sub>OH, C<sub>2</sub>H<sub>5</sub>OH, C<sub>2</sub>H<sub>4</sub>O, HCHO, NMHC and CH<sub>4</sub>. ~~Manufacturers incorporating N<sub>2</sub>O and CH<sub>4</sub> emissions in their fleet average carbon-related exhaust emissions as allowed under § 86.1818 of this chapter shall also submit N<sub>2</sub>O and CH<sub>4</sub> emission data where applicable. The fuel economy, carbon-related exhaust emissions, and CO<sub>2</sub> emission test results shall be adjusted in accordance with paragraph (g) of this section.~~

\* \* \* \* \*

(e) In lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy, and CO<sub>2</sub> ~~emissions, and carbon-related exhaust~~ emission values derived from a previously tested vehicle, where the fuel economy, and CO<sub>2</sub> ~~emissions, and carbon-related exhaust emissions~~ are expected to be equivalent (or less fuel-efficient and with higher CO<sub>2</sub> emissions ~~and carbon-related exhaust emissions~~). Additionally, in lieu of submitting actual data from a test vehicle, a manufacturer may provide fuel economy, and CO<sub>2</sub> ~~emissions, and carbon-related exhaust~~ emission values derived from an analytical expression, e.g., regression analysis. In order for fuel economy, and CO<sub>2</sub> ~~emissions, and carbon-related exhaust~~ emission values derived from analytical methods to be accepted, the expression (form and coefficients) must have been approved by the Administrator.

\* \* \* \* \*

(g) \* \* \*

(3) \* \* \*

(ii)(A) The manufacturer shall adjust ~~all carbon-related exhaust emission (CREE) and~~ all CO<sub>2</sub> test data generated by vehicles with engine-drive system combinations with more than 6,200 miles by using the following equation:

$$ADJ_{4,000mi} = TEST[0.979 + 5.25 \cdot 10^{-6} \cdot (mi)]$$

Where:

ADJ<sub>4,000mi</sub> = ~~CREE or~~ CO<sub>2</sub> emission data adjusted to 4,000-mile test point.

TEST = Tested emissions value of ~~CREE or~~ CO<sub>2</sub> in grams per mile.

mi = System miles accumulated at the start of the test rounded to the nearest whole mile.

(B) Emissions test values and results used and determined in the calculations in this paragraph (g)(3)(ii) shall be rounded in accordance with § 86.1837 of this chapter as

applicable. ~~CO<sub>2</sub> and CREE values shall be rounded~~ Round results to the nearest gram per mile.

~~(C) Note that the CREE test results are determined using the unadjusted CO<sub>2</sub> value; i.e., CO<sub>2</sub> is not adjusted twice when determining the 4,000 mile CREE value.~~

\* \* \* \* \*

51. Amend § 600.007 by revising paragraphs (b)(5) and (6), (c), and (f) introductory text to read as follows:

**§ 600.007 Vehicle acceptability.**

\* \* \* \* \*

(b) \* \* \*

(5) The calibration information submitted under § 600.006(b) must be representative of the vehicle configuration for which the fuel economy; and CO<sub>2</sub> ~~emissions, and carbon-related exhaust~~ emissions data were submitted.

(6) Any vehicle tested for fuel economy; or CO<sub>2</sub> emissions; ~~or carbon-related exhaust emissions purposes~~ must be representative of a vehicle which the manufacturer intends to produce under the provisions of a certificate of conformity.

\* \* \* \* \*

(c) If, based on review of the information submitted under § 600.006(b), the Administrator determines that a fuel economy data vehicle meets the requirements of this section, the fuel economy data vehicle will be judged to be acceptable and fuel economy ~~and carbon-related exhaust emissions~~ data from that fuel economy data vehicle will be reviewed pursuant to § 600.008.

\* \* \* \* \*

(f) All vehicles used to generate fuel economy ~~and carbon-related exhaust emissions~~ data, and for which emission standards apply, must be covered by a certificate of conformity under part 86 of this chapter before:

\* \* \* \* \*

52. Amend § 600.008 by revising the section heading and paragraph (a)(1)(ii) to read as follows:

**§ 600.008 Review of fuel economy; and CO<sub>2</sub>; ~~emissions, and carbon-related exhaust~~ emission data, testing by the Administrator.**

(a) \* \* \*

(1) \* \* \*

(ii) ~~Starting with the 2012 model year for carbon-related exhaust emissions and with the 2013 model year for CO<sub>2</sub> emissions, t~~The evaluations, testing, and test data described in this section pertaining to fuel economy shall also be performed for CO<sub>2</sub> emissions ~~and carbon-related exhaust emissions~~, except that CO<sub>2</sub> emissions ~~and carbon-related exhaust emissions~~ shall be arithmetically averaged instead of harmonically averaged, and in cases where the manufacturer selects the lowest of several fuel economy results to represent the vehicle, the manufacturer shall select the CO<sub>2</sub> ~~emissions and carbon-related exhaust emissions~~ value from the test results associated with the lowest selected fuel economy results.

\* \* \* \* \*

53. Amend § 600.010 by revising paragraphs (c)(1)(ii) and (d) to read as follows:

**§ 600.010 Vehicle test requirements and minimum data requirements.**

\* \* \* \* \*

(c) \* \* \*

(1) \* \* \*

(ii)(A) FTP and HFET data from the highest projected model year sales subconfiguration within the highest projected model year sales vehicle configuration for each base level, and

(B) If required under § 600.115, for 2011 and later model year vehicles, US06, SC03 and cold temperature FTP data from the highest projected model year sales subconfiguration within the highest projected model year sales vehicle configuration for each base level. Manufacturers may optionally generate this data for any 2008 through 2010 model years, and 2011 and later model year vehicles, if not otherwise required.

\* \* \* \* \*

(d) *Minimum data requirements for the manufacturer's average fuel economy ~~and average carbon-related exhaust emissions~~.* For the purpose of calculating the manufacturer's average fuel economy ~~and average carbon-related exhaust emissions~~ under § 600.510, the manufacturer shall submit FTP (city) and HFET (highway) test data representing at least 90 percent of the manufacturer's actual model year production, by vehicle configuration, for each category identified for calculation under ~~§ 600.510-08(a) or~~ § 600.510-12(a)(1).

**Subpart B—Fuel Economy and ~~Carbon-related~~ Exhaust Emission Test Procedures**

54. Revise the heading of subpart B as set forth above.

55. Amend § 600.101 by revising paragraph (a)(2) and removing and reserving paragraph (b)(2). The revision reads as follows:

**§ 600.101 Testing overview.**

\* \* \* \* \*

(a) \* \* \*

(2) Calculate fuel economy ~~and CREE~~ values for vehicle subconfigurations, configurations, base levels, and model types as described in §§ 600.206 and 600.208. Calculate fleet average values for fuel economy ~~and CREE~~ as described in § 600.510. Note that § 600.510(c) describes how to use CREE to determine fuel consumption improvement values for specific cases.

\* \* \* \* \*

(b) \* \* \*

(2) ~~[Reserved] Determine fleet average CO<sub>2</sub> emissions as described in 40 CFR 86.1819-14(d)(9). These CO<sub>2</sub> emission results are used to calculate corresponding fuel consumption values to demonstrate compliance with fleet average fuel consumption standards under 49 CFR part 535.~~

\* \* \* \* \*

56. Amend § 600.111-08 by revising paragraph (h) to read as follows:

**§ 600.111-08 Test procedures.**

\* \* \* \* \*

(h) *Special test procedures.* We may allow or require you to use procedures other than those specified in this section as described in 40 CFR 1066.10(c). For example, special test procedures may be used for advanced technology vehicles, including, but not limited to fuel cell vehicles,

hybrid electric vehicles using hydraulic energy storage, and vehicles equipped with hydrogen internal combustion engines. Additionally, we may conduct fuel economy and ~~carbon-related~~ exhaust emission testing using the special test procedures approved for a specific vehicle.

57. Amend § 600.113-12 by:

- a. Revising the section heading, introductory text, and paragraph (g);
- b. Removing and reserving paragraphs (h)(2), (i)(2), (j)(2), (k)(2), (l)(2), (m)(2);
- c. Revising paragraph (n);
- d. Removing and reserving paragraph (o)(2); and
- e. Revising paragraph (p).

The revisions read as follows:

**§ 600.113-12 Fuel economy, and CO<sub>2</sub> emissions, ~~and carbon-related exhaust emission~~ calculations for FTP, HFET, US06, SC03 and cold temperature FTP tests.**

The Administrator will use the calculation procedure set forth in this section for all official EPA testing of vehicles fueled with gasoline, diesel, alcohol-based or natural gas fuel. The calculations of the weighted fuel economy ~~and carbon-related exhaust emission~~ values require input of the weighted grams/mile values for total hydrocarbons (HC), carbon monoxide (CO), and carbon dioxide (CO<sub>2</sub>); and, additionally for methanol-fueled automobiles, methanol (CH<sub>3</sub>OH) and formaldehyde (HCHO); and, additionally for ethanol-fueled automobiles, methanol (CH<sub>3</sub>OH), ethanol (C<sub>2</sub>H<sub>5</sub>OH), acetaldehyde (C<sub>2</sub>H<sub>4</sub>O), and formaldehyde (HCHO); and additionally for natural gas-fueled vehicles, non-methane hydrocarbons (NMHC) and methane (CH<sub>4</sub>). ~~For manufacturers selecting the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter the calculations of the carbon-related exhaust emissions require the input of grams/mile values for nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>).~~ Emissions shall be determined for the FTP, HFET, US06, SC03, and cold temperature FTP tests. Additionally, the specific gravity, carbon weight fraction and net heating value of the test fuel must be determined. The FTP, HFET, US06, SC03, and cold temperature FTP fuel economy ~~and carbon-related exhaust emission~~ values shall be calculated as specified in this section. An example fuel economy calculation appears in appendix II to this part.

\* \* \* \* \*

(g) Calculate separate FTP, highway, US06, SC03 and Cold temperature FTP fuel economy ~~values and carbon-related exhaust emissions~~ from the grams/mile values for total HC, CO, CO<sub>2</sub> and, where applicable, CH<sub>3</sub>OH, C<sub>2</sub>H<sub>5</sub>OH, C<sub>2</sub>H<sub>4</sub>O, HCHO, NMHC, N<sub>2</sub>O, and CH<sub>4</sub>, and the test fuel's specific gravity, carbon weight fraction, net heating value, and additionally for natural gas, the test fuel's composition.

(1) *Emission values for fuel economy calculations.* The emission values (obtained per paragraph (a) through (e) of this section, as applicable) used in the calculations of fuel economy in this section shall be rounded in accordance with § 86.1837 of this chapter. The CO<sub>2</sub> values (obtained per this section, as applicable) used in each calculation of fuel economy in this section shall be rounded to the nearest gram/mile.

(2) ~~[Reserved] Emission values for carbon-related exhaust emission calculations.~~

~~(i) If the emission values (obtained per paragraph (a) through (e) of this section, as applicable) were obtained from testing with aged exhaust emission control components as allowed under § 86.1823 of this chapter, then these test values shall be used in the calculations of carbon-related exhaust emissions in this section.~~

(ii) If the emission values (obtained per paragraph (a) through (e) of this section, as applicable) were not obtained from testing with aged exhaust emission control components as allowed under § 86.1823 of this chapter, then these test values shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section. For vehicles within a test group, the appropriate NMOG deterioration factor may be used in lieu of the deterioration factors for CH<sub>3</sub>OH, C<sub>2</sub>H<sub>5</sub>OH, and/or C<sub>2</sub>H<sub>4</sub>O emissions.

(iii) The emission values determined in paragraph (g)(2)(i) or (ii) of this section shall be rounded in accordance with § 86.1837 of this chapter. The CO<sub>2</sub> values (obtained per this section, as applicable) used in each calculation of carbon-related exhaust emissions in this section shall be rounded to the nearest gram/mile.

(iv) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, N<sub>2</sub>O and CH<sub>4</sub> emission values for use in the calculation of carbon-related exhaust emissions in this section shall be the values determined according to paragraph (g)(2)(iv)(A), (B), or (C) of this section.

(A) The FTP and HFET test values as determined for the emission data vehicle according to the provisions of § 86.1835 of this chapter. These values shall apply to all vehicles tested under this section that are included in the test group represented by the emission data vehicle and shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section, except that in-use test data shall not be adjusted by a deterioration factor.

(B) The FTP and HFET test values as determined according to testing conducted under the provisions of this subpart. These values shall be adjusted by the appropriate deterioration factor determined according to § 86.1823 of this chapter before being used in the calculations of carbon-related exhaust emissions in this section, except that in-use test data shall not be adjusted by a deterioration factor.

(C) For the 2012 through 2016 model years only, manufacturers may use an assigned value of 0.010 g/mi for N<sub>2</sub>O FTP and HFET test values. This value is not required to be adjusted by a deterioration factor.

(3) The specific gravity and the carbon ~~weight~~mass fraction (obtained per paragraph (f) of this section) shall be recorded using three places to the right of the decimal point. Net heat of combustion shall be recorded using three places to the right of the decimal point if expressed in MJ/kg, or the nearest whole number if expressed in Btu/lb. The net heating value (obtained per paragraph (f) of this section) shall be recorded to the nearest whole Btu/lb.

(4) For the purpose of determining the applicable in-use CO<sub>2</sub> exhaust emission standard under § 86.1818 of this chapter, the combined city/highway carbon-related exhaust emission value for a vehicle subconfiguration is calculated by arithmetically averaging the FTP-based city and HFET-based highway carbon-related exhaust emission values, as determined in paragraphs (h) through (n) of this section for the subconfiguration, weighted 0.55 and 0.45 respectively, and rounded to the nearest tenth of a gram per mile.

(h)(1) For gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter, the fuel economy in miles per gallon is to be calculated using the following equation and rounded to the nearest 0.1 miles per gallon:

$$\text{mpg} = (5174 \times 10^4 \times \text{CWF} \times \text{SG}) / [((\text{CWF} \times \text{HC}) + (0.429 \times \text{CO}) + (0.273 \times \text{CO}_2)) \times ((0.6 \times \text{SG} \times \text{NHV}) + 5471)]$$

Where:

HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.



CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.

CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(1) of this section.

CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

NHV = Net heating value by mass of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

SG = Specific gravity of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.

(2) ~~[Reserved](i) For 2012 and later model year gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (\text{CWF}/0.273 \times \text{HC}) + (1.571 \times \text{CO}) + \text{CO}_2$$

~~Where:~~

~~CREE means the carbon-related exhaust emissions as defined in § 600.002.~~

~~HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year gasoline-fueled automobiles tested on a test fuel specified in § 86.113 of this chapter is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = [(\text{CWF}/0.273) \times \text{NMHC}] + (1.571 \times \text{CO}) + \text{CO}_2 + (298 \times \text{N}_2\text{O}) + (25 \times \text{CH}_4)$$

~~Where:~~

~~CREE means the carbon-related exhaust emissions as defined in § 600.002.~~

~~NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~N<sub>2</sub>O = Grams/mile N<sub>2</sub>O as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

~~CWF = Carbon weight fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.~~

(i)(1) For diesel-fueled automobiles, calculate the fuel economy in miles per gallon of diesel fuel by dividing 2778 by the sum of three terms and rounding the quotient to the nearest 0.1 mile per gallon:

(i)(A) 0.866 multiplied by HC (in grams/miles as obtained in paragraph (g)(1) of this section), or  
(B) Zero, in the case of cold FTP diesel tests for which HC was not collected, as permitted in § 600.113-08(c);

(ii) 0.429 multiplied by CO (in grams/mile as obtained in paragraph (g)(1) of this section); and

(iii) 0.273 multiplied by CO<sub>2</sub> (in grams/mile as obtained in paragraph (g)(1) of this section).

(2) ~~[Reserved](i) For 2012 and later model year diesel-fueled automobiles, the carbon-related exhaust emissions in grams per mile is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (3.172 \times \text{HC}) + (1.571 \times \text{CO}) + \text{CO}_2$$

~~Where:~~

~~CREE means the carbon related exhaust emissions as defined in § 600.002.~~

~~HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, the carbon related exhaust emissions in grams per mile for 2012 and later model year diesel fueled automobiles is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (3.172 \times \text{NMHC}) + (1.571 \times \text{CO}) + \text{CO}_2 + (298 \times \text{N}_2\text{O}) + (25 \times \text{CH}_4)$$

~~Where:~~

~~CREE means the carbon related exhaust emissions as defined in § 600.002.~~

~~NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~N<sub>2</sub>O = Grams/mile N<sub>2</sub>O as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

~~(j)(1) For methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the fuel economy in miles per gallon of methanol is to be calculated using the following equation:~~

$$\text{mpg} = (\text{CWF} \times \text{SG} \times 3781.8) / ((\text{CWF}_{\text{exHC}} \times \text{HC}) + (0.429 \times \text{CO}) + (0.273 \times \text{CO}_2) + (0.375 \times \text{CH}_3\text{OH}) + (0.400 \times \text{HCHO}))$$

~~Where:~~

~~CWF = Carbon weight fraction of the fuel as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section.~~

~~SG = Specific gravity of the fuel as determined in paragraph (f)(2)(i) of this section and rounded according to paragraph (g)(3) of this section.~~

~~CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, CWF<sub>exHC</sub> = 0.866).~~

~~HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(1) of this section.~~

~~CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(1) of this section.~~

~~HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(1) of this section.~~

~~(2) [Reserved](i) For 2012 and later model year methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol, the carbon related exhaust emissions in grams per mile while operating on methanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (\text{CWF}_{\text{exHC}} / 0.273 \times \text{HC}) + (1.571 \times \text{CO}) + (1.374 \times \text{CH}_3\text{OH}) + (1.466 \times \text{HCHO}) + \text{CO}_2$$

~~Where:~~

~~CREE means the carbon related exhaust emission value as defined in § 600.002.~~

~~CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, CWF<sub>exHC</sub> = 0.866).~~

~~HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(2) of this section.~~

~~HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year methanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and methanol while operating on methanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = [(CWF_{\text{exHC}}/0.273) \times \text{NMHC}] + (1.571 \times \text{CO}) + (1.374 \times \text{CH}_3\text{OH}) + (1.466 \times \text{HCHO}) + \text{CO}_2 + (298 \times \text{N}_2\text{O}) + (25 \times \text{CH}_4)$$

~~Where:~~

~~CREE means the carbon related exhaust emission value as defined in § 600.002.~~

~~CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(2)(ii) of this section and rounded according to paragraph (g)(3) of this section (for M100 fuel, CWF<sub>exHC</sub> = 0.866).~~

~~NMHC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(2) of this section.~~

~~HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~N<sub>2</sub>O = Grams/mile N<sub>2</sub>O as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

(k)(1) For automobiles fueled with natural gas and automobiles designed to operate on gasoline and natural gas, the fuel economy in miles per gallon of natural gas is to be calculated using the following equation:

$$\text{mpg}_e = \frac{CWF_{\text{HC/NG}} \times D_{\text{NG}} \times 121.5}{(0.749 \times \text{CH}_4) + (CWF_{\text{NMHC}} \times \text{NMHC}) + (0.429 \times \text{CO}) + (0.273 \times (\text{CO}_1 - \text{CO}_{2\text{NG}}))}$$

Where:

mpg<sub>e</sub> = miles per gasoline gallon equivalent of natural gas.

CWF<sub>HC/NG</sub> = carbon weight fraction based on the hydrocarbon constituents in the natural gas fuel as obtained in paragraph (f)(3) of this section and rounded according to paragraph (g)(3) of this section.

D<sub>NG</sub> = density of the natural gas fuel [grams/ft<sup>3</sup> at 68 °F (20 °C) and 760 mm Hg (101.3 kPa)] pressure as obtained in paragraph (g)(3) of this section.

CH<sub>4</sub>, NMHC, CO, and CO<sub>2</sub> = weighted mass exhaust emissions [grams/mile] for methane, non-methane HC, carbon monoxide, and carbon dioxide as obtained in paragraph (g)(2) of this section.

CWF<sub>NMHC</sub> = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (g)(3) of this section.

CO<sub>2NG</sub> = grams of carbon dioxide in the natural gas fuel consumed per mile of travel.

$$\text{CO}_{2\text{NG}} = \text{FC}_{\text{NG}} \times D_{\text{NG}} \times \text{WF}_{\text{CO}_2}$$

Where:

$$\text{FC}_{\text{NG}} = \frac{(0.749 \times \text{CH}_4) + (CWF_{\text{NMHC}} \times \text{NMHC}) + (0.429 \times \text{CO}) + (0.273 \times \text{CO}_2)}{CWF_{\text{NG}} \times D_{\text{NG}}}$$

= cubic feet of natural gas fuel consumed per mile

Where:

CWF<sub>NG</sub> = the carbon weight fraction of the natural gas fuel as calculated in paragraph (f)(3) of this section.

WF<sub>CO2</sub> = weight fraction carbon dioxide of the natural gas fuel calculated using the mole fractions and molecular weights of the natural gas fuel constituents per ASTM D 1945 (incorporated by reference in § 600.011).

(2) ~~[(Reserved)(i) For automobiles fueled with natural gas and automobiles designed to operate on gasoline and natural gas, the carbon-related exhaust emissions in grams per mile while operating on natural gas is to be calculated for 2012 and later model year vehicles using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = 2.743 \times \text{CH}_4 + \text{CWF}_{\text{NMHC}}/0.273 \times \text{NMHC} + 1.571 \times \text{CO} + \text{CO}_2$$

~~Where:~~

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

~~NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CWF<sub>NMHC</sub> = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (f)(3) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year automobiles fueled with natural gas and automobiles designed to operate on gasoline and natural gas while operating on natural gas is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (25 \times \text{CH}_4) + [( \text{CWF}_{\text{NMHC}}/0.273 ) \times \text{NMHC}] + (1.571 \times \text{CO}) + \text{CO}_2 + (298 \times \text{N}_2\text{O})$$

~~Where:~~

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

~~NMHC = Grams/mile NMHC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CWF<sub>NMHC</sub> = carbon weight fraction of the non-methane HC constituents in the fuel as determined from the speciated fuel composition per paragraph (f)(3) of this section and rounded according to paragraph (f)(3) of this section.~~

~~N<sub>2</sub>O = Grams/mile N<sub>2</sub>O as obtained in paragraph (g)(2) of this section.~~

(1)(1) For ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol, the fuel economy in miles per gallon of ethanol is to be calculated using the following equation:

$$\text{mpg} = (\text{CWF} \times \text{SG} \times 3781.8) / ((\text{CWF}_{\text{exHC}} \times \text{HC}) + (0.429 \times \text{CO}) + (0.273 \times \text{CO}_2) + (0.375 \times \text{CH}_3\text{OH}) + (0.400 \times \text{HCHO}) + (0.521 \times \text{C}_2\text{H}_5\text{OH}) + (0.545 \times \text{C}_2\text{H}_4\text{O}))$$

Where:

CWF = Carbon weight fraction of the fuel as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

SG = Specific gravity of the fuel as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

HC = Grams/mile HC as obtained in paragraph (g)(1) of this section.

CO = Grams/mile CO as obtained in paragraph (g)(1) of this section.

CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(1) of this section.

CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(1) of this section.

HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(1) of this section.

C<sub>2</sub>H<sub>5</sub>OH = Grams/mile C<sub>2</sub>H<sub>5</sub>OH (ethanol) as obtained in paragraph (g)(1) of this section.

C<sub>2</sub>H<sub>4</sub>O = Grams/mile C<sub>2</sub>H<sub>4</sub>O (acetaldehyde) as obtained in paragraph (g)(1) of this section.

(2) ~~[(Reserved)(i) For 2012 and later model year ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol, the carbon-related exhaust emissions in grams per mile while operating on ethanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = (\text{CWF}_{\text{exHC}} / 0.273 \times \text{HC}) + (1.571 \times \text{CO}) + (1.374 \times \text{CH}_3\text{OH}) + (1.466 \times \text{HCHO}) + (1.911 \times \text{C}_2\text{H}_5\text{OH}) + (1.998 \times \text{C}_2\text{H}_4\text{O}) + \text{CO}_2$$

Where:

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.~~

~~HC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(2) of this section.~~

~~HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~C<sub>2</sub>H<sub>5</sub>OH = Grams/mile C<sub>2</sub>H<sub>5</sub>OH (ethanol) as obtained in paragraph (g)(2) of this section.~~

~~C<sub>2</sub>H<sub>4</sub>O = Grams/mile C<sub>2</sub>H<sub>4</sub>O (acetaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year ethanol-fueled automobiles and automobiles designed to operate on mixtures of gasoline and ethanol while operating on ethanol is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

$$\text{CREE} = [( \text{CWF}_{\text{exHC}} / 0.273 ) \times \text{NMHC}] + (1.571 \times \text{CO}) + (1.374 \times \text{CH}_3\text{OH}) + (1.466 \times \text{HCHO}) + (1.911 \times \text{C}_2\text{H}_5\text{OH}) + (1.998 \times \text{C}_2\text{H}_4\text{O}) + \text{CO}_2 + (298 \times \text{N}_2\text{O}) + (25 \times \text{CH}_4)$$

Where:

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~CWF<sub>exHC</sub> = Carbon weight fraction of exhaust hydrocarbons = CWF as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.~~

~~NMHC = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~CO = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~CO<sub>2</sub> = Grams/mile CO<sub>2</sub> as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>3</sub>OH = Grams/mile CH<sub>3</sub>OH (methanol) as obtained in paragraph (g)(2) of this section.~~

~~HCHO = Grams/mile HCHO (formaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~C<sub>2</sub>H<sub>5</sub>OH = Grams/mile C<sub>2</sub>H<sub>5</sub>OH (ethanol) as obtained in paragraph (g)(2) of this section.~~

~~C<sub>2</sub>H<sub>4</sub>O = Grams/mile C<sub>2</sub>H<sub>4</sub>O (acetaldehyde) as obtained in paragraph (g)(2) of this section.~~

~~N<sub>2</sub>O = Grams/mile N<sub>2</sub>O as obtained in paragraph (g)(2) of this section.~~

~~CH<sub>4</sub> = Grams/mile CH<sub>4</sub> as obtained in paragraph (g)(2) of this section.~~

(m)(1) For automobiles fueled with liquefied petroleum gas and automobiles designed to operate on gasoline and liquefied petroleum gas, the fuel economy in miles per gallon of liquefied petroleum gas is to be calculated using the following equation:



$$mpg_e = \frac{CWF_{fuel} \cdot SG_{fuel} \cdot 3781.8}{CWF_{HC} \cdot HC + 0.429 \cdot CO + 0.273 \cdot CO_2}$$

Where:

$mpg_e$  = miles per gasoline gallon equivalent of liquefied petroleum gas.

$CWF_{fuel}$  = carbon weight fraction based on the hydrocarbon constituents in the liquefied petroleum gas fuel as obtained in paragraph (f)(5) of this section and rounded according to paragraph (g)(3) of this section.

$SG$  = Specific gravity of the fuel as determined in paragraph (f)(5) of this section and rounded according to paragraph (g)(3) of this section.

3781.8 = Grams of  $H_2O$  per gallon conversion factor.

$CWF_{HC}$  = Carbon weight fraction of exhaust hydrocarbon =  $CWF_{fuel}$  as determined in paragraph (f)(4) of this section and rounded according to paragraph (f)(3) of this section.

$HC$  = Grams/mile HC as obtained in paragraph (g)(2) of this section.

$CO$  = Grams/mile CO as obtained in paragraph (g)(2) of this section.

$CO_2$  = Grams/mile  $CO_2$  as obtained in paragraph (g)(2) of this section.

~~(2) [Reserved](i) For automobiles fueled with liquefied petroleum gas and automobiles designed to operate on gasoline and liquefied petroleum gas, the carbon-related exhaust emissions in grams per mile while operating on liquefied petroleum gas is to be calculated for 2012 and later model year vehicles using the following equation and rounded to the nearest 1 gram per mile:~~

~~$$CREE = (CWF_{HC}/0.273 \times HC) + (1.571 \times CO) + CO_2$$~~

~~Where:~~

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~$CWF_{HC}$  = Carbon weight fraction of exhaust hydrocarbon =  $CWF_{fuel}$  as determined in paragraph (f)(5) of this section and rounded according to paragraph (g)(3) of this section.~~

~~$HC$  = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~$CO$  = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~$CO_2$  = Grams/mile  $CO_2$  as obtained in paragraph (g)(2) of this section.~~

~~(ii) For manufacturers complying with the fleet averaging option for  $N_2O$  and  $CH_4$  as allowed under § 86.1818 of this chapter, the carbon-related exhaust emissions in grams per mile for 2012 and later model year automobiles fueled with liquefied petroleum gas and automobiles designed to operate on mixtures of gasoline and liquefied petroleum gas while operating on liquefied petroleum gas is to be calculated using the following equation and rounded to the nearest 1 gram per mile:~~

~~$$CREE = [(CWF_{exHC}/0.273) \times NMHC] + (1.571 \times CO) + CO_2 + (298 \times N_2O) + (25 \times CH_4)$$~~

~~Where:~~

~~CREE means the carbon-related exhaust emission value as defined in § 600.002.~~

~~$CWF_{HC}$  = Carbon weight fraction of exhaust hydrocarbon =  $CWF_{fuel}$  as determined in paragraph (f)(5) of this section and rounded according to paragraph (g)(3) of this section.~~

~~$NMHC$  = Grams/mile HC as obtained in paragraph (g)(2) of this section.~~

~~$CO$  = Grams/mile CO as obtained in paragraph (g)(2) of this section.~~

~~$CO_2$  = Grams/mile  $CO_2$  as obtained in paragraph (g)(2) of this section.~~

~~$N_2O$  = Grams/mile  $N_2O$  as obtained in paragraph (g)(2) of this section.~~

~~$CH_4$  = Grams/mile  $CH_4$  as obtained in paragraph (g)(2) of this section.~~



(n) Manufacturers may use a value of 0 grams CO<sub>2</sub> ~~and CREE~~ per mile to represent the emissions of electric vehicles and the electric operation of plug-in hybrid electric vehicles derived from electricity generated from sources that are not onboard the vehicle.

(o)(1) For testing with E10, calculate fuel economy using the following equation, rounded to the nearest 0.1 miles per gallon:

$$FE_{\text{[interval]}} = \frac{(CMF_{\text{testfuel}} \cdot SG_{\text{testfuel}}) \cdot (\rho_{\text{H}_2\text{O}} \cdot SG_{\text{basefuel}} \cdot NHC_{\text{basefuel}})}{[(CMF_{\text{testfuel}} \cdot NMOG) + (0.749 \cdot CH_4) + (0.429 \cdot CO) + (0.273 \cdot CO_2)] \cdot [(R_a \cdot SG_{\text{testfuel}} \cdot NHC_{\text{testfuel}}) + (SG_{\text{basefuel}} \cdot NHC_{\text{basefuel}} \cdot (1 - R_a))]}$$

Where:

$CMF_{\text{testfuel}}$  = carbon mass fraction of the test fuel, expressed to three decimal places.

$SG_{\text{testfuel}}$  = the specific gravity of the test fuel as obtained in paragraph (f)(1) of this section, expressed to three decimal places.

$\rho_{\text{H}_2\text{O}}$  = the density of pure water at 60 °F. Use  $\rho_{\text{H}_2\text{O}}$  = 3781.69 g/gal.

$SG_{\text{basefuel}}$  = the specific gravity of the 1975 base fuel. Use  $SG_{\text{basefuel}}$  = 0.7394.

$NHC_{\text{basefuel}}$  = net heat of combustion of the 1975 base fuel. Use  $NHC_{\text{basefuel}}$  = 43.047 MJ/kg.

$NMOG$  = NMOG emission rate over the test interval or duty cycle in grams/mile.

$CH_4$  = CH<sub>4</sub> emission rate over the test interval or duty cycle in grams/mile.

$CO$  = CO emission rate over the test interval or duty cycle in grams/mile.

$CO_2$  = measured tailpipe CO<sub>2</sub> emission rate over the test interval or duty cycle in grams/mile.

$R_a$  = sensitivity factor that represents the response of a typical vehicle's fuel economy to changes in fuel properties, such as volumetric energy content. Use  $R_a$  = 0.81.

$NHC_{\text{testfuel}}$  = net heat of combustion by mass of test fuel as obtained in paragraph (f)(1) of this section, expressed to three decimal places.

(2) ~~[Reserved] Use one of the following methods to calculate the carbon-related exhaust emissions for testing model year 2027 and later vehicles with the E10 test fuel specified in 40 CFR 1065.710(b):~~

~~(i) For manufacturers not complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under 40 CFR 86.1818-12(f)(2), calculate CREE using the following equation, rounded to the nearest whole gram per mile:~~

$$\text{CREE} = (CMF/0.273 \cdot NMOG) + (1.571 \cdot CO) + CO_2 + (0.749 \cdot CH_4)$$

~~Where:~~

~~CREE = carbon-related exhaust emissions.~~

~~$CMF$  = carbon mass fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.~~

~~$NMOG$  = NMOG emission rate obtained in 40 CFR 1066.635 in grams/mile.~~

~~$CO$  = CO emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~

~~$CO_2$  = measured tailpipe CO<sub>2</sub> emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~

~~$CH_4$  = CH<sub>4</sub> emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~

~~(ii) For manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under 40 CFR 86.1818-12(f)(2), calculate CREE using the following equation, rounded to the nearest whole gram per mile:~~

$$\text{CREE} = [(CMF/0.273) \cdot NMOG] + (1.571 \cdot CO) + CO_2 + (298 \cdot N_2O) + (25 \cdot CH_4)$$

~~Where:~~

~~CREE = the carbon-related exhaust emissions as defined in § 600.002.~~

~~$NMOG$  = NMOG emission rate obtained in 40 CFR 1066.635 in grams/mile.~~

~~$CO$  = CO emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~

~~$CO_2$  = measured tailpipe CO<sub>2</sub> emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~

~~$N_2O$  =  $N_2O$  emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~  
 ~~$CH_4$  =  $CH_4$  emission rate obtained in paragraph (g)(2) of this section in grams/mile.~~  
 ~~$CMF$  = carbon mass fraction of test fuel as obtained in paragraph (f)(1) of this section and rounded according to paragraph (g)(3) of this section.~~

(p) Equations for fuels other than those specified in this section may be used with advance EPA approval. Alternate calculation methods for fuel economy ~~and carbon-related exhaust emissions~~ may be used in lieu of the methods described in this section if shown to yield equivalent or superior results and if approved in advance by the Administrator.

58. Amend § 600.114-12 by revising the section heading and introductory text to read as follows:

**§ 600.114-12 Vehicle-specific 5-cycle fuel economy ~~and carbon-related exhaust~~ CO<sub>2</sub> emission calculations.**

Paragraphs (a) through (f) of this section apply to data used for fuel economy labeling under subpart D of this part. Paragraphs (d) through (f) of this section are used to calculate 5-cycle carbon-related exhaust emission values for the purpose of determining optional credits for CO<sub>2</sub>-reducing technologies under § ~~86.1869-1286.1866~~ of this chapter and to calculate 5-cycle CO<sub>2</sub> values for the purpose of fuel economy labeling under subpart D of this part.

\* \* \* \* \*

59. Amend § 600.116-12 by revising paragraphs (a)(11)(iii)(E), (c) introductory text, (c)(1), (c)(2), (c)(5), and (c)(6)(iii) to read as follows:

**§ 600.116-12 Special procedures related to electric vehicles and hybrid electric vehicles.**

(a) \* \* \*

(11) \* \* \*

(iii) \* \* \*

(E) A description of each test group and vehicle configuration ~~which-that~~ will use the 5-cycle adjustment factor, including the battery capacity of the vehicle used to generate the 5-cycle adjustment factor and the battery capacity of all the vehicle configurations to which it will be applied.

\* \* \* \* \*

(c) Determine performance values for hybrid electric vehicles that have plug-in capability as specified in §§ 600.210 and 600.311 using the procedures of SAE J1711 (incorporated by reference, ~~see in~~ § 600.011), with the following clarifications and modifications:

(1) ~~To determine CREE values to demonstrate compliance with GHG standards, e~~Calculate fuel economy composite values representing combined operation during charge-depleting and charge-sustaining operation using the following utility factors, except as otherwise specified in this paragraph (c):

TABLE 1 TO PARAGRAPH (c)(1)—FLEET UTILITY FACTORS FOR URBAN “CITY” DRIVING

Schedule range for UDDS phases, miles	Model year 2030 and earlier		Model year 2031 and later	
	Cumulative UF	Sequential UF	Cumulative UF	Sequential UF
3.59	0.125	0.125	0.062	0.062
7.45	0.243	0.117	0.125	0.062
11.04	0.338	0.095	0.178	0.054
14.90	0.426	0.088	0.232	0.053
18.49	0.497	0.071	0.278	0.046
22.35	0.563	0.066	0.324	0.046
25.94	0.616	0.053	0.363	0.040
29.80	0.666	0.049	0.403	0.040
33.39	0.705	0.040	0.437	0.034
37.25	0.742	0.037	0.471	0.034
40.84	0.772	0.030	0.500	0.029
44.70	0.800	0.028	0.530	0.029
48.29	0.822	0.022	0.555	0.025
52.15	0.843	0.021	0.580	0.025
55.74	0.859	0.017	0.602	0.022
59.60	0.875	0.016	0.624	0.022
63.19	0.888	0.013	0.643	0.019
67.05	0.900	0.012	0.662	0.019
70.64	0.909	0.010	0.679	0.017

TABLE 2 TO PARAGRAPH (c)(1)—FLEET UTILITY FACTORS FOR HIGHWAY DRIVING

Schedule range for HFET, miles	Model year 2030 and earlier		Model year 2031 and later	
	Cumulative UF	Sequential UF	Cumulative UF	Sequential UF
10.3	0.123	0.123	0.168	0.168
20.6	0.240	0.117	0.303	0.136
30.9	0.345	0.105	0.414	0.110
41.2	0.437	0.092	0.503	0.090
51.5	0.516	0.079	0.576	0.073
61.8	0.583	0.067	0.636	0.060
72.1	0.639	0.056	0.685	0.049

(2) Determine fuel economy values to demonstrate compliance with CAFE standards as follows:

- (i) For vehicles that are not dual fueled automobiles, determine fuel economy using the utility factors specified in paragraph (c)(1) of this section ~~for model year 2030 and earlier vehicles~~. Do not use the petroleum-equivalence factors described in 10 CFR 474.3.
- (ii) Except as described in paragraph (c)(2)(iii) of this section, determine fuel economy for dual fueled automobiles from the following equation, separately for city and highway driving:

**Equation 2 to paragraph (c)(2)(ii)**

$$MPGe_{CAFE} = \frac{1}{\left( \frac{0.5}{MPG_{gas}} + \frac{0.5}{MPG_{elec}} \right)}$$

Where:

$MPG_{gas}$  = The miles per gallon measured while operating on gasoline during charge-sustaining operation as determined using the procedures of SAE J1711.

$MPGe_{elec}$  = The miles per gallon equivalent measured while operating on electricity. Calculate this value by dividing the equivalent all-electric range determined from the equation in § 86.1866–12(b)(2)(ii) by the corresponding measured Watt-hours of energy consumed; apply the appropriate petroleum-equivalence factor from 10 CFR 474.3 to convert Watt-hours to gallons equivalent. Note that if vehicles use no gasoline during charge-depleting operation,  $MPGe_{elec}$  is the same as the charge-depleting fuel economy specified in SAE J1711.

(iii) For 2016 and later model year dual fueled automobiles, you may determine fuel economy based on the following equation, separately for city and highway driving:

**Equation 3 to paragraph (c)(2)(iii)**

$$MPGe_{CAFE} = \frac{1}{\left( \frac{UF}{MPGe_{elec}} + \frac{(1-UF)}{MPGe_{gas}} \right)}$$

Where:

$UF$  = The appropriate utility factor for city or highway driving specified in paragraph (c)(1) of this section ~~for model year 2030 and earlier vehicles.~~

\* \* \* \* \*

(5) Instead of the utility factors specified in paragraphs (c)(1) through (3) of this section, calculate utility factors using the following equation for vehicles whose maximum speed is less than the maximum speed specified in the driving schedule, where the vehicle's maximum speed is determined, to the nearest 0.1 mph, from observing the highest speed over the first duty cycle (FTP, HFET, etc.):

**Equation 4 to paragraph (c)(5)**

$$UF_i = 1 - \left[ \exp \left( - \sum_{j=1}^k \left( \left( \frac{d_i}{ND} \right)^j \times C_j \right) \right) \right] - \sum_{i=1}^n UF_{i-1}$$

Where:

$UF_i$  = the utility factor for phase  $i$ . Let  $UF_0 = 0$ .

$j$  = a counter to identify the appropriate term in the summation (with terms numbered consecutively).

$k$  = the number of terms in the equation (see Table 5 of this section).

$d_i$  = the distance driven in phase  $i$ .

$ND$  = the normalized distance. Use  $ND = 399$  for all types of driving, and for both CAFE fleet values and multi-day individual values for labeling, for both FTP and HFET operation for CAFE and GHG fleet values, except that  $ND = 583$  for both FTP and HFET

operation for GHG fleet values starting in model year 2031. Use 399 for both FTP and HFET operation for multi-day individual values for labeling.

$C_j$  = the coefficient for term  $j$  from the following table:

TABLE 5 TO PARAGRAPH (c)(5)—CITY/HIGHWAY SPECIFIC UTILITY FACTOR COEFFICIENTS

$j$	Fleet values for CAFE for all model years, and for GHG through MY 2030		Fleet values for GHG starting in MY 2031	Multi-day individual values for labeling
	City	Highway	City or highway	City or highway
1	14.86	4.8	10.52	13.1
2	2.965	13	-7.282	-18.7
3	-84.05	-65	-26.37	5.22
4	153.7	120	79.08	8.15
5	-43.59	-100.00	-77.36	3.53
6	-96.94	31.00	26.07	-1.34
7	14.47			-4.01
8	91.70			-3.90
9	-46.36			-1.15
10				3.88

$n$  = the number of test phases (or bag measurements) before the vehicle reaches the end-of-test criterion.

(6) \* \* \*

(iii) For charge-sustaining tests, we may approve alternate Net Energy Change/Fuel Ratio tolerances as specified in Appendix C of SAE J1711 to correct final fuel economy values, and CO<sub>2</sub> emissions, ~~and carbon-related exhaust emissions~~. For charge-sustaining tests, do not use alternate Net Energy Change/Fuel Ratio tolerances to correct emissions of criteria pollutants. Additionally, if we approve an alternate End-of-Test criterion or Net Energy Change/Fuel Ratio tolerances for a specific vehicle, we may use the alternate criterion or tolerances for any testing we conduct on that vehicle.

\* \* \* \* \*

60. Amend § 600.117 by:

- Revising paragraph (a)(1);
- Removing and reserving paragraph (a)(5); and
- Revising paragraphs (a)(6) and (b) to read as follows:

The revisions read as follows:

### § 600.117 Interim provisions.

(a) \* \* \*

(1) Except as specified in paragraphs (a)(5) and (6) of this section, manufacturers must ~~demonstrate compliance with greenhouse gas emission standards and~~ determine fuel economy values using E0 gasoline test fuel as specified in 40 CFR 86.113-04(a)(1), regardless of any testing with E10 test fuel specified in 40 CFR 1065.710(b) under paragraph (a)(2) of this section.

\* \* \* \* \*

- (5) ~~[Reserved]For IUVP testing under 40 CFR 86.1845, manufacturers may demonstrate compliance with greenhouse gas emission standards using a test fuel meeting specifications for demonstrating compliance with emission standards for criteria pollutants.~~
- (6) Manufacturers may alternatively ~~demonstrate compliance with greenhouse gas emission standards and~~ determine fuel economy values using E10 gasoline test fuel as specified in 40 CFR 1065.710(b). Calculate fuel economy using the equation specified in § 600.113-12(o)(1) based on measured CO<sub>2</sub> results without adjusting to account for fuel effects.~~However, manufacturers must then multiply measured CO<sub>2</sub> results by 1.0166 and round to the nearest 0.01 g/mile and calculate fuel economy using the equations appropriate equation for testing with E10 test fuel.~~
- \* \* \* \* \*
- (b) ~~Manufacturers may certify model year 2027 through 2029 vehicles to greenhouse gas emission standards~~For model years 2027 through 2029, manufacturers may determine fuel economy values using data with E0 test fuel from testing for earlier model years, subject to the carryover provisions of 40 CFR 86.1839 and § 600.006. Calculate fuel economy using the equation specified in § 600.113-12(h)(1) based on measured CO<sub>2</sub> results without adjusting to account for fuel effects.~~In the case of the fleet average CO<sub>2</sub> standard, manufacturers must divide the measured CO<sub>2</sub> results by 1.0166 and round to the nearest 0.01 g/mile.~~
- \* \* \* \* \*

61. Amend § 600.206-12 by revising paragraphs (a) introductory text, (a)(4) introductory text, (b), and (c) to read as follows:

**§ 600.206-12 Calculation and use of FTP-based and HFET-based fuel economy, CO<sub>2</sub> emissions, and carbon-related exhaust emission values for vehicle configurations.**

(a) Fuel economy, CO<sub>2</sub> emissions, and carbon-related exhaust emissions values determined for each vehicle under § 600.113-~~1208~~(a) and (b) and as approved in § 600.008(c), are used to determine FTP-based city, HFET-based highway, and combined FTP/Highway-based fuel economy, CO<sub>2</sub> emissions, and carbon-related exhaust emission values for each vehicle configuration for which data are available. Note that fuel economy for some alternative fuel vehicles may mean miles per gasoline gallon equivalent and/or miles per unit of fuel consumed. For example, electric vehicles will determine miles per kilowatt-hour in addition to miles per gasoline gallon equivalent, and fuel cell vehicles will determine miles per kilogram of hydrogen.

\* \* \* \* \*

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles the procedures of paragraphs (a)(1) or (2) of this section, as applicable, shall be used to calculate two separate sets of FTP-based city, HFET-based highway, and combined values for fuel economy, CO<sub>2</sub> emissions, and carbon-related exhaust emissions for each vehicle configuration.

\* \* \* \* \*

(b) If only one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based fuel economy for that vehicle configuration.

(c) If more than one equivalent petroleum-based fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that vehicle configuration.



62. Amend § 600.207-12 by revising paragraphs (a)(1), (a)(4) introductory text, (b), and (c) to read as follows:

**§ 600.207-12 Calculation and use of vehicle-specific 5-cycle-based fuel economy and CO<sub>2</sub> emission values for vehicle configurations.**

(a) \* \* \*

(1) If only one set of 5-cycle city and highway fuel economy and CO<sub>2</sub> emission values is accepted for a vehicle configuration, these values, where fuel economy is rounded to the nearest 0.0001 of a mile per gallon and the CO<sub>2</sub> emission value in grams per mile is rounded to the nearest tenth of a gram per mile, comprise the city and highway fuel economy and CO<sub>2</sub> emission values for that vehicle configuration. Note that the appropriate vehicle-specific CO<sub>2</sub> values for fuel economy labels based on 5-cycle testing with E10 test fuel are adjusted as described in § 600.114-12.

\* \* \* \* \*

(4) For alcohol dual fuel automobiles and natural gas dual fuel automobiles, the procedures of paragraphs (a)(1) and (2) of this section shall be used to calculate two separate sets of 5-cycle city and highway fuel economy and CO<sub>2</sub> emission values for each vehicle configuration.

\* \* \* \* \*

(b) If only one equivalent petroleum-based fuel economy value exists for an electric-vehicle configuration, that value, rounded to the nearest tenth of a mile per gallon, will comprise the petroleum-based 5-cycle fuel economy for that vehicle configuration.

(c) If more than one equivalent petroleum-based 5-cycle fuel economy value exists for an electric vehicle configuration, all values for that vehicle configuration are harmonically averaged and rounded to the nearest 0.0001 mile per gallon for that vehicle configuration.

63. Amend § 600.210-12 by revising paragraph (b) to read as follows:

**§ 600.210-12 Calculation of fuel economy and CO<sub>2</sub> emission values for labeling.**

\* \* \* \* \*

(b) *Specific labels.* Except as specified in paragraphs (d) and (e) of this section, fuel economy and CO<sub>2</sub> emissions for specific labels may be determined by one of two methods. The first is based on vehicle-specific vehicle configuration 5-cycle data as determined in § 600.207. This method is available for all vehicles and is required for vehicles that do not qualify for the second method as described in § 600.115 (other than electric vehicles). The second method, the derived 5-cycle method, determines fuel economy and CO<sub>2</sub> emissions values from the FTP and HFET tests using equations that are derived from vehicle-specific 5-cycle vehicle configuration data, as determined in paragraph (b)(2) of this section. Manufacturers may voluntarily lower fuel economy values and raise CO<sub>2</sub> values if they determine that the label values from either method are not representative of the fuel economy or CO<sub>2</sub> emissions for that model type.

(1) *Vehicle-specific 5-cycle labels.* The city and highway vehicle configuration fuel economy determined in § 600.207, rounded to the nearest mpg, and the city and highway vehicle configuration CO<sub>2</sub> emissions determined in § 600.207, rounded to the nearest gram per mile, comprise the fuel economy and CO<sub>2</sub> emission values for specific fuel economy labels, or, alternatively;

(2) *Derived 5-cycle labels.* Specific city and highway label values from derived 5-cycle are determined according to the following method:

- (i)(A) Determine the derived five-cycle city fuel economy of the vehicle configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{(\text{City Intercept}) + \frac{(\text{City Slope})}{\text{Config FTP FE}}}$$

$$\text{Derived 5-cycle City Fuel Economy} = \frac{1}{\left\{ \text{City Intercept} \right\} + \frac{\left\{ \text{City Slope} \right\}}{\text{Config FTP FE}}}$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

Config FTP FE = the vehicle configuration FTP-based city fuel economy determined under § 600.206, rounded to the nearest 0.0001 mpg.

- (B) Determine the derived five-cycle city CO<sub>2</sub> emissions of the vehicle configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle City CO}_2 = \text{City Intercept} + \text{City Slope} \cdot \text{Config FTP CO}_2$$

Where:

City Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

City Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle city fuel economy data.

Config FTP CO<sub>2</sub> = the vehicle configuration FTP-based city CO<sub>2</sub> emissions determined under § 600.206, rounded to the nearest 0.1 grams per mile. Note that the appropriate Config FTP CO<sub>2</sub> input values for fuel economy labels based on testing with E10 test fuel are adjusted as referenced in § 600.206-12(a)(2)(iii).

- (ii)(A) Determine the derived five-cycle highway fuel economy of the vehicle configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{(\text{Highway Intercept}) + \frac{(\text{Highway Slope})}{\text{Config HFET FE}}}$$

$$\text{Derived 5-cycle Highway Fuel Economy} = \frac{1}{\left\{ \text{Highway Intercept} \right\} + \frac{\left\{ \text{Highway Slope} \right\}}{\text{Config HFET FE}}}$$

Where:

Highway Intercept = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Highway Slope = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

Config HFET FE = the vehicle configuration highway fuel economy determined under § 600.206, rounded to the nearest tenth.

- (B) Determine the derived five-cycle highway CO<sub>2</sub> emissions of the vehicle configuration using the equation below and coefficients determined by the Administrator:

$$\text{Derived 5-cycle city Highway CO}_2 = \text{Highway Intercept} + \text{Highway Slope} \cdot \text{Config HFET CO}_2$$

Where:

*Highway Intercept* = Intercept determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

*Highway Slope* = Slope determined by the Administrator based on historic vehicle-specific 5-cycle highway fuel economy data.

*Config HFET CO<sub>2</sub>* = the vehicle configuration highway fuel economy determined under § 600.206, rounded to the nearest tenth. Note that the appropriate Config HFET CO<sub>2</sub> input values for fuel economy labels based on testing with E10 test fuel are adjusted as referenced in § 600.206-12(a)(2)(iii).

(iii) The slopes and intercepts of paragraph (a)(2)(iii) of this section apply.

(3) *Specific alternative fuel economy and CO<sub>2</sub> emissions label values for dual fuel vehicles.*

(i) Determine an alternative fuel label value for dual fuel vehicles, rounded to the nearest whole number, as follows:

(A) Specific city and highway fuel economy label values for dual fuel alcohol-based and natural gas vehicles when using the alternative fuel are separately determined by the following calculation:

$$\text{Derived FE}_{\text{alt}} = \text{FE}_{\text{alt}} \times \frac{5 \text{ cycle}_{\text{gas}}}{\text{FE}_{\text{gas}}}$$
~~$$\text{Derived FE}_{\text{alt}} = \text{FE}_{\text{alt}} \times \frac{5 \text{ cycle}_{\text{gas}}}{\text{FE}_{\text{gas}}}$$~~

Where:

$\text{FE}_{\text{alt}}$  = The unrounded FTP-based vehicle configuration city or HFET-based vehicle configuration highway fuel economy from the alternative fuel, as determined in § 600.206.

$5\text{cycle FE}_{\text{gas}}$  = The unrounded vehicle-specific or derived 5-cycle vehicle configuration city or highway fuel economy as determined in paragraph (b)(1) or (2) of this section.

$\text{FE}_{\text{gas}}$  = The unrounded FTP-based city or HFET-based vehicle configuration highway fuel economy from gasoline, as determined in § 600.206.

~~The result, rounded to the nearest whole number, is the alternate fuel label value for dual fuel vehicles.~~

(B) Specific city and highway CO<sub>2</sub> emission label values for dual fuel alcohol-based and natural gas vehicles when using the alternative fuel are separately determined by the following calculation:

$$\text{Derived CO}_{2\text{alt}} = \text{CO}_{2\text{alt}} \times \frac{5 \text{ cycle CO}_{2\text{gas}}}{\text{CO}_{2\text{gas}}}$$

Where:

$\text{CO}_{2\text{alt}}$  = The unrounded FTP-based vehicle configuration city or HFET-based vehicle configuration highway CO<sub>2</sub> emissions value from the alternative fuel, as determined in § 600.206.

5cycle CO<sub>2gas</sub> = The unrounded vehicle-specific or derived 5-cycle vehicle configuration city or highway CO<sub>2</sub> emissions value as determined in paragraph (b)(1) or (b)(2) of this section.

CO<sub>2gas</sub> = The unrounded FTP-based city or HFET-based vehicle configuration highway CO<sub>2</sub> emissions value from gasoline, as determined in § 600.206.

~~The result, rounded to the nearest whole number, is the alternate fuel CO<sub>2</sub> emissions label value for dual fuel vehicles.~~

(ii) Optionally, if complete 5-cycle testing has been performed using the alternative fuel, the manufacturer may choose to use the alternative fuel label city or highway fuel economy and CO<sub>2</sub> emission values determined in § 600.207-12(a)(4)(ii), rounded to the nearest whole number.

(4) *Specific alternative fuel economy and CO<sub>2</sub>emissions label values for electric vehicles.*

Determine FTP-based city and HFET-based highway fuel economy label values for electric vehicles as described in § 600.116. Determine these values by running the appropriate repeat test cycles. Convert W-hour/mile results to miles per kW-hr and miles per gasoline gallon equivalent. CO<sub>2</sub> label information is based on tailpipe emissions only, so CO<sub>2</sub> emissions from electric vehicles are assumed to be zero.

(5) *Specific alternate fuel economy and CO<sub>2</sub>emissions label values for fuel cell vehicles.*

Determine FTP-based city and HFET-based highway fuel economy label values for fuel cell vehicles using procedures specified by the Administrator. Convert kilograms of hydrogen/mile results to miles per kilogram of hydrogen and miles per gasoline gallon equivalent. CO<sub>2</sub> label information is based on tailpipe emissions only, so CO<sub>2</sub> emissions from fuel cell vehicles are assumed to be zero.

\* \* \* \* \*

## **Subpart F—Procedures for Determining Manufacturer's Average Fuel Economy ~~and Manufacturer's Average Carbon-related Exhaust Emissions~~**

64. Revise the heading of subpart F as set forth above.

65. Amend § 600.507-12 by revising paragraphs (a) introductory text, (b), and (d) to read as follows:

### **§ 600.507-12 Running change data requirements.**

(a) Except as specified in paragraph (d) of this section, the manufacturer shall submit additional running change fuel economy ~~and carbon-related exhaust emissions~~ data as specified in paragraph (b) of this section for any running change approved or implemented under § 86.1842 of this chapter, which:

\* \* \* \* \*

(b)(1) The additional running change fuel economy ~~and carbon-related exhaust emissions~~ data requirement in paragraph (a) of this section will be determined based on the sales of the vehicle configurations in the created or affected base level(s) as updated at the time of running change approval.

(2) Within each newly created base level as specified in paragraph (a)(1) of this section, the manufacturer shall submit data from the highest projected total model year sales subconfiguration within the highest projected total model year sales vehicle configuration in the base level.

(3) Within each base level affected by a running change as specified in paragraph (a)(2) of this section, fuel economy ~~and carbon-related exhaust emissions~~ data shall be submitted for the vehicle configuration created or affected by the running change which has the highest total model year projected sales. The test vehicle shall be of the subconfiguration created by the running change which has the highest projected total model year sales within the applicable vehicle configuration.

\* \* \* \* \*

(d) For those model types created under § 600.208-12(a)(2), the manufacturer shall submit fuel economy ~~and carbon-related exhaust emissions~~ data for each subconfiguration added by a running change.

66. Revise § 600.509-12 to read as follows:

**§ 600.509-12 Voluntary submission of additional data.**

(a) The manufacturer may optionally submit data in addition to the data required by the Administrator.

(b) Additional fuel economy ~~and carbon-related exhaust emissions~~ data may be submitted by the manufacturer for any vehicle configuration which is to be tested as required in § 600.507 or for which fuel economy ~~and carbon-related exhaust emissions~~ data were previously submitted under paragraph (c) of this section.

(c) Within a base level, additional fuel economy ~~and carbon-related exhaust emissions~~ data may be submitted by the manufacturer for any vehicle configuration which is not required to be tested by § 600.507.

67. Amend § 600.510-12 by:

- a. Revising the section heading;
- b. Removing and reserving paragraph (a)(2);
- c. Revising paragraphs (b) and (g)(1) introductory text; and
- d. Removing paragraphs (i), (j), and (k).

The revisions read as follows:

**§ 600.510-12 Calculation of average fuel economy ~~and average carbon-related exhaust emissions~~.**

(a) \* \* \*

(2) ~~[Reserved] Average carbon-related exhaust emissions will be calculated to the nearest one gram per mile for the categories of automobiles identified in this section, and the results of such calculations will be reported to the Administrator for use in determining compliance with the applicable CO<sub>2</sub> emission standards.~~

~~(i) An average carbon-related exhaust emissions calculation will be made for passenger automobiles.~~

~~(ii) An average carbon-related exhaust emissions calculation will be made for light trucks.~~

(b) For the purpose of calculating average fuel economy under paragraph (c) of this section ~~and for the purpose of calculating average carbon-related exhaust emissions under paragraph (j) of this section:~~

(1) All fuel economy ~~and carbon-related exhaust emissions~~ data submitted in accordance with § 600.006(e) or § 600.512(c) shall be used.

(2) The combined city/highway fuel economy ~~and carbon-related exhaust emission~~ values will be calculated for each model type in accordance with § 600.208, with the following exceptions-except that:

(i) Separate fuel economy values will be calculated for model types and base levels associated with car lines for each category of passenger automobiles and light trucks as determined by the Secretary of Transportation pursuant to paragraph (a)(1) of this section.

(ii) Total model year production data, as required by this subpart, will be used instead of sales projections.;

(iii) ~~[Reserved]~~

~~(iv)~~ The fuel economy value will be rounded to the nearest 0.1 mpg; and

~~(v) The carbon-related exhaust emission value will be rounded to the nearest gram per mile; and~~

~~(iv)~~ At the manufacturer's option, those vehicle configurations that are self-compensating to altitude changes may be separated by sales into high-altitude sales categories and low-altitude sales categories. These separate sales categories may then be treated (only for the purpose of this section) as separate vehicle configurations in accordance with the procedure of § 600.208-12(a)(4)(ii).

(3) The fuel economy ~~and carbon-related exhaust emission~~ values for each vehicle configuration are the combined fuel economy ~~and carbon-related exhaust emissions~~ calculated according to § 600.206-12(a)(3), with the following exceptions-except that:

(i) Separate fuel economy values will be calculated for vehicle configurations associated with car lines for each category of passenger automobiles and light trucks as determined by the Secretary of Transportation pursuant to paragraph (a)(1) of this section.;

(ii) Total model year production data, as required by this subpart will be used instead of sales projections.;

~~(iii) [Reserved]~~

~~(4) Emergency vehicles may be excluded from the fleet average carbon-related exhaust emission calculations described in paragraph (j) of this section. The manufacturer should notify the Administrator that they are making such an election in the model year reports required under § 600.512 of this chapter. Such vehicles should be excluded from both the calculation of the fleet average standard for a manufacturer under 40 CFR 86.1818-12(c)(4) and from the calculation of the fleet average carbon-related exhaust emissions in paragraph (j) of this section.~~

\* \* \* \* \*

(g)(1) Dual fuel automobiles must provide equal or greater energy efficiency while operating on the alternative fuel as while operating on gasoline or diesel fuel to obtain the CAFE credit determined in paragraphs (c)(2)(iv) and (v) of this section ~~or to obtain the carbon-related exhaust emissions credit determined in paragraphs (j)(2)(ii) and (iii) of this section.~~ The following equation must hold true:

\* \* \* \* \*

~~(i) For model years 2012 through 2015, and for each category of automobile identified in paragraph (a)(1) of this section, the maximum decrease in average carbon-related exhaust emissions determined in paragraph (j) of this section attributable to alcohol dual fuel automobiles and natural gas dual fuel automobiles shall be calculated using the following formula, and rounded to the nearest tenth of a gram per mile:~~



$$\text{Maximum Decrease} = \frac{8887}{\left[ \frac{8887}{\text{FltAvg}} - \text{MPG}_{\text{MAX}} \right]} - \text{FltAvg}$$

Where:

~~FltAvg~~ = The fleet average CREE value in grams per mile, rounded to the nearest whole number, for passenger automobiles or light trucks determined for the applicable model year according to paragraph (j) of this section, except by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel. For the purposes of these calculations, the values for natural gas dual fuel automobiles using the optional Utility Factor approach in paragraph (j)(2)(vii) of this section shall not be the gasoline CREE values, but the CREE values determined in paragraph (j)(2)(vii) of this section.

~~MPG<sub>MAX</sub>~~ = The maximum increase in miles per gallon determined for the appropriate model year in paragraph (h) of this section.

~~(1) The Administrator shall calculate the decrease in average carbon-related exhaust emissions to determine if the maximum decrease provided in this paragraph (i) has been reached. The Administrator shall calculate the average carbon-related exhaust emissions for each category of automobiles specified in paragraph (a) of this section by subtracting the average carbon-related exhaust emission values determined in paragraph (j) of this section from the average carbon-related exhaust emission values calculated in accordance with this section by assuming all alcohol dual fuel and natural gas dual fuel automobiles are operated exclusively on gasoline (or diesel) fuel. For the purposes of these calculations, the values for natural gas dual fuel automobiles using the optional Utility Factor approach in paragraph (j)(2)(vii) of this section shall not be the gasoline CREE values, but the CREE values determined in paragraph (j)(2)(vii) of this section. The difference is limited to the maximum decrease specified in paragraph (i) of this section.~~

~~(2) [Reserved]~~

~~(j) The average carbon-related exhaust emissions will be calculated individually for each category identified in paragraph (a)(1) of this section as follows:~~

~~(1) Divide the total production volume of that category of automobiles into:~~

~~(2) A sum of terms, each of which corresponds to a model type within that category of automobiles and is a product determined by multiplying the number of automobiles of that model type produced by the manufacturer in the model year by:~~

~~(i) For gasoline-fueled and diesel-fueled model types, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or~~

~~(ii)~~

~~(A) For alcohol-fueled model types, for model years 2012 through 2015, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter must perform this calculation such that N<sub>2</sub>O and CH<sub>4</sub> values are not multiplied by 0.15; or~~

~~(B) For alcohol-fueled model types, for model years 2016 and later, the carbon-related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or~~

~~(iii)~~

(A) For natural gas fueled model types, for model years 2012 through 2015, the carbon related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section multiplied by 0.15 and rounded to the nearest gram per mile, except that manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter must perform this calculation such that N<sub>2</sub>O and CH<sub>4</sub> values are not multiplied by 0.15; or

(B) For natural gas fueled model types, for model years 2016 and later, the carbon related exhaust emissions value calculated for that model type in accordance with paragraph (b)(2) of this section; or

(iv) For alcohol dual fuel model types, for model years 2012 through 2015, the arithmetic average of the following two terms, the result rounded to the nearest gram per mile:

(A) The combined model type carbon related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208-12(b)(5)(i); and

(B) The combined model type carbon related exhaust emissions value for operation on alcohol fuel as determined in § 600.208-12(b)(5)(ii) multiplied by 0.15 provided the requirements of paragraph (g) of this section are met, except that manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter must perform this calculation such that N<sub>2</sub>O and CH<sub>4</sub> values are not multiplied by 0.15; or

(v) For natural gas dual fuel model types, for model years 2012 through 2015, the arithmetic average of the following two terms; the result rounded to the nearest gram per mile:

(A) The combined model type carbon related exhaust emissions value for operation on gasoline or diesel as determined in § 600.208-12(b)(5)(i); and

(B) The combined model type carbon related exhaust emissions value for operation on natural gas as determined in § 600.208-12(b)(5)(ii) multiplied by 0.15 provided the requirements of paragraph (g) of this section are met, except that manufacturers complying with the fleet averaging option for N<sub>2</sub>O and CH<sub>4</sub> as allowed under § 86.1818 of this chapter must perform this calculation such that N<sub>2</sub>O and CH<sub>4</sub> values are not multiplied by 0.15.

(vi) For alcohol dual fuel model types, for model years 2016 and later, the combined model type carbon related exhaust emissions value determined according to the following formula and rounded to the nearest gram per mile:

$$CREE = (F \times CREE_{alt}) + ((1 - F) \times CREE_{gas})$$

Where:

F = 0.00 unless otherwise approved by the Administrator according to the provisions of paragraph (k) of this section;

CREE<sub>alt</sub> = The combined model type carbon related exhaust emissions value for operation on alcohol fuel as determined in § 600.208-12(b)(5)(ii); and

CREE<sub>gas</sub> = The combined model type carbon related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208-12(b)(5)(i).

(vii)

(A) This paragraph (j)(2)(vii) applies to model year 2016 and later natural gas dual fuel model types. Model year 2021 and later natural gas dual fuel model types may use a utility factor of 0.5 or the utility factor prescribed in this paragraph (j)(2)(vii).

~~$$CREE = [CREE_{CNG} \times UF] + [CREE_{GAS} \times (1 - UF)]$$~~

Where:

CREE<sub>CNG</sub> = The combined model type carbon related exhaust emissions value for operation on natural gas as determined in § 600.208-12(b)(5)(ii); and

~~CREE<sub>GAS</sub> = The combined model type carbon related exhaust emissions value for operation on gasoline or diesel fuel as determined in § 600.208-12(b)(5)(i).~~

~~UF = A Utility Factor (UF) value selected from the following table based on the driving range of the vehicle while operating on natural gas, except for natural gas dual fuel vehicles that do not meet the criteria in paragraph (j)(2)(vii)(B) the Utility Factor shall be 0.5. Determine the vehicle's driving range in miles by multiplying the combined fuel economy as determined in § 600.208-12(b)(5)(ii) by the vehicle's usable fuel storage capacity (as defined at § 600.002 and expressed in gasoline gallon equivalents), and rounding to the nearest 10 miles.~~

Driving range (miles)	UF
10	0.228
20	0.397
30	0.523
40	0.617
50	0.689
60	0.743
70	0.785
80	0.818
90	0.844
100	0.865
110	0.882
120	0.896
130	0.907
140	0.917
150	0.925
160	0.932
170	0.939
180	0.944
190	0.949
200	0.954
210	0.958
220	0.962
230	0.965
240	0.968
250	0.971
260	0.973
270	0.976
280	0.978
290	0.980
300	0.981

~~(B) Model year 2016 through 2020 natural gas dual fuel model types must meet the following criteria to qualify for use of a Utility Factor greater than 0.5:~~

~~(1) The driving range using natural gas must be at least two times the driving range using gasoline.~~

~~(2) The natural gas dual fuel vehicle must be designed such that gasoline is used only when the natural gas tank is effectively empty, except for limited use of gasoline that may be required to initiate combustion.~~

~~(k) Alternative in-use weighting factors for dual fuel model types. Using one of the methods in either paragraph (k)(1) or (2) of this section, manufacturers may request the use of alternative values for the weighting factor F in the equations in paragraphs (j)(2)(vi) and (vii) of this section. Unless otherwise approved by the Administrator, the manufacturer must use the value of F that is in effect in paragraphs (j)(2)(vi) and (vii) of this section.~~

~~(1) Upon written request from a manufacturer, the Administrator will determine and publish by written guidance an appropriate value of F for each requested alternative fuel based on the Administrator's assessment of real world use of the alternative fuel. Such published values would be available for any manufacturer to use. The Administrator will periodically update these values upon written request from a manufacturer.~~

~~(2) The manufacturer may optionally submit to the Administrator its own demonstration regarding the real world use of the alternative fuel in their vehicles and its own estimate of the appropriate value of F in the equations in paragraphs (j)(2)(vi) and (vii) of this section. Depending on the nature of the analytical approach, the manufacturer could provide estimates of F that are model type specific or that are generally applicable to the manufacturer's dual fuel fleet. The manufacturer's analysis could include use of data gathered from on-board sensors and computers, from dual fuel vehicles in fleets that are centrally fueled, or from other sources. The analysis must be based on sound statistical methodology and must account for analytical uncertainty. Any approval by the Administrator will pertain to the use of values of F for the model types specified by the manufacturer.~~

68. Amend § 600.512-12 by:

- a. Revising paragraph (a) introductory text;
- b. Removing and reserving paragraph (a)(2), (c)(1)(ii), and (c)(2)(ii);
- c. Revising paragraphs (c)(3);
- d. Removing and reserving paragraphs (c)(4)(ii), and (c)(5)(ii); and
- e. Removing paragraph (c)(11).

The revisions read as follows:

**§ 600.512-12 Model year report.**

(a) For each model year, the manufacturer shall submit to the Administrator a report, known as the model year report, containing all information necessary for the calculation of the manufacturer's average fuel economy ~~and all information necessary for the calculation of the manufacturer's average carbon related exhaust emissions.~~

\* \* \* \* \*

(2) [Reserved] ~~The results of the manufacturer calculations and summary information of model type carbon related exhaust emission values which are contained in the average calculation shall be submitted to the Administrator.~~

\* \* \* \* \*

(c) The model year report must include the following information:

- (1)
  - (i) All fuel economy data used in the FTP/HFET-based model type calculations under § 600.208, and subsequently required by the Administrator in accordance with § 600.507;
  - (ii) ~~[Reserved] All carbon-related exhaust emission data used in the FTP/HFET-based model type calculations under § 600.208, and subsequently required by the Administrator in accordance with § 600.507;~~
- (2)
  - (i) All fuel economy data for certification vehicles and for vehicles tested for running changes approved under § 86.1842 of this chapter;
  - (ii) ~~[Reserved] All carbon-related exhaust emission data for certification vehicles and for vehicles tested for running changes approved under § 86.1842 of this chapter;~~
- (3)
  - (i) For manufacturers calculating air conditioning efficiency credits in support of fuel consumption improvement values under § 600.510(c), a description of the air conditioning system and the total credits earned for each averaging set, model year, and region, as applicable.
  - (ii) Any additional fuel economy ~~and carbon-related exhaust emission~~ data submitted by the manufacturer under § 600.509;
- (4)
  - (i) A fuel economy value for each model type of the manufacturer's product line calculated according to § 600.510-12(b)(2);
  - (ii) ~~[Reserved] A carbon-related exhaust emission value for each model type of the manufacturer's product line calculated according to § 600.510-12(b)(2);~~
- (5)
  - (i) The manufacturer's average fuel economy value calculated according to § 600.510-12(c);
  - (ii) ~~[Reserved] The manufacturer's average carbon-related exhaust emission value calculated according to § 600.510-12(j);~~

\* \* \* \* \*

~~(11) A detailed (but easy to understand) list of vehicle models and the applicable in-use CREE emission standard. The list of models shall include the applicable earline/subconfiguration parameters (including earline, equivalent test weight, road-load horsepower, axle ratio, engine code, transmission class, transmission configuration and basic engine); the test parameters (ETW and a, b, c, dynamometer coefficients) and the associated CREE emission standard. The manufacturer shall provide the method of identifying EPA engine code for applicable in-use vehicles.~~

#### **§ 600.514-12 [Removed]**

69. Remove § 600.514-12.

#### **~~§ 600.514-12 Reports to the Environmental Protection Agency.~~**

~~This section establishes requirements for automobile manufacturers to submit reports to the Environmental Protection Agency regarding their efforts to reduce automotive greenhouse gas emissions.~~

##### ~~(a) General Requirements.~~

~~(1) For each model year, each manufacturer shall submit a pre-model year report.~~

~~(2) The pre-model year report required by this section for each model year must be submitted before the model year begins and before the certification of any test group, no later than December 31 of the calendar year two years before the model year. For example the pre-model year report for the 2012 model year must be submitted no later than December 31, 2010.~~

~~(3) Each report required by this section must:~~

- ~~(i) Identify the report as a pre-model year report;~~
- ~~(ii) Identify the manufacturer submitting the report;~~
- ~~(iii) State the full name, title, and address of the official responsible for preparing the report;~~
- ~~(iv) Be submitted to: Director, Compliance and Innovative Strategies Division, U.S. Environmental Protection Agency, 2000 Traverwood, Ann Arbor, Michigan 48105;~~
- ~~(v) Identify the current model year;~~
- ~~(vi) Be written in the English language; and~~
- ~~(vii) Be based upon all information and data available to the manufacturer approximately 30 days before the report is submitted to the Administrator.~~

~~(b) Content of pre-model year reports.~~

~~(1) Each pre-model year report must include the following information for each compliance category for the applicable future model year and to the extent possible, two model years into the future:~~

- ~~(i) The manufacturer's estimate of its footprint-based fleet average CO<sub>2</sub> standards (including temporary lead time allowance alternative standards, if applicable);~~
- ~~(ii) Projected total and model level production volumes for each applicable standard category;~~
- ~~(iii) Projected fleet average CO<sub>2</sub> compliance level for each applicable standard category; and the model level CO<sub>2</sub> emission values which form the basis of the projection;~~
- ~~(iv) Projected fleet average CO<sub>2</sub> credit/debit status for each applicable standard category;~~
- ~~(v) A description of the various credit, transfer and trading options that will be used to comply with each applicable standard category, including the amount of credit the manufacturer intends to generate for air conditioning leakage, air conditioning efficiency, off-cycle technology, advanced technology vehicles, hybrid or low-emission full-size pickup trucks, and various early credit programs;~~
- ~~(vi) A description of the method which will be used to calculate the carbon-related exhaust emissions for any electric vehicles, fuel cell vehicles and plug-in hybrid vehicles;~~
- ~~(vii) A summary by model year (beginning with the 2009 model year) of the number of electric vehicles, fuel cell vehicles, plug-in hybrid electric vehicles, dedicated compressed natural gas vehicles, and dual fuel natural gas vehicles using (or projected to use) the advanced technology vehicle credit and incentives program, including the projected use of production multipliers;~~
- ~~(viii) The methodology which will be used to comply with N<sub>2</sub>O and CH<sub>4</sub> emission standards; and~~
- ~~(ix) Notification of the manufacturer's intent to exclude emergency vehicles from the calculation of fleet average standards and the end-of-year fleet average, including a description of the excluded emergency vehicles and the quantity of such vehicles excluded.~~
- ~~(x) Other information requested by the Administrator.~~

~~(2) Manufacturers must submit, in the pre-model year report for each model year in which a credit deficit is generated (or projected to be generated), a compliance plan demonstrating how the manufacturer will comply with the fleet average CO<sub>2</sub> standard by the end of the third year after the deficit occurred.~~



## ATTACHMENT 4

### PART 1036— CONTROL OF EMISSIONS FROM NEW AND IN-USE HEAVY-DUTY HIGHWAY ENGINES

70. The authority citation for part 1036 continues to read as follows:

Authority: 42 U.S.C. 7401 - 7671q.

#### Subpart A—Overview and Applicability

71. Amend § 1036.1 by revising paragraph (a) introductory text and adding paragraph (e) to read as follows:

##### § 1036.1 Applicability.

(a) Except as specified in § 1036.5, the provisions of this part apply for engines that will be installed in heavy-duty vehicles (including glider vehicles). Heavy-duty engines produced before December 20, 2026 are subject to ~~greenhouse gas emission standards and related provisions under this part as specified in § 1036.108; these engines are subject to~~ exhaust emission standards for NO<sub>x</sub>, HC, PM, and CO, and related provisions under 40 CFR part 86, subpart A and subpart N, instead of this part, except as follows:

\* \* \* \* \*

(e) This part establishes criteria pollutant standards as described in § 1036.101. This part does not establish standards for CO<sub>2</sub> or other greenhouse gas emissions, but it includes certification and testing provisions related to CO<sub>2</sub> emissions to support the fuel consumption standards for heavy-duty engines adopted by the Department of Transportation's National Highway Traffic and Safety Administration (NHTSA) under 49 CFR part 535.

72. Amend § 1036.5 by revising paragraph (a) and removing paragraph (e). The revision reads as follows:

##### § 1036.5 Excluded engines.

(a) The provisions of this part do not apply to engines used in medium-duty passenger vehicles or other heavy-duty vehicles that are subject to regulation under 40 CFR part 86, subpart S, except as specified in 40 CFR part 86, subpart S, ~~and § 1036.150(j)~~. For example, this exclusion applies for engines used in incomplete vehicles or high-GCWR vehicles certified to vehicle-based standards as described in 40 CFR 86.1801-12~~vehicles certified to the standards of 40 CFR 86.1818 and 86.1819.~~

\* \* \* \* \*

~~(e) The provisions of this part do not apply for model year 2013 and earlier heavy-duty engines unless they were:~~

~~(1) Voluntarily certified to this part.~~

~~(2) Installed in a glider vehicle subject to 40 CFR part 1037.~~

73. Amend § 1036.15 by revising paragraph (b) to read as follows:

##### § 1036.15 Other applicable regulations.

\* \* \* \* \*

(b) Part 1037 of this chapter describes ~~emission standards and other~~ requirements for ~~controlling evaporative and refueling emissions and greenhouse gas emissions from~~ heavy-duty vehicles, whether or not they use engines certified under this part.

\* \* \* \* \*

## Subpart B—Emission Standards and Related Requirements

74. Amend § 1036.101 by revising paragraph (a) to read as follows:

### § 1036.101 Overview of exhaust emission standards.

(a) You must show that engines meet the ~~following exhaust emission standards: criteria~~ ~~(1) Criteria~~ pollutant standards for NO<sub>x</sub>, HC, PM, and CO ~~apply~~ as described in § 1036.104. These pollutants are sometimes described collectively as “criteria pollutants” because they are either criteria pollutants under the Clean Air Act or precursors to the criteria pollutants ozone and PM.

~~(2) This part contains standards and other regulations applicable to the emission of the air pollutant defined as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Greenhouse gas (GHG) standards for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O apply as described in § 1036.108.~~

\* \* \* \* \*

### § 1036.108 [Removed]

75. Remove § 1036.108.

### ~~§ 1036.108 Greenhouse gas emission standards—CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O.~~

~~This section contains standards and other regulations applicable to the emission of the air pollutant defined as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. This section describes the applicable CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub> standards for engines.~~

~~(a) Emission standards. Emission standards apply for engines and optionally powertrains measured using the test procedures specified in subpart F of this part as follows:~~

~~(1) CO<sub>2</sub> emission standards in this paragraph (a)(1) apply based on testing as specified in subpart F of this part. The applicable test cycle for measuring CO<sub>2</sub> emissions differs depending on the engine family’s primary intended service class and the extent to which the engines will be (or were designed to be) used in tractors. For Medium HDE and Heavy HDE certified as tractor engines, measure CO<sub>2</sub> emissions using the SET steady-state duty cycle specified in § 1036.510. This testing with the SET duty cycle is intended for engines designed to be used primarily in tractors and other line-haul applications. Note that the use of some SET-certified tractor engines in vocational applications does not affect your certification obligation under this paragraph (a)(1); see other provisions of this part and 40 CFR part 1037 for limits on using engines certified to only one cycle. For Medium HDE and Heavy HDE certified as both tractor and vocational engines, measure CO<sub>2</sub> emissions using the SET duty cycle specified in § 1036.510 and the FTP transient duty cycle specified in § 1036.512. Testing with both SET and FTP duty cycles is intended for engines that are designed for use in both tractor and vocational applications. For all other engines (including Spark-ignition HDE), measure CO<sub>2</sub> emissions using the FTP transient duty cycle specified in § 1036.512.~~

~~(i) Spark-ignition standards. The CO<sub>2</sub> standard for all spark-ignition engines is 627 g/hp-hr for model years 2016 through 2020. This standard continues to apply in later~~

model years for all spark ignition engines that are not Heavy HDE. Spark ignition engines that qualify as Heavy HDE under § 1036.140(b)(2) for model years 2021 and later are subject to the compression-ignition engine standards for Heavy HDE-Vocational or Heavy HDE-Tractor, as applicable. You may certify spark ignition engines to the compression-ignition standards for the appropriate model year under this paragraph (a). If you do this, those engines are treated as compression-ignition engines for all the provisions of this part.

(ii) *Compression-ignition standards.* The following CO<sub>2</sub> standards apply for compression-ignition engines and model year 2021 and later spark ignition engines that qualify as Heavy HDE:

Table 1 to Paragraph (a)(1)(ii) of § 1036.108—Compression Ignition CO<sub>2</sub> Standards [g/hp-hr]

Phase	Model years	Light HDE	Medium HDE-vocational	Heavy HDE-vocational	Medium HDE-tractor	Heavy HDE-tractor
1	2014-2016	600	600	567	502	475
	2017-2020	576	576	555	487	460
2	2021-2023	563	545	513	473	447
	2024-2026	555	538	506	461	436
	2027 and later	552	535	503	457	432

(2) The CH<sub>4</sub> emission standard is 0.10 g/hp-hr when measured over the applicable FTP transient duty cycle specified in § 1036.512. This standard begins in model year 2014 for compression-ignition engines and in model year 2016 for spark ignition engines. Note that this standard applies for all fuel types just like the other standards of this section.

(3) The N<sub>2</sub>O emission standard is 0.10 g/hp-hr when measured over the applicable FTP transient duty cycle specified in § 1036.512. This standard begins in model year 2014 for compression-ignition engines and in model year 2016 for spark ignition engines.

(b) *Family Certification Levels.* You must specify a CO<sub>2</sub> Family Certification Level (FCL) for each engine family expressed to the same number of decimal places as the emission standard. The FCL may not be less than the certified emission level for the engine family. The CO<sub>2</sub> family emission limit (FEL) for the engine family is equal to the FCL multiplied by 1.03.

(c) *Averaging, banking, and trading.* You may generate or use emission credits under the averaging, banking, and trading (ABT) program described in subpart H of this part for demonstrating compliance with CO<sub>2</sub> emission standards. Credits (positive and negative) are calculated from the difference between the FCL and the applicable emission standard. As described in § 1036.705, you may use CO<sub>2</sub> credits to certify your engine families to FELs for N<sub>2</sub>O and/or CH<sub>4</sub>, instead of the N<sub>2</sub>O/CH<sub>4</sub> standards of this section that otherwise apply. Except as specified in §§ 1036.150 and 1036.705, you may not generate or use credits for N<sub>2</sub>O or CH<sub>4</sub> emissions.

(d) *Useful life.* The exhaust emission standards of this section apply for the useful life, expressed as vehicle miles, or hours of engine operation, or years in service, whichever comes first, as follows:

Table 3 to Paragraph (d) of § 1036.108—Useful life by Primary Intended Service Class for Model Year 2021 and Later

Primary intended service class	Miles	Years
Spark ignition HDE <sup>a</sup>	150,000	15
Light HDE <sup>a</sup>	150,000	15
Medium HDE	185,000	10
Heavy HDE <sup>b</sup>	435,000	10

<sup>a</sup>Useful life for Spark ignition HDE and Light HDE before model year 2021 is 110,000 miles or 10 years, whichever occurs first.

<sup>b</sup>Useful life for Heavy HDE is also expressed as 22,000 operating hours. For an individual engine, the useful life is no shorter than 10 years or 100,000 miles, whichever occurs first, regardless of operating hours.

~~(e) *Applicability for testing.* The emission standards in this subpart apply as specified in this paragraph (e) to all duty cycle testing (according to the applicable test cycles) of testable configurations, including certification, selective enforcement audits, and in-use testing. The CO<sub>2</sub> FCLs serve as the CO<sub>2</sub> emission standards for the engine family with respect to certification and confirmatory testing instead of the standards specified in paragraph (a)(1) of this section. The FELs serve as the emission standards for the engine family with respect to all other duty cycle testing. See §§ 1036.235 and 1036.241 to determine which engine configurations within the engine family are subject to testing. Note that engine fuel maps and powertrain test results also serve as standards as described in §§ 1036.535, 1036.540, 1036.545, and 1036.630.~~

76. Amend § 1036.110 by adding paragraphs (b)(14) through (18) to read as follows:

#### § 1036.110 Onboard diagnostics.

\* \* \* \* \*

(b) \* \* \*

(14) The definition of “Active Technology” in 13 CCR 1971.1(c) does not apply.

(15) The standardization requirements in 13 CCR 1971.1(h)(5.4) do not apply.

(16) The data storage requirements in 13 CCR 1971.1(h)(6.1) related to the standardization requirements in 13 CCR 1971.1(h)(5.4) do not apply.

(17) The certification documentation requirement related to “Active Technology” in 13 CCR 1971.1(j)(2.32) does not apply.

(18) The monitoring system demonstration requirements in 13 CCR 1971.1(i)(4.3.2)(C) related to CO<sub>2</sub> emission data does not apply.

\* \* \* \* \*

77. Amend § 1036.115 by revising paragraph (b) to read as follows:

#### § 1036.115 Other requirements.

\* \* \* \* \*

(b) *Fuel mapping.* ~~You must perform f~~Fuel mapping for your engine in support of NHTSA’s fuel consumption standards are as described in § 1036.505(b).

\* \* \* \* \*

78. Amend § 1036.130 by revising paragraph (b)(5) to read as follows:

**§ 1036.130 Installation instructions for vehicle manufacturers.**

\* \* \* \* \*

(b) \* \* \*

(5) Describe how your certification is limited for any type of application. ~~For example, if you certify Heavy HDE to the CO<sub>2</sub> standards using only transient FTP testing, you must make clear that the engine may not be installed in tractors. For example, if you certify engines only for use in emergency vehicles, you must make clear that the engine may only be installed in emergency vehicles.~~

\* \* \* \* \*

79. Amend § 1036.135 by revising paragraph (c)(9) to read as follows:

**§ 1036.135 Labeling.**

\* \* \* \* \*

(c) \* \* \*

(9) Identify any limitations on your certification. For example, if you certify ~~Heavy HDE to the CO<sub>2</sub> standards using only steady state testing, include the statement “TRACTORS ONLY”.~~ Similarly, for engines with one or more approved AECDs for emergency vehicle applications under § 1036.115(h)(4), include the statement: “THIS ENGINE IS FOR INSTALLATION IN EMERGENCY VEHICLES ONLY”.

\* \* \* \* \*

80. Revise and republish § 1036.150 to read as follows:

**§ 1036.150 Interim provisions.**

The provisions in this section apply instead of other provisions in this part. This section describes when these interim provisions expire, if applicable.

(a) *Transitional ABT credits for NO<sub>x</sub> emissions.* You may generate NO<sub>x</sub> credits from model year 2026 and earlier engines and use those as transitional credits for model year 2027 and later engines using any of the following methods:

(1) *Discounted credits.* Generate discounted credits by certifying any model year 2022 through 2026 engine family to meet all the requirements that apply under 40 CFR part 86, subpart A. Calculate discounted credits for certifying engines in model years 2027 through 2029 as described in § 1036.705 relative to a NO<sub>x</sub> emission standard of 200 mg/hp·hr and multiply the result by 0.6. You may not use discounted credits for certifying model year 2030 and later engines.

(2) *Partial credits.* Generate partial credits by certifying any model year 2024 through 2026 compression-ignition engine family as described in this paragraph (a)(2). You may not use partial credits for certifying model year 2033 and later engines. Certify engines for partial credits to meet all the requirements that apply under 40 CFR part 86, subpart A, with the following adjustments:

(i) Calculate credits as described in § 1036.705 relative to a NO<sub>x</sub> emission standard of 200 mg/hp·hr using the appropriate useful life mileage from 40 CFR 86.004-2. Your declared NO<sub>x</sub> family emission limit applies for the FTP and SET duty cycles.

- (ii) Engines must meet a NO<sub>x</sub> standard when tested over the Low Load Cycle as described in § 1036.514. Engines must also meet an off-cycle NO<sub>x</sub> standard as specified in § 1036.104(a)(3). Calculate the NO<sub>x</sub> family emission limits for the Low Load Cycle and for off-cycle testing as described in § 1036.104(c)(3) with *Std*<sub>FTPNO<sub>x</sub></sub> set to 35 mg/hp·hr and *Std*<sub>[cycle]NO<sub>x</sub></sub> set to the values specified in § 1036.104(a)(1) or (3), respectively. No standard applies for HC, PM, and CO emissions for the Low Load Cycle or for off-cycle testing, but you must record measured values for those pollutants and include those measured values where you report NO<sub>x</sub> emission results.
- (iii) For engines selected for in-use testing, we may specify that you perform testing as described in 40 CFR part 86, subpart T, or as described in subpart E of this part.
- (iv) Add the statement “Partial credit” to the emission control information label.

(3) *Full credits.* Generate full credits by certifying any model year 2024 through 2026 engine family to meet all the requirements that apply under this part. Calculate credits as described in § 1036.705 relative to a NO<sub>x</sub> emission standard of 200 mg/hp·hr. You may not use full credits for certifying model year 2033 and later engines.

(4) *2026 service class pull-ahead credits.* Generate credits from diesel-fueled engines under this paragraph (a)(4) by certifying all your model year 2026 diesel-fueled Heavy HDE to meet all the requirements that apply under this part, with a NO<sub>x</sub> family emission limit for FTP testing at or below 50 mg/hp·hr. Calculate credits as described in § 1036.705 relative to a NO<sub>x</sub> emission standard of 200 mg/hp·hr. You may use credits generated under this paragraph (a)(4) through model year 2034, but not for later model years. Credits generated by Heavy HDE may be used for certifying Medium HDE after applying a 10 percent discount (multiply credits by 0.9). Engine families using credits generated under this paragraph (a)(4) are subject to a NO<sub>x</sub> FEL cap of 50 mg/hp·hr for FTP testing.

(b) ~~[Reserved] Model year 2014 N<sub>2</sub>O standards. In model year 2014 and earlier, manufacturers may show compliance with the N<sub>2</sub>O standards using an engineering analysis. This allowance also applies for later families certified using carryover CO<sub>2</sub> data from model 2014 consistent with § 1036.235(d).~~

(c) *Engine cycle classification.* Through model year 2020, engines meeting the definition of spark-ignition, but regulated as compression-ignition engines under § 1036.140, must be certified to the requirements applicable to compression-ignition engines under this part. Such engines are deemed to be compression-ignition engines for purposes of this part. Similarly, through model year 2020, engines meeting the definition of compression-ignition, but regulated as Otto-cycle under 40 CFR part 86 must be certified to the requirements applicable to spark-ignition engines under this part. Such engines are deemed to be spark-ignition engines for purposes of this part. See § 1036.140 for provisions that apply for model year 2021 and later.

(d) *Small manufacturers.* The ~~greenhouse gas standards of this part~~ fuel consumption standards under 49 CFR part 535 apply on a delayed schedule for manufacturers meeting the small business criteria specified in 13 CFR 121.201. Apply the small business criteria for NAICS code 336310 for engine manufacturers with respect to gasoline-fueled engines and 33618 for engine manufacturers with respect to other engines; the employee limits apply to the total number employees together for affiliated companies. Qualifying small manufacturers are not subject to the ~~greenhouse gas emission standards in § 1036.108~~ fuel consumption standards for engines with a date of manufacture on or after November 14, 2011, but before January 1, 2022. In addition, qualifying small manufacturers producing engines that run on any fuel other than gasoline, E85, or diesel fuel may delay complying with every later ~~greenhouse gas~~ fuel consumption standard under 49 CFR part 535 ~~this part~~ by one model year; however, small



manufacturers may generate ~~emission~~ credits only by certifying all their engine families within a given averaging set to standards that apply for the current model year. Note that engines not yet subject to standards must nevertheless supply fuel maps to vehicle manufacturers as described in paragraph (n) of this section. Note also that engines produced by small manufacturers are subject to criteria pollutant standards.

(e) ~~[Reserved] Alternate phase in standards for greenhouse gas emissions. Where a manufacturer certifies all of its model year 2013 compression-ignition engines within a given primary intended service class to the applicable alternate standards of this paragraph (e), its compression-ignition engines within that primary intended service class are subject to the standards of this paragraph (e) for model years 2013 through 2016. This means that once a manufacturer chooses to certify a primary intended service class to the standards of this paragraph (e), it is not allowed to opt out of these standards.~~

~~TABLE 1 TO PARAGRAPH (e) OF § 1036.150—ALTERNATE PHASE IN STANDARDS (g/hp·hr)~~

<del>Vehicle type</del>	<del>Model years</del>	<del>Light HDE</del>	<del>Medium HDE</del>	<del>Heavy HDE</del>
<del>Tractors</del>	<del>2013–2015</del>	<del>NA</del>	<del>512 g/hp·hr</del>	<del>485 g/hp·hr.</del>
	<del>2016 and later<sup>a</sup></del>	<del>NA</del>	<del>487 g/hp·hr</del>	<del>460 g/hp·hr.</del>
<del>Vocational</del>	<del>2013–2015</del>	<del>618 g/hp·hr</del>	<del>618 g/hp·hr</del>	<del>577 g/hp·hr.</del>
	<del>2016 through 2020<sup>a</sup></del>	<del>576 g/hp·hr</del>	<del>576 g/hp·hr</del>	<del>555 g/hp·hr.</del>

~~<sup>a</sup>Note: these alternate standards for 2016 and later are the same as the otherwise applicable standards for 2017 through 2020.~~

(f) ~~Testing exemption for hydrogen engines. Tailpipe CO<sub>2</sub> emissions from engines fueled with neat hydrogen are deemed to be 3 g/hp·hr and tailpipe CH<sub>4</sub>, HC, and CO emissions from engines fueled with neat hydrogen are deemed to comply with the applicable standard. Fuel mapping and testing for CO<sub>2</sub>, CH<sub>4</sub>, Testing for HC, or CO is optional under this part for these engines.~~

(g) ~~[Reserved] Default deterioration factors for greenhouse gas standards. You may use default deterioration factors (DFs) without performing your own durability emission tests or engineering analysis as follows:~~

~~(1) You may use a default additive DF of 0.0 g/hp·hr for CO<sub>2</sub> emissions from engines that do not use advanced or off-cycle technologies. If we determine it to be consistent with good engineering judgment, we may allow you to use a default additive DF of 0.0 g/hp·hr for CO<sub>2</sub> emissions from your engines with advanced or off-cycle technologies.~~

~~(2) You may use a default additive DF of 0.010 g/hp·hr for N<sub>2</sub>O emissions from any engine through model year 2021, and 0.020 g/hp·hr for later model years.~~

~~(3) You may use a default additive DF of 0.020 g/hp·hr for CH<sub>4</sub> emissions from any engine.~~

(h) ~~[Reserved] Advanced technology credits. If you generate CO<sub>2</sub> credits from model year 2020 and earlier engines certified for advanced technology, you may multiply these credits by 1.5.~~

(i) ~~[Reserved] CO<sub>2</sub> credits for low N<sub>2</sub>O emissions. If you certify your model year 2014, 2015, or 2016 engines to an N<sub>2</sub>O FEL less than 0.04 g/hp·hr (provided you measure N<sub>2</sub>O emissions from your emission data engines), you may generate additional CO<sub>2</sub> credits under this paragraph (i). Calculate the additional CO<sub>2</sub> credits from the following equation instead of the equation in § 1036.705:~~

$$\text{CO}_2 \text{ credits (Mg)} = (0.04 - \text{FEL}_{\text{N}_2\text{O}}) \cdot CF \cdot \text{Volume} \cdot UL \cdot 10^{-6} \cdot 298$$

~~Eq. 1036.150-1~~

(j) ~~[Reserved] Alternate standards under 40 CFR part 86. This paragraph (j) describes alternate emission standards that apply for model year 2023 and earlier loose engines certified under 40~~

~~CFR 86.1819-14(k)(8). The standards of § 1036.108 do not apply for these engines. The standards in this paragraph (j) apply for emissions measured with the engine installed in a complete vehicle consistent with the provisions of 40 CFR 86.1819-14(k)(8)(vi). The only requirements of this part that apply to these engines are those in this paragraph (j) and §§ 1036.115 through 1036.135, 1036.535, and 1036.540.~~

(k) *Limited production volume allowance under ABT.* You may produce a limited number of Heavy HDE that continue to meet the standards that applied under 40 CFR 86.007-11 in model years 2027 through 2029. The maximum number of engines you may produce under this limited production allowance is 5 percent of the annual average of your actual production volume of Heavy HDE in model years 2023-2025 for calculating emission credits under § 1036.705. Engine certification under this paragraph (k) is subject to the following conditions and requirements:

(1) Engines must meet all the standards and other requirements that apply under 40 CFR part 86 for model year 2026. Engine must be certified in separate engine families that qualify for carryover certification as described in § 1036.235(d).

(2) The NO<sub>x</sub> FEL must be at or below 200 mg/hp·hr. Calculate negative credits as described in § 1036.705 by comparing the NO<sub>x</sub> FEL to the FTP emission standard specified in § 1036.104(a)(1), with a value for useful life of 650,000 miles. Meet the credit reporting and recordkeeping requirements in §§ 1036.730 and 1036.735.

(3) Label the engine as described in 40 CFR 86.095-35, but include the following alternate compliance statement: “THIS ENGINE CONFORMS TO U.S. EPA REGULATIONS FOR MODEL YEAR 2026 ENGINES UNDER 40 CFR 1036.150(k).”

~~(l) [Reserved] *Credit adjustment for spark ignition engines and light heavy-duty compression-ignition engines.* For greenhouse gas emission credits generated from model year 2020 and earlier spark ignition and light heavy-duty engines, multiply any banked CO<sub>2</sub> credits that you carry forward to demonstrate compliance with model year 2021 and later standards by 1.36.~~

(m) *Infrequent regeneration.* For model year 2020 and earlier, you may invalidate any test interval with respect to CO<sub>2</sub> measurements if an infrequent regeneration event occurs during the test interval. Note that § 1036.580 specifies how to apply infrequent regeneration adjustment factors for later model years.

(n) *Supplying fuel maps.* Engine manufacturers not yet subject to fuel consumption standards under ~~49 CFR part 535~~ § 1036.108 in model year 2021 must supply vehicle manufacturers with fuel maps (or powertrain test results) as described in § 1036.130 for those engines.

(o) *Engines used in glider vehicles.* For purposes of recertifying a used engine for installation in a glider vehicle, we may allow you to include in an existing certified engine family those engines you modify (or otherwise demonstrate) to be identical to engines already covered by the certificate. We would base such an approval on our review of any appropriate documentation. These engines must have emission control information labels that accurately describe their status.

~~(p) [Reserved] *Transition to Phase 2 CO<sub>2</sub> standards.* If you certify all your model year 2020 engines within an averaging set to the model year 2021 FTP and SET standards and requirements, you may apply the provisions of this paragraph (p) for enhanced generation and use of emission credits. These provisions apply separately for Medium HDE and Heavy HDE. (1) Greenhouse gas emission credits you generate with model year 2018 through 2024 engines may be used through model year 2030, instead of being limited to a five-year credit life as specified in § 1036.740(d).~~

(2) You may certify your model year 2024 through 2026 engines to the following alternative standards:

TABLE 2 TO PARAGRAPH (p)(2) OF § 1036.150—ALTERNATIVE STANDARDS FOR MODEL YEARS 2024 THROUGH 2026

Model years	Medium-heavy-duty vocational	Heavy-heavy-duty vocational	Medium-heavy-duty tractor	Heavy-heavy-duty tractor
2024-2026	542	510	467	442

(q) *Confirmatory and in-use testing of fuel maps defined in § 1036.505(b).* For model years 2021 and later, where the results from Eq. 1036.235-1 for a confirmatory or in-use test are at or below 2.0 %, we will not replace the manufacturer's fuel maps.

(r) *Fuel maps for the transition to updated GEM.* (1) You may use fuel maps from model year 2023 and earlier engines for certifying model year 2024 and later engines using carryover provisions in § 1036.235(d).

(2) Compliance testing will be based on the GEM version you used to generate fuel maps for certification. For example, if you perform a selective enforcement audit with respect to fuel maps, use the same GEM version that you used to generate fuel maps for certification. Similarly, we will use the same GEM version that you used to generate fuel maps for certification if we perform confirmatory testing with one of your engine families.

(s) ~~[Greenhouse gas]~~Fuel consumption *compliance testing.* Select duty cycles and measure emissions to demonstrate compliance with ~~greenhouse gas emission~~the fuel consumption standards under 49 CFR part 535 before model year 2027 as follows:

(1) For model years 2016 through 2020, measure emissions using the FTP duty cycle specified in § 1036.512 and the SET duty cycle specified in 40 CFR 86.1362, as applicable.

(2) The following provisions apply for model years 2021 through 2026:

(i) ~~[Reserved] Determine criteria pollutant emissions during any testing used to demonstrate compliance with greenhouse gas emission standards; however, the duty-cycle standards of § 1036.104 apply for measured criteria pollutant emissions only as described in subpart F of this part.~~

(ii) You may demonstrate compliance with SET-based ~~greenhouse gas emission~~fuel consumption standards ~~in § 1036.108(a)(1)~~ using the SET duty cycle specified in 40 CFR 86.1362 if you collect emissions with continuous sampling. Integrate the test results by mode to establish separate emission rates for each mode (including the transition following each mode, as applicable). Apply the CO<sub>2</sub> weighting factors specified in 40 CFR 86.1362 to calculate a composite emission result.

(t) *Model year 2027 compliance date.* The following provisions describe when this part 1036 starts to apply for model year 2027 engines:

(1) *Split model year.* Model year 2027 engines you produce before December 20, 2026 are subject to the criteria standards and related provisions in 40 CFR part 86, subpart A, as described in § 1036.1(a). Model year 2027 engines you produce on or after December 20, 2026 are subject to all the provisions of this part.

(2) *Optional early compliance.* You may optionally certify model year 2027 engines you produce before December 20, 2026 to all the provisions of this part.

(3) *Certification.* If you certify any model year 2027 engines to 40 CFR part 86, subpart A, under paragraph (t)(1) of this section, certify the engine family by dividing the model year into two partial model years. The first portion of the model year starts when it would

normally start and ends when you no longer produce engines meeting standards under 40 CFR part 86, subpart A, on or before December 20, 2026. The second portion of the model year starts when you begin producing engines meeting standards under this part 1036, and ends on the day your model year would normally end. The following additional provisions apply for model year 2027 if you split the model year as described in this paragraph (t):

- (i) You may generate emission credits only with engines that are certified under this part 1036.
- (ii) In your production report under § 1036.250(a), identify production volumes separately for the two parts of the model year.
- (iii) OBD testing demonstrations apply singularly for the full model year.
- (u) *Crankcase emissions*. The provisions of 40 CFR 86.007-11(c) for crankcase emissions continue to apply through model year 2026.
- (v) *OBD communication protocol*. We may approve the alternative communication protocol specified in SAE J1979-2 (incorporated by reference, see § 1036.810) if the protocol is approved by the California Air Resources Board. The alternative protocol would apply instead of SAE J1939 and SAE J1979 as specified in 40 CFR 86.010-18(k)(1). Engines designed to comply with SAE J1979-2 must meet the freeze-frame requirements in § 1036.110(b)(8) and in 13 CCR 1971.1(h)(4.3.2) (incorporated by reference, see § 1036.810). This paragraph (v) also applies for model year 2026 and earlier engines.
- (w) ~~[Reserved] Greenhouse gas warranty. For model year 2027 and later engines, you may ask us to approve the model year 2026 warranty periods specified in § 1036.120 for components or systems needed to comply with greenhouse gas emission standards if those components or systems do not play a role in complying with criteria pollutant standards.~~
- (x) *Powertrain testing for criteria pollutants*. You may apply the powertrain testing provisions of § 1036.101(b) for demonstrating compliance with criteria pollutant emission standards in 40 CFR part 86 before model year 2027.
- (y) *NO<sub>x</sub> compliance allowance for in-use testing*. A NO<sub>x</sub> compliance allowance of 15 mg/hp·hr applies for any in-use testing of Medium HDE and Heavy HDE as described in subpart E of this part. Add the compliance allowance to the NO<sub>x</sub> standard that applies for each duty cycle and for off-cycle testing, with both field testing and laboratory testing. The NO<sub>x</sub> compliance allowance does not apply for the bin 1 off-cycle standard. As an example, for manufacturer-run field-testing of a Heavy HDE, add the 15 mg/hp·hr compliance allowance and the 5 mg/hp·hr accuracy margin from § 1036.420 to the 58 mg/hp·hr bin 2 off-cycle standard to calculate a 78 mg/hp·hr NO<sub>x</sub> standard.
- (z) *Alternate family pass criteria for in-use testing*. The following family pass criteria apply for manufacturer-run in-use testing instead of the pass criteria described in § 1036.425 for model years 2027 and 2028:
  - (1) Start by measuring emissions from five engines using the procedures described in subpart E of this part and § 1036.530. If four or five engines comply fully with the off-cycle bin standards, the engine family passes and you may stop testing.
  - (2) If exactly two of the engines tested under paragraph (z)(1) of this section do not comply fully with the off-cycle bin standards, test five more engines. If these additional engines all comply fully with the off-cycle bin standards, the engine family passes and you may stop testing.
  - (3) If three or more engines tested under paragraphs (z)(1) and (2) of this section do not comply fully with the off-cycle bin standards, test a total of at least 10 but not more than 15 engines. Calculate the arithmetic mean of the bin emissions from all the engine tests as

specified in § 1036.530(g) for each pollutant. If the mean values are at or below the off-cycle bin standards, the engine family passes. If the mean value for any pollutant is above an off-cycle bin standard, the engine family fails.

~~(aa) *Correcting credit calculations.* If you notify us by October 1, 2024, that errors mistakenly decreased your balance of GHG emission credits for 2020 or any earlier model years, you may correct the errors and recalculate the balance of emission credits after applying a 10 percent discount to the credit correction.~~

## Subpart C—Certifying Engine Families

81. Amend § 1036.205 by revising paragraphs (b) introductory text, (l), (m), (o)(2), and (t) and removing paragraph (aa). The revisions read as follows:

### § 1036.205 Requirements for an application for certification.

\* \* \* \* \*

(b) Explain how the emission control system operates. Describe in detail all system components for controlling greenhouse gas and criteria pollutant emissions, including all auxiliary emission control devices (AECs) and all fuel-system components you will install on any production or test engine. Identify the part number of each component you describe. For this paragraph (b), treat as separate AECs any devices that modulate or activate differently from each other.

Include all the following:

\* \* \* \* \*

(l) Identify the duty-cycle emission standards from § 1036.104(a) and (b) ~~and 1036.108(a)~~ that apply for the engine family. Also identify FELs and FCLs as follows:

(1) Identify the NO<sub>x</sub> FEL over the FTP for the engine family.

(2) Identify the CO<sub>2</sub> FCLs for the engine family; ~~also identify any FELs that apply for CH<sub>4</sub> and N<sub>2</sub>O.~~ The actual U.S.-directed production volume of configurations that ~~have CO<sub>2</sub> emission rates~~ are at or below the FCL ~~and CH<sub>4</sub> and N<sub>2</sub>O emission rates at or below the applicable standards or FELs~~ must be at least one percent of your actual (not projected) U.S.-directed production volume for the engine family. Identify configurations within the family that have emission rates at or below the FCL and meet the one percent requirement. For example, if your U.S.-directed production volume for the engine family is 10,583 and the U.S.-directed production volume for the tested rating is 75 engines, then you can comply with this provision by setting your FCL so that one more rating with a U.S.-directed production volume of at least 31 engines meets the FCL. Where applicable, also identify other testable configurations required under § 1036.230(f)(2)(ii).

(m) Identify the engine family's deterioration factors and describe how you developed them (see § 1036.240 ~~and 1036.241~~). Present any test data you used for this. For engines designed to discharge crankcase emissions to the ambient atmosphere, use the deterioration factors for crankcase emission to determine deteriorated crankcase emission levels of NO<sub>x</sub>, HC, PM, and CO as specified in § 1036.240(e).

\* \* \* \* \*

(o) \* \* \*

(2) Identify the value of  $e_{CO_2FTPFC}$  from § 1036.235(b). ~~For CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, show that your engines meet the applicable emission standards we specify in § 1036.108.~~ Show emission figures before and after applying deterioration factors for each engine. In addition to the composite results, show individual measurements for cold-start testing and hot-start



testing over the transient test cycle. ~~For each of these tests, also include the corresponding exhaust emission data for criteria emissions.~~

\* \* \* \* \*

(t) State whether your certification is limited for certain engines. For example, you might certify engines only for use ~~in tractors~~, in emergency vehicles, or in vehicles with hybrid powertrains. If this is the case, describe how you will prevent use of these engines in vehicles for which they are not certified.

\* \* \* \* \*

~~(aa) Include information needed to certify vehicles to greenhouse gas standards under 40 CFR part 1037 as described in § 1036.505.~~

82. Amend § 1036.230 by revising paragraphs (f) introductory text, and (f)(1) and (5) to read as follows:

**§ 1036.230 Selecting engine families.**

\* \* \* \* \*

(f) ~~You must certify your engines to the greenhouse gas standards of § 1036.108 using the same engine families you use for criteria pollutants.~~ The following additional provisions apply with respect to demonstrating compliance with the fuel consumption standards ~~in § 1036.108~~ of 49 CFR 535.5:

(1) ~~Use the same engine families you use for criteria pollutants.~~ You may subdivide an engine family into subfamilies that have a different FCL for CO<sub>2</sub> emissions. These subfamilies do not apply for demonstrating compliance with criteria standards in § 1036.104.

\* \* \* \* \*

(5) Except as described in this paragraph (f), engine configurations within an engine family must use equivalent ~~greenhouse gas emission~~ controls. Unless we approve it, you may not produce nontested configurations without the same ~~emission~~ control hardware included on the tested configuration. ~~We will only approve it if you demonstrate that the exclusion of the hardware does not increase greenhouse gas emissions.~~

\* \* \* \* \*

83. Add § 1036.231 to subpart C to read as follows:

**§ 1036.231 Powertrain families.**

(a) If you choose to perform powertrain testing as specified in § 1036.545, use good engineering judgment to divide your product line into powertrain families that are expected to have similar criteria emissions throughout the useful life as described in this section. Your powertrain family is limited to a single model year.

(b) Except as specified in paragraph (c) of this section, group powertrains in the same powertrain family if they share all the following attributes:

(1) Have the same engine design aspects as specified in § 1036.230.

(2) [Reserved]

(3) Number of clutches.

(4) Type of clutch (e.g., wet or dry).

(5) Presence and location of a fluid coupling such as a torque converter.

(6) Gear configuration, as follows:

(i) Planetary (e.g., simple, compound, meshed-planet, stepped-planet, multi-stage).



- (ii) Countershaft (e.g., single, double, triple).
- (iii) Continuously variable (e.g., pulley, magnetic, toroidal).
- (7) Number of available forward gears, and transmission gear ratio for each available forward gear, if applicable. Count forward gears as being available only if the vehicle has the hardware and software to allow operation in those gears.
- (8) Transmission oil sump configuration (e.g., conventional or dry).
- (9) The power transfer configuration of any hybrid technology (e.g., series or parallel).
- (10) The type of any RESS (e.g., hydraulic accumulator, Lithium-ion battery pack, ultracapacitor bank).
- (c) For powertrains that share all the attributes described in paragraph (b) of this section, divide them further into separate powertrain families based on common calibration attributes. Group powertrains in the same powertrain family to the extent that powertrain test results and corresponding emission levels are expected to be similar throughout the useful life.
- (d) You may subdivide a group of powertrains with shared attributes under paragraph (b) of this section into different powertrain families.
- (e) In unusual circumstances, you may group powertrains into the same powertrain family even if they do not have shared attributes under in paragraph (b) of this section if you show that their emission characteristics throughout the useful life will be similar.
- (f) If you include the axle when performing powertrain testing for the family, you must limit the family to include only those axles represented by the test results. You may include multiple axle ratios in the family if you test with the axle expected to produce the highest emission results.

84. Amend § 1036.235 by revising the introductory text and paragraphs (a), (b), and (c)(5) introductory text to read as follows:

**§ 1036.235 Testing requirements for certification.**

This section describes the emission testing you must perform to show compliance with the emission standards in §§ 1036.104 ~~and 1036.108~~ or fuel consumption standards under 49 CFR part 535.

- (a) Select and configure one or two emission-data engines from each engine family as follows:
  - (1) You may use one engine for criteria pollutant testing and a different engine for ~~greenhouse gas emission~~ fuel consumption testing, or you may use the same engine for all testing.
  - (2) For criteria pollutant emission testing, select the engine configuration with the highest volume of fuel injected per cylinder per combustion cycle at the point of maximum torque - unless good engineering judgment indicates that a different engine configuration is more likely to exceed (or have emissions nearer to) an applicable emission standard or FEL. If two or more engines have the same fueling rate at maximum torque, select the one with the highest fueling rate at rated speed. In making this selection, consider all factors expected to affect emission-control performance and compliance with the standards, including emission levels of all exhaust constituents, especially NO<sub>x</sub> and PM. To the extent we allow it for establishing deterioration factors, select for testing those engine components or subsystems whose deterioration best represents the deterioration of in-use engines.
  - (3) For ~~greenhouse gas emission~~ fuel consumption testing, the standards of this part apply only with respect to emissions measured from the tested configuration and other configurations identified in § 1036.205(l)(2). Note that configurations identified in § 1036.205(l)(2) are considered to be “tested configurations” whether or not you test them

for certification. However, you must apply the same (or equivalent) emission controls to all other engine configurations in the engine family. In other contexts, the tested configuration is sometimes referred to as the “parent configuration”, although the terms are not synonymous.

(4) In the case of powertrain testing under § 1036.545, select a test engine, test hybrid components, test axle and test transmission as applicable, by considering the whole range of vehicle models covered by the powertrain family. If the powertrain has more than one transmission calibration, for example economy vs. performance, you may weight the results from the powertrain testing in § 1036.545 by the percentage of vehicles in the family by prior model year for each configuration. This can be done, for example, through the use of survey data or based on the previous model year’s sales volume. Weight the results of  $M_{\text{fuel}[\text{cycle}]}$ ,  $f_{\text{npowertrain}}/v_{\text{powertrain}}$ , and  $W_{[\text{cycle}]}$  from table 5 to paragraph (o)(8)(i) of § 1036.545 according to the percentage of vehicles in the family that use each transmission calibration.

(b) Test your emission-data engines using the procedures and equipment specified in subpart F of this part. In the case of dual-fuel and flexible-fuel engines, measure emissions when operating with each type of fuel for which you intend to certify the engine.

(1) For criteria pollutant emission testing, measure NO<sub>x</sub>, PM, CO, and NMHC emissions using each duty cycle specified in § 1036.104. Note that off-cycle testing depends on determining the value of  $e_{\text{CO2FTPFCFL}}$  from § 1036.530.

(2) For ~~greenhouse gas emission~~ fuel consumption testing, measure CO<sub>2</sub>, ~~CH<sub>4</sub>~~, and ~~N<sub>2</sub>O~~ emissions; the following provisions apply regarding test cycles for demonstrating compliance with tractor and vocational fuel consumption standards:

(i) ~~If you are certifying the engine for use in For~~ tractors, you must measure CO<sub>2</sub> emissions using the SET duty cycle specified in § 1036.510, taking into account the interim provisions in § 1036.150(s), ~~and measure CH<sub>4</sub> and N<sub>2</sub>O emissions using the FTP transient cycle.~~

(ii) ~~If you are certifying the engine for use in For~~ vocational applications, you must measure CO<sub>2</sub>, ~~CH<sub>4</sub>~~, and ~~N<sub>2</sub>O~~ emissions using the appropriate FTP transient duty cycle, including cold-start and hot-start testing as specified in § 1036.512.

(iii) ~~You may certify your For~~ engine families iesy for that include both tractor and vocational use, you may submit by submitting CO<sub>2</sub> emission data and specifying FCLs for both SET and FTP transient duty cycles.

(iv) Some of your engines certified-tested for use in tractors may also be used in vocational vehicles, and some of your engines certified-tested for use in vocational may be used in tractors. However, you may not knowingly circumvent the intent of this part ~~(to reduce in-use emissions of CO<sub>2</sub>)~~ by certifying-testing engines designed for tractors or vocational vehicles (and rarely used in the other application) to the wrong cycle. ~~For example, we would generally not allow you to certify all your engines to the SET duty cycle without certifying any to the FTP transient cycle.~~

(c) \* \* \*

(5) For ~~greenhouse gas emission~~ fuel consumption testing, we may use our emission test results for steady-state, idle, cycle-average and powertrain fuel maps defined in § 1036.505(b) as the official emission results. We will not replace individual points from your fuel map.

\* \* \* \* \*

## § 1036.241 [Removed]

85. Remove § 1036.241.

### ~~§ 1036.241 Demonstrating compliance with greenhouse gas emission standards.~~

~~(a) For purposes of certification, your engine family is considered in compliance with the emission standards in § 1036.108 if all emission data engines representing the tested configuration of that engine family have test results showing official emission results and deteriorated emission levels at or below the standards. Note that your FCLs are considered to be the applicable emission standards with which you must comply for certification.~~

~~(b) Your engine family is deemed not to comply if any emission data engine representing the tested configuration of that engine family has test results showing an official emission result or a deteriorated emission level for any pollutant that is above an applicable emission standard (generally the FCL). Note that you may increase your FCL if any certification test results exceed your initial FCL.~~

~~(c) Apply deterioration factors to the measured emission levels for each pollutant to show compliance with the applicable emission standards. Your deterioration factors must take into account any available data from in-use testing with similar engines. Apply deterioration factors as follows:~~

~~(1) *Additive deterioration factor for greenhouse gas emissions.* Except as specified in paragraphs (c)(2) and (3) of this section, use an additive deterioration factor for exhaust emissions. An additive deterioration factor is the difference between the highest exhaust emissions (typically at the end of the useful life) and exhaust emissions at the low-hour test point. In these cases, adjust the official emission results for each tested engine at the selected test point by adding the factor to the measured emissions. If the factor is less than zero, use zero. Additive deterioration factors must be specified to one more decimal place than the applicable standard.~~

~~(2) *Multiplicative deterioration factor for greenhouse gas emissions.* Use a multiplicative deterioration factor for a pollutant if good engineering judgment calls for the deterioration factor for that pollutant to be the ratio of the highest exhaust emissions (typically at the end of the useful life) to exhaust emissions at the low-hour test point. Adjust the official emission results for each tested engine at the selected test point by multiplying the measured emissions by the deterioration factor. If the factor is less than one, use one. A multiplicative deterioration factor may not be appropriate in cases where testing variability is significantly greater than engine-to-engine variability. Multiplicative deterioration factors must be specified to one more significant figure than the applicable standard.~~

~~(3) *Sawtooth and other nonlinear deterioration patterns.* The deterioration factors described in paragraphs (c)(1) and (2) of this section assume that the highest useful life emissions occur either at the end of useful life or at the low-hour test point. The provisions of this paragraph (c)(3) apply where good engineering judgment indicates that the highest useful life emissions will occur between these two points. For example, emissions may increase with service accumulation until a certain maintenance step is performed, then return to the low-hour emission levels and begin increasing again. Such a pattern may occur with battery-based hybrid powertrains. Base deterioration factors for engines with such emission patterns on the difference between (or ratio of) the point at which the highest emissions occur and the low-hour test point. Note that this paragraph (c)(3) applies for maintenance-related deterioration only where we allow such critical emission-related maintenance.~~

~~(4) Dual fuel and flexible fuel engines. In the case of dual fuel and flexible fuel engines, apply deterioration factors separately for each fuel type by measuring emissions with each fuel type at each test point. You may accumulate service hours on a single emission data engine using the type of fuel or the fuel mixture expected to have the highest combustion and exhaust temperatures; you may ask us to approve a different fuel mixture if you demonstrate that a different criterion is more appropriate.~~

~~(d) Calculate emission data using measurements to at least one more decimal place than the applicable standard. Apply the deterioration factor to the official emission result, as described in paragraph (c) of this section, then round the adjusted figure to the same number of decimal places as the emission standard. Compare the rounded emission levels to the emission standard for each emission data engine.~~

~~(e) If you identify more than one configuration in § 1036.205(l)(2), we may test (or require you to test) any of the identified configurations. We may also require you to provide an engineering analysis that demonstrates that untested configurations listed in § 1036.205(l)(2) comply with their FCL.~~

#### **Subpart D—Testing Production Engines and Hybrid Powertrains**

86. Amend § 1036.301 by revising the section heading to read as follows:

##### **§ 1036.301 ~~Measurements related to GEM inputs in a s~~Selective enforcement audits.**

\* \* \* \* \*

#### **Subpart F—Test Procedures**

87. Amend § 1036.501 by revising paragraph (a) to read as follows:

##### **§ 1036.501 General testing provisions.**

(a) Use the equipment and procedures specified in this subpart and 40 CFR part 1065 to determine whether engines meet the emission standards in §§ 1036.104 ~~and 1036.108~~ or fuel consumption standards under 49 CFR part 535.

\* \* \* \* \*

88. Add § 1036.503 to subpart F to read as follows:

##### **§ 1036.503 Engine data and information to support vehicle certification for NHTSA.**

See § 1036.505 for engine data and information required to support vehicle certification.

89. Amend § 1036.505 by revising the introductory text and paragraph (a) to read as follows:

##### **§ 1036.505 Engine data and information to support vehicle certification.**

You must give vehicle manufacturers information as follows so they can certify their vehicles to ~~greenhouse gas emission standards~~ fuel consumption standards under ~~40 CFR part 1037~~ 49 CFR part 535:

(a) Identify engine make, model, fuel type, combustion type, engine family name, calibration identification, and engine displacement. Also identify whether the engines ~~meet CO<sub>2</sub> standards~~ for will be used in tractors, vocational vehicles, or both. When certifying vehicles with GEM, for any fuel type not identified in table 1 to paragraph (b)(4) of § 1036.550, identify the fuel type as diesel fuel for engines subject to compression-ignition standards, and as gasoline for engines subject to spark-ignition standards.

\* \* \* \* \*

90. Amend § 1036.510 by revising paragraphs (b)(2) introductory text and (b)(2)(vii) and (viii) to read as follows:

**§ 1036.510 Supplemental Emission Test.**

\* \* \* \* \*

(b) \* \* \*

(2) Test hybrid powertrains as described in § 1036.545, except as specified in this paragraph (b)(2). Do not compensate the duty cycle for the distance driven as described in § 1036.545(g)(4). For hybrid engines, select the transmission ~~from § 1036.540(e)(2) model parameters as described in § 1036.510(b)(2)(viii), substituting “engine” for “vehicle” and “highway cruise cycle” for “SET”.~~ Disregard duty cycles in § 1036.545(j). For cycles that begin with idle, leave the transmission in neutral or park for the full initial idle segment. Place the transmission into drive no earlier than 5 seconds before the first nonzero vehicle speed setpoint. For SET testing only, place the transmission into park or neutral when the cycle reaches the final idle segment. Use the following vehicle parameters instead of those in § 1036.545 to define the vehicle model in § 1036.545(a)(3):

\* \* \* \* \*

(vii) Select a combination of drive axle ratio,  $k_a$ , and a tire radius,  $r$ , that represents the worst-case combination of top gear ratio, drive axle ratio, and tire size for CO<sub>2</sub> emissions expected for vehicles in which the hybrid engine or hybrid powertrain will be installed. This is typically the highest axle ratio and smallest tire radius. Disregard configurations or settings corresponding to a maximum vehicle speed below 60 mi/hr in selecting a drive axle ratio and tire radius, unless you can demonstrate that in-use vehicles will not exceed that speed. You may request preliminary approval for selected drive axle ratio and tire radius consistent with the provisions of § 1036.210. If the hybrid engine or hybrid powertrain is used exclusively in vehicles not capable of reaching 60 mi/hr, you may request that we approve an alternate test cycle and cycle-validation criteria as described in 40 CFR 1066.425(b)(5). Note that hybrid engines rely on a specified transmission that is different for each duty cycle; the transmission's top gear ratio therefore depends on the duty cycle, which will in turn change the selection of the drive axle ratio and tire size. For example, § 1036.520 prescribes a different top gear ratio than this paragraph (b)(2).

(viii) If you are certifying a hybrid engine, use a default transmission efficiency of 0.95 and create the vehicle model along with its default transmission shift strategy as described in § 1036.545(a)(3)(ii). ~~Use the transmission parameters defined in § 1036.540(e)(2) to determine transmission type and gear ratio. Specify the transmission type as Automatic Transmission for all engines and for all duty cycles, except that the transmission type is Automated Manual Transmission for Heavy HDE operating over the SET duty cycle. For automatic transmissions set neutral idle to “Y” in the vehicle file. Select gear ratios for each gear as shown in the following table: For Light HDV and Medium HDV, use the Light HDV and Medium HDV parameters for FTP, LLC, and SET duty cycles. For Tractors and Heavy HDVs, use the Tractor and Heavy HDV transient cycle parameters for the FTP and LLC duty cycles and the Tractor and Heavy HDV highway cruise cycle parameters for the SET duty cycle.~~

TABLE 1 TO PARAGRAPH (b)(2)(viii) OF § 1036.510—GEM HIL INPUT FOR GEAR RATIO

<u>Gear Number</u>	<u>Spark-ignition HDE, Light HDE, and Medium HDE— all duty cycles</u>	<u>Heavy HDE— LLC and FTP duty cycles</u>	<u>Heavy HDE— SET duty cycle</u>
<u>1</u>	<u>3.10</u>	<u>3.51</u>	<u>12.8</u>
<u>2</u>	<u>1.81</u>	<u>1.91</u>	<u>9.25</u>
<u>3</u>	<u>1.41</u>	<u>1.43</u>	<u>6.76</u>
<u>4</u>	<u>1.00</u>	<u>1.00</u>	<u>4.90</u>
<u>5</u>	<u>0.71</u>	<u>0.74</u>	<u>3.58</u>
<u>6</u>	<u>0.61</u>	<u>0.64</u>	<u>2.61</u>
<u>7</u>	<u>—</u>	<u>—</u>	<u>1.89</u>
<u>8</u>	<u>—</u>	<u>—</u>	<u>1.38</u>
<u>9</u>	<u>—</u>	<u>—</u>	<u>1.00</u>
<u>10</u>	<u>—</u>	<u>—</u>	<u>0.73</u>
<u>Lockup Gear</u>	<u>3</u>	<u>3</u>	<u>—</u>

\* \* \* \* \*

91. Amend § 1036.512 by revising paragraphs (b)(2)(iv) and (e) to read as follows:

**§ 1036.512 Federal Test Procedure.**

\* \* \* \* \*

(b) \* \* \*

(2) \* \* \*

(iv) For plug-in hybrid powertrains, test over the FTP in both charge-sustaining and charge-depleting operation for ~~both criteria and greenhouse gas~~ pollutant determination.

\* \* \* \* \*

(e) Determine ~~greenhouse gas pollutant~~ CO<sub>2</sub> emissions for plug-in hybrid engines and powertrains using the emissions results for all the transient duty cycle test intervals described in either paragraph (b) or (c) of appendix B to this part for both charge-depleting and charge-sustaining operation from paragraph (d)(2) of this section. Calculate the utility factor weighted composite mass of emissions from the charge-depleting and charge-sustaining test results,  $e_{UF[emission]comp}$ , as described in § 1036.510(e), replacing occurrences of “SET” with “transient test interval”. Note this results in composite FTP ~~GHG-CO<sub>2</sub>~~ emission results for plug-in hybrid engines and powertrains without the use of the cold-start and hot-start test interval weighting factors in Eq. 1036.512-1.

\* \* \* \* \*

92. Amend § 1036.514 by revising paragraph (b)(4) to read as follows:

**§ 1036.514 Low Load Cycle.**

\* \* \* \* \*

(b) \* \* \*

(4) Adjust procedures in this section as described in § 1036.510(d) ~~and (e)~~ for plug-in hybrid powertrains ~~to determine criteria pollutant and greenhouse gas emissions~~, replacing “SET” with “LLC”. Note that the LLC is therefore the preconditioning duty cycle for plug-in hybrid powertrains.



\* \* \* \* \*

93. Amend § 1036.520 by revising paragraph (b)(1) to read as follows:

**§ 1036.520 Determining power and vehicle speed values for powertrain testing.**

\* \* \* \* \*

(b) \* \* \*

(1) Use vehicle parameters, other than power, as specified in § 1036.510(b)(2). Use the applicable automatic transmission as specified in § ~~1036.540(e)(2)~~1036.510(b)(2)(viii).

\* \* \* \* \*

94. Amend § 1036.535 by revising the introductory text and removing and reserving paragraph (f). The revision reads as follows:

**§ 1036.535 Determining steady-state engine fuel maps and fuel consumption at idle.**

The procedures in this section describe how to determine an engine's steady-state fuel map and fuel consumption at idle for model year 2021 and later vehicles; these procedures apply as described in § 1036.505. Vehicle manufacturers may need these values to demonstrate compliance with ~~emission~~ standards under ~~40 CFR part 103749~~ CFR part 535.

\* \* \* \* \*

(f) ~~[Reserved] Measuring NO<sub>x</sub> emissions. Measure NO<sub>x</sub> emissions for each sampling period in g/s. You may perform these measurements using a NO<sub>x</sub> emission measurement system that meets the requirements of 40 CFR part 1065, subpart J. If a system malfunction prevents you from measuring NO<sub>x</sub> emissions during a test under this section but the test otherwise gives valid results, you may consider this a valid test and omit the NO<sub>x</sub> emission measurements; however, we may require you to repeat the test if we determine that you inappropriately voided the test with respect to NO<sub>x</sub> emission measurement.~~

\* \* \* \* \*

95. Amend § 1036.540 by revising paragraph (a) introductory text and removing and reserving paragraph (b)(1). The revision reads as follows:

**§ 1036.540 Determining cycle-average engine fuel maps.**

(a) *Overview.* This section describes how to determine an engine's cycle-average fuel maps for model year 2021 and later vehicles. Vehicle manufacturers may need cycle-average fuel maps for transient duty cycles, highway cruise cycles, or both to demonstrate compliance with ~~emission~~ standards under ~~40 CFR part 103749~~ CFR part 535. Generate cycle-average engine fuel maps as follows:

\* \* \* \* \*

(b) \* \* \*

(1) ~~[Reserved] Measure NO<sub>x</sub> emissions for each specified sampling period in grams. You may perform these measurements using a NO<sub>x</sub> emission measurement system that meets the requirements of 40 CFR part 1065, subpart J. Include these measured NO<sub>x</sub> values any time you report to us your fuel consumption values from testing under this section. If a system malfunction prevents you from measuring NO<sub>x</sub> emissions during a test under this section but the test otherwise gives valid results, you may consider this a valid test and omit the NO<sub>x</sub>~~

~~emission measurements; however, we may require you to repeat the test if we determine that you inappropriately voided the test with respect to NO<sub>x</sub> emission measurement.~~

~~\* \* \* \* \*~~

96. Amend § 1036.545 by revising the introductory text, removing and reserving paragraph (a)(1), revising paragraph (d) and removing paragraph (p). The revisions read as follows:

**§ 1036.545 Powertrain testing.**

This section describes the procedure to measure fuel consumption and create engine fuel maps by testing a powertrain that includes an engine coupled with a transmission, drive axle, and hybrid components or any assembly with one or more of those hardware elements. Engine fuel maps are part of demonstrating compliance with ~~Phase 2 and Phase 3 vehicle~~ standards under ~~40 CFR part 1037.49~~ CFR part 535; the powertrain test procedure in this section is one option for generating this fuel-mapping information as described in § 1036.505. Additionally, this powertrain test procedure is one option for certifying hybrid powertrains to the engine standards in ~~§§ 1036.104 and 1036.108~~.

(a) *General test provisions.* The following provisions apply broadly for testing under this section:

~~(1) [Reserved] Measure NO<sub>x</sub> emissions as described in paragraph (k) of this section. Include these measured NO<sub>x</sub> values any time you report to us your greenhouse gas emissions or fuel consumption values from testing under this section.~~

~~\* \* \* \* \*~~

~~(d) *Powertrain break in.* Break in the powertrain as a complete system using the engine break-in procedure in 40 CFR 1065.405(c), or take the following steps to break in the engine, axle assembly, and transmission separately, as applicable:~~

~~(1) Break in the engine according to 40 CFR 1065.405(c).~~

~~(2) Break in the axle assembly using good engineering judgment. Maintain gear oil temperature at or below 100 °C throughout the break-in period.~~

~~(3) Break in the transmission using good engineering judgment. Maintain transmission oil temperature at (87 to 93) °C for automatic transmissions and transmissions having more than two friction clutches, and at (77 to 83) °C for all other transmissions. You may ask us to approve a different range of transmission oil temperatures if you have data showing that it better represents in-use operation. *Engine break in.* Break in the engine according to 40 CFR 1065.405(c), the axle assembly according to 40 CFR 1037.560, and the transmission according to 40 CFR 1037.565. You may instead break in the powertrain as a complete system using the engine break in procedure in 40 CFR 1065.405(c).~~

~~\* \* \* \* \*~~

~~(p) *Determine usable battery energy.* Determine usable battery energy (UBE) for plug-in hybrid powertrains using one of the following procedures:~~

~~(1) Select a representative vehicle configuration from paragraph (h) of this section. Measure DC discharge energy,  $E_{DCD}$ , in DC watt hours and measure DC discharge current per hour,  $C_D$ , for the charge-depleting test intervals of the Heavy Duty Transient Test Cycle in 40 CFR part 1037, appendix A. The measurement period must include all the current flowing into and out of the battery pack during the charge-depleting test intervals, including current associated with regenerative braking. Eq. 1036.545-12 shows how to calculate  $E_{DCD}$ , but the power analyzer specified in paragraph (a)(10)(i) of this section will typically perform this calculation internally. Battery voltage measurements made by the powertrain's on-board sensors (such as those~~

available with a diagnostic port) may be used for calculating  $E_{DCD}$  if they are equivalent to those from the power analyzer.

$$E_{DCD} = \sum_{i=0}^N V_t \cdot I_t \cdot \Delta t$$

Eq. 1036.545-12

Where:

$i$  = an indexing variable that represents one individual measurement.

$N$  = total number of measurements.

$V$  = battery DC bus voltage.

$I$  = battery current.

$\Delta t = 1/f_{\text{record}}$

$f_{\text{record}}$  = the data recording frequency.

Example:

$N = 13360$

$V_1 = 454.0$

$V_2 = 454.0$

$I_1 = 0$

$I_2 = 0$

$f_{\text{record}} = 20 \text{ Hz}$

$\Delta t = 1/20 = 0.05 \text{ s}$

$$E_{DCD} = \sum_{i=0}^{13360} (454.0 \cdot 0 + 454.0 \cdot 0 + \dots + V_{13360} \cdot I_{13360}) \cdot 0.05$$

$E_{DCD} = 6540232.7 \text{ W}\cdot\text{s} = 1816.7 \text{ W}\cdot\text{hr}$

(2) Determine a declared UBE that is at or below the corresponding value determined in paragraph (p)(1) of this section, including those from redundant measurements. This declared UBE serves as UBE<sub>certified</sub> determined under 40 CFR 1037.115(f).

97. Amend § 1036.550 by revising the section heading and introductory text to read as follows:

#### **§ 1036.550 Calculating ~~greenhouse gas~~ CO<sub>2</sub> emission rates.**

This section describes how to calculate official emission results for CO<sub>2</sub>, ~~CH<sub>4</sub>, and N<sub>2</sub>O~~.

\* \* \* \* \*

98. Amend § 1036.580 by revising the introductory text and paragraph (c) to read as follows:

#### **§ 1036.580 Infrequently regenerating aftertreatment devices.**

For engines using aftertreatment technology with infrequent regeneration events that may occur during testing, take one of the following approaches to account for the emission impact of regeneration ~~on criteria pollutant and greenhouse gas emissions~~:

\* \* \* \* \*

(c) You may choose to make no adjustments to measured emission results if you determine that regeneration does not significantly affect emission levels for an engine family (or configuration) or if it is not practical to identify when regeneration occurs. You may omit adjustment factors under this paragraph (c) for ~~N<sub>2</sub>O, CH<sub>4</sub>, or other~~ individual pollutants under this paragraph (c) as appropriate. If you choose not to make adjustments under paragraph (a) or (b) of this section, your engines must meet emission standards for all testing, without regard to regeneration.

\* \* \* \* \*

## Subpart G—Special Compliance Provisions

99. Amend § 1036.605 by revising paragraphs (b) and (g) to read as follows:

### § 1036.605 Alternate emission standards for engines used in specialty vehicles.

\* \* \* \* \*

(b) Compression-ignition engines must be of a configuration that is identical to one that is certified under 40 CFR part 1039, and must be certified with a family emission limit for PM of 0.020 g/kW-hr ~~meet the following additional standards~~ using the same duty cycles that apply under 40 CFR part 1039.

~~(1) The engines must be certified with a family emission limit for PM of 0.020 g/kW-hr.~~

~~(2) Diesel fueled engines using selective catalytic reduction must meet an emission standard of 0.1 g/kW-hr for N<sub>2</sub>O.~~

\* \* \* \* \*

(g) Engines certified under this section may not generate or use emission credits under this part or under 40 CFR part 1039. ~~The vehicles in which these engines are installed may generate or use emission credits as described in 40 CFR part 1037.~~

100. Amend § 1036.610 by revising the section heading to read as follows:

### § 1036.610 Off-cycle technology credits ~~and adjustments for reducing greenhouse gas emissions.~~

\* \* \* \* \*

101. Amend § 1036.620 by revising the section heading, introductory text, and paragraph (a), and removing and reserving paragraphs (d) and (e) to read as follows:

### § 1036.620 Alternate ~~CO<sub>2</sub>~~ standards based on model year 2011 compression-ignition engines.

For model years 2014 through 2016, you may certify your compression-ignition engines to ~~the CO<sub>2</sub> standards of this section instead of the CO<sub>2</sub> standards in § 1036.108~~ alternate fuel consumption standards as described in this section. However, you may not certify engines to these alternate standards if they are part of an averaging set in which you carry a balance of banked credits. ~~You may submit applications for certifications before using up banked credits in the averaging set, but such certificates will not become effective until you have used up (or retired) your banked credits in the averaging set.~~ For purposes of this section, you are deemed to carry credits in an averaging set if you carry credits from advanced technology that are allowed to be used in that averaging set.

(a) The standards of this section are determined from the measured emission rate of the engine of the applicable baseline 2011 engine family or families as described in paragraphs (b) and (c) of this section. Calculate the CO<sub>2</sub> emission rate of the baseline engine using the same equations

used for showing compliance with the otherwise applicable fuel consumption standard. The alternate CO<sub>2</sub> standard emission rate for light and medium heavy-duty vocational-certified engines (~~certified for CO<sub>2</sub>~~ using the transient cycle) is equal to the baseline emission rate multiplied by 0.975. The alternate CO<sub>2</sub> standard emission rate for tractor-certified engines (~~certified for CO<sub>2</sub>~~ using the SET duty cycle) and all other Heavy HDE is equal to the baseline emission rate multiplied by 0.970. The in-use FEL for these engines is equal to the alternate standard multiplied by 1.03.

\* \* \* \* \*

(d) ~~[Reserved] Include the following statement on the emission control information label: “THIS ENGINE WAS CERTIFIED TO AN ALTERNATE CO<sub>2</sub> STANDARD UNDER 40 CFR 1036.620.”~~

(e) ~~[Reserved] You may not bank CO<sub>2</sub> emission credits for any engine family in the same averaging set and model year in which you certify engines to the standards of this section. You may not bank any advanced technology credits in any averaging set for the model year you certify under this section (since such credits would be available for use in this averaging set). Note that the provisions of § 1036.745 apply for deficits generated with respect to the standards of this section.~~

\* \* \* \* \*

## **§1036.625 [Removed]**

102. Remove § 1036.625.

### **~~§ 1036.625 In-use compliance with CO<sub>2</sub> family emission limits (FELs).~~**

~~Section 1036.225 describes how to change the FEL for an engine family during the model year. This section, which describes how you may ask us to increase an engine family’s CO<sub>2</sub> FEL after the end of the model year, is intended to address circumstances in which it is in the public interest to apply a higher in-use CO<sub>2</sub> FEL based on forfeiting an appropriate number of emission credits. For example, this may be appropriate where we determine that recalling vehicles would not significantly reduce in-use emissions. We will generally not allow this option where we determine the credits being forfeited would likely have expired.~~

~~(a) You may ask us to increase an engine family’s FEL after the end of the model year if you believe some of your in-use engines exceed the CO<sub>2</sub> FEL that applied during the model year (or the CO<sub>2</sub> emission standard if the family did not generate or use emission credits). We may consider any available information in making our decision to approve or deny your request.~~

~~(b) If we approve your request under this section, you must apply emission credits to cover the increased FEL for all affected engines. Apply the emission credits as part of your credit demonstration for the current production year. Include the appropriate calculations in your final report under § 1036.730.~~

~~(c) Submit your request to the Designated Compliance Officer. Include the following in your request:~~

~~(1) Identify the names of each engine family that is the subject of your request. Include separate family names for different model years~~

~~(2) Describe why your request does not apply for similar engine models or additional model years, as applicable.~~

~~(3) Identify the FEL(s) that applied during the model year and recommend a replacement FEL for in-use engines; include a supporting rationale to describe how you determined the recommended replacement FEL.~~

~~(4) Describe whether the needed emission credits will come from averaging, banking, or trading.~~

~~(d) If we approve your request, we will identify the replacement FEL. The value we select will reflect our best judgment to accurately reflect the actual in-use performance of your engines, consistent with the testing provisions specified in this part. We may apply the higher FELs to other engine families from the same or different model years to the extent they used equivalent emission controls. We may include any appropriate conditions with our approval.~~

~~(e) If we order a recall for an engine family under 40 CFR 1068.505, we will no longer approve a replacement FEL under this section for any of your engines from that engine family, or from any other engine family that relies on equivalent emission controls.~~

103. Revise and republish § 1036.630 to read as follows:

**§ 1036.630 ~~Certification of engine greenhouse gas~~ Measurement of CO<sub>2</sub> emissions for powertrain testing.**

For engines included in powertrain families under ~~40 CFR part 1037~~ § 1036.231, you may choose to include the corresponding engine emissions in your engine families under this part instead of (or in addition to) the otherwise applicable engine fuel maps.

(a) If you choose to certify powertrain fuel maps in an engine family for fuel consumption standards, the declared values for powertrain ~~emission level~~ testing become the standards that apply for selective enforcement audits and in-use testing. We may require that you provide to us the engine cycle (not normalized) corresponding to a given powertrain for each of the specified duty cycles.

(b) If you choose to certify only fuel map ~~emissions values~~ for an engine family for fuel consumption standards and to not certify ~~emissions values~~ over powertrain cycles under § 1036.545, we will not presume you are responsible for ~~emissions value~~ over the powertrain cycles. However, where we determine that you are responsible in whole or in part for the emission exceedance in such cases, we may require that you participate in any recall of the affected vehicles ~~(Note: this does not apply if you also hold the certificate of conformity for the vehicle).~~

(c) If you split an engine family into subfamilies based on different fuel-mapping procedures as described in § 1036.230(f)(2), the fuel-mapping procedures you identify for certifying each subfamily also apply for selective enforcement audits and in-use testing.

**§ 1036.635 [Removed]**

104. Remove § 1036.635.

**~~§ 1036.635 Certification requirements for high-GCWR medium-duty vehicles.~~**

~~Engines that will be installed in Vehicles at or below 14,000 pounds GVWR that have GCWR above 22,000 pounds may be optionally certified under this part instead of vehicle certification under 40 CFR part 86, subpart S.~~

~~(a) Affected engines must meet the criteria pollutant standards specified in § 1036.104. The following specific provisions apply if engines are exempt from greenhouse gas standards under paragraph (b) or (c) of this section:~~

~~(1) Determine brake-specific CO<sub>2</sub> emissions over the FTP,  $e_{CO_2FTP}$ , from the emission data engine used for demonstrating compliance with criteria pollutant standards. You may alternatively determine  $e_{CO_2FTP}$  based on chassis testing as described in 40 CFR 86.1845-~~



~~04(h)(6). Use  $e_{CO_2FTP/FCL}$  for calculating emission rates from in-use engines under § 1036.530. Report the measured  $CO_2$  emission rate and the method of testing in your application for certification.~~

~~(2) For plug-in hybrid electric vehicles, meet battery monitor requirements under 40 CFR 1037.115(f) instead of the battery-related requirements under 40 CFR 86.1815-27.~~

~~(b) Affected engines that will be installed in complete vehicles are exempt from the greenhouse gas emission standards in § 1036.108, but engine certification under this part 1036 depends on the following conditions:~~

~~(1) The vehicles in which the engines are installed must meet the following vehicle-based standards under 40 CFR part 86, subpart S:~~

~~(i) Evaporative and refueling emission standards as specified in 40 CFR 86.1813-17.~~

~~(ii) Greenhouse gas emission standards as specified in 40 CFR 86.1819-14.~~

~~(2) Additional provisions related to relevant requirements from 40 CFR part 86, subpart S, apply for certifying engines under this part, as illustrated in the following examples:~~

~~(i) The engine's emission control information label must state that the vehicle meets evaporative and refueling emission standards under 40 CFR 86.1813-17 and greenhouse gas emission standards under 40 CFR 86.1819-14.~~

~~(ii) The application for certification must include the information related to complying with evaporative, refueling, and greenhouse gas emission standards.~~

~~(iii) We may require you to perform testing on in-use vehicles and report test results as specified in 40 CFR 86.1845-04, 86.1846-01, and 86.1847-01.~~

~~(iv) Demonstrate compliance with the fleet average  $CO_2$  standard as described in 40 CFR 86.1865-12 by including vehicles certified under this section in the compliance calculations as part of the fleet averaging calculation for medium-duty vehicles certified under 40 CFR part 86, subpart S.~~

~~(3) State in the application for certification that you are using the provisions of this section to meet the fleet average  $CO_2$  standard in 40 CFR 86.1819-14 instead of meeting the standards of § 1036.108 and instead of certifying the vehicle to standards under 40 CFR part 1037.~~

~~(c) The provisions in paragraph (b) of this section are optional for affected engines that will be installed in incomplete vehicles. If vehicles do not meet all the requirements described in paragraph (b) of this section, the engines must meet the greenhouse gas emission standards of § 1036.108 and the vehicles must be certified under 40 CFR part 1037.~~

## **Subpart H—Averaging, Banking, and Trading for Certification**

105. Amend § 1036.701 by revising paragraph (a) and removing and reserving paragraphs (h) through (j) to read as follows:

### **§ 1036.701 General provisions.**

(a) You may average, bank, and trade (ABT) emission credits for purposes of certification as described in this subpart and in subpart B of this part to show compliance with the standards of §§ 1036.104 ~~and 1036.108~~. Participation in this program is voluntary. Note that certification to  $NO_x$  standards in § 1036.104 is based on a family emission limit (FEL) ~~and certification to  $CO_2$  standards in § 1036.108~~ the NHTSA fuel efficiency program under 49 CFR part 535 is based on a Family Certification Level (FCL). This part refers to “FEL/FCL” to simultaneously refer to FELs for  $NO_x$  and FCLs for  $CO_2$  NHTSA. Note also that subpart B of this part requires you to assign an FCL to all engine families, whether or not they participate in the ABT provisions of this subpart.

\* \* \* \* \*

(h)-(j) [Reserved]

(h) See § 1036.740 for special credit provisions that apply for greenhouse gas credits generated under 40 CFR 86.1819-14(k)(7) or § 1036.615 or 40 CFR 1037.615.

(i) Unless the regulations in this part explicitly allow it, you may not calculate Phase 1 credits more than once for any emission reduction. For example, if you generate Phase 1 CO<sub>2</sub> emission credits for a hybrid engine under this part for a given vehicle, no one may generate CO<sub>2</sub> emission credits for that same hybrid engine and the associated vehicle under 40 CFR part 1037. However, Phase 1 credits could be generated for identical vehicles using engines that did not generate credits under this part.

(j) Credits you generate with compression ignition engines in 2020 and earlier model years may be used in model year 2021 and later as follows:

(1) For credit-generating engines certified to the tractor engine standards in § 1036.108, you may use credits calculated relative to the tractor engine standards.

(2) For credit-generating engines certified to the vocational engine standards in § 1036.108, you may optionally carry over adjusted vocational credits from an averaging set, and you may use credits calculated relative to the emission levels in the following table:

Table 1 to Paragraph (j)(2) of § 1036.701—Emission Levels for Credit Calculation

Medium HDE	Heavy HDE
558 g/hp·hr	525 g/hp·hr.

\* \* \* \* \*

106. Revise § 1036.705 to read as follows:

#### § 1036.705 Generating and calculating emission credits.

(a) The provisions of this section apply ~~separately~~ for calculating NO<sub>x</sub> emission credits ~~for each pollutant~~.

(b) For each participating family, calculate positive or negative emission credits relative to the otherwise applicable emission standard. Calculate positive emission credits for a family that has an FEL/~~FCL~~ below the standard. Calculate negative emission credits for a family that has an FEL/~~FCL~~ above the standard. Sum your positive and negative credits for the model year before rounding.

~~(1)~~ Calculate emission credits to the nearest megagram (Mg) for each family ~~or subfamily~~ using the following equation:

$$\text{Emission credits (Mg)} = (\text{Std} - \text{FL}) \cdot \text{CF} \cdot \text{Volume} \cdot \text{UL} \cdot c$$

Eq. 1036.705-1

Where:

*Std* = the emission standard, in (mg NO<sub>x</sub>)/hp·hr ~~or (g CO<sub>2</sub>)/hp·hr~~, that applies under subpart B of this part for engines not participating in the ABT program of this subpart (the “otherwise applicable standard”).

*FL* = the engine family’s FEL ~~for NO<sub>x</sub>~~, in mg/hp·hr, ~~and FCL for CO<sub>2</sub>, in g/hp·hr~~, rounded to the same number of decimal places as the emission standard.

*CF* = a transient cycle conversion factor (hp·hr/mile), calculated by dividing the total (integrated) horsepower-hour over the applicable duty cycle by 6.3 miles for engines subject to spark-ignition standards and 6.5 miles for engines subject to compression-

ignition standards. This represents the average work performed over the duty cycle. ~~See paragraph (b)(3) of this section for provisions that apply for CO<sub>2</sub>.~~

*Volume* = the number of engines eligible to participate in the averaging, banking, and trading program within the given engine family ~~or subfamily~~ during the model year, as described in paragraph (c) of this section.

*UL* = the useful life for the standard that applies for a given primary intended service class, in miles.

*c* = ~~use 10<sup>-6</sup> for CO<sub>2</sub> and 10<sup>-9</sup> for NO<sub>x</sub>.~~

*Example for model year 2028~~5~~ Heavy HDE generating CO<sub>2</sub> credits for a model year 2028 Heavy HDE NO<sub>x</sub> credits:*

*Std* = ~~432.35~~ mg/hp·hr

*FEL* = ~~401.20~~ mg/hp·hr

*CF* = 9.78 hp·hr/mile

*Volume* = 15,342

*UL* = ~~435650~~,000 miles

*c* = 10<sup>-69</sup>

*Emission credits* = (~~432.35~~ – ~~401.20~~) · 9.78 · 15,342 · ~~435650~~,000 · 10<sup>-62</sup>

*Emission credits* = ~~28,131,1421.463~~ Mg

(2) [Reserved]

(3) ~~The following additional provisions apply for calculating CO<sub>2</sub> credits:~~

(i) ~~For engine families certified to both the vocational and tractor engine standards, calculate credits separately for the vocational engines and the tractor engines. We may allow you to use statistical methods to estimate the total production volumes where a small fraction of the engines cannot be tracked precisely.~~

(ii) ~~Calculate the transient cycle conversion factor for vocational engines based on the average of vocational engine configurations weighted by their production volumes. Similarly, calculate the transient cycle conversion factor for tractor engines based on the average of tractor engine configurations weighted by their production volumes. Note that calculating the transient cycle conversion factor for tractors requires you to use the conversion factor even for engines certified to standards based on the SET duty cycle.~~

(iii) ~~The FCL for CO<sub>2</sub> is based on measurement over the FTP duty cycle for vocational engines and over the SET duty cycle for tractor engines.~~

(4) ~~You may not generate emission credits for tractor engines (i.e., engines not certified to the transient cycle for CO<sub>2</sub>) installed in vocational vehicles (including vocational tractors certified under 40 CFR 1037.630 or exempted under 40 CFR 1037.631). We will waive this provision where you demonstrate that less than five percent of the engines in your tractor family were installed in vocational vehicles. For example, if you know that 96 percent of your tractor engines were installed in non-vocational tractors but cannot determine the vehicle type for the remaining four percent, you may generate credits for all the engines in the family.~~

(5) ~~You may generate CO<sub>2</sub> emission credits from a model year 2021 or later medium heavy-duty engine family subject to spark ignition standards for exchanging with other engine families only if the engines in the family are gasoline-fueled. You may generate CO<sub>2</sub> credits from non-gasoline engine families only for the purpose of offsetting CH<sub>4</sub> and/or N<sub>2</sub>O emissions within the same engine family as described in paragraph (d) of this section.~~

(c) Compliance with the requirements of this subpart is determined at the end of the model year by calculating emission credits based on actual production volumes, excluding the following engines:

- (1) Engines that you do not certify to the ~~CO<sub>2</sub>~~-standards of this part because they are permanently exempted under subpart G of this part or under 40 CFR part 1068.
- (2) Exported engines.
- (3) Engines not subject to the requirements of this part, such as those excluded under § 1036.5. ~~For example, do not include engines used in vehicles certified to the greenhouse gas standards of 40 CFR 86.1819.~~
- (4) Engines certified to state emission standards that are different than the emission standards referenced in this section, and intended for sale in a state that has adopted those emission standards.
- (5) Any other engines if we indicate elsewhere in this part that they are not to be included in the calculations of this subpart.

~~(d) You may use CO<sub>2</sub> emission credits to show compliance with CH<sub>4</sub> and/or N<sub>2</sub>O FELs instead of the otherwise applicable emission standards. To do this, calculate the CH<sub>4</sub> and/or N<sub>2</sub>O emission credits needed (negative credits) using the equation in paragraph (b) of this section, using the FEL(s) you specify for your engines during certification instead of the FCL. You must use 34 Mg of positive CO<sub>2</sub> credits to offset 1 Mg of negative CH<sub>4</sub> credits for model year 2021 and later engines, and you must use 25 Mg of positive CO<sub>2</sub> credits to offset 1 Mg of negative CH<sub>4</sub> credits for earlier engines. You must use 298 Mg of positive CO<sub>2</sub> credits to offset 1 Mg of negative N<sub>2</sub>O credits.~~

107. Amend § 1036.710 by revising paragraph (b) to read as follows:

**§ 1036.710 Averaging.**

\* \* \* \* \*

(b) You may certify one or more engine families to an FEL/FCL above the applicable standard, subject to any applicable FEL caps and other the provisions in subpart B of this part, if you show in your application for certification that your projected balance of all emission-credit transactions in that model year is greater than or equal to zero, or that a negative balance is allowed under § 1036.745 for NHTSA's fuel efficiency program.

\* \* \* \* \*

108. Amend § 1036.720 by revising paragraph (c) to read as follows:

**§ 1036.720 Trading.**

\* \* \* \* \*

(c) If a negative emission credit balance results from a transaction, both the buyer and seller are liable, except in cases we deem to involve fraud. See § 1036.255(e) for cases involving fraud. We may void the certificates of all engine families participating in a trade that results in a manufacturer having a negative balance of emission credits. See § 1036.745 for NHTSA's fuel efficiency program.

109. Amend § 1036.725 by revising paragraph (b)(1) to read as follows:

**§ 1036.725 Required information for certification.**

\* \* \* \* \*

(b) \* \* \*

(1) A statement that, to the best of your belief, you will not have a negative balance of emission credits for any averaging set when all emission credits are calculated at the end of the year. For NHTSA's fuel efficiency program, you may include; ~~or~~ a statement that you will have a negative balance of emission credits for one or more averaging sets, but that it is allowed under § 1036.745.

\* \* \* \* \*

110. Amend § 1036.730 by revising paragraphs (c)(1), and (f)(1) to read as follows:

**§ 1036.730 ABT reports.**

\* \* \* \* \*

(c) \* \* \*

(1) Show that your net balance of emission credits from all your participating engine families in each averaging set in the applicable model year is not negative, except as allowed under § 1036.745 for NHTSA's fuel efficiency program. Your credit tracking must account for the limitation on credit life under § 1036.740(d).

\* \* \* \* \*

(f) \* \* \*

(1) If you notify us by the deadline for submitting the final report that errors mistakenly decreased your balance of emission credits, you may correct the errors and recalculate the balance of emission credits. ~~If you notify us that errors mistakenly decreased your balance of GHG emission credits after the deadline for submitting the final report, you may correct the errors and recalculate the balance of emission credits after applying a 10 percent discount to the credit correction, but only if you notify us within 24 months after the deadline for submitting the final report. If you report a negative balance of emission credits, we may disallow corrections under this paragraph (f)(1).~~

\* \* \* \* \*

111. Amend § 1036.740 by removing and reserving paragraphs (b) and (c) and revising paragraph (d) to read as follows:

**§ 1036.740 Restrictions for using emission credits.**

\* \* \* \* \*

(b) ~~[Reserved] Applying credits to prior year deficits. Where your CO<sub>2</sub> credit balance for the previous year is negative, you may apply credits to that deficit only after meeting your credit obligations for the current year.~~

(c) ~~[Reserved] CO<sub>2</sub> credits from hybrid engines and other advanced technologies. Phase 1 CO<sub>2</sub> credits you generate under § 1036.615 may be used for any of the averaging sets identified in paragraph (a) of this section; you may also use those credits to demonstrate compliance with the CO<sub>2</sub> emission standards in 40 CFR 86.1819 and 40 CFR part 1037. Similarly, you may use Phase 1 advanced technology credits generated under 40 CFR 86.1819-14(k)(7) or 40 CFR 1037.615 to demonstrate compliance with the CO<sub>2</sub> standards in this part. In the case of Spark-ignition HDE~~

and Light HDE you may not use more than 60,000 Mg of credits from other averaging sets in any model year.

(1) The maximum CO<sub>2</sub>-credits you may bring into the following service class groups is 60,000 Mg per model year:

(i) Spark-ignition HDE, Light HDE, and Light HDV. This group comprises the averaging sets listed in paragraphs (a)(1) and (2) of this section and the averaging set listed in 40 CFR 1037.740(a)(1).

(ii) Medium HDE and Medium HDV. This group comprises the averaging sets listed in paragraph (a)(3) of this section and 40 CFR 1037.740(a)(2).

(iii) Heavy HDE and Heavy HDV. This group comprises the averaging sets listed in paragraph (a)(4) of this section and 40 CFR 1037.740(a)(3).

(2) Paragraph (c)(1) of this section does not limit the advanced technology credits that can be used within a service class group if they were generated in that same service class group.

(d) ~~NO<sub>x</sub> and CO<sub>2</sub>-credit~~ Credit life. NO<sub>x</sub> and CO<sub>2</sub>-credits may be used only for five model years after the year in which they are generated. For example, credits you generate in model year 2027 may be used to demonstrate compliance with emission standards only through model year 2032.

\* \* \* \* \*

112. Revise § 1036.745 to read as follows:

#### **§ 1036.745 End-of-year ~~CO<sub>2</sub>~~-credit deficits.**

~~See 49 CFR 535.7 for provisions related to credit deficits for NHTSA's fuel consumption credits. Except as allowed by this section, we may void the certificate of any engine family certified to an FCL above the applicable standard for which you do not have sufficient credits by the deadline for submitting the final report.~~

~~(a) Your certificate for an engine family for which you do not have sufficient CO<sub>2</sub>-credits will not be void if you remedy the deficit with surplus credits within three model years. For example, if you have a credit deficit of 500 Mg for an engine family at the end of model year 2015, you must generate (or otherwise obtain) a surplus of at least 500 Mg in that same averaging set by the end of model year 2018.~~

~~(b) You may not bank or trade away CO<sub>2</sub>-credits in the averaging set in any model year in which you have a deficit.~~

~~(c) You may apply only surplus credits to your deficit. You may not apply credits to a deficit from an earlier model year if they were generated in a model year for which any of your engine families for that averaging set had an end-of-year credit deficit.~~

~~(d) You must notify us in writing how you plan to eliminate the credit deficit within the specified time frame. If we determine that your plan is unreasonable or unrealistic, we may deny an application for certification for a vehicle family if its FEL would increase your credit deficit. We may determine that your plan is unreasonable or unrealistic based on a consideration of past and projected use of specific technologies, the historical sales mix of your vehicle models, your commitment to limit production of higher-emission vehicles, and expected access to traded credits. We may also consider your plan unreasonable if your credit deficit increases from one model year to the next. We may require that you send us interim reports describing your progress toward resolving your credit deficit over the course of a model year.~~

~~(e) If you do not remedy the deficit with surplus credits within three model years, we may void your certificate for that engine family. We may void the certificate based on your end-of-year report. Note that voiding a certificate applies *ab initio*. Where the net deficit is less than the total~~



~~amount of negative credits originally generated by the family, we will void the certificate only with respect to the number of engines needed to reach the amount of the net deficit. For example, if the original engine family generated 500 Mg of negative credits, and the manufacturer's net deficit after three years was 250 Mg, we would void the certificate with respect to half of the engines in the family.~~

~~(f) For purposes of calculating the statute of limitations, the following actions are all considered to occur at the expiration of the deadline for offsetting a deficit as specified in paragraph (a) of this section:~~

~~(1) Failing to meet the requirements of paragraph (a) of this section.~~

~~(2) Failing to satisfy the conditions upon which a certificate was issued relative to offsetting a deficit.~~

~~(3) Selling, offering for sale, introducing or delivering into U.S. commerce, or importing vehicles that are found not to be covered by a certificate as a result of failing to offset a deficit.~~

113. Amend § 1036.750 by revising paragraph (b) to read as follows:

#### **§ 1036.750 Consequences for noncompliance.**

\* \* \* \* \*

(b) You may certify your engine family to an FEL/~~FCL~~ above an applicable standard based on a projection that you will have enough emission credits to offset the deficit for the engine family.

~~See § 1036.745 for provisions specifying what happens if you cannot show in your final report that you have enough actual emission credits to offset a deficit for any pollutant in an engine family.~~

\* \* \* \* \*

114. Revise § 1036.755 to read as follows:

#### **§ 1036.755 Information provided to the Department of Transportation.**

After receipt of each manufacturer's final report as specified in § 1036.730 and completion of any verification testing required to validate the manufacturer's submitted final data, we will issue a report to the Department of Transportation with CO<sub>2</sub> emission information and will verify the accuracy of each manufacturer's equivalent fuel consumption data ~~that~~ required by NHTSA under 49 CFR 535.8. We will send a report to DOT for each engine manufacturer based on each regulatory category and subcategory, including sufficient information for NHTSA to determine fuel consumption and associated credit values. See 49 CFR 535.8 to determine if NHTSA deems submission of this information to EPA to also be a submission to NHTSA.

#### **Subpart I—Definitions and Other Reference Information**

115. Revise and republish § 1036.801 to read as follows:

#### **§ 1036.801 Definitions.**

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

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

*Adjustable parameter* has the meaning given in 40 CFR 1068.50.

*Advanced technology* means technology certified under 40 CFR 86.1819-14(k)(7), § 1036.615, or 40 CFR 1037.615.

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

*Aircraft* means any vehicle capable of sustained air travel more than 100 feet above the ground.

*Alcohol-fueled engine* mean an engine that is designed to run using an alcohol fuel. For purposes of this definition, alcohol fuels do not include fuels with a nominal alcohol content below 25 percent by volume.

*Automated manual transmission (AMT)* means a transmission that operates mechanically similar to a manual transmission, except that an automated clutch actuator controlled by the onboard computer disengages and engages the drivetrain instead of a human driver. An automated manual transmission does not include a torque converter or a clutch pedal controllable by the driver.

*Automatic transmission (AT)* means a transmission with a torque converter (or equivalent) that uses computerize or other internal controls to shift gears in response to a single driver input for controlling vehicle speed. Note that automatic manual transmissions are not automatic transmissions because they do not include torque converters.

*Auxiliary emission control device* means any element of design that senses temperature, motive speed, engine speed (r/min), transmission gear, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.

*Averaging set* has the meaning given in § 1036.740.

*Axle ratio or Drive axle ratio; ( $k_a$ )*; means the dimensionless number representing the angular speed of the transmission output shaft divided by the angular speed of the drive axle.

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

*Carbon-containing fuel* has the meaning given in 40 CFR 1065.1001.

*Carryover* means relating to certification based on emission data generated from an earlier model year as described in § 1036.235(d).

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

*Certified emission level* means the highest deteriorated emission level in an engine family for a given pollutant from the applicable transient ~~and/or~~ steady-state testing, rounded to the same number of decimal places as the applicable standard. ~~Note that you may have two certified~~

~~emission levels for CO<sub>2</sub> if you certify a family for both vocational and tractor use.~~

*Charge-depleting* has the meaning given in 40 CFR 1066.1001.

*Charge-sustaining* has the meaning given in 40 CFR 1066.1001.

*Complete vehicle* means a vehicle meeting the definition of complete vehicle in 40 CFR 1037.801 when it is first sold as a vehicle. For example, where a vehicle manufacturer sells an incomplete vehicle to a secondary vehicle manufacturer, the vehicle is not a complete vehicle under this part, even after its final assembly.

*Compression-ignition* means relating to a type of reciprocating, internal-combustion engine that is not a spark-ignition engine. Note that § 1036.1 also deems gas turbine engines and other engines to be compression-ignition engines.

*Crankcase emissions* means airborne substances emitted to the atmosphere from any part of the engine crankcase's ventilation or lubrication systems. The crankcase is the housing for the crankshaft and other related internal parts.

*Critical emission-related component* has the meaning given in 40 CFR 1068.30.

*Defeat device* has the meaning given in § 1036.115(h).

*Designated Compliance Officer* means one of the following:

- (1) For engines subject to compression-ignition standards, *Designated Compliance Officer* means Director, Diesel Engine Compliance Center, U.S. Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105; [complianceinfo@epa.gov](mailto:complianceinfo@epa.gov); [www.epa.gov/ve-certification](http://www.epa.gov/ve-certification).
- (2) For engines subject to spark-ignition standards, *Designated Compliance Officer* means Director, Gasoline Engine Compliance Center, U.S. Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor, MI 48105; [complianceinfo@epa.gov](mailto:complianceinfo@epa.gov); [www.epa.gov/ve-certification](http://www.epa.gov/ve-certification).

*Deteriorated emission level* means the emission level that results from applying the appropriate deterioration factor to the official emission result of the emission-data engine. Note that where no deterioration factor applies, references in this part to the *deteriorated emission level* mean the official emission result.

*Deterioration factor* means the relationship between emissions at the end of useful life (or point of highest emissions if it occurs before the end of useful life) and emissions at the low-hour/low-mileage point, expressed in one of the following ways:

- (1) For multiplicative deterioration factors, the ratio of emissions at the end of useful life (or point of highest emissions) to emissions at the low-hour point.
- (2) For additive deterioration factors, the difference between emissions at the end of useful life (or point of highest emissions) and emissions at the low-hour point.

*Diesel exhaust fluid (DEF)* means a liquid reducing agent (other than the engine fuel) used in conjunction with selective catalytic reduction to reduce NO<sub>x</sub> emissions. *Diesel exhaust fluid* is generally understood to be an aqueous solution of urea conforming to the specifications of ISO

22241.

*Drive idle* means idle operation during which the vehicle operator remains in the vehicle cab, as evidenced by engaging the brake or clutch pedals, or by other indicators we approve.

*Dual-fuel* means relating to an engine designed for operation on two different types of fuel but not on a continuous mixture of those fuels (see § 1036.601(d)). For purposes of this part, such an engine remains a dual-fuel engine even if it is designed for operation on three or more different fuels.

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

*Emergency vehicle* means a vehicle that meets one of the following criteria:

(1) It is an ambulance or a fire truck.

(2) It is a vehicle that we have determined will likely be used in emergency situations where emission control function or malfunction may cause a significant risk to human life. For example, we would consider a truck that is certain to be retrofitted with a slip-on firefighting module to become an emergency vehicle, even though it was not initially designed to be a fire truck. Also, a mobile command center that is unable to manually regenerate its DPF while on duty could be an emergency vehicle. In making this determination, we may consider any factor that has an effect on the totality of the actual risk to human life. For example, we may consider how frequently a vehicle will be used in emergency situations or how likely it is that the emission controls will cause a significant risk to human life when the vehicle is used in emergency situations. We would not consider the truck in the example above to be an emergency vehicle if there is merely a possibility (rather than a certainty) that it will be retrofitted with a slip-on firefighting module.

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

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

*Emission-related component* has the meaning given in 40 CFR part 1068, appendix A.

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

*Engine configuration* means a unique combination of engine hardware and calibration (related to the emission standards) within an engine family, which would include hybrid components for engines certified as hybrid engines and hybrid powertrains. Engines within a single engine configuration differ only with respect to normal production variability or factors unrelated to compliance with emission standards.

*Engine family* has the meaning given in § 1036.230.

*Excluded* means relating to engines that are not subject to some or all of the requirements of this part as follows:

- (1) An engine that has been determined not to be a heavy-duty engine is excluded from this part.
- (2) Certain heavy-duty engines are excluded from the requirements of this part under § 1036.5.
- (3) Specific regulatory provisions of this part may exclude a heavy-duty engine generally subject to this part from one or more specific standards or requirements of this part.

*Exempted* has the meaning given in 40 CFR 1068.30.

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

*Family certification level (FCL)* means a CO<sub>2</sub> emission level declared by the manufacturer that is at or above emission results for all emission-data engines. ~~The FCL serves as the emission standard for the engine family with respect to certification testing if it is different than the otherwise applicable standard.~~

*Family emission limit (FEL)* means one of the following:

- (1) For NO<sub>x</sub> emissions, *family emission limit* means a NO<sub>x</sub> emission level declared by the manufacturer to serve in place of an otherwise applicable emission standard under the ABT program in subpart H of this part. The FEL serves as the emission standard for the engine family with respect to all required testing.
- (2) For ~~greenhouse gas standards~~ NHTSA's fuel efficiency program under 49 CFR part 535, *family emission limit* means ~~an emission-a fuel consumption~~ level that serves as the standard that applies for testing individual certified engines. The CO<sub>2</sub> FEL is equal to the CO<sub>2</sub> FCL multiplied by 1.03 and rounded to the same number of decimal places as the standard.

*Federal Test Procedure (FTP)* means the applicable transient duty cycle described in § 1036.512 designed to measure exhaust emissions during urban driving.

*Final drive ratio; ( $k_{d\tau}$ )* means the dimensionless number representing the angular speed of the transmission input shaft divided by the angular speed of the drive axle when the vehicle is operating in its highest available gear. The final drive ratio is the transmission gear ratio (in the highest available gear) multiplied by the drive axle ratio.

*Flexible-fuel* means relating to an engine designed for operation on any mixture of two or more different types of fuels (see § 1036.601(d)).

*Fuel type* means a general category of fuels such as diesel fuel, gasoline, or natural gas. There can be multiple grades within a single fuel type, such as premium gasoline, regular gasoline, or gasoline with 10 percent ethanol.

*Gear ratio or Transmission gear ratio; ( $k_g$ )* means the dimensionless number representing the angular speed of the transmission's input shaft divided by the angular speed of the transmission's

output shaft when the transmission is operating in a specific gear.

*Good engineering judgment* has the meaning given in 40 CFR 1068.30. See 40 CFR 1068.5 for the administrative process we use to evaluate good engineering judgment.

*Greenhouse gas Emissions Model (GEM)* means the GEM simulation tool described in 40 CFR 1037.520. Note that an updated version of GEM applies starting in model year 2021.

*Gross vehicle weight rating (GVWR)* means the value specified by the vehicle manufacturer as the maximum design loaded weight of a single vehicle, consistent with good engineering judgment.

*Heavy-duty engine* means any engine which the engine manufacturer could reasonably expect to be used for motive power in a heavy-duty vehicle. For purposes of this definition in this part, the term “engine” includes internal combustion engines and other devices that convert chemical fuel into motive power. For example, a gas turbine used in a heavy-duty vehicle is a heavy-duty engine.

*Heavy-duty vehicle* means any motor vehicle above 8,500 pounds GVWR. An incomplete vehicle is also a heavy-duty vehicle if it has a curb weight above 6,000 pounds or a basic vehicle frontal area greater than 45 square feet. *Curb weight* and *basic vehicle frontal area* have the meaning given in 40 CFR 86.1803-01.

*Hybrid* means relating to an engine or powertrain that includes a Rechargeable Energy Storage System. Hybrid engines store and recover energy in a way that is integral to the engine or otherwise upstream of the vehicle’s transmission. Examples of hybrid engines include engines with hybrid components connected to the front end of the engine (P0), connected to the crankshaft before the clutch (P1), or connected between the clutch and the transmission where the clutch upstream of the hybrid feature is in addition to the transmission clutch or clutches (P2). Engine-based systems that recover kinetic energy to power an electric heater in the aftertreatment are themselves not sufficient to qualify as a hybrid engine. The provisions in this part that apply for hybrid powertrains apply equally for hybrid engines, except as specified. Note that certain provisions in this part treat hybrid powertrains intended for vehicles that include regenerative braking different than those intended for vehicles that do not include regenerative braking. The definition of hybrid includes plug-in hybrid electric powertrains.

*Hydrocarbon (HC)* has the meaning given in 40 CFR 1065.1001.

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

*Incomplete vehicle* means a vehicle meeting the definition of incomplete vehicle in 40 CFR 1037.801 when it is first sold (or otherwise delivered to another entity) as a vehicle.

*Innovative technology* means technology certified under § 1036.610 (also described as “off-cycle technology”).

*Liquefied petroleum gas (LPG)* means a liquid hydrocarbon fuel that is stored under pressure and is composed primarily of nonmethane compounds that are gases at atmospheric conditions. Note



that, although this commercial term includes the word “petroleum”, LPG is not considered to be a petroleum fuel under the definitions of this section.

*Low-hour* means relating to an engine that has stabilized emissions and represents the undeteriorated emission level. This would generally involve less than 300 hours of operation for engines with NO<sub>x</sub> aftertreatment and 125 hours of operation for other engines.

*Manual transmission (MT)* means a transmission that requires the driver to shift the gears and manually engage and disengage the clutch.

*Manufacture* means the physical and engineering process of designing, constructing, and/or assembling a heavy-duty engine or a heavy-duty vehicle.

*Manufacturer* has the meaning given in 40 CFR 1068.30.

*Medium-duty passenger vehicle* has the meaning given in 40 CFR 86.1803.

~~*Mild hybrid* means relating to a hybrid engine or hybrid powertrain with regenerative braking capability where the system recovers less than 20 percent of the total braking energy over the transient cycle defined in 40 CFR part 1037, appendix A.~~

*Model year* 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.

*Motorcoach* means a heavy-duty vehicle designed for carrying 30 or more passengers over long distances. Such vehicles are characterized by row seating, rest rooms, and large luggage compartments, and facilities for stowing carry-on luggage.

*Motor vehicle* has the meaning given in 40 CFR 85.1703.

*Natural gas* means a fuel whose primary constituent is methane.

*Neat* has the meaning given in 40 CFR 1065.1001.

*New motor vehicle engine* has the meaning given in the Act. This generally means a motor vehicle engine meeting any of the following:

- (1) A motor vehicle engine for which the ultimate purchaser has never received the equitable or legal title is a *new motor vehicle engine*. This kind of engine might commonly be thought of as “brand new” although a *new motor vehicle engine* may include previously used parts. Under this definition, the engine is new from the time it is produced until the ultimate purchaser receives the title or places it into service, whichever comes first.
- (2) An imported motor vehicle engine is a *new motor vehicle engine* if it was originally built on or after January 1, 1970.
- (3) Any motor vehicle engine installed in a new motor vehicle.

*Noncompliant engine* means an engine that was originally covered by a certificate of conformity, but is not in the certified configuration or otherwise does not comply with the conditions of the certificate.

*Nonconforming engine* means an engine not covered by a certificate of conformity that would otherwise be subject to emission standards.

*Nonmethane hydrocarbon (NMHC)* means the sum of all hydrocarbon species except methane, as measured according to 40 CFR part 1065.

*Nonmethane hydrocarbon equivalent (NMHCE)* has the meaning given in 40 CFR 1065.1001.

*Nonmethane nonethane hydrocarbon equivalent (NMNEHC)* has the meaning given in 40 CFR 1065.1001.

*Off-cycle technology* means technology certified under § 1036.610 (also described as “innovative technology”).

*Official emission result* means the measured emission rate for an emission-data engine on a given duty cycle before the application of any deterioration factor, but after the applicability of any required regeneration or other adjustment factors.

*Owners manual* means a document or collection of documents prepared by the engine or vehicle manufacturer for the owner or operator to describe appropriate engine maintenance, applicable warranties, and any other information related to operating or keeping the engine. The owners manual is typically provided to the ultimate purchaser at the time of sale. The owners manual may be in paper or electronic format.

*Oxides of nitrogen* has the meaning given in 40 CFR 1065.1001.

*Percent* has the meaning given in 40 CFR 1065.1001. Note that this means percentages identified in this part are assumed to be infinitely precise without regard to the number of significant figures. For example, one percent of 1,493 is 14.93.

*Placed into service* means put into initial use for its intended purpose, excluding incidental use by the manufacturer or a dealer.

*Preliminary approval* means approval granted by an authorized EPA representative prior to submission of an application for certification, consistent with the provisions of § 1036.210.

*Primary intended service class* has the meaning given in § 1036.140.

*Rechargeable Energy Storage System (RESS)* has the meaning given in 40 CFR 1065.1001.

*Relating to* as used in this section means relating to something in a specific, direct manner. This expression is used in this section only to define terms as adjectives and not to broaden the meaning of the terms.

*Revoke* has the meaning given in 40 CFR 1068.30.

*Round* has the meaning given in 40 CFR 1065.1001.

*Sample* means the collection of engines selected from the population of an engine family for emission testing. This may include testing for certification, production-line testing, or in-use testing.

*Scheduled maintenance* means adjusting, removing, disassembling, cleaning, or replacing components or systems periodically to keep a part or system from failing, malfunctioning, or wearing prematurely.

*Small manufacturer* means a manufacturer meeting the criteria specified in 13 CFR 121.201. The employee and revenue limits apply to the total number of employees and total revenue together for all affiliated companies (as defined in 40 CFR 1068.30). Note that manufacturers with low production volumes may or may not be “small manufacturers”.

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

~~*State of certified energy (SOCE)* means a value representing the amount of usable battery energy available at a specific point in time relative to the certified value for a new battery, expressed as a percentage of the certified usable battery energy.~~

~~*Stop-start* means a vehicle technology that automatically turns the engine off when the vehicle is stopped.~~

*Steady-state* has the meaning given in 40 CFR 1065.1001. This includes ~~fuel mapping and~~ idle testing where engine speed and load are held at a finite set of nominally constant values.

*Suspend* has the meaning given in 40 CFR 1068.30.

*Test engine* means an engine in a sample.

*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, or relating to such a vehicle.

~~*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 reasonably believes will be (or has been) installed 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.~~

*Ultimate purchaser* means, with respect to any new engine or vehicle, the first person who in good faith purchases such new engine or vehicle for purposes other than resale.

*United States* has the meaning given in 40 CFR 1068.30.

*Upcoming model year* means for an engine family the model year after the one currently in

production.

*U.S.-directed production volume* means the number of engines, subject to the requirements of this part, produced by a manufacturer for which the manufacturer has a reasonable assurance that sale was or will be made to ultimate purchasers in the United States.

*Vehicle* has the meaning given in 40 CFR 1037.801.

~~*Vocational engine* means an engine certified for use in vocational vehicles. Where an engine family is certified for use in both tractors and vocational vehicles, “vocational engine” means an engine that the engine manufacturer reasonably believes will be (or has been) installed in a vocational vehicle. Note that the provisions of this part may require a manufacturer to document how it determines that an engine is a vocational engine.~~

*Vocational vehicle* means a vehicle meeting the definition of “vocational” vehicle in 40 CFR 1037.801.

*Void* has the meaning given in 40 CFR 1068.30.

*We (us, our)* means the Administrator of the Environmental Protection Agency and any authorized representatives for issues related to criteria pollutant standards. In the case of testing, compliance, and approvals related to fuel consumption standards, “we (us, our)” includes the Administrator of the National Highway Traffic Safety Administration (NHTSA) and any authorized representatives.

#### **§ 1036.805 [Amended]**

116. Amend § 1036.805 by revising Table 1 to Paragraph (a) to remove entries for “CH<sub>4</sub>” and “N<sub>2</sub>O”.

#### **§ 1036.805 Symbols, abbreviations, and acronyms.**

\* \* \* \* \*

TABLE 1 TO PARAGRAPH (a) OF § 1036.805—SYMBOLS FOR CHEMICAL SPECIES AND EXHAUST CONSTITUENTS

Symbol	Species
C	carbon.
<del>CH<sub>4</sub></del>	<del>methane.</del>
CH <sub>4</sub> N <sub>2</sub> O	urea.
CO	carbon monoxide.
CO <sub>2</sub>	carbon dioxide.
H <sub>2</sub> O	water.
HC	hydrocarbon.
NMHC	nonmethane hydrocarbon.
NMHCE	nonmethane hydrocarbon equivalent.
NMNEHC	nonmethane nonethane hydrocarbon.
NO	nitric oxide.
NO <sub>2</sub>	nitrogen dioxide.
NO <sub>x</sub>	oxides of nitrogen.
<del>N<sub>2</sub>O</del>	<del>nitrous oxide.</del>
PM	particulate matter.

117. Amend § 1036.815 by revising paragraph (b) to read as follows:

**§ 1036.815 Confidential information.**

\* \* \* \* \*

(b) Emission data or information that is publicly available cannot be treated as confidential business information as described in 40 CFR 1068.11. Data that vehicle manufacturers need for demonstrating compliance with ~~greenhouse gas emission~~ standards, including fuel-consumption data as described in §§ 1036.535 and 1036.545, also qualify as emission data for purposes of confidentiality determinations.

## ATTACHMENT 5

### PART 1037— CONTROL OF EMISSIONS FROM NEW HEAVY-DUTY MOTOR VEHICLES

118. The authority citation for part 1037 continues to read as follows:  
Authority: 42 U.S.C. 7401 - 7671q.

#### Subpart A—Overview and Applicability

119. Amend § 1037.1 by adding paragraph (c) to read as follows:

##### § 1037.1 Applicability.

\* \* \* \* \*

(c) This part establishes criteria pollutant and evaporative and refueling standards as described in § 1037.101. This part does not establish standards for CO<sub>2</sub> or other greenhouse gas emissions, but it includes certification and testing provisions related to CO<sub>2</sub> emissions to support the fuel consumption standards for heavy-duty vehicles adopted by the Department of Transportation's National Highway Traffic and Safety Administration (NHTSA) under 49 CFR part 535.

##### § 1037.5 [Amended]

120. Amend § 1037.5 by removing and reserving paragraphs (c) and (d).

##### § 1037.5 Excluded vehicles.

Except for the definitions specified in § 1037.801, this part does not apply to the following vehicles:

- (a) Vehicles not meeting the definition of “motor vehicle” in § 1037.801.
- (b) Vehicles excluded from the definition of “heavy-duty vehicle” in § 1037.801 because of vehicle weight, weight rating, and frontal area (such as light-duty vehicles and light-duty trucks).
- (c) ~~[Reserved] Vehicles produced in model years before 2014, unless they were certified under § 1037.150.~~
- (d) ~~[Reserved] Medium-duty passenger vehicles and other vehicles subject to the light-duty greenhouse gas standards of 40 CFR part 86. See 40 CFR 86.1818 for greenhouse gas standards that apply for these vehicles. An example of such a vehicle would be a vehicle meeting the definition of “heavy-duty vehicle” in § 1037.801 and 40 CFR 86.1803, but also meeting the definition of “light truck” in 40 CFR 86.1818-12(b)(2).~~
- (e) Vehicles subject to emission standards under 40 CFR part 86, subpart S.
- (f) Aircraft meeting the definition of “motor vehicle”. For example, this would include certain convertible aircraft that can be adjusted to operate on public roads. Standards apply separately to certain aircraft engines, as described in 40 CFR part 87.
- (g) Where it is unclear, you may ask us to make a determination regarding the exclusions identified in this section. We recommend that you make your request before you produce the vehicle.

121. Amend § 1037.15 by revising paragraph (a) to read as follows:

##### § 1037.15 Do any other regulation parts apply to me?

(a) Parts 1065 and 1066 of this chapter describe procedures and equipment specifications for testing engines and vehicles to measure exhaust emissions. Subpart F of this part 1037 describes



how to apply the testing provisions of 40 CFR parts 1065 and ~~part 1066 of this chapter to determine whether vehicles meet the exhaust emission standards in this part.~~

\* \* \* \* \*

## Subpart B—Emission Standards and Related Requirements

### § 1037.101 [Amended]

122. Amend § 1037.101 by removing and reserving paragraphs (a)(2) and (b)(2).

### § 1037.101 Overview of emission standards.

(a) You must show that vehicles meet the following emission standards:

(1) *Exhaust emissions of criteria pollutants.* Criteria pollutant standards for NO<sub>x</sub>, HC, PM, and CO apply as described in § 1037.102. These pollutants are sometimes described collectively as “criteria pollutants” because they are either criteria pollutants under the Clean Air Act or precursors to the criteria pollutants ozone and PM.

(2) ~~[Reserved] Exhaust emissions of greenhouse gases. This part contains standards and other regulations applicable to the emission of the air pollutant defined as the aggregate group of six greenhouse gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Emission standards apply as follows for greenhouse gas emissions:~~

~~(i) CO<sub>2</sub> emission standards apply as described in §§ 1037.105 and 1037.106. No CH<sub>4</sub> or N<sub>2</sub>O standards apply under this part. See 40 CFR part 1036 for CH<sub>4</sub> or N<sub>2</sub>O standards that apply to engines used in these vehicles.~~

~~(ii) Hydrofluorocarbon standards apply as described in § 1037.115(e). These pollutants are also “greenhouse gas pollutants” but are treated separately from exhaust greenhouse gas pollutants listed in paragraph (a)(2)(i) of this section.~~

(3) *Fuel evaporative and refueling emissions.* Requirements related to fuel evaporative and refueling emissions are described in § 1037.103.

(b) The regulated heavy-duty vehicles are addressed in different groups as follows:

(1) For criteria pollutants, vehicles are regulated based on gross vehicle weight rating (GVWR), whether they are considered “spark-ignition” or “compression-ignition,” and whether they are first sold as complete or incomplete vehicles.

(2) ~~[Reserved] Greenhouse gas standards apply differently for vocational vehicles and tractors. Greenhouse gas standards also apply differently depending on the vehicle service class as described in § 1037.140. In addition, standards apply differently for vehicles with spark ignition and compression ignition engines. References in this part to “spark ignition” or “compression ignition” generally relate to the application of standards under 40 CFR 1036.140. For example, a vehicle with an engine certified to spark ignition standards under 40 CFR part 1036 is generally subject to requirements under this part that apply for spark ignition vehicles. However, note that emission standards for Heavy HDE are considered to be compression ignition standards for purposes of applying vehicle emission standards under this part. Also, for spark ignition engines voluntarily certified as compression ignition engines under 40 CFR part 1036, you must choose at certification whether your vehicles are subject to spark ignition standards or compression ignition standards. Heavy duty vehicles with no installed propulsion engine, such as battery electric vehicles, are subject to compression ignition emission standards under §§ 1037.105 and 1037.106 for the purpose of calculating emission credits.~~

(3) For evaporative and refueling emissions, vehicles are regulated based on the type of fuel they use. Vehicles fueled with volatile liquid fuels or gaseous fuels are subject to evaporative and refueling emission standards.

123. Amend § 1037.102 by revising the section heading and adding paragraph (c) to read as follows:

**§ 1037.102 Criteria pollutant exhaust emission standards—NO<sub>x</sub>, HC, PM, and CO.**

\* \* \* \* \*

(c) Starting in model year 2024, auxiliary power units installed on new tractors, including tractors that are glider vehicles or tractors with no installed propulsion engine, must be certified to the PM emission standard specified in 40 CFR 1039.699. For model years 2021 through 2023, the APU engine must be certified under 40 CFR part 1039 with a deteriorated emission level for PM at or below 0.15 g/kW-hr. Selling, offering for sale, or introducing or delivering into commerce in the United States or importing into the United States a new tractor subject to this standard is a violation of 40 CFR 1068.101(a)(1) unless the auxiliary power unit has a valid certificate of conformity and the required label showing that it meets the PM standard specified in 40 CFR 1039.699 as described in this paragraph (c).

**§§ 1037.105 and 1037.106 [Removed]**

124. Remove §§ 1037.105 and 1037.106.

**~~§ 1037.105 CO<sub>2</sub> emission standards for vocational vehicles.~~**

~~(a) The standards of this section apply for the following vehicles:~~

~~(1) Heavy-duty vehicles at or below 14,000 pounds GVWR that are not subject to the greenhouse gas standards in 40 CFR part 86, subpart S, or that use engines certified under § 1037.150(m);~~

~~(2) Vehicles above 14,000 pounds GVWR and at or below 26,000 pounds GVWR, but not certified to the vehicle greenhouse gas standards in 40 CFR part 86, subpart S;~~

~~(3) Vehicles above 26,000 pounds GVWR that are not tractors;~~

~~(4) Vocational tractors.~~

~~(b) CO<sub>2</sub> standards in this paragraph (b) apply based on modeling and testing as specified in subpart F of this part. The provisions of § 1037.241 specify how to comply with the standards in this paragraph (b). Standards differ based on engine cycle, vehicle size, and intended vehicle duty cycle. See § 1037.510(c) to determine which duty cycle applies. Note that § 1037.230 describes how to divide vehicles into subcategories.~~

~~(1) Except as specified in paragraph (b)(2) of this section, model year 2027 and later vehicles are subject to Phase 3 CO<sub>2</sub> standards corresponding to the selected subcategories as shown in the following table:~~

TABLE 1 OF PARAGRAPH (b)(1) OF § 1037.105—PHASE 3 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2027 AND LATER VOCATIONAL VEHICLES

Model Year	Subcategory	CO <sub>2</sub> standard by vehicle service class (g/ton-mile)				
		CI Light Heavy	CI Medium Heavy	CI Heavy Heavy	SI Light Heavy	SI Medium Heavy
2027	Urban	305	224	269	351	263
	Multi-Purpose	274	204	230	316	237
	Regional	242	190	189	270	219
2028	Urban	286	217	269	332	256
	Multi-Purpose	257	197	230	299	230
	Regional	227	183	189	255	212
2029	Urban	268	209	234	314	248
	Multi-Purpose	241	190	200	283	223
	Regional	212	177	164	240	206
2030	Urban	250	201	229	296	240
	Multi-Purpose	224	183	196	266	216
	Regional	198	170	161	226	199
2031	Urban	198	178	207	244	217
	Multi-Purpose	178	162	177	220	195
	Regional	157	150	146	185	179
2032 and later	Urban	147	155	188	193	194
	Multi-Purpose	132	141	161	174	174
	Regional	116	131	132	144	160

(2) Qualifying small manufacturers of model year 2027 and later vehicles may continue to meet Phase 2 CO<sub>2</sub> standards in this paragraph (b)(2) instead of the standards specified in paragraph (b)(1) of this section. If you certify to these Phase 2 CO<sub>2</sub> standards, you may use the averaging provisions of subpart H of this part to demonstrate compliance. You may use other credit provisions of this part only by certifying all vehicle families within a given averaging set to the Phase 3 standards that apply in that model year.

TABLE 2 OF PARAGRAPH (b)(2) OF § 1037.105—SMALL MANUFACTURER PHASE 2 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2027 AND LATER VOCATIONAL VEHICLES

Engine cycle	Vehicle service class	CO <sub>2</sub> standard by regulatory subcategory (g/ton-mile)		
		Multi-purpose	Regional	Urban
Compression-ignition	Light HDV	330	291	367
Compression-ignition	Medium HDV	235	218	258
Compression-ignition	Heavy HDV	230	189	269
Spark-ignition	Light HDV	372	319	413
Spark-ignition	Medium HDV	268	247	297

(3) Model year 2024 through 2026 vehicles are subject to Phase 2 CO<sub>2</sub> standards corresponding to the selected subcategories as shown in the following table:

TABLE 3 OF PARAGRAPH (b)(3) OF § 1037.105—PHASE 2 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2024 THROUGH 2026 VOCATIONAL VEHICLES

Engine-cycle	Vehicle-service class	CO <sub>2</sub> -standard by regulatory subcategory (g/ton-mile)		
		Multi-purpose	Regional	Urban
Compression-ignition	Light HDV	344	296	385
Compression-ignition	Medium HDV	246	221	271
Compression-ignition	Heavy HDV	242	194	283
Spark-ignition	Light HDV	385	324	432
Spark-ignition	Medium HDV	279	251	310

(4) Model year 2021 through 2023 vehicles are subject to Phase 2 CO<sub>2</sub>-standards corresponding to the selected subcategories as shown in the following table:

TABLE 4 OF PARAGRAPH (b)(4) OF § 1037.105—PHASE 2 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2021 THROUGH 2023 VOCATIONAL VEHICLES

Engine-cycle	Vehicle-service class	CO <sub>2</sub> -standard by regulatory subcategory (g/ton-mile)		
		Multi-purpose	Regional	Urban
Compression-ignition	Light HDV	373	311	424
Compression-ignition	Medium HDV	265	234	296
Compression-ignition	Heavy HDV	261	205	308
Spark-ignition	Light HDV	407	335	461
Spark-ignition	Medium HDV	293	261	328

(5) Model year 2014 through 2020 vehicles are subject to Phase 1 CO<sub>2</sub>-standards as shown in the following table:

TABLE 5 OF PARAGRAPH (b)(5) OF § 1037.105—PHASE 1 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2014 THROUGH 2020 VOCATIONAL VEHICLES (g/ton-mile)

Vehicle-size	CO <sub>2</sub> -standard for model-years 2014-2016	CO <sub>2</sub> -standard for model-year 2017-2020
Light HDV	388	373
Medium HDV	234	225
Heavy HDV	226	222

(c) [Reserved]

(d) You may generate or use emission credits for averaging, banking, and trading to demonstrate compliance with the standards in paragraph (b) of this section as described in subpart H of this part. This requires that you specify a Family Emission Limit (FEL) for CO<sub>2</sub> for each vehicle subfamily. The FEL may not be less than the result of emission modeling from § 1037.520. These FELs serve as the emission standards for the vehicle subfamily instead of the standards specified in paragraph (b) of this section.

~~(e) The exhaust emission standards of this section apply for the full useful life, expressed in service miles or calendar years, whichever comes first. The following useful life values apply for the standards of this section:~~

- ~~(1) 150,000 miles or 15 years, whichever comes first, for Light HDV.~~
- ~~(2) 185,000 miles or 10 years, whichever comes first, for Medium HDV.~~
- ~~(3) 435,000 miles or 10 years, whichever comes first, for Heavy HDV.~~

~~(f) See § 1037.631 for provisions that exempt certain vehicles used in off-road operation from the standards of this section.~~

~~(g) You may optionally certify a vocational vehicle to the standards and useful life applicable to a heavier vehicle service class (such as Medium HDV instead of Light HDV). Provisions related to generating emission credits apply as follows:~~

- ~~(1) If you certify all your vehicles from a given vehicle service class in a given model year to the standards and useful life that applies for a heavier vehicle service class, you may generate credits as appropriate for the heavier service class.~~
- ~~(2) Class 8 hybrid vehicles with Light HDE or Medium HDE may be certified to compression-ignition standards for the Heavy HDV service class. You may generate and use credits as allowed for the Heavy HDV service class.~~
- ~~(3) Except as specified in paragraphs (g)(1) and (2) of this section, you may not generate credits with the vehicle. If you include lighter vehicles in a subfamily of heavier vehicles with an FEL below the standard, exclude the production volume of lighter vehicles from the credit calculation. Conversely, if you include lighter vehicles in a subfamily with an FEL above the standard, you must include the production volume of lighter vehicles in the credit calculation.~~

~~(h) You may optionally certify certain vocational vehicles to alternative standards as specified in this paragraph (h) instead of the standards specified in paragraph (b) of this section. You may apply the provisions in this paragraph (h) to any qualifying vehicles even though these standards were established for custom chassis vehicles. For example, large, diversified vehicle manufacturers may certify vehicles to the refuse hauler standards of this section as long as the manufacturer ensures that those vehicles qualify as refuse haulers when placed into service. GEM simulates vehicle operation for each type of vehicle based on an assigned vehicle service class, independent of the vehicle's actual characteristics, as specified in § 1037.140(g)(7); however, standards apply for the vehicle's useful life based on its actual characteristics as specified in paragraph (e) of this section. Vehicles certified to the standards in this paragraph (h) must include the following statement on the emission control label: "THIS VEHICLE WAS CERTIFIED AS A [*identify vehicle type as identified in this section*] UNDER 40 CFR 1037.105(h)." These custom chassis provisions apply as follows:~~

- ~~(1) The following alternative emission standards apply by vehicle type and model year as follows:~~
  - ~~(i) Except as specified in paragraph (h)(1)(ii) of this section, CO<sub>2</sub> standards apply for model year 2021 and later custom chassis vehicles as shown in the following tables:~~

~~TABLE 6 OF PARAGRAPH (h)(1)(i) OF § 1037.105—CUSTOM CHASSIS STANDARDS SCHOOL BUSES, OTHER BUSES, AND REFUSE HAULERS~~

Phase	Model year	CO <sub>2</sub> standard by custom chassis vehicle type (g/ton-mile)		
		School bus	Other bus	Refuse hauler
2	2021-2026	291	300	313
3	2027	236	286	298
	2028	228	286	283
	2029	220	249	268
	2030	211	243	253
	2031	187	220	250
	2032 and later	163	200	250

~~TABLE 7 OF PARAGRAPH (h)(1)(i) OF § 1037.105—CUSTOM CHASSIS STANDARDS FOR MOTOR HOMES, COACH BUSES, CONCRETE MIXERS, MIXED-USE VEHICLES, AND EMERGENCY VEHICLES~~

Phase	Model year	CO <sub>2</sub> standard by custom chassis vehicle type (g/ton-mile)				
		Motor home	Coach bus	Concrete mixer	Mixed-use vehicle	Emergency vehicle
2	2021-2026	228	210	319	319	324
3	2027 and later	226	205	316	316	319

(ii) For qualifying small manufacturers, Phase 2 CO<sub>2</sub> standards apply for model year 2027 and later custom chassis vehicles instead of the standards specified in paragraph (h)(1)(i) of this section.

~~TABLE 8 OF PARAGRAPH (h)(1)(ii) OF § 1037.105—SMALL MANUFACTURER PHASE 2 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2027 AND LATER CUSTOM CHASSIS VOCATIONAL VEHICLES (g/ton-mile)~~

Vehicle type	CO <sub>2</sub> standard
School bus	271
Motor home	226
Coach bus	205
Other bus	286
Refuse hauler	298
Concrete mixer	316
Mixed-use vehicle	316
Emergency vehicle	319

(iii) Vehicle types identified in this paragraph (h)(1) are generally defined in § 1037.801. “Other bus” includes any bus that is not a school bus or a coach bus. A “mixed-use vehicle” is one that meets at least one of the criteria specified in § 1037.631(a)(1) or (2).

(2) You may generate or use emission credits for averaging to demonstrate compliance with the alternative standards as described in subpart H of this part. This requires that you specify a Family Emission Limit (FEL) for CO<sub>2</sub> for each vehicle subfamily. The FEL may not be less than the result of emission modeling as described in § 1037.520. These FELs serve as the emission standards for the vehicle subfamily instead of the standards specified in this paragraph (h). Calculate credits using the equation in § 1037.705(b) with the standard payload for the assigned vehicle service class and the useful life identified in paragraph (e) of this section. Each separate vehicle type identified in paragraph (h)(1) of this section (or group



of vehicle types identified in a single row) represents a separate averaging set. You may not use averaging for vehicles meeting standards under paragraphs (h)(5) through (7) of this section, and you may not bank or trade emission credits from any vehicles certified under this paragraph (h).

(3) [Reserved]

(4) For purposes of emission modeling under § 1037.520, consider motor homes and coach buses to be subject to the Regional duty cycle, and consider all other vehicles to be subject to the Urban duty cycle.

(5) Emergency vehicles are deemed to comply with the standards of this paragraph (h) if they use tires with TRRL at or below 8.4 N/kN (8.7 N/kN for model years 2021 through 2026).

(6) Concrete mixers and mixed-use vehicles are deemed to comply with the standards of this paragraph (h) if they use tires with TRRL at or below 7.1 N/kN (7.6 N/kN for model years 2021 through 2026).

(7) Motor homes are deemed to comply with the standards of this paragraph (h) if they have tires with TRRL at or below 6.0 N/kN (6.7 N/kN for model years 2021 through 2026) and automatic tire inflation systems or tire pressure monitoring systems with wheels on all axles.

(8) Vehicles certified to standards under this paragraph (h) must use engines certified under 40 CFR part 1036 for the appropriate model year, except that motor homes and emergency vehicles may use engines certified with the loose engine provisions of § 1037.150(m). This paragraph (h)(8) also applies for vehicles meeting standards under paragraphs (h)(5) through (7) of this section.

#### **~~§ 1037.106 CO<sub>2</sub> emission standards for tractors above 26,000 pounds GVWR.~~**

(a) The CO<sub>2</sub> standards of this section apply for tractors above 26,000 pounds GVWR. Note that the standards of this section do not apply for vehicles classified as “vocational tractors” under § 1037.630.

(b) CO<sub>2</sub> standards in this paragraph (b) apply based on modeling and testing as described in subpart F of this part. The provisions of § 1037.241 specify how to comply with the standards in this paragraph (b). Note that § 1037.230 describes how to divide vehicles into subcategories.

(1) Except as specified in paragraph (b)(2) of this section, model year 2027 and later tractors are subject to Phase 3 CO<sub>2</sub> standards corresponding to the selected subcategories as shown in the following table:

**TABLE 1 OF PARAGRAPH (b)(1) OF § 1037.106—PHASE 3 CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2027 AND LATER TRACTORS**

Model year	Roof height	CO <sub>2</sub> standard by regulatory subcategory (g/ton-mile)			
		Class 7 all-cab styles	Class 8 day cab	Class 8 sleeper cab	Heavy-haul
2027	Low Roof	96.2	73.4	64.1	48.3
	Mid Roof	103.4	78.0	69.6	
	High Roof	100.0	75.7	64.3	
2028	Low Roof	88.5	67.5	64.1	48.3
	Mid Roof	95.1	71.8	69.6	
	High Roof	92.0	69.6	64.3	
2029	Low Roof	84.7	64.6	64.1	47.8
	Mid Roof	91.0	68.6	69.6	
	High Roof	88.0	66.6	64.3	
2030	Low Roof	80.8	61.7	60.3	47.8
	Mid Roof	86.9	65.5	65.4	
	High Roof	84.0	63.6	60.4	
2031	Low Roof	69.3	52.8	56.4	46.9
	Mid Roof	74.4	56.2	61.2	
	High Roof	72.0	54.5	56.6	
2032 and Later	Low Roof	57.7	44.0	48.1	45.9
	Mid Roof	62.0	46.8	52.2	
	High Roof	60.0	45.4	48.2	

(2) Qualifying small manufacturers of model year 2027 and later vehicles may continue to meet Phase 2 CO<sub>2</sub> standards in this paragraph (b)(2) instead of the standards specified in paragraph (b)(1) of this section. If you certify to these Phase 2 CO<sub>2</sub> standards, you may use the averaging provisions of subpart H of this part to demonstrate compliance. You may use other credit provisions of this part only by certifying all vehicle families within a given averaging set to the Phase 3 standards that apply in that model year.

TABLE 2 OF PARAGRAPH (b)(2) OF § 1037.106 — ~~SMALL MANUFACTURER CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2027 AND LATER TRACTORS~~

<b>Subcategory</b>	<b>Phase 2 CO<sub>2</sub> standards (g/ton-mile)</b>
<del>Class 7 Low Roof (all cab styles)</del>	<del>96.2</del>
<del>Class 7 Mid Roof (all cab styles)</del>	<del>103.4</del>
<del>Class 7 High Roof (all cab styles)</del>	<del>100.0</del>
<del>Class 8 Low Roof Day Cab</del>	<del>73.4</del>
<del>Class 8 Low Roof Sleeper Cab</del>	<del>64.1</del>
<del>Class 8 Mid Roof Day Cab</del>	<del>78.0</del>
<del>Class 8 Mid Roof Sleeper Cab</del>	<del>69.6</del>
<del>Class 8 High Roof Day Cab</del>	<del>75.7</del>
<del>Class 8 High Roof Sleeper Cab</del>	<del>64.3</del>
<del>Heavy Haul Tractors</del>	<del>48.3</del>

(3) Model year 2026 and earlier tractors are subject to CO<sub>2</sub> standards corresponding to the selected subcategory as shown in the following table:

TABLE 3 OF PARAGRAPH (b)(3) OF § 1037.106 — ~~CO<sub>2</sub> STANDARDS FOR MODEL YEAR 2026 AND EARLIER TRACTORS (g/ton-mile)~~

<b>Subcategory</b>	<b>Phase 1 standards for model years 2014-2016</b>	<b>Phase 1 standards for model years 2017-2020</b>	<b>Phase 2 standards for model years 2021-2023</b>	<b>Phase 2 standards for model years 2024-2026</b>
<del>Class 7 Low Roof (all cab styles)</del>	<del>107</del>	<del>104</del>	<del>105.5</del>	<del>99.8</del>
<del>Class 7 Mid Roof (all cab styles)</del>	<del>119</del>	<del>115</del>	<del>113.2</del>	<del>107.1</del>
<del>Class 7 High Roof (all cab styles)</del>	<del>124</del>	<del>120</del>	<del>113.5</del>	<del>106.6</del>
<del>Class 8 Low Roof Day Cab</del>	<del>81</del>	<del>80</del>	<del>80.5</del>	<del>76.2</del>
<del>Class 8 Low Roof Sleeper Cab</del>	<del>68</del>	<del>66</del>	<del>72.3</del>	<del>68.0</del>
<del>Class 8 Mid Roof Day Cab</del>	<del>88</del>	<del>86</del>	<del>85.4</del>	<del>80.9</del>
<del>Class 8 Mid Roof Sleeper Cab</del>	<del>76</del>	<del>73</del>	<del>78.0</del>	<del>73.5</del>
<del>Class 8 High Roof Day Cab</del>	<del>92</del>	<del>89</del>	<del>85.6</del>	<del>80.4</del>
<del>Class 8 High Roof Sleeper Cab</del>	<del>75</del>	<del>72</del>	<del>75.7</del>	<del>70.7</del>
<del>Heavy Haul Tractors</del>	<del>—</del>	<del>—</del>	<del>52.4</del>	<del>50.2</del>

(e) [Reserved]

~~(d) You may generate or use emission credits for averaging, banking, and trading as described in subpart H of this part. This requires that you calculate a credit quantity if you specify a Family Emission Limit (FEL) that is different than the standard specified in this section for a given pollutant. The FEL may not be less than the result of emission modeling from § 1037.520. These FELs serve as the emission standards for the specific vehicle subfamily instead of the standards specified in paragraph (a) of this section.~~

~~(e) The exhaust emission standards of this section apply for the full useful life, expressed in service miles or calendar years, whichever comes first. The following useful life values apply for the standards of this section:~~

~~(1) 185,000 miles or 10 years, whichever comes first, for vehicles at or below 33,000 pounds GVWR.~~

~~(2) 435,000 miles or 10 years, whichever comes first, for vehicles above 33,000 pounds GVWR.~~

~~(f) You may optionally certify Class 7 tractors to Class 8 standards as follows:~~

~~(1) You may optionally certify 4×2 tractors with Heavy HDE to the standards and useful life for Class 8 tractors, with no restriction on generating or using emission credits within the Class 8 averaging set.~~

~~(2) You may optionally certify Class 7 tractors not covered by paragraph (f)(1) of this section to the standards and useful life for Class 8 tractors. This paragraph (f)(2) applies equally for hybrid vehicles, battery electric vehicles, and fuel cell electric vehicles. Credit provisions apply as follows:~~

~~(i) If you certify all your Class 7 tractors to Class 8 standards, you may use these Heavy HDV credits without restriction.~~

~~(ii) This paragraph (f)(2)(ii) applies if you certify some Class 7 tractors to Class 8 standards under this paragraph (f)(2) but not all of them. If you include Class 7 tractors in a subfamily of Class 8 tractors with an FEL below the standard, exclude the production volume of Class 7 tractors from the credit calculation. Conversely, if you include Class 7 tractors in a subfamily of Class 8 tractors with an FEL above the standard, you must include the production volume of Class 7 tractors in the credit calculation.~~

~~(g) Diesel auxiliary power units installed on tractors subject to standards under this section must meet PM standards as follows:~~

~~(1) For model years 2021 through 2023, the APU engine must be certified under 40 CFR part 1039 with a deteriorated emission level for PM at or below 0.15 g/kW-hr.~~

~~(2) Starting in model year 2024, auxiliary power units installed on tractors subject to standards under this section must be certified to the PM emission standard specified in 40 CFR 1039.699. Selling, offering for sale, or introducing or delivering into commerce in the United States or importing into the United States a new tractor subject to this standard is a violation of 40 CFR 1068.101(a)(1) unless the auxiliary power unit has a valid certificate of conformity and the required label showing that it meets the PM standard of this paragraph (g)(2).~~

~~(3) See § 1037.660(e) for requirements that apply for diesel APUs in model year 2020 and earlier tractors.~~

## § 1037.115 [Amended]

125. Amend § 1037.115 by removing paragraphs (e) and (f).

## § 1037.115 Other requirements.

\* \* \* \* \*

~~(e) *Air conditioning leakage.* Loss of refrigerant from your air conditioning systems may not exceed a total leakage rate of 11.0 grams per year or a percent leakage rate of 1.50 percent per year, whichever is greater. Calculate the total leakage rate in g/year as specified in 40 CFR 86.1867-12(a). Calculate the percent leakage rate as: [total leakage rate (g/yr)] ÷ [total refrigerant capacity (g)] × 100. Round your percent leakage rate to the nearest one hundredth of a percent. This paragraph (e) applies for all refrigerants.~~

~~(1) This paragraph (e) is intended to address air conditioning systems for which the primary purpose is to cool the driver compartment. This would generally include all cab complete pickups and vans. Similarly, it does not apply for self-contained air conditioning used to cool passengers or refrigeration units used to cool cargo on vocational vehicles. For purposes of this paragraph (e), a self-contained system is an enclosed unit with its own evaporator and condenser even if it draws power from the engine.~~

~~(2) For purposes of this paragraph (e), “refrigerant capacity” is the total mass of refrigerant recommended by the vehicle manufacturer as representing a full charge. Where full charge is specified as a pressure, use good engineering judgment to convert the pressure and system volume to a mass.~~

~~(3) If air conditioning systems are designed such that a compliance demonstration under 40 CFR 86.1867-12(a) is impossible or impractical, you may ask to use alternative means to demonstrate that your air conditioning system achieves an equivalent level of control.~~

~~(f) *Battery durability monitor.* Model year 2030 and later battery electric vehicles and plug-in hybrid electric vehicles must meet the following requirements to estimate and monitor usable battery energy for batteries serving as Rechargeable Energy Storage Systems:~~

~~(1) Create a customer-accessible system that monitors and displays the vehicle’s State of Certified Energy (*SOCE*) with an accuracy of ±5 %. Display the *SOCE* from paragraph (f)(2) of this section as a percentage expressed to the nearest whole number. Update the display as needed to reflect the current value of *SOCE*.~~

~~(2) Determine *SOCE* using the following equation:~~

$$SOCE = \frac{UBE_{aged}}{UBE_{certified}} = \frac{\left( \int_0^{end} V(t)I(t)dt \right)_{aged}}{\left( \int_0^{end} V(t)I(t)dt \right)_{certified}}$$

Eq. 1037.115-1

Where:

*UBE* = usable battery energy as determined in paragraph (f)(3) or (4) of this section, where certified refers to the value established for certification and aged refers to the current value as the battery ages.

*V* = battery voltage.

*t* = the time for the test, running from time zero to the end point when the battery is not able to maintain the target power.

*I* = battery current.

~~(3) For battery electric vehicles, ask us to approve a procedure you develop to determine UBE that meets the following requirements:~~

~~(i) Measure UBE by discharging the battery at a constant power that is representative of the vehicle cruising on the highway. For many HDV, the power to cruise on the highway would result in a C-rate between 1/6 C and 1/2 C. Where C-rate is a measure of the rate at which a battery is discharged or charged relative to its maximum capacity and has units of inverse hours. For example, at a 2 C discharge rate, it would take 0.5 hours to fully discharge a battery. For test procedures that involve driving a vehicle, you may discharge the battery at variable rates until the last portion of the test, consistent with good engineering judgment.~~

~~(ii) The test is complete when the battery is not able to maintain the target power.~~

~~(iii) Use the same procedure for measuring certified and aged UBE.~~

~~(iv) Measurements to determine power must meet the requirements in 40 CFR 1036.545(a)(10).~~

~~(4) For plug-hybrid electric vehicles, determine UBE as described in 40 CFR 1036.545(p) or you may use a procedure that meets the requirements of paragraph (f)(3) of this section.~~

126. Revise and republish § 1037.120 to read as follows:

### **§ 1037.120 Emission-related warranty requirements.**

(a) *General requirements.* You must warrant to the ultimate purchaser and each subsequent purchaser that ~~the each~~ new vehicle, including all parts of its emission control system, meets two conditions:

(1) It is designed, built, and equipped so it conforms at the time of sale to the ultimate purchaser with the requirements of this part.

(2) It is free from defects in materials and workmanship that cause the vehicle to fail to conform to the requirements of this part during the applicable warranty period.

(b) *Warranty period.* (1) Your emission-related warranty must be valid for at least:

(i) 5 years or 50,000 miles for Light HDV ~~(except tires).~~

(ii) 5 years or 100,000 miles for heavy-duty vehicles above 19,500 pounds GVWR ~~(except tires).~~

~~(iii) 2 years or 24,000 miles for tires.~~

(2) You may offer an emission-related warranty more generous than we require. The emission-related warranty for the vehicle may not be shorter than any basic mechanical warranty you provide to that owner without charge for the vehicle. Similarly, the emission-related warranty for any component may not be shorter than any warranty you provide to that owner without charge for that component. This means that your warranty for a given vehicle may not treat emission-related and nonemission-related defects differently for any component. The warranty period begins when the vehicle is placed into service.

(c) *Components covered.* ~~The emission-related warranty covers tires, automatic tire inflation systems, tire pressure monitoring systems, vehicle speed limiters, idle reduction systems, devices added to the vehicle to improve aerodynamic performance (not including standard components such as hoods or mirrors even if they have been optimized for aerodynamics) to the extent such emission-related components are included in your application for certification.~~ The emission-related warranty ~~similarly~~ covers fuel cell stacks, RESS, and other components used with ~~hybrid systems, battery electric vehicles, and fuel cell electric vehicles.~~ ~~The emission-related warranty also covers other added emission-related components to the extent they are included in your~~



~~application for certification, and any other components whose failure would increase a vehicle's CO<sub>2</sub> emissions. The emission-related warranty covers all components whose failure would increase a vehicle's emissions of air conditioning refrigerants (for vehicles subject to air conditioning leakage standards), and it covers all components whose failure would increase a vehicle's evaporative and refueling emissions (for vehicles subject to evaporative and refueling emission standards). The emission-related warranty covers components that are part of your certified configuration even if another company produces the component.~~

~~(d) *Limited applicability.* You may deny warranty claims under this section if the operator caused the problem through improper maintenance or use, as described in 40 CFR 1068.115. For example, it may be appropriate to require the seals on automatic tire inflation systems to be replaced during the warranty period.~~

~~(e) *Owners manual.* Describe in the owners manual the emission-related warranty provisions from this section that apply to the vehicle.~~

127. Revise § 1037.125 to read as follows:

**§ 1037.125 Maintenance instructions and allowable maintenance.**

Give the ultimate purchaser of each new vehicle written instructions for properly maintaining and using ~~the vehicle, including~~ the emission control system. ~~The maintenance instructions also apply to service accumulation on any of your emission data vehicles. See paragraph (i) of this section for requirements related to tire replacement.~~

~~(a) *Critical emission related maintenance.* Critical emission related maintenance includes any adjustment, cleaning, repair, or replacement of critical emission related components. Critical emission related maintenance may also include additional emission related maintenance that you determine is critical if we approve it in advance. You may schedule critical emission related maintenance on these components if you demonstrate that the maintenance is reasonably likely to be done at the recommended intervals on in-use vehicles. We will accept scheduled maintenance as reasonably likely to occur if you satisfy any of the following conditions:~~

~~(1) You present data showing that, if a lack of maintenance increases emissions, it also unacceptably degrades the vehicle's performance.~~

~~(2) You present survey data showing that at least 80 percent of vehicles in the field get the maintenance you specify at the recommended intervals.~~

~~(3) You provide the maintenance free of charge and clearly say so in your maintenance instructions.~~

~~(4) You otherwise show us that the maintenance is reasonably likely to be done at the recommended intervals.~~

~~(b) *Recommended additional maintenance.* You may recommend any additional amount of maintenance on the components listed in paragraph (a) of this section, as long as you state clearly that these maintenance steps are not necessary to keep the emission related warranty valid. If operators do the maintenance specified in paragraph (a) of this section, but not the recommended additional maintenance, this does not allow you to disqualify those vehicles from in-use testing or deny a warranty claim. Do not take these maintenance steps during service accumulation on your emission data vehicles.~~

~~(c) *Special maintenance.* You may specify more frequent maintenance to address problems related to special situations, such as atypical vehicle operation. You must clearly state that this additional maintenance is associated with the special situation you are addressing. We may disapprove your maintenance instructions if we determine that you have specified special~~

~~maintenance steps to address vehicle operation that is not atypical, or that the maintenance is unlikely to occur in use. If we determine that certain maintenance items do not qualify as special maintenance under this paragraph (c), you may identify this as recommended additional maintenance under paragraph (b) of this section.~~

~~(d) *Noncritical emission-related maintenance.* Subject to the provisions of this paragraph (d), you may schedule any amount of emission-related inspection or maintenance that is not covered by paragraph (a) of this section (that is, maintenance that is neither explicitly identified as critical emission-related maintenance, nor that we approve as critical emission-related maintenance). Noncritical emission-related maintenance generally includes maintenance on the components we specify in 40 CFR part 1068, appendix A, that is not covered in paragraph (a) of this section. You must state in the owners manual that these steps are not necessary to keep the emission-related warranty valid. If operators fail to do this maintenance, this does not allow you to disqualify those vehicles from in-use testing or deny a warranty claim. Do not take these inspection or maintenance steps during service accumulation on your emission data vehicles.~~

~~(e) *Maintenance that is not emission-related.* For maintenance unrelated to emission controls, you may schedule any amount of inspection or maintenance. You may also take these inspection or maintenance steps during service accumulation on your emission data vehicles, as long as they are reasonable and technologically necessary. You may perform this nonemission-related maintenance on emission data vehicles at the least frequent intervals that you recommend to the ultimate purchaser (but not the intervals recommended for severe service).~~

~~(f) *Source of parts and repairs.* State clearly in your written maintenance instructions that a repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. Your instructions may not require components or service identified by brand, trade, or corporate name. Also, do not directly or indirectly condition your warranty on a requirement that the vehicle be serviced by your franchised dealers or any other service establishments with which you have a commercial relationship. You may disregard the requirements in this paragraph (f) if you do one of two things:~~

~~(1) Provide a component or service without charge under the purchase agreement.~~

~~(2) Get us to waive this prohibition in the public's interest by convincing us the vehicle will work properly only with the identified component or service.~~

~~(g) [Reserved]~~

~~(h) *Owners manual.* Explain the owner's responsibility for proper maintenance in the owners manual.~~

~~(i) *Tire maintenance and replacement.* Include instructions that will enable the owner to replace tires so that the vehicle conforms to the original certified vehicle configuration.~~

128. Amend § 1037.135 by removing and reserving paragraphs (c)(6) and (7).

### § 1037.135 Labeling.

\* \* \* \* \*

(c) \* \* \*

(6) [Reserved] For Phase 1 vehicles, identify the emission control system. Use terms and abbreviations as described in appendix C to this part or other applicable conventions.

(7) [Reserved] Identify any requirements for fuel and lubricants that do not involve fuel sulfur levels.

\* \* \* \* \*

129. Amend § 1037.140 by revising paragraphs (g) introductory text and (g)(6) and (7) to read as follows:

**§ 1037.140 Classifying vehicles and determining vehicle parameters.**

\* \* \* \* \*

(g) The ~~standards and other~~ provisions of this part relating to NHTSA's fuel efficiency program under 49 CFR part 535 apply to specific vehicle service classes as follows:

\* \* \* \* \*

(6) In certain circumstances, you may certify vehicles to standards that apply for a different vehicle service class. ~~For example, see §§ 1037.105(g) and 1037.106(f).~~ If you optionally certify vehicles to different standards, those vehicles are subject to all the regulatory requirements as if the standards were mandatory.

(7) ~~Vehicles meeting the custom chassis standards of § 1037.105(h)(1)~~ Custom chassis vehicles are subject to the following vehicle service classes instead of the other provisions in this section:

(i) School buses and motor homes are considered "Medium HDV".

(ii) All other custom-chassis are considered "Heavy HDV".

\* \* \* \* \*

130. Revise and republish § 1037.150 to read as follows:

**§ 1037.150 Interim provisions.**

The provisions in this section apply instead of other provisions in this part.

(a) *Incentives for early introduction.* The provisions of this paragraph (a) apply with respect to vehicles produced in model years before 2014. Manufacturers may voluntarily certify in model year 2013 (or earlier model years for electric vehicles) to the ~~greenhouse gas standards of this part~~ fuel consumption standards of 49 CFR part 535.

(1) This paragraph (a)(1) applies for regulatory subcategories subject to the standards of 49 CFR part 535 ~~§ 1037.105 or § 1037.106~~. Except as specified in paragraph (a)(3) of this section, to generate early credits under this paragraph (a)(1) for any vehicles other than electric vehicles, you must certify your entire U.S.-directed production volume within the regulatory subcategory to the standards of 49 CFR part 535 ~~§ 1037.105 or § 1037.106~~. Except as specified in paragraph (a)(4) of this section, if some vehicle families within a regulatory subcategory are certified after the start of the model year, you may generate credits only for production that occurs after all families are certified. For example, if you produce three vehicle families in an averaging set and you receive your certificates for those families on January 4, 2013, March 15, 2013, and April 24, 2013, you may not generate credits for model year 2013 production in any of the families that occurs before April 24, 2013. Calculate credits relative to the standard that would apply in model year 2014 using the equations in subpart H of this part. You may bank credits equal to the surplus credits you generate under this paragraph (a) multiplied by 1.50. For example, if you have 1.0 Mg of surplus credits for model year 2013, you may bank 1.5 Mg of credits. Credit deficits for an averaging set prior to model year 2014 do not carry over to model year 2014. These credits may be used to show compliance with the standards of this part for 2014 and later model years. We recommend that you notify EPA-us of your intent to use this paragraph (a)(1) before submitting your applications.

(2) [Reserved]

- (3) You may generate ~~emission~~ credits for the number of additional SmartWay designated tractors (relative to your 2012 production), provided you do not generate credits for those vehicles under paragraph (a)(1) of this section. Calculate credits for each regulatory subcategory relative to the standard that would apply in model year 2014 using the equations in subpart H of this part. Use a production volume equal to the number of designated model year 2013 SmartWay tractors minus the number of designated model year 2012 SmartWay tractors. You may bank credits equal to the surplus credits you generate under this paragraph (a)(3) multiplied by 1.50. Your 2012 and 2013 model years must be equivalent in length.
- (4) This paragraph (a)(4) applies where you do not receive your final certificate in a regulatory subcategory within 30 days of submitting your final application for that subcategory. Calculate your credits for all production that occurs 30 days or more after you submit your final application for the subcategory.
- (b) *Phase 1 coastdown procedures.* For tractors subject to Phase 1 standards ~~under § 1037.106~~, the default method for measuring drag area ( $C_dA$ ) is the coastdown procedure specified in 40 CFR part 1066, subpart D. This includes preparing the tractor and the standard trailer with wheels meeting specifications of § 1037.528(b) and submitting information related to your coastdown testing under § 1037.528(h).
- (c) *Small manufacturers.* The following provisions apply for qualifying small manufacturers:
- (1) The ~~greenhouse gas standards of §§ 1037.105 and 1037.106~~ fuel consumption standards under 49 CFR part 535 are optional for small manufacturers producing vehicles with a date of manufacture before January 1, 2022. In addition, small manufacturers producing vehicles that run on any fuel other than gasoline, E85, or diesel fuel may delay complying with every later standard under this part by one model year.
  - (2) Qualifying manufacturers must notify the Designated Compliance Officer each model year before introducing excluded vehicles into U.S. commerce. This notification must include a description of the manufacturer's qualification as a small business under 13 CFR 121.201. ~~Manufacturers must label excluded vehicles with the following statement: "THIS VEHICLE IS EXCLUDED UNDER 40 CFR 1037.150(c)."~~
  - (3) Small manufacturers may meet Phase 1 standards instead of Phase 2 standards in the first year Phase 2 standards apply to them if they voluntarily comply with the Phase 1 standards for the full preceding year. Specifically, small manufacturers may certify their model year 2022 vehicles to the Phase 1 ~~greenhouse gas standards of §§ 1037.105 and 1037.106~~ fuel consumption standards under 49 CFR part 535 if they certify all the vehicles from their annual production volume included in emission credit calculations for the Phase 1 standards starting on or before January 1, 2021.
  - (4) See paragraphs (r), (t), (u), and (w) of this section for additional allowances for small manufacturers.
- (d) ~~through (f) [Reserved]. Air conditioning leakage for vocational vehicles. The air conditioning leakage standard of § 1037.115 does not apply for model year 2020 and earlier vocational vehicles.~~
- (e) ~~Delegated assembly. The delegated assembly provisions of § 1037.621 do not apply before January 1, 2018.~~
- (f) ~~Testing exemption for qualifying vehicles. Tailpipe CO<sub>2</sub> emissions from battery electric vehicles, fuel cell electric vehicles, and vehicles with engines fueled with neat hydrogen are deemed to be zero. No CO<sub>2</sub>-related testing is required under this part for these vehicles.~~
- (g) *Compliance date.* Compliance with the standards of this part was optional prior to January 1, 2014. This means that if your 2014 model year begins before January 1, 2014, you may certify

for a partial model year that begins on January 1, 2014, and ends on the day your model year would normally end. ~~You must label model year 2014 vehicles excluded under this paragraph (g) with the following statement: "THIS VEHICLE IS EXCLUDED UNDER 40 CFR 1037.150(g)."~~

(h) *Off-road vehicle exemption.* (1) Vocational vehicles with a date of manufacture before January 1, 2021, automatically qualify for an exemption under § 1037.631 if the tires installed on the vehicle have a maximum speed rating at or below 55 miles per hour. (2) In unusual circumstances, vehicle manufacturers may ask us to exempt vehicles under § 1037.631 based on other criteria that are equivalent to those specified in § 1037.631(a); however, we will normally not grant relief in cases where the vehicle manufacturer has credits or can otherwise comply with applicable standards. Request approval for an exemption under this paragraph (h) before you produce the subject vehicles. ~~Send your request with supporting information to the Designated Compliance Officer; we will coordinate with NHTSA in making a determination under § 1037.210. If you introduce into U.S. commerce vehicles that depend on our approval under this paragraph (h) before we inform you of our approval, those vehicles violate 40 CFR 1068.101(a)(1).~~

(i) *Limited carryover from Phase 1 to Phase 2.* The provisions for carryover data in § 1037.235(d) do not allow you to use aerodynamic test results from Phase 1 to support a compliance demonstration for Phase 2 certification.

(j) *Limited prohibition related to early model year engines.* The provisions of this paragraph (j) apply only for vehicles that have a date of manufacture before January 1, 2018. See § 1037.635 for related provisions that apply in later model years. The prohibition in § 1037.601 against introducing into U.S. commerce a vehicle containing an engine not certified to the standards applicable for the calendar year of installation does not apply for vehicles using model year 2014 or 2015 spark-ignition engines, or any model year 2013 or earlier engines.

(k) *Verifying drag areas from in-use tractors.* This paragraph (k) applies for tractors instead of § 1037.401(b) through model year 2020. We may measure the drag area of your vehicles after they have been placed into service. To account for measurement variability, your vehicle is deemed to conform to the regulations of this part with respect to aerodynamic performance if we measure its drag area to be at or below the maximum drag area allowed for the bin above the bin to which you certified (for example, Bin II if you certified the vehicle to Bin III), unless we determine that you knowingly produced the vehicle to have a higher drag area than is allowed for the bin to which it was certified.

(l) ~~[Reserved] Optional certification to GHG standards under 40 CFR part 86. The greenhouse gas standards in 40 CFR part 86, subpart S, may apply instead of the standards of § 1037.105 as follows:~~

~~(1) Complete or cab-complete vehicles may optionally meet alternative standards as described in 40 CFR 86.1819-14(j).~~

~~(2) Complete high-GCWR vehicles must meet the greenhouse gas standards of 40 CFR part 86, subpart S, as described in 40 CFR 1036.635.~~

~~(3) Incomplete high-GCWR vehicles may meet the greenhouse gas standards of 40 CFR part 86, subpart S, as described in 40 CFR 1036.635.~~

(m) *Loose engine sales.* Manufacturers may certify certain spark-ignition engines along with chassis-certified heavy-duty vehicles where they are identical to engines used in those vehicles as described in 40 CFR 86.1819-14(k)(8). Vehicles in which those engines are installed are subject to standards under 49 CFR part 535 ~~this part as specified in § 1037.105.~~



(n) *Transition to engine-based model years.* The following provisions apply for production and ABT reports during the transition to engine-based model year determinations for vehicles in 2020 and 2021:

(1) If you install model year 2020 or earlier engines in your vehicles in calendar year 2020, include all those Phase 1 vehicles in your production and ABT reports related to model year 2020 compliance, although we may require you identify these separately from vehicles produced in calendar year 2019.

(2) If you install model year 2020 engines in your vehicles in calendar year 2021, submit production and ABT reports for those Phase 1 vehicles separate from the reports you submit for Phase 2 vehicles with model year 2021 engines.

~~(o) through (p) [Reserved] *Interim useful life for light heavy-duty vocational vehicles.* Class 2b through Class 5 vocational vehicles certified to Phase 1 standards are subject to a useful life of 110,000 miles or 10 years, whichever comes first, instead of the useful life specified in § 1037.105. For emission credits generated from these Phase 1 vehicles, multiply any banked credits that you carry forward to demonstrate compliance with Phase 2 standards by 1.36.~~

~~(p) *Credit multiplier for advanced technology.* The following provisions describe how you may generate and use credits from vehicles certified with advanced technology:~~

~~(1) You may calculate credits you generate from vehicles certified with advanced technology as follows:~~

~~(i) For Phase 1 vehicles, multiply the credits by 1.50, except that you may not apply this multiplier in addition to the early credit multiplier of paragraph (a) of this section.~~

~~(ii) For model year 2026 and earlier Phase 2 vehicles, apply multipliers of 3.5 for plug-in hybrid electric vehicles, 4.5 for battery electric vehicles, and 5.5 for fuel cell electric vehicles. Calculate credits relative to the Phase 2 standard.~~

~~(iii) For Phase 3 vehicles, the advanced technology multipliers described in paragraph (p)(1)(ii) of this section apply only in model year 2027. Calculate credits relative to the Phase 3 standard.~~

~~(2) You may use credit quantities described in paragraphs (p)(1)(i) and (ii) of this section through model year 2026. The following provisions apply for advanced technology credits starting in model year 2027:~~

~~(i) Quantify accumulated credit balances in each model year that result from multiplier credit values. For example, if BEV earns 100 Mg of CO<sub>2</sub> credits that become 450 Mg of credits when multiplied, the base credit value is 100 Mg and the multiplier credit value is 350 Mg. Provide a detailed accounting of base and multiplier credits in your annual ABT reports for the relevant model years.~~

~~(ii) For each vehicle family, calculate a credit quantity with no consideration of credit multipliers. Sum these credit quantities for every family within a given averaging set.~~

~~(iii) Apply available credits in the following priority order as long as the summed credit quantity is negative.~~

~~(A) Base credits banked or traded within the same averaging set.~~

~~(B) Base credits earned in the same model year from other averaging sets as specified in paragraph (z) of this section.~~

~~(C) Base credits from other averaging sets as specified in paragraph (z) of this section that are banked or traded.~~

~~(D) Multiplier credits within the same averaging set for the same model year.~~

~~(E) Multiplier credits banked or traded within the same averaging set.~~

~~(F) Multiplier credits earned in the same model year from other averaging sets as specified in paragraph (z) of this section.~~



~~(G) Multiplier credits from other averaging sets as specified in paragraph (z) of this section that are banked or traded.~~

~~(iv) You may no longer use multiplier credits for certifying model year 2030 and later vehicles.~~

~~(v) Credit provisions not addressed in this paragraph (p)(2), such as limitations on credit life and credit trading, continue to apply as specified. Note the following:~~

~~(A) Unlike multiplier credits, the life of base credits is not limited under this paragraph (p)(2).~~

~~(B) You may apply multiplier credits without the restrictions described in this paragraph (p)(2) to resolve a deficit that remains from complying with Phase 2 standards in model years 2026 and earlier.~~

(q) *Vehicle families for advanced and off-cycle technologies.* Apply the following provisions for grouping vehicles into families if you use off-cycle technologies under § 1037.610 or advanced technologies under § 1037.615:

(1) For Phase 1 vehicles, create separate vehicle families for vehicles that contain advanced or off-cycle technologies; group those vehicles together in a vehicle family if they use the same advanced or off-cycle technologies.

(2) For Phase 2 ~~and Phase 3~~ vehicles, create separate vehicle subfamilies for vehicles that contain advanced or off-cycle technologies; group those vehicles together in a vehicle subfamily if they use the same advanced or off-cycle technologies.

(r) *Conversion to mid- roof and high-roof configurations.* Secondary vehicle manufacturers that qualify as small manufacturers may convert low- and mid-roof tractors to mid- and high-roof configurations without recertification for the purpose of building a custom sleeper tractor or converting it to run on natural gas, as follows:

(1) The original low- or mid-roof tractor must be covered by a valid certificate of conformity.

(2) The modifications may not increase the frontal area of the tractor beyond the frontal area of the equivalent mid- or high-roof tractor with the corresponding standard trailer. Note that these dimensions have a tolerance of  $\pm 2$  inches. Use good engineering judgment to achieve aerodynamic performance similar to or better than the certifying manufacturer's corresponding mid- or high-roof tractor.

(3) ~~[Reserved] Add a permanent supplemental label to the vehicle near the original manufacturer's emission control information label. On the label identify your full corporate name and include the following statement: "THIS VEHICLE WAS MODIFIED AS ALLOWED UNDER 40 CFR 1037.150."~~

(4) We may require that you submit annual production reports as described in § 1037.250.

(5) Modifications made under this paragraph (r) do not violate 40 CFR 1068.101(b)(1).

(s) *Confirmatory testing for  $F_{alt-aero}$ .* If we conduct coastdown testing to verify your  $F_{alt-aero}$  value for Phase 2 and later tractors, we will make our determination using the principles of SEA testing in § 1037.305. We will not replace your  $F_{alt-aero}$  value if the tractor passes. If your tractor fails, we will generate a replacement value of  $F_{alt-aero}$  based on at least one  $C_dA$  value and corresponding effective yaw angle,  $\psi_{eff}$ , from a minimum of 100 valid runs using the procedures of § 1037.528(h). Note that we intend to minimize the differences between our test conditions and those of the manufacturer by testing at similar times of the year where possible and the same location where possible and when appropriate.

(t) *Glider kits and glider vehicles.* (1) Glider vehicles conforming to the requirements in this paragraph (t)(1) are exempt from the Phase 1 emission standards of this part 1037 prior to January 1, 2021. Engines in such vehicles (including vehicles produced after January 1, 2021) remain subject to the requirements of 40 CFR part 86 applicable for the engines'

original model year, but not subject to the Phase 1 or Phase 2 standards of 40 CFR part 1036 unless they were originally manufactured in model year 2014 or later.

- (i) You are eligible for the exemption in this paragraph (t)(1) if you are a small manufacturer and you sold one or more glider vehicles in 2014 under the provisions of paragraph (c) of this section. You do not qualify if you only produced glider vehicles for your own use. You must notify us of your plans to use this exemption before you introduce exempt vehicles into U.S. commerce. In your notification, you must identify your annual U.S.-directed production volume (and sales, if different) of such vehicles for calendar years 2010 through 2014. Vehicles you produce before notifying us are not exempt under this section.
  - (ii) In a given calendar year, you may produce up to 300 exempt vehicles under this section, or up to the highest annual production volume you identify in this paragraph (t)(1), whichever is less.
  - (iii) Identify the number of exempt vehicles you produced under this exemption for the preceding calendar year in your annual report under § 1037.250.
  - (iv) Include the appropriate statement on the label required under § 1037.135, as follows:
    - (A) For Phase 1 vehicles, “THIS VEHICLE AND ITS ENGINE ARE EXEMPT UNDER 40 CFR 1037.150(t)(1).”
    - (B) For Phase 2 vehicles, “THE ENGINE IN THIS VEHICLE IS EXEMPT UNDER 40 CFR 1037.150(t)(1).”
  - (v) If you produce your glider vehicle by installing remanufactured or previously used components in a glider kit produced by another manufacturer, you must provide the following to the glider kit manufacturer prior to obtaining the glider kit:
    - (A) Your name, the name of your company, and contact information.
    - (B) A signed statement that you are a qualifying small manufacturer and that your production will not exceed the production limits of this paragraph (t)(1). This statement is deemed to be a submission to EPA, and we may require the glider kit manufacturer to provide a copy to us at any time.
  - (vi) The exemption in this paragraph (t)(1) is valid for a given vehicle and engine only if you meet all the requirements and conditions of this paragraph (t)(1) that apply with respect to that vehicle and engine. Introducing such a vehicle into U.S. commerce without meeting all applicable requirements and conditions violates 40 CFR 1068.101(a)(1).
  - (vii) Companies that are not small manufacturers may sell uncertified incomplete vehicles without engines to small manufacturers for the purpose of producing exempt vehicles under this paragraph (t)(1), subject to the provisions of § 1037.622. However, such companies must take reasonable steps to ensure that their incomplete vehicles will be used in conformance with the requirements of this part.
- (2) Glider vehicles produced using engines certified to model year 2010 or later standards for all pollutants are subject to the same provisions that apply to vehicles using engines within their useful life in § 1037.635.
- (3) For calendar year 2017, you may produce a limited number of glider kits and/or glider vehicles subject to the requirements applicable to model year 2016 glider vehicles, instead of the requirements of § 1037.635. The limit applies to your combined 2017 production of glider kits and glider vehicles and is equal to your highest annual production of glider kits and glider vehicles for any year from 2010 to 2014. Any glider kits or glider vehicles produced beyond this cap are subject to the provisions of § 1037.635. Count any glider kits

and glider vehicles you produce under paragraph (t)(1) of this section as part of your production with respect to this paragraph (t)(3).

(u) *Transition to Phase 2 standards.* The following provisions allow for enhanced generation and use of emission credits from Phase 1 vehicles for meeting the Phase 2 standards:

(1) For vocational Light HDV and vocational Medium HDV, ~~emission~~ credits you generate in model years 2018 through 2021 may be used through model year 2027, instead of being limited to a five-year credit life as specified in § 1037.740(c). For Class 8 vocational vehicles with Medium HDE, we will approve your request to generate these credits in and use these credits for the Medium HDV averaging set if you show that these vehicles would qualify as Medium HDV under the Phase 2 program as described in § 1037.140(g)(4).

(2) You may use the off-cycle provisions of § 1037.610 to apply technologies to Phase 1 vehicles as follows:

(i) You may apply an improvement factor of 0.988 for vehicles with automatic tire inflation systems on all axles.

(ii) For vocational vehicles with automatic engine shutdown systems that conform with § 1037.660, you may apply an improvement factor of 0.95.

(iii) For vocational vehicles with stop-start systems that conform with § 1037.660, you may apply an improvement factor of 0.92.

(iv) For vocational vehicles with neutral-idle systems conforming with § 1037.660, you may apply an improvement factor of 0.98. You may adjust this improvement factor if we approve a partial reduction under § 1037.660(a)(2); for example, if your design reduces fuel consumption by half as much as shifting to neutral, you may apply an improvement factor of 0.99.

(3) Small manufacturers may generate ~~emission~~ credits for natural gas-fueled vocational vehicles as follows:

(i) Small manufacturers may certify their vehicles instead of relying on the exemption of paragraph (c) of this section. The provisions of this part apply for such vehicles, except as specified in this paragraph (u)(3).

(ii) Use GEM version 2.0.1 to determine a ~~CO<sub>2</sub>-emission~~fuel consumption level for your vehicle, then multiply this value by the engine's Family Certification Level for CO<sub>2</sub> and divide by the engine's applicable ~~CO<sub>2</sub>-emission~~fuel consumption standard.

(4) Phase 1 vocational vehicle credits that small manufacturers generate may be used through model year 2027.

~~(v) [Reserved] Constraints for vocational regulatory subcategories. The following provisions apply to determinations of vocational regulatory subcategories as described in § 1037.140:~~

~~(1) Select the Regional regulatory subcategory for coach buses and motor homes you certify under § 1037.105(b).~~

~~(2) You may not select the Urban regulatory subcategory for any vehicle with a manual or single-clutch automated manual transmission.~~

~~(3) Starting in model year 2024, you must select the Regional regulatory subcategory for any vehicle with a manual transmission.~~

~~(4) You may select the Multi-purpose regulatory subcategory for any vocational vehicle, except as specified in paragraph (v)(1) of this section.~~

~~(5) You may select the Urban regulatory subcategory for a hybrid vehicle equipped with regenerative braking, unless it is equipped with a manual transmission.~~

~~(6) You may select the Urban regulatory subcategory for any vehicle with a hydrokinetic torque converter paired with an automatic transmission, or a continuously variable automatic~~

~~transmission, or a dual-clutch transmission with no more than two consecutive forward gears between which it is normal for both clutches to be momentarily disengaged.~~

(w) *Custom-chassis standards for small manufacturers.* The following provisions apply uniquely to qualifying small manufacturers under the custom-chassis standards of § 1037.105(h):

(1) You may use emission credits generated under § 1037.105(d), including banked or traded credits from any averaging set. Such credits remain subject to other limitations that apply under subpart H of this part.

(2) You may produce up to 200 drayage tractors in a given model year to the standards described in § 1037.105(h) for “other buses”. The limit in this paragraph (w)(2) applies with respect to vehicles produced by you and your affiliated companies. Treat these drayage tractors as being in their own averaging set.

(x) *Transition to updated GEM.* (1) Vehicle manufacturers may demonstrate compliance with Phase 2 greenhouse gas standards in model years 2021 through 2023 using GEM Phase 2, Version 3.0, Version 3.5.1, or Version 4.0 (all incorporated by reference, see § 1037.810). Manufacturers may change to a different version of GEM for model years 2022 and 2023 for a given vehicle family after initially submitting an application for certification; such a change must be documented as an amendment under § 1037.225. Manufacturers may submit an end-of-year report for model year 2021 using any of the three regulatory versions of GEM, but only for demonstrating compliance with the custom-chassis standards in § 1037.105(h); such a change must be documented in the report submitted under § 1037.730. Once a manufacturer certifies a vehicle family based on GEM Version 4.0, it may not revert back to using GEM Phase 2, Version 3.0 or Version 3.5.1 for that vehicle family in any model year. (2) Vehicle manufacturers may certify for model years 2021 through 2023 based on fuel maps from engines or powertrains that were created using GEM Phase 2, Version 3.0, Version 3.5.1, or Version 4.0 (all incorporated by reference, see § 1037.810). Vehicle manufacturers may alternatively certify in those years based on fuel maps from powertrains that were created using GEM Phase 2, Version 3.0, GEM HIL model 3.8, or GEM Phase 2, Version 4.0 (all incorporated by reference, see § 1037.810). Vehicle manufacturers may continue to certify vehicles in later model years using fuel maps generated with earlier versions of GEM for model year 2024 and later vehicle families that qualify for using carryover provisions in § 1037.235(d).

(y) ~~[Reserved] *Correcting credit calculations.* If you notify us by October 1, 2024, that errors mistakenly decreased your balance of emission credits for 2020 or any earlier model years, you may correct the errors and recalculate the balance of emission credits after applying a 10 percent discount to the credit correction.~~

(z) *Constraints for vocational regulatory subcategories.* The following provisions apply to determinations of vocational regulatory subcategories as described in § 1037.140:

(1) Select the Regional regulatory subcategory for coach buses and motor homes.

(2) You may not select the Urban regulatory subcategory for any vehicle with a manual or single-clutch automated manual transmission.

(3) Starting in model year 2024, you must select the Regional regulatory subcategory for any vehicle with a manual transmission.

(4) You may select the Multi-purpose regulatory subcategory for any vocational vehicle, except as specified in paragraph (v)(1) of this section.

(5) You may select the Urban regulatory subcategory for a hybrid vehicle equipped with regenerative braking, unless it is equipped with a manual transmission.

(6) You may select the Urban regulatory subcategory for any vehicle with a hydrokinetic torque converter paired with an automatic transmission, or a continuously variable automatic transmission, or a dual-clutch transmission with no more than two consecutive forward gears between which it is normal for both clutches to be momentarily disengaged.

~~(z) Credit exchanges across averaging sets for certain vehicles. The provisions of this paragraph (z) apply for credits generated from model year 2026 and earlier vehicles certified with advanced technology under this part. The provisions of this paragraph (z) also apply for credits generated from model year 2027 through 2032 vehicles, as follows:~~

~~(1) Credits generated under this part may be used through model year 2032 for any of the averaging sets identified in § 1037.740(a).~~

~~(2) Credits generated from vehicles certified to the standards in 40 CFR 86.1819-14 may be used through model year 2032 to demonstrate compliance with the CO<sub>2</sub> emission standards for Light HDV or Medium HDV in this part.~~

~~(3) The following provisions apply for redesignating credits for use in different averaging sets:~~

~~(i) The restrictions that apply for trading credits under § 1037.720 also apply for redesignating credits.~~

~~(ii) Send us a report by June 30 after model year to describe how you are redesignating credits. Identify the averaging set and number of credits generated from each vehicle family. Also identify the number of redesignated emission credits you intend to apply for each averaging set.~~

~~(4) You may trade redesignated credits as allowed under the standard setting part. Credit provisions not addressed in this paragraph (z), such as limitations on credit life and credit multipliers for advanced technology, continue to apply as specified.~~

~~(aa) Warranty for components used with battery electric vehicles and fuel cell electric vehicles ~~advanced technologies~~. The emission-related warranty requirements in § 1037.120 are optional for fuel cell stacks, RESS, and other components used with battery electric vehicles and fuel cell electric vehicles before model year 2027.~~

## Subpart C—Certifying Vehicle Families

131. Amend § 1037.201 by revising paragraph (i) to read as follows:

### § 1037.201 General requirements for obtaining a certificate of conformity.

\* \* \* \* \*

(i) Vehicles and installed engines must meet exhaust, evaporative, and refueling emission standards and certification requirements ~~in 40 CFR part 86 or 40 CFR part 1036~~ as described in §§ 1037.102 and 1037.103, as applicable. Include the information described in 40 CFR part 86, subpart S, or 40 CFR 1036.205 in your application for certification in addition to what we specify in § 1037.205 so we can issue a single certificate of conformity for all the requirements that apply for your vehicle and the installed engine.

132. Amend § 1037.205 by
- Revising paragraph (b) introductory text and (b)(8);
  - Removing and reserving paragraphs (c) and (q); and
  - Revising paragraph (t).
- The revisions read as follows:

**§ 1037.205 What must I include in my application?**

\* \* \* \* \*

(b) Explain how the emission control system operates. As applicable, describe in detail all system components for controlling ~~greenhouse gas~~ emissions, including all auxiliary emission control devices (AECs) and all fuel-system components you will install on any production vehicle. For any vehicle using RESS (such as ~~hybrid vehicles~~, fuel cell electric vehicles, and battery electric vehicles), describe in detail all components needed to charge the system, store energy, and transmit power to move the vehicle. Identify the part number of each component you describe. For this paragraph (b), treat as separate AECs any devices that modulate or activate differently from each other. Also describe your modeling inputs as described in § 1037.520, with the following additional information if it applies for your vehicles:

\* \* \* \* \*

(8) If you install auxiliary power units in tractors under § 1037.~~106(g)~~102(c), identify the family name associated with the engine's certification under 40 CFR part 1039. Starting in model year 2024, also identify the family name associated with the auxiliary power unit's certification to the standards of 40 CFR 1039.699.

\* \* \* \* \*

(c) ~~[Reserved] For vehicles subject to air conditioning standards, include:~~

~~(1) The refrigerant leakage rates (leak scores).~~

~~(2) The type of refrigerant and the refrigerant capacity of the air conditioning systems.~~

~~(3) The corporate name of the final installer of the air conditioning system.~~

\* \* \* \* \*

(q) ~~[Reserved] For battery electric vehicles and plug-in hybrid electric vehicles, describe the recharging procedures and methods for determining battery performance, such as state of charge and charging capacity. Also include the certified usable battery energy for each battery durability subfamily.~~

\* \* \* \* \*

(t) Include the information required by other subparts of this part. ~~For example, include the information required by § 1037.725 if you plan to generate or use emission credits.~~

\* \* \* \* \*

133. Amend § 1037.230 by revising paragraphs (a) introductory text, (b), and (d)(2) introductory text to read as follows:

**§ 1037.230 Vehicle families, sub-families, and configurations.**

(a) ~~For purposes of certifying your vehicles to greenhouse gas standards, d~~Divide your product line into families of vehicles based on regulatory subcategories as specified in this section. Subcategories are specified using terms defined in § 1037.801. Your vehicle family is limited to a single model year.

\* \* \* \* \*



(b) If the vehicles in your family are being certified to more than one FEL, subdivide your ~~greenhouse gas~~ vehicle families into subfamilies that include vehicles with identical FELs. Note that you may add subfamilies at any time during the model year.

\* \* \* \* \*

(d) \* \* \*

(2) For a Phase 2 or later vehicle model that includes a range of GVWR values that straddle weight classes, you may include all the vehicles in the same vehicle family if you certify the vehicle family to the numerically lower ~~CO<sub>2</sub>-emission~~fuel consumption standard from the affected service classes. Vehicles that are optionally certified to a more stringent standard under this paragraph (d)(2) are subject to useful-life and all other provisions corresponding to the weight class with the numerically lower ~~CO<sub>2</sub>-emission~~fuel consumption standard. For a Phase 2 or later tractor model that includes a range of roof heights that straddle subcategories, you may include all the vehicles in the same vehicle family if you certify the vehicle family to the appropriate subcategory as follows:

\* \* \* \* \*

134. Revise § 1037.231 to read as follows:

#### **§ 1037.231 Powertrain families.**

See 40 CFR 1036.231 for provisions describing how to divide your product line into powertrain families.

~~(a) If you choose to perform powertrain testing as specified in 40 CFR 1036.545, use good engineering judgment to divide your product line into powertrain families that are expected to have similar fuel consumptions and CO<sub>2</sub>-emission characteristics throughout the useful life. Your powertrain family is limited to a single model year.~~

~~(b) Except as specified in paragraph (c) of this section, group powertrains in the same powertrain family if they share all the following attributes:~~

~~(1) Engine family as specified in 40 CFR 1036.230.~~

~~(2) Shared vehicle service class grouping, as follows:~~

~~(i) Light HDV or Medium HDV.~~

~~(ii) Heavy HDV other than heavy-haul tractors.~~

~~(iii) Heavy-haul tractors.~~

~~(3) Number of clutches.~~

~~(4) Type of clutch (e.g., wet or dry).~~

~~(5) Presence and location of a fluid coupling such as a torque converter.~~

~~(6) Gear configuration, as follows:~~

~~(i) Planetary (e.g., simple, compound, meshed planet, stepped planet, multi-stage).~~

~~(ii) Countershaft (e.g., single, double, triple).~~

~~(iii) Continuously variable (e.g., pulley, magnetic, toroidal).~~

~~(7) Number of available forward gears, and transmission gear ratio for each available forward gear, if applicable. Count forward gears as being available only if the vehicle has the hardware and software to allow operation in those gears.~~

~~(8) Transmission oil sump configuration (e.g., conventional or dry).~~

~~(9) The power transfer configuration of any hybrid technology (e.g., series or parallel).~~

~~(10) The energy storage device and capacity of any hybrid technology (e.g., 10 MJ hydraulic accumulator, 10 kW-hr Lithium-ion battery pack, 10 MJ ultracapacitor bank).~~

(11) The rated output of any hybrid mechanical power technology (e.g., 50 kW electric motor).

(c) For powertrains that share all the attributes described in paragraph (b) of this section, divide them further into separate powertrain families based on common calibration attributes. Group powertrains in the same powertrain family to the extent that powertrain test results and corresponding emission levels are expected to be similar throughout the useful life.

(d) You may subdivide a group of powertrains with shared attributes under paragraph (b) of this section into different powertrain families.

(e) In unusual circumstances, you may group powertrains into the same powertrain family even if they do not have shared attributes under in paragraph (b) of this section if you show that their emission characteristics throughout the useful life will be similar.

(f) If you include the axle when performing powertrain testing for the family, you must limit the family to include only those axles represented by the test results. You may include multiple axle ratios in the family if you test with the axle expected to produce the highest emission results.

135. Amend § 1037.235 by revising the introductory text to read as follows:

**§ 1037.235 Testing requirements for certification.**

This section describes the emission testing you must perform to show compliance with ~~respect to the greenhouse gas standards in subpart B of this part~~NHTSA's fuel efficiency program under 49 CFR part 535, and to determine any input values from § 1037.520 that involve measured quantities.

\* \* \* \* \*

136. Revise § 1037.241 to read as follows:

**§ 1037.241 Demonstrating compliance with ~~exhaust emission standards for greenhouse gas pollutants~~fuel consumption standards.**

(a) Compliance determinations for purposes of certification depend on whether or not you participate in the ABT program in subpart H of this part.

(1) If none of your vehicle families generate or use ~~emission~~ credits in a given model year, each of your vehicle families is considered in compliance ~~with the CO<sub>2</sub> emission standards in §§ 1037.105 and 1037.106~~ if all vehicle configurations in the family have modeled CO<sub>2</sub> emission rates from § 1037.520 that are at or below the applicable standards. A vehicle family is deemed not to comply if any vehicle configuration in the family has a modeled ~~CO<sub>2</sub> emission rate~~fuel consumption value that is above the applicable standard.

(2) If you generate or use ~~emission~~ credits with one or more vehicle families in a given model year, your vehicle families within an averaging set are considered in compliance ~~with the CO<sub>2</sub> emission standards in §§ 1037.105 and 1037.106~~ if the sum of positive and negative credits for all vehicle configurations in those vehicle families lead to a zero balance or a positive balance of credits, except as allowed by § 1037.745 for NHTSA's fuel efficiency program. Note that the FEL is considered to be the applicable emission standard for an individual configuration.

(b) We may require you to provide an engineering analysis showing that the performance of your ~~emission~~ controls will not deteriorate during the useful life with proper maintenance. If we determine that your ~~emission~~ controls are likely to deteriorate during the useful life, we may require you to develop and apply deterioration factors consistent with good engineering

judgment. ~~For example, you may need to apply a deterioration factor to address deterioration of battery performance for a hybrid vehicle.~~ Where the highest useful life emissions-fuel consumption occurs between the end of useful life and at the low-hour test point, base deterioration factors for the vehicles on the difference between (or ratio of) the point at which the highest emissions-fuel consumption occurs and the low-hour test point.

## Subpart F—Test and Modeling Procedures

137. Amend § 1037.501 by revising the introductory text and paragraphs (a), (b), (d)(2), and (f) to read as follows:

### § 1037.501 General testing and modeling provisions.

This subpart specifies how to perform ~~emission~~-testing and ~~emission~~-modeling required elsewhere in this part for demonstrating compliance with fuel consumption standards under 49 CFR part 535.

(a) Except as specified in subpart B of this part, you must demonstrate that you meet ~~emission the applicable~~ standards using ~~emission~~-modeling as described in § 1037.520. This modeling depends on several measured values as described in this subpart. You may use fuel-mapping information from the engine manufacturer as described in 40 CFR 1036.535 and 1036.540, or you may use powertrain testing as described in 40 CFR 1036.545.

(b) Where ~~exhaust emission~~-testing is required, use equipment and procedures as described in 40 CFR part 1065 and part 1066. Measure CO<sub>2</sub> emissions ~~of all the exhaust constituents subject to emission standards~~ as specified in 40 CFR part 1065 and part 1066. Use the applicable duty cycles specified in § 1037.510.

\* \* \* \* \*

(d) \* \* \*

(2) For diesel-fueled vehicles, use the appropriate diesel fuel specified for emission testing. Unless ~~we specify specified~~ otherwise, the appropriate diesel test fuel is ultra-low sulfur diesel fuel.

\* \* \* \* \*

(f) This subpart is addressed to you as a manufacturer, but it applies equally to anyone who does testing for you, and to us when we perform testing to determine if your vehicles meet ~~emission the~~ standards.

\* \* \* \* \*

138. Amend § 1037.520 by revising the section heading and introductory text to read as follows:

### § 1037.520 Modeling CO<sub>2</sub> emissions to show that vehicles comply with fuel consumption standards.

This section describes how to use the Greenhouse gas Emissions Model (GEM) to show compliance with ~~the CO<sub>2</sub> standards of §§ 1037.105 and 1037.106~~ NHTSA's fuel consumption standards under 49 CFR part 535. Use GEM version 2.0.1 to demonstrate compliance with Phase 1 standards; use GEM Phase 2, Version 4.0 to demonstrate compliance with Phase 2 ~~and Phase 3~~ standards (both incorporated by reference, see § 1037.810). Use good engineering judgment when demonstrating compliance using GEM.

\* \* \* \* \*

139. Amend § 1037.540 by revising the introductory text and paragraph (a)(1) to read as follows:

**§ 1037.540 Special procedures for testing vehicles with hybrid power take-off.**

This section describes optional procedures for quantifying the reduction in ~~greenhouse gas emissions~~fuel consumption for vehicles as a result of running power take-off (PTO) devices with a hybrid energy delivery system. See 40 CFR 1036.545 for powertrain testing requirements that apply for drivetrain hybrid systems. The procedures are written to test the PTO by ensuring that the engine produces all of the energy with no net change in stored energy (charge-sustaining), and for plug-in hybrid electric vehicles, also allowing for drawing down the stored energy (charge-depleting). The full charge-sustaining test for the hybrid vehicle is from a fully charged rechargeable energy storage system (RESS) to a depleted RESS and then back to a fully charged RESS. You must include all hardware for the PTO system. You may ask us to modify the provisions of this section to allow testing hybrid vehicles that use a technology other than batteries for storing energy, consistent with good engineering judgment. For plug-in hybrid electric vehicles, use a utility factor to properly weight charge-sustaining and charge-depleting operation as described in paragraph (f)(3) of this section.

(a) \* \* \*

- (1) Select a vehicle with a hybrid energy delivery system to represent the range of PTO configurations that will be covered by the test data. If your test data will represent more than one PTO configuration, use good engineering judgment to select the configuration with the maximum number of PTO circuits that has the smallest potential reduction in ~~greenhouse gas emissions~~fuel consumption.

\* \* \* \* \*

140. Add § 1037.550 to subpart F to read as follows:

**§ 1037.550 Powertrain testing.**

See 40 CFR 1036.545 for the powertrain test procedure.

141. Amend § 1037.551 by revising paragraph (a) to read as follows:

**§ 1037.551 Engine-based simulation of powertrain testing.**

\* \* \* \* \*

- (a) Use the procedures of 40 CFR part 1065 to set up the engine, measure emissions, and record data. Measure individual parameters and emission constituents as described in this section.

~~Measure NO<sub>x</sub> emissions for each sampling period in grams. You may perform these measurements using a NO<sub>x</sub> emission measurement system that meets the requirements of 40 CFR part 1065, subpart J. Include these measured NO<sub>x</sub> values any time you report to us your greenhouse gas emissions or fuel consumption values from testing under this section. If a system malfunction prevents you from measuring NO<sub>x</sub> emissions during a test under this section but the test otherwise gives valid results, you may consider this a valid test and omit the NO<sub>x</sub> emission measurements; however, we may require you to repeat the test if we determine that you inappropriately voided the test with respect to NO<sub>x</sub> emission measurement.~~ For hybrid powertrains, correct for the net energy change of the energy storage device as described in 40 CFR 1066.501(a)(3).

\* \* \* \* \*

142. Amend § 1037.555 by revising paragraph (c) to read as follows:

**§ 1037.555 Special procedures for testing Phase 1 hybrid systems.**

\* \* \* \* \*

(c) Collect and measure emissions as described in 40 CFR part 1066. Calculate emission rates in grams per ton-mile without rounding. Determine values for  $A$ ,  $B$ ,  $C$ , and  $M$  for the vehicle being simulated as specified in 40 CFR part 1066. If you will apply an improvement factor or test results to multiple vehicle configurations, use values of  $A$ ,  $B$ ,  $C$ ,  $M$ ,  $k_a$ , and  $r$  that represent the vehicle configuration with the smallest potential reduction in greenhouse gas emissions as a result of the hybrid capability.

\* \* \* \* \*

143. Amend § 1037.560 by revising paragraph (b)(4) to read as follows:

**§ 1037.560 Axle efficiency test.**

\* \* \* \* \*

(b) \* \* \*

(4) Add gear oil according to the axle manufacturer's instructions. If the axle manufacturer specifies multiple gear oils, select the one with the highest viscosity at operating temperature. You may use a lower-viscosity gear oil if we approve ~~it that as critical emission-related maintenance under § 1037.125~~. Fill the gear oil to a level that represents in-use operation. You may use an external gear oil conditioning system, as long as it does not affect measured values.

\* \* \* \* \*

144. Amend § 1037.565 by revising paragraph (b)(3) to read as follows:

**§ 1037.565 Transmission efficiency test.**

\* \* \* \* \*

(b) \* \* \*

(3) Add transmission oil according to the transmission manufacturer's instructions. If the transmission manufacturer specifies multiple transmission oils, select the one with the highest viscosity at operating temperature. You may use a lower-viscosity transmission oil if we approve it ~~as critical emission-related maintenance under § 1037.125~~. Fill the transmission oil to a level that represents in-use operation. You may use an external transmission oil conditioning system, as long as it does not affect measured values.

\* \* \* \* \*

145. Amend § 1037.570 by revising paragraph (a)(4)(i) to read as follows:

**§ 1037.570 Procedures to characterize torque converters.**

\* \* \* \* \*

(a) \* \* \*

(4) \* \* \*

(i) If the torque converter manufacturer specifies multiple transmission oils, select the one with the highest viscosity at operating temperature. You may use a lower-viscosity

transmission oil if we approve ~~it that as critical emission related maintenance under § 1037.125.~~

\* \* \* \* \*

## Subpart G—Special Compliance Provisions

146. Amend § 1037.605 by revising paragraph (d) to read as follows:

### § 1037.605 Installing engines certified to alternate standards for specialty vehicles.

\* \* \* \* \*

(d) *Vehicle standards.* The ~~vehicle standards of this part~~ Vehicle standards apply as follows for these vehicles:

(1) Vehicles qualifying under ~~paragraphs (a)(1) through (3) of~~ this section are subject to evaporative emission standards ~~of as specified in~~ § 1037.103, but are exempt from the other requirements of this part, except as specified in this section and in § 1037.601. ~~These vehicles must include a label as specified in § 1037.135(a) with the information from § 1037.135(e)(1) and (2) and the following statement: “THIS VEHICLE IS EXEMPT FROM GREENHOUSE GAS STANDARDS UNDER 40 CFR 1037.605.”.~~

(2) Hybrid vehicles ~~using the provisions of this section remain subject to the vehicle standards and all other requirements of this part 1037. For example, you~~ may need to use GEM in conjunction with powertrain testing to demonstrate compliance with emission-fuel consumption standards ~~under subpart B of this part.~~

147. Amend § 1037.610 by revising paragraphs (a) and (d)(1) to read as follows:

### § 1037.610 Vehicles with off-cycle technologies.

(a) You may ask us to apply the provisions of this section for CO<sub>2</sub>-emission-fuel consumption reductions resulting from vehicle technologies that were not in common use with heavy-duty vehicles before model year 2010 that are not reflected in GEM. While you are not required to prove that such technologies were not in common use with heavy-duty vehicles before model year 2010, we will not approve your request if we determine that they do not qualify. These may be described as off-cycle or innovative technologies. You may apply these provisions for CO<sub>2</sub>-emission-fuel consumption reductions reflected in the specified test procedures if they are not reflected in GEM, except as allowed under paragraph (g) of this section. We will apply these provisions only for technologies that will result in measurable, demonstrable, and verifiable real-world CO<sub>2</sub>-emission-fuel consumption -reductions.

\* \* \* \* \*

(d) \* \* \*

(1) A detailed description of the off-cycle technology and how it functions to reduce CO<sub>2</sub>-emissions-fuel consumption under conditions not represented on the duty cycles required for certification.

\* \* \* \* \*



148. Amend § 1037.615 by revising paragraphs (a), (b)(4), and (d), removing and reserving paragraph (f), and revising paragraph (g). The revisions read as follows:

**§ 1037.615 Advanced technologies.**

(a) This section describes how to calculate emission credits for advanced technologies. You may calculate Phase 1 advanced technology credits through model year 2020 for hybrid vehicles with regenerative braking, vehicles equipped with Rankine-cycle engines, battery electric vehicles, and fuel cell electric vehicles. You may calculate Phase 2 advanced technology credits through model year 2026 for plug-in hybrid electric vehicles, battery electric vehicles, and fuel cell electric vehicles. ~~You may calculate Phase 3 advanced technology credits for model year 2027 for plug-in hybrid electric vehicles, battery electric vehicles, and fuel cell electric vehicles.~~ You may not generate credits for Phase 1 engine technologies for which the engines generate CO<sub>2</sub> credits under 40 CFR part 1036.

(b) \* \* \*

~~(4) Use the equation in § 1037.705 to convert the g/ton-mile benefit to emission credits (in Mg). Use the g/ton-mile benefit in place of the (Std—FEL) term.~~

\* \* \* \* \*

(d) For Phase 2 ~~and Phase 3~~ plug-in hybrid electric vehicles and for fuel cells powered by any fuel other than hydrogen, calculate CO<sub>2</sub>-credits using an FEL based on ~~emission~~ measurements from powertrain testing. Phase 2 ~~and Phase 3~~ advanced technology credits do not apply for hybrid vehicles that have no plug-in capability.

\* \* \* \* \*

~~(f) [Reserved] For battery electric vehicles and for fuel cell electric vehicles, calculate CO<sub>2</sub> credits using an FEL of 0 g/ton-mile. Note that these vehicles are subject to compression ignition standards for CO<sub>2</sub>.~~

(g) As specified in subpart H of this part, advanced-technology credits generated from Phase 1 vehicles under this section may be used under this part outside of the averaging set in which they were generated, ~~or they may be used under 40 CFR part 86, subpart S, or 40 CFR part 1036.~~

Advanced-technology credits generated from Phase 2 and later vehicles are subject to the averaging-set restrictions that apply to other ~~emission~~ credits.

(h) You may certify using both provisions of this section and the off-cycle technology provisions of § 1037.610, provided you do not double count ~~emission~~ benefits.

149. Amend § 1037.620 by revising paragraphs (a)(2) and (e) to read as follows:

**§ 1037.620 Responsibilities for multiple manufacturers.**

\* \* \* \* \*

(a) \* \* \*

(2) We will apply the requirements of subparts C and D of this part to the manufacturer that ~~obtains the certificate of conformity for~~certifies the vehicle. Other manufacturers are required to comply with the requirements of subparts C and D of this part only when notified by us. In our notification, we will specify a reasonable time period in which you need to comply with the requirements identified in the notice. See § 1037.601 for the applicability of 40 CFR part 1068 to these other manufacturers and remanufacturers.

\* \* \* \* \*

(e) We may require component manufacturers to provide information or take other actions ~~under 42 U.S.C. 7542~~. For example, we may require component manufacturers to test components they produce.

150. Amend § 1037.622 by revising the introductory text and paragraph (a)(2) removing and reserving paragraph (d)(5). The revisions read as follows:

**§ 1037.622 Shipment of partially complete vehicles to secondary vehicle manufacturers.**

This section specifies how manufacturers may introduce partially complete vehicles into U.S. commerce (or in the case of certain custom vehicles, introduce complete vehicles into U.S. commerce for modification by a small manufacturer). The provisions of this section are intended to accommodate normal business practices without compromising the effectiveness of certified emission controls. You may not use the provisions of this section to circumvent the intent of this part. ~~For vehicles subject to both exhaust greenhouse gas and evaporative standards, the provisions of this part apply separately for each certificate.~~

(a) \* \* \*

(2) *Uncertified vehicles that will be certified by secondary vehicle manufacturers.*

Manufacturers may introduce into U.S. commerce partially complete vehicles for which they do not hold the required certificate of conformity only as allowed by paragraph (b) of this section; however, the requirements of this section do not apply for tractors or vocational vehicles with a date of manufacture before January 1, 2022, that are produced by a secondary vehicle manufacturer if they are excluded ~~from the standards of this part~~ under

§ 1037.5150(e).

\* \* \* \* \*

(d) \* \* \*

(5) ~~[Reserved]The provisions of this paragraph (d) may apply separately for vehicle greenhouse gas, evaporative, and refueling emission standards.~~

\* \* \* \* \*

151. Amend § 1037.631 by revising the introductory text and paragraph (a) introductory text to read as follows:

**§ 1037.631 Exemption for vocational vehicles intended for off-road use.**

This section provides an exemption from the ~~greenhouse gas standards of this part~~ fuel consumption standards under 49 CFR part 535 for certain vocational vehicles (including certain vocational tractors) that are intended to be used extensively in off-road environments such as forests, oil fields, and construction sites. This section does not exempt engines used in vocational vehicles from the standards of 40 CFR part 86 or part 1036. Note that you may not include these exempted vehicles in any credit calculations ~~under this part~~.

(a) *Qualifying criteria.* Vocational vehicles intended for off-road use are exempt without request, subject to the provisions of this section, if they are primarily designed to perform work off-road (such as in oil fields, mining, forests, or construction sites), and they meet at least one of the criteria of paragraph (a)(1) of this section and at least one of the criteria of paragraph (a)(2) of this section. See § 1037.105(h) for alternate Phase 2 ~~and Phase 3~~ standards that apply for vehicles meeting only one of these sets of criteria.

\* \* \* \* \*

152. Amend § 1037.635 by revising paragraphs (a) and (b) introductory text and removing and reserving paragraph (b)(1). The revisions read as follows:

**§ 1037.635 Glider kits and glider vehicles.**

\* \* \* \* \*

(a) Vehicles produced from glider kits and other glider vehicles are subject to the same standards as other new vehicles, ~~including the applicable vehicle standards described in Subpart B of this part.~~ Note that this requirement for the vehicle generally applies even if the engine meets the criteria of paragraph (c)(1) of this section. For engines originally produced before 2017, if you are unable to obtain a fuel map for an engine you may ask to use a default map, consistent with good engineering judgment.

(b) Section 1037.601(a)(1) disallows the introduction into U.S. commerce of a new ~~tractor or vocational~~ vehicle (including a vehicle assembled from a glider kit) unless it has an engine that is certified to the applicable standards in 40 CFR parts 86 and 1036. Except as specified otherwise in this part, the standards apply for engines used in glider vehicles as follows:

(1) ~~[Reserved] The engine must meet the greenhouse gas standards of 40 CFR part 1036 that apply for the engine model year corresponding to the vehicle's date of manufacture. For example, for a vehicle with a 2024 date of manufacture, the engine must meet the greenhouse gas standards that apply for model year 2024.~~

\* \* \* \* \*

**§ 1037.645 [Removed]**

153. Remove § 1037.645.

~~**§ 1037.645 In-use compliance with family emission limits (FELs).**~~

~~Section 1037.225 describes how to change the FEL for a vehicle family during the model year. This section, which describes how you may ask us to increase a vehicle family's FEL after the end of the model year, is intended to address circumstances in which it is in the public interest to apply a higher in-use FEL based on forfeiting an appropriate number of emission credits. For example, this may be appropriate where we determine that recalling vehicles would not significantly reduce in-use emissions. We will generally not allow this option where we determine the credits being forfeited would likely have expired.~~

~~(a) You may ask us to increase a vehicle family's FEL after the end of the model year if you believe some of your in-use vehicles exceed the CO<sub>2</sub> FEL that applied during the model year (or the CO<sub>2</sub> emission standard if the family did not generate or use emission credits). We may consider any available information in making our decision to approve or deny your request.~~

~~(b) If we approve your request under this section, you must apply emission credits to cover the increased FEL for all affected vehicles. Apply the emission credits as part of your credit demonstration for the current production year. Include the appropriate calculations in your final report under § 1037.730.~~

~~(c) Submit your request to the Designated Compliance Officer. Include the following in your request:~~

~~(1) Identify the names of each vehicle family that is the subject of your request. Include separate family names for different model years~~

~~(2) Describe why your request does not apply for similar vehicle models or additional model years, as applicable.~~

- (3) Identify the FEL that applied during the model year for each configuration and recommend replacement FELs for in-use vehicles; include a supporting rationale to describe how you determined the recommended replacement FELs.
- (4) Describe whether the needed emission credits will come from averaging, banking, or trading.
- (d) If we approve your request, we will identify one or more replacement FELs, as follows:
- (1) Where your vehicle family includes more than one sub-family with different FELs, we may apply a higher FEL within the family than was applied to the vehicle's configuration in your final ABT report. For example, if your vehicle family included three sub-families, with FELs of 200 g/ton-mile, 210 g/ton-mile, and 220 g/ton-mile, we may apply a 220 g/ton-mile in-use FEL to vehicles that were originally designated as part of the 200 g/ton-mile or 210 g/ton-mile sub-families.
- (2) Without regard to the number of sub-families in your certified vehicle family, we may specify one or more new sub-families with higher FELs than you included in your final ABT report. We may apply these higher FELs as in-use FELs for your vehicles. For example, if your vehicle family included three sub-families, with FELs of 200 g/ton-mile, 210 g/ton-mile, and 220 g/ton-mile, we may specify a new 230 g/ton-mile sub-family.
- (3) Our selected values for the replacement FEL will reflect our best judgment to accurately reflect the actual in-use performance of your vehicles, consistent with the testing provisions specified in this part.
- (4) We may apply the higher FELs to other vehicle families from the same or different model years to the extent they used equivalent emission controls. We may include any appropriate conditions with our approval.
- (e) If we order a recall for a vehicle family under 40 CFR 1068.505, we will no longer approve a replacement FEL under this section for any of your vehicles from that vehicle family, or from any other vehicle family that relies on equivalent emission controls.

154. Amend § 1037.655 by revising paragraph (a) to read as follows:

**§ 1037.655 Post-useful life vehicle modifications.**

(a) *General.* ~~Vehicle modifications during and after the useful life are presumed to violate 42 U.S.C. 7522(a)(3)(A) if they involve removing or rendering inoperative any emission control device installed to comply with the requirements of this part 1037.~~ This section specifies vehicle modifications that may occur in certain circumstances after a vehicle reaches the end of its regulatory useful life. ~~EPA~~ We may require a higher burden of proof with respect to modifications that occur within the useful life period, and the specific examples presented here do not necessarily apply within the useful life. This section also does not apply with respect to engine modifications or recalibrations.

\* \* \* \* \*

**§§ 1037.665 and 1037.670 [Removed]**

155. Remove §§ 1037.665 and 1037.670.

**~~§ 1037.665 Production and in-use tractor testing.~~**

~~We may require manufacturers with annual U.S. directed production volumes of greater than 20,000 tractors to perform testing as described in this section. Tractors may be new or used.~~

~~(a) Test model year 2021 and later tractors as follows:~~

(1) Each calendar year, we may require you to select for testing three sleeper cabs and two day cabs certified to Phase 1 or Phase 2 standards. If we do not identify certain vehicle configurations for your testing, select models that you project to be among your 12 highest-selling vehicle configurations for the given year.

(2) Set up the tractors on a chassis dynamometer and operate them over all applicable duty cycles from § 1037.510(a)(3). You may use emission measurement systems meeting the specifications of 40 CFR part 1065, subpart J. Calculate coefficients for the road load force equation as described in Section 10 of SAE J1263 or Section 11 of SAE J2263 (both incorporated by reference, see § 1037.810). Use standard payload. Measure emissions of NO<sub>x</sub>, PM, CO, NMHC, CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Determine emission levels in g/ton-mile.

(b) Send us an annual report with your test results for each duty cycle and the corresponding GEM results. Send the report by the next October 1 after the year we select the vehicles for testing, or a later date that we approve. We may make your test data publicly available.

(c) We may approve your request to perform alternative testing that will provide equivalent or better information compared to the specified testing. For example, we may allow you to provide CO<sub>2</sub> data from in-use operation or from manufacturer run-on-road testing as long as it allows for reasonable year-to-year comparisons and includes testing from production vehicles. We may also direct you to do less testing than we specify in this section.

(d) Greenhouse gas standards do not apply with respect to testing under this section. Note however that NTE standards apply for any qualifying operation that occurs during the testing in the same way that it would during any other in-use testing.

#### **§ 1037.670 Optional CO<sub>2</sub> emission standards for tractors at or above 120,000 pounds GCWR.**

(a) You may certify model year 2026 and earlier tractors at or above 120,000 pounds GCWR to the following CO<sub>2</sub> standards instead of the Phase 2 CO<sub>2</sub> standards of § 1037.106:

TABLE 1 OF PARAGRAPH (a) OF § 1037.670—OPTIONAL CO<sub>2</sub> STANDARDS FOR TRACTORS ABOVE 120,000 POUNDS GCWR (g/ton-mile)<sup>a</sup>

Subcategory	Model years 2021–2023	Model years 2024–2026
Heavy Class 8 Low-Roof Day Cab	53.5	50.8
Heavy Class 8 Low-Roof Sleeper Cab	47.1	44.5
Heavy Class 8 Mid-Roof Day Cab	55.6	52.8
Heavy Class 8 Mid-Roof Sleeper Cab	49.6	46.9
Heavy Class 8 High-Roof Day Cab	54.5	51.4
Heavy Class 8 High-Roof Sleeper Cab	47.1	44.2

<sup>a</sup> Note that these standards are not directly comparable to the standards for Heavy-Haul Tractors in § 1037.106 because GEM handles aerodynamic performance differently for the two sets of standards.

(b) Determine subcategories as described in § 1037.230 for tractors that are not heavy-haul tractors. For example, the subcategory for tractors that would otherwise be considered Class 8 low-roof day cabs would be Heavy Class 8 Low-Roof Day Cabs and would be identified as HC8\_DC\_LR for the GEM run.

~~(c) Except for the CO<sub>2</sub> standards of § 1037.106, all provisions applicable to tractors under this part continue to apply to tractors certified to the standards of this section. Include the following compliance statement on your label instead of the statement specified in § 1037.135(c)(8): "THIS VEHICLE COMPLIES WITH U.S. EPA REGULATIONS FOR [MODEL YEAR] HEAVY-DUTY VEHICLES UNDER 40 CFR 1037.670."~~

~~(d) The optional emission standards in this section are intended primarily for tractors that will be exported; however, you may include any tractors certified under this section in your emission credit calculation under § 1037.705 if they are part of your U.S.-directed production volume.~~

## Subpart H—Averaging, Banking, and Trading for Certification

156. Revise § 1037.701 to read as follows:

### § 1037.701 General provisions.

(a) You may average, bank, and trade ~~emission~~-credits as described in 49 CFR part 535 for purposes of certification as described in this subpart and in subpart B of this part to show compliance with the standards of §§ 1037.105 and 1037.106. Note that § 1037.105(h) specifies standards involving limited or no use of emission credits under this subpart. Participation in this program is voluntary.

(b) The definitions of subpart I of this part apply to this subpart in addition to the following definitions:

(1) *Actual ~~emission~~-credits* means ~~emission~~-credits you have generated that we have verified by reviewing your final report.

(2) *Averaging set* means a set of vehicles in which ~~emission~~-credits may be exchanged. Note that an averaging set may comprise more than one regulatory subcategory. See § 1037.740.

(3) *Broker* means any entity that facilitates a trade of ~~emission~~-credits between a buyer and seller.

(4) *Buyer* means the entity that receives ~~emission~~-credits as a result of a trade.

(5) *Reserved ~~emission~~-credits* means ~~emission~~-credits you have generated that we have not yet verified by reviewing your final report.

(6) *Seller* means the entity that provides ~~emission~~-credits during a trade.

(7) *Standard* means the ~~emission~~-standard that applies under subpart B of this part for vehicles not participating in the ABT program of this subpart.

(8) *Trade* means to exchange ~~emission~~-credits, either as a buyer or seller.

(c) ~~Emission-e~~Credits may be exchanged only within an averaging set, except as specified in § 1037.740.

(d) You may not use ~~emission~~-credits generated under this subpart to offset any emissions that exceed an FEL or standard, ~~except as allowed by § 1037.645.~~

(e) You may use either of the following approaches to retire or forego ~~emission~~-credits:

(1) You may trade ~~emission~~-credits generated from any number of your vehicles to the vehicle purchasers or other parties to retire the credits. Identify any such credits in the reports described in § 1037.730. Vehicles must comply with the applicable FELs even if you donate or sell the corresponding ~~emission~~-credits under this paragraph (e). Those credits may no longer be used by anyone to demonstrate compliance with any ~~EPA emission~~-standards.

(2) You may certify a family using an FEL below the ~~emission~~-standard as described in this part and choose not to generate ~~emission~~-credits for that family. If you do this, you do not



need to calculate ~~emission~~ credits for those families and you do not need to submit or keep the associated records described in this subpart for that family.

(f) ~~Emission-e~~Credits may be used in the model year they are generated. Where ~~we allow it/allowed~~, surplus ~~emission~~ credits may be banked for future model years. Surplus ~~emission~~ credits may sometimes be used for past model years, as described in § 1037.745. You may not apply banked or traded credits in a given model year until you have used all available credits through averaging to resolve credit balances for that model year.

(g) You may increase or decrease an FEL during the model year by amending your application for certification under § 1037.225. The new FEL may apply only to vehicles you have not already introduced into commerce.

~~(h) See § 1037.740 for special credit provisions that apply for credits generated under 40 CFR 86.1819-14(k)(7) or 40 CFR 1036.615 or § 1037.615.~~

~~(i) Unless the regulations in this part explicitly allow it, you may not calculate Phase 1 credits more than once for any emission reduction. For example, if you generate Phase 1 CO<sub>2</sub> emission credits for a given hybrid vehicle under this part, no one may generate CO<sub>2</sub> emission credits for the associated hybrid engine under 40 CFR part 1036. However, Phase 1 credits could be generated for identical engines used in vehicles that did not generate credits under this part.~~

~~(j) You may use emission credits generated under the Phase 1 standards when certifying vehicles to Phase 2 standards. No credit adjustments are required other than corrections for different useful lives.~~

## **§§ 1037.705, 1037.710, 1037.715, and 1037.720 [Removed]**

157. Remove §§ 1037.705, 1037.710, 1037.715, and 1037.720.

### **~~§ 1037.705 Generating and calculating CO<sub>2</sub> emission credits.~~**

~~(a) The provisions of this section apply separately for calculating CO<sub>2</sub> emission credits for each pollutant.~~

~~(b) For each participating family or subfamily, calculate positive or negative emission credits relative to the otherwise applicable emission standard. Calculate positive emission credits for a family or subfamily that has an FEL below the standard. Calculate negative emission credits for a family or subfamily that has an FEL above the standard. Sum your positive and negative credits for the model year before rounding. Round the sum of emission credits to the nearest megagram (Mg), using consistent units with the following equation:~~

$$\text{Emission credits (Mg)} = (\text{Std} - \text{FEL}) \cdot \text{PL} \cdot \text{Volume} \cdot \text{UL} \cdot 10^{-6}$$

~~Eq. 1037.705-1~~

~~Where:~~

~~Std = the emission standard associated with the specific regulatory subcategory (g/ton-mile).~~

~~FEL = the family emission limit for the vehicle subfamily (g/ton-mile).~~

~~PL = standard payload, in tons.~~

~~Volume = U.S. directed production volume of the vehicle subfamily, subject to the exclusions described in paragraph (c) of this section. For example, if you produce three configurations with the same FEL, the subfamily production volume would be the sum of the production volumes for these three configurations.~~

~~UL = useful life of the vehicle, in miles, as described in §§ 1037.105 and 1037.106.~~

~~(c) Compliance with the requirements of this subpart is determined at the end of the model year by calculating emission credits based on actual production volumes, excluding any of the following vehicles:~~

- ~~(1) Vehicles that you do not certify to the CO<sub>2</sub> standards of this part because they are permanently exempted under subpart G of this part or under 40 CFR part 1068.~~
- ~~(2) Exported vehicles even if they are certified under this part and labeled accordingly.~~
- ~~(3) Vehicles not subject to the requirements of this part, such as those excluded under § 1037.5.~~
- ~~(4) Any other vehicles, where we indicate elsewhere in this part that they are not to be included in the calculations of this subpart.~~

#### **~~§ 1037.710 Averaging.~~**

~~(a) Averaging is the exchange of emission credits among your vehicle families. You may average emission credits only within the same averaging set, except as specified in § 1037.740.~~

~~(b) You may certify one or more vehicle families (or subfamilies) to an FEL above the applicable standard, subject to any applicable FEL caps and other provisions in subpart B of this part, if you show in your application for certification that your projected balance of all emission credit transactions in that model year is greater than or equal to zero or that a negative balance is allowed under § 1037.745.~~

~~(c) If you certify a vehicle family to an FEL that exceeds the otherwise applicable standard, you must obtain enough emission credits to offset the vehicle family's deficit by the due date for the final report required in § 1037.730. The emission credits used to address the deficit may come from your other vehicle families that generate emission credits in the same model year (or from later model years as specified in § 1037.745), from emission credits you have banked from previous model years, or from emission credits generated in the same or previous model years that you obtained through trading.~~

#### **~~§ 1037.715 Banking.~~**

~~(a) Banking is the retention of surplus emission credits by the manufacturer generating the emission credits for use in future model years for averaging or trading.~~

~~(b) You may designate any emission credits you plan to bank in the reports you submit under § 1037.730 as reserved credits. During the model year and before the due date for the final report, you may designate your reserved emission credits for averaging or trading.~~

~~(c) Reserved credits become actual emission credits when you submit your final report. However, we may revoke these emission credits if we are unable to verify them after reviewing your reports or auditing your records.~~

~~(d) Banked credits retain the designation of the averaging set in which they were generated.~~

#### **~~§ 1037.720 Trading.~~**

~~(a) Trading is the exchange of emission credits between manufacturers, or the transfer of credits to another party to retire them. You may use traded emission credits for averaging, banking, or further trading transactions. Traded emission credits remain subject to the averaging set restrictions based on the averaging set in which they were generated.~~

~~(b) You may trade actual emission credits as described in this subpart. You may also trade reserved emission credits, but we may revoke these emission credits based on our review of your records or reports or those of the company with which you traded emission credits. You may trade banked credits within an averaging set to any certifying manufacturer.~~

~~(c) If a negative emission credit balance results from a transaction, both the buyer and seller are liable, except in cases we deem to involve fraud. See § 1037.255(e) for cases involving fraud. We may void the certificates of all vehicle families participating in a trade that results in a manufacturer having a negative balance of emission credits. See § 1037.745.~~

158. Revise § 1037.725 to read as follows:

**§ 1037.725 Required information for certification.**

(a) You must declare ~~in your application for certification~~ your intent to use the provisions of this subpart for each vehicle family that will be certified using the ABT program before production. You must also declare the FELs you select for the vehicle family or subfamily for each pollutant for which you are using the ABT program. Your FELs must comply with the specifications of subpart B of this part, ~~including the FEL caps~~. FELs must be expressed to the same number of decimal places as the applicable standards.

(b) ~~Include~~ Your declaration must include the following ~~in your application for certification information~~:

(1) A statement that, to the best of your belief, you will not have a negative balance of ~~emission~~ credits for any averaging set when all ~~emission~~ credits are calculated at the end of the year; or a statement that you will have a negative balance of ~~emission~~ credits for one or more averaging sets but that it is allowed under § 1037.745 for NHTSA's fuel efficiency program.

(2) Calculations of projected ~~emission~~ credits (positive or negative) based on projected U.S.-directed production volumes. We may require you to include similar calculations from your other vehicle families to project your net credit balances for the model year. If you project negative ~~emission~~ credits for a family or subfamily, state the source of positive ~~emission~~ credits you expect to use to offset the negative ~~emission~~ credits.

159. Revise and republish § 1037.730 to read as follows:

**§ 1037.730 ABT reports.**

(a) If you certify any vehicle families using the ABT provisions of this subpart, send us a final report by September 30 following the end of the model year.

(b) Your report must include the following information for each vehicle family participating in the ABT program:

(1) Vehicle-family and subfamily designations, and averaging set.

(2) The regulatory subcategory and ~~emission~~ standards that would otherwise apply to the vehicle family.

(3) The FEL ~~for each pollutant~~. If you change the FEL after the start of production, identify the date that you started using the new FEL and/or give the vehicle identification number for the first vehicle covered by the new FEL. In this case, identify each applicable FEL and calculate the positive or negative ~~emission~~ credits as specified in § 1037.225.

(4) The projected and actual production volumes for the model year for calculating ~~emission~~ credits. If you changed an FEL during the model year, identify the actual production volume associated with each FEL.

(5) Useful life.

(6) Calculated positive or negative ~~emission~~ credits for the whole vehicle family. Identify any ~~emission~~ credits that you traded, as described in paragraph (d)(1) of this section.

- (7) If you have a negative credit balance for the averaging set in the given model year, specify whether the vehicle family (or certain subfamilies with the vehicle family) have a credit deficit for the year. Consider for example, a manufacturer with three vehicle families (“A”, “B”, and “C”) in a given averaging set. If family A generates enough credits to offset the negative credits of family B but not enough to also offset the negative credits of family C (and the manufacturer has no banked credits in the averaging set), the manufacturer may designate families A and B as having no deficit for the model year, provided it designates family C as having a deficit for the model year.
- (c) Your report must include the following additional information:
- (1) Show that your net balance of ~~emission~~-credits from all your participating vehicle families in each averaging set in the applicable model year is not negative, except as allowed under § 1037.745 for NHTSA’s fuel efficiency program. Your credit tracking must account for the limitation on credit life under § 1037.740(c).
  - (2) State whether you will retain any ~~emission~~-credits for banking. If you choose to retire ~~emission~~-credits that would otherwise be eligible for banking, identify the families that generated the ~~emission~~-credits, including the number of ~~emission~~-credits from each family.
  - (3) State that the report’s contents are accurate.
  - (4) Identify the technologies that make up the certified configuration associated with each vehicle identification number. You may identify this as a range of identification numbers for vehicles involving a single, identical certified configuration.
- (d) If you trade ~~emission~~-credits, you must send us a report within 90 days after the transaction, as follows:
- (1) As the seller, you must include the following information in your report:
    - (i) The corporate names of the buyer and any brokers.
    - (ii) A copy of any contracts related to the trade.
    - (iii) The averaging set corresponding to the vehicle families that generated ~~emission~~ credits for the trade, including the number of ~~emission~~-credits from each averaging set.
  - (2) As the buyer, you must include the following information in your report:
    - (i) The corporate names of the seller and any brokers.
    - (ii) A copy of any contracts related to the trade.
    - (iii) How you intend to use the ~~emission~~-credits, including the number of ~~emission~~-credits you intend to apply for each averaging set.
- (e) Send your reports electronically to the Designated Compliance Officer using an approved information format. If you want to use a different format, send us a written request with justification for a waiver.
- (f) Correct errors in your report as follows:
- (1) If you notify us by the deadline for submitting the final report that errors mistakenly decreased your balance of ~~emission~~-credits, you may correct the errors and recalculate the balance of ~~emission~~-credits. If you notify us that errors mistakenly decreased your balance of ~~emission~~-credits after the deadline for submitting the final report, you may correct the errors and recalculate the balance of ~~emission~~-credits after applying a 10 percent discount to the credit correction, but only if you notify us within 24 months after the deadline for submitting the final report. If you report a negative balance of ~~emission~~-credits, we may disallow corrections under this paragraph (f)(1).
  - (2) If you or we determine any time that errors mistakenly increased your balance of ~~emission~~-credits, you must correct the errors and recalculate the balance of ~~emission~~-credits.

160. Amend § 1037.735 by revising paragraphs (b) and (e) to read as follows:

**§ 1037.735 Recordkeeping.**

\* \* \* \* \*

(b) Keep the records required by this section for at least eight years after the due date for the final report. You may not use ~~emission~~-credits for any vehicles if you do not keep all the records required under this section. You must therefore keep these records to continue to bank valid credits.

\* \* \* \* \*

(e) We may require you to keep additional records or to send us relevant information not required by this section ~~in accordance with the Clean Air Act.~~

161. Revise § 1037.740 to read as follows:

**§ 1037.740 Restrictions for using ~~emission~~-credits.**

The following restrictions apply for using ~~emission~~-credits.

(a) *Averaging sets.* ~~Except as specified in § 1037.105(h) and paragraph (b) of this section,~~ Credits may be exchanged only within an averaging set. The following principal averaging sets apply for vehicles certified to the standards of this part involving ~~emission~~-credits as described in this subpart:

(1) Light HDV.

(2) Medium HDV.

(3) Heavy HDV.

(4) Note that other separate averaging sets also apply for ~~emission~~-credits not related to this part. ~~For example, vehicles certified to the greenhouse gas standards of 40 CFR part 86, subpart S, comprise a single averaging set.~~ Separate averaging sets also apply for engines under 40 CFR part 1036, including engines used in vehicles subject to this subpart.

(b) ~~[Reserved] Credits from hybrid vehicles and other advanced technologies. The following provisions apply for credits you generate under § 1037.615:~~

~~(1) Credits generated from Phase 1 vehicles may be used for any of the averaging sets identified in paragraph (a) of this section; you may also use those credits to demonstrate compliance with the CO<sub>2</sub> emission standards in 40 CFR part 86, subpart S, and 40 CFR part 1036. Similarly, you may use Phase 1 advanced technology credits generated under 40 CFR 86.1819-14(k)(7) or 1036.615 to demonstrate compliance with the CO<sub>2</sub> standards in this part. The maximum amount of advanced technology credits generated from Phase 1 vehicles that you may bring into each of the following service class groups is 60,000 Mg per model year:~~

~~(i) Spark-ignition HDE, Light HDE, and Light HDV. This group comprises the averaging set listed in paragraph (a)(1) of this section and the averaging set listed in 40 CFR 1036.740(a)(1) and (2).~~

~~(ii) Medium HDE and Medium HDV. This group comprises the averaging sets listed in paragraph (a)(2) of this section and 40 CFR 1036.740(a)(3).~~

~~(iii) Heavy HDE and Heavy HDV. This group comprises the averaging sets listed in paragraph (a)(3) of this section and 40 CFR 1036.740(a)(4).~~

~~(iv) This paragraph (b)(1) does not limit the advanced technology credits that can be used within a service class group if they were generated in that same service class group.~~

~~(2) Credits generated from Phase 2 and later vehicles are subject to the averaging set restrictions that apply to other emission credits.~~

(c) *Credit life*. Banked credits may be used only for five model years after the year in which they are generated. ~~For example, credits you generate in model year 2018 may be used to demonstrate compliance with emission standards only through model year 2023.~~

(d) *Other restrictions*. Other sections of this part specify additional restrictions for using ~~emission~~ credits under certain special provisions.

162. Revise § 1037.745 to read as follows:

**§ 1037.745 End-of-year ~~CO<sub>2</sub>~~ credit deficits.**

~~See 49 CFR 535.7 for provisions related to credit deficits for NHTSA's fuel consumption credits. Except as allowed by this section, we may void the certificate of any vehicle family certified to an FEL above the applicable standard for which you do not have sufficient credits by the deadline for submitting the final report.~~

~~(a) Your certificate for a vehicle family for which you do not have sufficient CO<sub>2</sub> credits will not be void if you remedy the deficit with surplus credits within three model years. For example, if you have a credit deficit of 500 Mg for a vehicle family at the end of model year 2015, you must generate (or otherwise obtain) a surplus of at least 500 Mg in that same averaging set by the end of model year 2018.~~

~~(b) You may not bank or trade away CO<sub>2</sub> credits in the averaging set in any model year in which you have a deficit.~~

~~(c) You may apply only surplus credits to your deficit. You may not apply credits to a deficit from an earlier model year if they were generated in a model year for which any of your vehicle families for that averaging set had an end-of-year credit deficit.~~

~~(d) You must notify us in writing how you plan to eliminate the credit deficit within the specified time frame. If we determine that your plan is unreasonable or unrealistic, we may deny an application for certification for a vehicle family if its FEL would increase your credit deficit. We may determine that your plan is unreasonable or unrealistic based on a consideration of past and projected use of specific technologies, the historical sales mix of your vehicle models, your commitment to limit production of higher emission vehicles, and expected access to traded credits. We may also consider your plan unreasonable if your credit deficit increases from one model year to the next. We may require that you send us interim reports describing your progress toward resolving your credit deficit over the course of a model year.~~

~~(e) If you do not remedy the deficit with surplus credits within three model years, we may void your certificate for that vehicle family. Note that voiding a certificate applies *ab initio*. Where the net deficit is less than the total amount of negative credits originally generated by the family, we will void the certificate only with respect to the number of vehicles needed to reach the amount of the net deficit. For example, if the original vehicle family generated 500 Mg of negative credits, and the manufacturer's net deficit after three years was 250 Mg, we would void the certificate with respect to half of the vehicles in the family.~~

~~(f) For purposes of calculating the statute of limitations, the following actions are all considered to occur at the expiration of the deadline for offsetting a deficit as specified in paragraph (a) of this section:~~

~~(1) Failing to meet the requirements of paragraph (a) of this section.~~

~~(2) Failing to satisfy the conditions upon which a certificate was issued relative to offsetting a deficit.~~



~~(3) Selling, offering for sale, introducing or delivering into U.S. commerce, or importing vehicles that are found not to be covered by a certificate as a result of failing to offset a deficit.~~

## **§ 1037.750 [Removed]**

163. Remove § 1037.750.

### ~~**§ 1037.750 What can happen if I do not comply with the provisions of this subpart?**~~

~~(a) For each vehicle family participating in the ABT program, the certificate of conformity is conditioned upon full compliance with the provisions of this subpart during and after the model year. You are responsible to establish to our satisfaction that you fully comply with applicable requirements. We may void the certificate of conformity for a vehicle family if you fail to comply with any provisions of this subpart.~~

~~(b) You may certify your vehicle family or subfamily to an FEL above an applicable standard based on a projection that you will have enough emission credits to offset the deficit for the vehicle family. See § 1037.745 for provisions specifying what happens if you cannot show in your final report that you have enough actual emission credits to offset a deficit for any pollutant in a vehicle family.~~

~~(c) We may void the certificate of conformity for a vehicle family if you fail to keep records, send reports, or give us information we request. Note that failing to keep records, send reports, or give us information we request is also a violation of 42 U.S.C. 7522(a)(2).~~

~~(d) You may ask for a hearing if we void your certificate under this section (see § 1037.820).~~

## **Subpart I—Definitions and Other Reference Information**

164. Amend § 1037.801 by:

- a. Revising the definitions of “Model year”, “Phase 1”, and “Phase 2”;
- b. Removing the definitions of “Phase 3” and “State of certified energy (SOCE)”;
- c. Revising the definition of “Tractor”;
- d. Removing the definition of “Usable battery energy (UBE)”;
- e. Revising the definitions of “Vocational vehicle” and “We (us, our)”.

The revisions read as follows:

### **§ 1037.801 Definitions.**

\* \* \* \* \*

*Model year* means one of the following for compliance with this part. Note that manufacturers may have other model year designations for the same vehicle for compliance with other requirements or for other purposes:

(1) For vehicles with a date of manufacture on or after January 1, 2021, *model year* means the manufacturer’s annual new model production period based on the vehicle’s date of manufacture, where the model year is the calendar year corresponding to the date of manufacture, except as follows:

- (i) The vehicle’s model year may be designated as the year before the calendar year corresponding to the date of manufacture if the engine’s model year is also from an earlier year. You may ask us to extend your prior model year certificate to include such vehicles. Note that § 1037.601(a)(2) limits the extent to which vehicle manufacturers may install engines built in earlier calendar years.

(ii) The vehicle's model year may be designated as the year after the calendar year corresponding to the vehicle's date of manufacture. For example, a manufacturer may produce a new vehicle by installing the engine in December 2023 and designating it as a model year 2024 vehicle.

(2) For ~~Phase 1~~ vehicles with a date of manufacture before January 1, 2021, *model year* means the manufacturer's annual new model production period, except as restricted under this definition and 40 CFR part 85, subpart X. 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. The model year may be set to match the calendar year corresponding to the date of manufacture.

(i) The manufacturer who holds the certificate of conformity for the vehicle must assign the model year based on the date when its manufacturing operations are completed relative to its annual model year period. In unusual circumstances where completion of your assembly is delayed, we may allow you to assign a model year one year earlier, provided it does not affect which regulatory requirements will apply.

(ii) Unless a vehicle is being shipped to a secondary vehicle manufacturer that will hold the certificate of conformity, the model year must be assigned prior to introduction of the vehicle into U.S. commerce. The certifying manufacturer must redesignate the model year if it does not complete its manufacturing operations within the originally identified model year. A vehicle introduced into U.S. commerce without a model year is deemed to have a model year equal to the calendar year of its introduction into U.S. commerce unless the certifying manufacturer assigns a later date.

\* \* \* \* \*

*Phase 1* means relating to the Phase 1 [fuel consumption](#) standards ~~specified in §§ 1037.105 and 1037.106. For example, a vehicle subject to the Phase 1 standards is a Phase 1 vehicle.~~

*Phase 2* means relating to the Phase 2 [fuel consumption](#) standards ~~specified in §§ 1037.105 and 1037.106.~~

~~*Phase 3* means relating to the Phase 3 standards specified in §§ 1037.105 and 1037.106.~~

~~*State of certified energy (SOCE)* means the measured or onboard UBE performance at a specific point in its lifetime, expressed as a percentage of the certified usable battery energy.~~

\* \* \* \* \*

*Tractor* ~~has the meaning given for "truck tractor" in 49 CFR 571.3~~ [means a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn.](#) This includes most heavy-duty vehicles specifically designed for the primary purpose of pulling trailers, but does not include vehicles designed to carry other loads. For purposes of this definition "other loads" would not include loads carried in the cab, sleeper compartment, or toolboxes. Examples of vehicles that are similar to tractors but that are not *tractors* under this part include dromedary tractors, automobile haulers, straight trucks with trailers hitches, and tow trucks. Note that the provisions of this part that apply for tractors do not apply for tractors that are classified as vocational tractors under § 1037.630.

~~Usable battery energy (UBE) means the energy the battery supplies from the start of the certification test procedure until the applicable break-off criterion. This part depends on certified and aged values of UBE to set battery monitoring requirements as described in § 1037.115(f).~~

\* \* \* \* \*

~~Vocational vehicle means a heavy-duty vehicle at or below 26,000 pounds GVWR that is not subject to standards under 40 CFR part 86, subpart S, or a heavy-duty vehicle above 26,000 pounds GVWR that is not a tractorrelating to a vehicle subject to the standards of § 1037.105 (including vocational tractors).~~

\* \* \* \* \*

*We (us, our)* means the Administrator of the Environmental Protection Agency and any authorized representatives for issues related to criteria pollutant standards. In the case of testing, compliance, and approvals related to fuel consumption standards, “we (us, our)” includes the Administrator of the National Highway Traffic Safety Administration (NHTSA) and any authorized representatives.

#### **§ 1037.805 [Amended]**

165. Amend § 1037.805 by removing “CH<sub>4</sub>” and “N<sub>2</sub>O” from table 1 to paragraph (a).

#### **§ 1037.805 Symbols, abbreviations, and acronyms.**

\* \* \* \* \*

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

TABLE 1 TO PARAGRAPH (a) OF § 1037.805—SYMBOLS FOR CHEMICAL SPECIES AND EXHAUST CONSTITUENTS	
Symbol	Species
C	carbon.
<del>CH<sub>4</sub></del>	<del>methane.</del>
CO	carbon monoxide.
CO <sub>2</sub>	carbon dioxide.
H <sub>2</sub> O	water.
HC	hydrocarbon.
NMHC	nonmethane hydrocarbon.
NMHCE	nonmethane hydrocarbon equivalent.
NO	nitric oxide.
NO <sub>2</sub>	nitrogen dioxide.
NO <sub>x</sub>	oxides of nitrogen.
<del>N<sub>2</sub>O</del>	<del>nitrous oxide.</del>
PM	particulate matter.
THC	total hydrocarbon.
THCE	total hydrocarbon equivalent.

\* \* \* \* \*

166. Amend § 1037.810 by revising paragraphs (c)(3) and (6) to read as follows:

**§ 1037.810 Incorporation by reference.**

\* \* \* \* \*

(c) \* \* \*

(3) SAE J1263 MAR2010, Road Load Measurement and Dynamometer Simulation Using Coastdown Techniques, Revised March 2010, (“SAE J1263”); IBR approved for §~~§~~ 1037.528 introductory text, (a), (b), (c), (e), and (h);~~1037.665(a).~~

\* \* \* \* \*

(6) SAE J2263 MAY2020, (R) Road Load Measurement Using Onboard Anemometry and Coastdown Techniques, Revised May 2020, (“SAE J2263”); IBR approved for §~~§~~ 1037.528 introductory text, (a), (b), (d), and (f);~~1037.665(a).~~

\* \* \* \* \*

## ATTACHMENT 6

### **PART 1039—CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES**

167. The authority citation for part 1039 continues to read as follows:  
Authority: 42 U.S.C. 7401-7671q.

168. Amend § 1039.699 by revising paragraphs (a) and (n) to read as follows:

#### **§ 1039.699 Emission standards and certification requirements for auxiliary power units for highway tractors.**

(a) This section describes emission standards and certification requirements for auxiliary power units (APU) installed on highway tractors subject to standards under 40 CFR ~~1037.106~~1037.102 starting in model year 2024.

\* \* \* \* \*

(n) If a highway tractor manufacturer violates 40 CFR ~~1037.106(g)~~1037.102 by installing an APU from you that is not properly certified and labeled, you are presumed to have caused the violation (see 40 CFR 1068.101(c)).