

§ 86.1811-17

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(h) through (s) [Reserved]. For guidance see § 86.1811-04.

(t) [Reserved]. For guidance see § 86.1811-09.

(u) *Cold temperature NMHC exhaust emission in-use standards for applicable phase-in models.* An interim full useful life in-use compliance standard is calculated by adding 0.1 g/mi to the FEL to which each test group is newly cer-

tified, and applies to that test group only for the model years shown in Tables S10-4 and S10-5. Otherwise, the in-use standard is the certification standard from paragraph (g)(2) of this section. The standards apply for purposes of in-use testing only and does not apply to certification or Selective Enforcement Auditing. Tables S10-4 and S10-5 follow:

TABLE S10-4—IN-USE STANDARDS FOR APPLICABLE PHASE-IN LDV/LLDTs

Model Year of Introduction	2008	2009	2010	2011	2012	2013
Models years that the interim in-use standard is available	2008	2009	2010	2011	2012	2013
	2009	2010	2011	2012	2013	2014
	2010	2011	2012	2013	2014	
	2011	2012	2013			

TABLE S10-5—IN-USE STANDARDS FOR APPLICABLE PHASE-IN HLDT/MDPVs

Model Year of Introduction	2010	2011	2012	2013	2014	2015
Models years that the interim in-use standard is available	2010	2011	2012	2013	2014	2015
	2011	2012	2013	2014	2015	2016
	2012	2013	2014	2015	2016	
	2013	2014	2015			

[72 FR 8564, Feb. 26, 2007]

§ 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 provisions of this section 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.

(b) *Tier 3 exhaust emission standards.* Exhaust emissions may not exceed the Tier 3 exhaust emission standards, as follows:

(1) Measure emissions using the chassis dynamometer procedures of 40 CFR part 1066, as follows:

(i) Establish appropriate load settings based on loaded vehicle weight (see § 86.1803).

(ii) Use appropriate driving schedules. Measurements involve testing over multiple driving schedules. The Federal Test Procedure (FTP) is based on testing with the Urban Dynamometer Driving Schedule (UDDS). The Supplemental Federal Test Procedure (SFTP) involves testing with the UDDS, the US06 driving schedule, and the SC03 driving schedule. See 40 CFR 1066.801 for further information on these test cycles.

(iii) Calculate SFTP emissions as a composite of test results over the driving schedules identified in paragraph (b)(1)(ii) of this section based on the following calculation:

$$\text{SFTP (g/mi)} = 0.35 \times \text{FTP} + 0.28 \times \text{US06} + 0.37 \times \text{SC03}$$

(A) For test vehicles that do not have air conditioning, you may omit SC03 testing. To calculate composite SFTP emissions for such vehicles, use FTP emission results to substitute for the SC03 value in the equation.

(B) You may also use FTP emission results to substitute for the SC03 value

in the equation for the types of vehicles identified in 40 CFR 600.115 that automatically qualify for the derived 5-cycle method for determining fuel economy label values. Such vehicles remain subject to the SFTP standard when tested over the SC03 driving schedule. Other vehicles remain subject to the litmus-test provisions in 40 CFR 600.115.

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

(v) Hydrocarbon emission standards are expressed as NMOG; however, for certain vehicles you may measure exhaust emissions based on nonmethane hydrocarbon instead of NMOG as described in 40 CFR 1066.635.

(vi) Measure emissions from hybrid electric vehicles (including plug-in hy-

brid 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.

(2) Table 1 of this section describes fully phased-in Tier 3 standards that apply as specified in this paragraph (b) for the identified driving schedules. The FTP standards for NMOG+NO_x apply on a fleet-average basis using discrete bin standards as described in paragraph (b)(4) of this section. The bin standards include additional emission standards for high-altitude testing and for CO emissions when testing over the FTP driving schedule. The SFTP standards for NMOG+NO_x apply on a fleet-average basis as described in paragraph (b)(5) of this section. Table 1 follows:

TABLE 1 OF § 86.1811-17—FULLY PHASED-IN TIER 3 EXHAUST EMISSION STANDARDS
[g/mile]

NMOG+NO _x		PM		CO	Formaldehyde
FTP ¹	SFTP	FTP	US06	SFTP	FTP
0.030	0.050	0.003	0.006	4.2	0.004

¹ The fleet-average FTP emission standard for NMOG+NO_x is 0.026 g/mile for any LDV or LDT1 test group certified to standards based on a useful life of 120,000 miles or 10 years in a given model year.

(3) The FTP standards specified in this section apply for testing at low-altitude conditions and high-altitude conditions as specified in paragraph (b)(4) of this section. The SFTP standards specified in paragraph (b)(2) of this section apply only for testing at low-altitude conditions.

(4) The FTP emission standard for NMOG+NO_x is based on a fleet average for a given model year. You must specify a family emission limit (FEL) for each test group. The FEL serves as the emission standard for the test group with respect to all required FTP testing. Calculate your fleet-average emission level as described in § 86.1860 based on the FEL that applies for low-altitude testing to show that you meet the specified standard. For multi-fueled vehicles, calculate fleet-average emission levels based only on emission levels for testing with gasoline or diesel fuel. You may generate emission credits for banking and trading and you may use

banked or traded credits as described in § 86.1861 for demonstrating compliance with the FTP emission standard for NMOG+NO_x. You comply with the emission standard for a given model year if you have enough credits to show that your fleet-average emission level is at or below the applicable standard. You may exchange FTP credits between or among any test groups subject to standards under this section. You may not exchange FTP and SFTP credits.

(i) Specify one of the identified values from Table 2 of this section as the FEL for demonstrating that your fleet-average emission level complies with the FTP emission standard for NMOG+NO_x under low-altitude conditions. These FEL values define emission bins that also determine corresponding emission standards for NMOG+NO_x emissions under high-altitude conditions, and for CO emissions, as follows:

TABLE 2 OF § 86.1811-17—TIER 3 FTP BIN STANDARDS
[g/mile]

FEL Name	NMOG+NO _x FELs for low altitude	NMOG+NO _x for high altitude	CO for low and high altitude
Bin 160	0.160	0.160	4.2
Bin 125	0.125	0.160	2.1
Bin 70	0.070	0.105	1.7
Bin 50	0.050	0.070	1.7
Bin 30	0.030	0.050	1.0
Bin 20	0.020	0.030	1.0
Bin 0	0.000	0.000	0.0

(ii) Manufacturers earn a compliance credit of 0.005 g/mile NMOG+NO_x for vehicles that are certified for a useful life of 150,000 miles or 15 years and that are covered by an extended warranty over the same period for all components whose failure triggers MIL illumination. Manufacturers may apply the compliance credit as follows:

(A) You may reduce your official FTP emission result for certification by the amount of the compliance credit if that allows you to certify to a more stringent bin. In that case, you may use the more stringent bin standard for calculating the fleet-average NMOG+NO_x emission level. For any compliance testing with these vehicles, the applicable FTP bin standard for NMOG+NO_x is higher than the specified bin standard by the amount of the compliance credit. For example, if the official FTP emission result for NMOG+NO_x is 0.052 g/mile, this qualifies for an FEL of 0.050 g/mile for calculating the fleet average and the vehicle is subject to an FTP bin standard of 0.055 g/mile.

(B) If the amount of the compliance credit does not allow you to certify to a more stringent bin, calculate the fleet-average NMOG+NO_x emission level using an FEL for these vehicles that is smaller than the bin standard by the amount of the compliance credit. For any compliance testing with these vehicles, the specified bin standard applies. For example, if the official FTP emission result for NMOG+NO_x is 0.038 g/mile, calculate the fleet-average NMOG+NO_x emission level by specifying an FEL of 0.045 g/mile; these vehicles are subject to the specified FTP bin standard of 0.050 g/mile.

(iii) If you qualify for a compliance credit for direct ozone reduction under

the LEV III program, you may apply the compliance credit approved for California vehicles as described in paragraphs (b)(4)(ii)(A) and (B) of this section.

(iv) You may combine the adjustments in paragraphs (b)(4)(ii) and (iii) of this section if you qualify for them separately.

(5) The SFTP emission standard for NMOG+NO_x is also based on a fleet average in a given model year. You must specify FELs as described in paragraph (b)(4) of this section and calculate a fleet-average emission level to show that you meet the SFTP emission standard for NMOG+NO_x, except that you may specify FELs in any even increment of 0.010 g/mile up to a maximum value of 0.180 g/mile. You may generate emission credits for banking and trading and you may use banked or traded credits as described in § 86.1861 for demonstrating compliance with the SFTP emission standard for NMOG+NO_x. You comply with the emission standard for a given model year if you have enough credits to show that your fleet-average emission level is at or below the applicable standard. You may exchange SFTP credits between or among any test groups subject to standards under this section. You may not exchange FTP and SFTP credits. The SFTP standards described in this section apply only for testing at low-altitude conditions.

(6) The full Tier 3 program includes new emission standards for NMOG+NO_x, PM, CO, and formaldehyde; it also includes measurement with a new test fuel and a longer useful life (for some vehicles). Vehicles meeting all these requirements are considered Final Tier 3 vehicles. Vehicles

that do not meet all the Tier 3 requirements are considered Interim Tier 3 vehicles. Paragraphs (b)(7) through (13) of this section describe how to comply with standards during a phase-in period.

(7) The Tier 3 PM standards phase in over several years. The following provisions describe the primary approach for phasing in the Tier 3 PM standards:

(i) You must meet the FTP and the US06 PM standards with 20, 20, 40, 70, and 100 percent of your projected nationwide sales of all vehicles subject to this section in model years 2017 through 2021, respectively. In model years 2017 and 2018, an interim US06 PM standard of 0.010 g/mile applies. Each vehicle meeting the Tier 3 FTP standard for PM must also meet the Tier 3 US06 standard for PM. In model year 2017, the phase-in requirement applies only for vehicles at or below 6,000 pounds GVWR; however, you may meet an alternative phase-in requirement of 10 percent in model year 2017 based on your full production of vehicles subject to standards under this section.

(ii) You may disregard the phase-in percentages specified in paragraph (b)(7)(i) of this section if you instead comply with an indexed PM phase-in schedule as described in this paragraph (b)(7)(ii). To do this, you must notify us of your intent before January 1, 2017, and include a detailed plan for complying with the indexed phase-in schedule. You comply with the indexed phase-in schedule by calculating a PM phase-in index at or above 540 using the following equation for model years 2017 through 2021:

$$\text{PM phase-in index} = 5 \cdot \text{APP}_{2017} + 4 \cdot \text{APP}_{2018} + 3 \cdot \text{APP}_{2019} + 2 \cdot \text{APP}_{2020} + \text{APP}_{2021}$$

Where:

APP = The phase-in percentage of vehicles meeting the Tier 3 PM standards for the indicated model year, based on actual sales, as described in paragraph (b)(7)(i) of this section.

(iii) Vehicles meeting the Tier 3 PM standards must meet those standards over the useful life as specified in § 86.1805. Note that Interim Tier 3 vehicles may have different useful life values for PM emission standards than for other emission standards.

(iv) Any vehicles not included for demonstrating compliance with the Tier 3 PM phase-in requirement must instead comply with an FTP emission standard for PM of 0.010 g/mile, and a composite SFTP emission standard for PM of 0.070 g/mile.

(v) Measure PM emissions from all vehicles using the same test fuel specified in paragraph (b)(8) of this section for measuring NMOG+NO_x emissions.

(vi) You may certify Interim Tier 3 vehicles based on carryover data.

(vii) You may use the alternative phase-in provisions described in paragraph (b)(9) of this section to transition to the Tier 3 exhaust emission standards on a different schedule.

(8) The following provisions describe the primary approach for phasing in the Tier 3 standards other than PM in 2025 and earlier model years:

(i) *FTP phase-in.* The fleet-average FTP emission standard for NMOG+NO_x phases in over several years as described in this paragraph (b)(8)(i). You must identify FELs as described in paragraph (b)(4) of this section and calculate a fleet-average emission level to show that you meet the FTP emission standard for NMOG+NO_x that applies for each model year. For model year 2017, do not include vehicles above 6,000 pounds GVWR. Through model year 2019, you may also certify to transitional Bin 85 or Bin 110 standards, which consist of all-altitude FTP emission standards for NMOG+NO_x of 0.085 or 0.110 g/mile, respectively; additional FTP standards for PM, CO, and formaldehyde apply as specified in this section for vehicles certified to Bin 125 standards. Fleet-average FTP emission standards decrease through the phase-in period as shown in the following table:

TABLE 3 OF § 86.1811-17—DECLINING FLEET-AVERAGE TIER 3 FTP EMISSION STANDARDS FOR NMOG+NO_x

Model year	[g/mile]	
	LDV, LDT ¹	LDT2, HLD ^T
2017 ²	0.086	0.101
2018	0.079	0.092
2019	0.072	0.083
2020	0.065	0.074
2021	0.058	0.065
2022	0.051	0.056
2023	0.044	0.047
2024	0.037	0.038

TABLE 3 OF § 86.1811-17—DECLINING FLEET-AVERAGE TIER 3 FTP EMISSION STANDARDS FOR NMOG+NO_x—Continued

[g/mile]		
Model year	LDV, LDT1 ¹	LDT2, HLDT
2025	0.030	0.030

¹ Calculate the adjusted fleet-average standard for LDV and LDT1 test groups certified to standards based on a useful life of 120,000 miles or 10 years in a given model year by multiplying the specified value by 0.85 and rounding to the nearest 0.001 g/mile. Through model year 2019, apply this adjustment only if one or more test groups is certified to Bin 70 or lower standards based on a useful life of 120,000 miles or 10 years.
² Vehicles above 6,000 pounds GVWR must meet the Tier 3 standards starting with model year 2018.

(ii) *SFTP phase-in.* The fleet-average SFTP emission standard for NMOG+NO_x phases in over several years as described in this paragraph (b)(8)(ii). You must identify FELs as described in paragraph (b)(5) of this section and calculate a fleet-average emission level to show that you meet the SFTP emission standard for NMOG+NO_x that applies for each model year.

(A) Calculate the fleet-average emission level together for all your light-duty vehicles and light-duty trucks, except for those certified using the provisions of paragraph (b)(8)(ii)(C) of this section. For model year 2017, do not include vehicles above 6,000 pounds GVWR (in the numerator or denominator).

(B) Fleet-average FTP emission standards decrease through the phase-in period as shown in the following table:

TABLE 4 OF § 86.1811-17—DECLINING FLEET-AVERAGE TIER 3 SFTP EMISSION STANDARDS

Model year	NMOG+NO _x (g/mile)
2017 ¹	0.103
2018	0.097
2019	0.090
2020	0.083
2021	0.077
2022	0.070
2023	0.063
2024	0.057
2025	0.050

¹ Vehicles above 6,000 pounds GVWR must meet the Tier 3 standards starting with model year 2018.

(C) You may use the Option 1 provisions specified in the LEV III program to demonstrate compliance with EPA's SFTP standards. Do not include any such test groups when demonstrating compliance with the phased-in fleet-average

SFTP standards specified in this paragraph (b)(8)(ii). Note that this option is not available for vehicles certified to the transitional bins described in paragraph (b)(8)(i) of this section.

(iii) *Interim provisions.* (A) For LDT2 and HLDT certified to bins higher than Bin 70 under this section through model year 2019, the Tier 2 useful life period applies as specified in § 86.1805-12 for all criteria pollutants other than PM. A similar provisions applies for LDV and LDT1, as described in Table 3 of this section.

(B) You may use the E0 test fuel specified in § 86.113 through model year 2019 for gasoline-fueled vehicles certified to bins higher than Bin 70. You may not certify these vehicles using carryover data after model year 2019.

(iv) You may use the alternative phase-in provisions described in paragraph (b)(9) of this section to transition to the Tier 3 exhaust emission standards on a different schedule.

(9) This paragraph (b)(9) describes an alternative approach to phasing in the Tier 3 emission standards for vehicles above 6,000 pounds GVWR. If you choose this approach, you must phase in the Tier 3 standards for all your vehicles above 6,000 pounds GVWR that are subject to this section according to this schedule. Under this alternative phase-in, you must meet the fully phased-in standards specified in this paragraph (b) with 40, 70, and 100 percent of your projected nationwide sales of all vehicles above 6,000 pounds GVWR that are subject to this section in model years 2019 through 2021, respectively. Any vehicles not subject to Tier 3 standards during the phase-in period must continue to comply with the Tier 2 standards in § 86.1811-04(c) and (f), including the Tier 2 SFTP emission standards for NMHC+NO_x and CO for 4,000-mile testing as specified in § 86.1811-04(f)(1). Vehicles subject to Tier 2 standards under this paragraph (b)(9) are subject to the useful life provisions in § 86.1805-12 relative to exhaust emission standards. Each vehicle counting toward the phase-in percentage under this paragraph (b)(9) must meet all the standards that apply throughout the useful life as specified in § 86.1805-17, and must use the Tier 3

test fuel specified in § 86.113-07. The following exceptions and special provisions apply under this paragraph (b)(9):

(i) For model year 2019, you may exclude from the phase-in calculation any test groups with vehicles above 6,000 pounds GVWR that have a Job 1 date on or before March 3, 2018 (see 40 CFR 85.2304).

(ii) The FTP and SFTP emission standards for NMOG+NO_x are fleet-average standards. Calculate your fleet-average values based on all the vehicles that are subject to the standard in a given year. You may not generate credits for banking or trading in model years 2019 or 2020, and you may not use banked or traded credits to demonstrate compliance with the standards in those years.

(iii) The US06 emission standard for PM is 0.010 g/mile in model years 2019 through 2021, and 0.006 g/mile starting in model year 2022. The other standards described in this paragraph (b)(9) apply to all your vehicles above 6,000 pounds GVWR in model years 2022 through 2024.

(10) You may not use credits generated from Tier 2 vehicles for demonstrating compliance with the Tier 3 standards except as specified in this paragraph (b)(10). You may generate early credits with U.S. sales of Tier 2 vehicles in the two model years before the Tier 3 standards start to apply for a given vehicle model. Vehicles certified to the Tier 2 standards must meet all the Tier 2 requirements in § 86.1811-10, including the fleet-average Tier 2 standards. Calculate early Tier 3 emission credits as described in § 86.1861 by subtracting the appropriate Tier 2 fleet-average value for FTP emissions of NMOG+NO_x from 0.160 g/mile. Calculate your fleet-average value for the model year based on vehicles at or below 6,000 pounds GVWR in 2015, on all sizes of vehicles in 2016, and on vehicles above 6,000 pounds GVWR in 2017. You may use these early credits as described in § 86.1861 for demonstrating compliance with the FTP emission standard for NMOG+NO_x starting in model year 2017. For model years 2018 and later, you may use these early credits for banking or trading subject to a limitation based on credits generated in California, as follows:

(i) For the applicable model years in which you generate emission credits relative to California's LEV III fleet-average NMOG+NO_x standard, determine the actual California sales of light-duty vehicles and light-duty trucks and the actual nationwide sales of those same vehicles. In 2015, count sales only from vehicle models at or below 6,000 pounds GVWR. For each model year, multiply the credits generated under the California program by the ratio of nationwide vehicle sales to LEV III vehicle sales to calculate an effective nationwide quantity. Sum these results for model years 2015 through 2017. Note that this calculation results in a maximum credit quantity based on vehicle sales in all states, even though the initial credit calculation does not include vehicle sales in California or the section 177 states. If you comply with the LEV III standards based on pooled emission credits for California and the section 177 states, use those pooled emission credits and corresponding sales for calculating the maximum credit quantity under this paragraph (b)(10)(i).

(ii) You may not use more early credits generated under this paragraph (b)(10) for banking or trading to demonstrate compliance with Tier 3 emission standards than the calculated value of the effective nationwide credit quantity summed in paragraph (b)(10)(i) of this section. If your generated credits are greater than this threshold, determine the percentage of your generated early credits that exceed the threshold. Calculate an adjusted quantity of early credits generated under this paragraph (b)(10) by decreasing the generated quantity from each model year by the calculated percentage that exceed the applicable threshold. This adjusted quantity of credits may be used for banking or trading relative to the Tier 3 standards, subject to the five-year credit life described in § 86.1861.

(11) You may certify vehicles to the Tier 3 standards starting in model year 2015. To do this, you may either sell all your LEV III vehicles models nationwide, or you may certify a subset of your fleet to alternate fleet-average emission standards as follows:

(i) The alternate fleet-average FTP emission standards for NMOG+NO_x are 0.100 g/mile in 2015 and 0.093 g/mile in 2016 for LDV and LDT1.

(ii) The alternate fleet-average FTP emission standards for NMOG+NO_x are 0.119 g/mile in 2015, 0.110 g/mile in 2016, and 0.101 g/mile in 2017 for LDT2 and HLDT.

(iii) The alternate fleet-average SFTP emission standards for NMOG+NO_x are 0.140 in 2015 for LDV and LDT1, 0.110 in 2016 for all vehicles, and 0.103 in 2017 for LDT2 and HLDT.

(iv) The vehicles must meet FTP and SFTP standards for PM as specified in § 86.1811-04. The PM testing provisions of § 86.1829-01(b)(1)(iii)(B) apply for these vehicles.

(v) Vehicles not certified to the Tier 3 standards in a given model year must meet all the requirements that apply for Tier 2 vehicles in that model year.

(vi) For cold temperature testing and for high-altitude testing, you may use the E0 fuel specified in § 86.113-04(a) or § 86.213 instead of the E10 test fuel specified in § 86.113-07.

(vii) For vehicles certified under this paragraph (b)(11), you may generate emission credits and use those credits for demonstrating compliance with Tier 3 standards as described in paragraph (b)(10) of this section.

(12) The following alternate standards apply for in-use testing:

(i) Alternate in-use FTP standards for NMOG+NO_x apply for 2021 and earlier model year vehicles certified to Bin 70 and lower. Calculate these alternate standards by multiplying the applicable FEL by 1.4. These alternate standards apply only for testing at low-altitude conditions.

(ii) The alternate in-use FTP standard for PM is 0.006 g/mile for 2021 and earlier model year vehicles.

(iii) The in-use US06 standard for PM is 0.010 g/mile for 2023 and earlier model year vehicles.

(13) Keep records as needed to show that you meet the requirements specified in this paragraph (b) for phasing in standards and for complying with declining fleet-average average standards.

(c) *Highway NMOG+NO_x exhaust emission standard.* NMOG+NO_x emissions measured on the federal Highway Fuel

Economy Test in 40 CFR part 600, subpart B, may not exceed the applicable FTP bin standard for NMOG+NO_x. Demonstrate compliance with this standard for low-mileage vehicles by applying the appropriate deterioration factor. For vehicles not certified to any Tier 3 emission standards specified in paragraph (b) of this section, the provisions of § 86.1811-04(j) apply instead of this paragraph (c).

(d) *Special provisions for Otto-cycle engines.* The special provisions described in this paragraph (d) apply for vehicles with Otto-cycle engines. For vehicles not certified to any Tier 3 emission standards, the provisions of § 86.1810-01(i)(6), (i)(13), and (i)(14) apply instead of this paragraph (d).

(1) *Enrichment limits.* The nominal air-fuel ratio throughout the US06 cycle may not be richer than the leanest air-fuel mixture required for lean best torque, except as allowed under paragraph (d)(2) of this section. Unless we approve otherwise in advance, lean best torque is the leanest air-fuel ratio required at any speed and load point with a fixed spark advance to make peak torque. The allowable tolerance around the nominal value for any given speed and load point over the US06 cycle for a particular vehicle is 4 percent, which is calculated as the nominal mass-based air-fuel ratio for lean best torque divided by 1.04.

(2) *Engine protection.* AECDs that use commanded enrichment to protect the engine or emission control hardware must not use enrichment more frequently or to a greater degree than is needed for this purpose. For purposes of this section, commanded enrichment includes intended engine operation at air-fuel ratios rich of stoichiometry, except the following:

(i) Cycling back and forth in a narrow window between rich and lean operation as a result of feedback controls targeted to maintain overall engine operation at stoichiometry.

(ii) Small changes in the target air-fuel ratio to optimize vehicle emissions or drivability. This may be called "closed-loop biasing."

(iii) Temporary enrichment in response to rapid throttle motion.

(iv) Enrichment during cold-start and warm-up conditions.

(v) Temporary enrichment for running OBD checks to comply with § 86.1806.

(3) *A/C-on specific calibrations.* (i) A/C-on specific calibrations (e.g., air-fuel ratio, spark timing, and exhaust gas recirculation) that differ from A/C-off calibrations may be used for a given set of engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce emission control effectiveness during A/C-on operation when the vehicle is operated under conditions that may reasonably be expected during normal operation and use. If emission control effectiveness decreases as a result of such calibrations, the manufacturer must describe in the Application for Certification the circumstances under which this occurs and the reason for using these calibrations.

(ii) For AECs involving commanded enrichment, these AECs must not operate differently for A/C-on operation than for A/C-off operation, except as provided under paragraph (d)(2) of this section. This includes both the sensor inputs for triggering enrichment and the degree of enrichment employed.

(4) *“Lean-on-cruise” calibration strategies.* Manufacturers may use “lean-on-cruise” strategies subject to the following specifications:

(i) A “lean-on-cruise” strategy is defined as the use of an air-fuel ratio significantly leaner than stoichiometry during non-deceleration conditions at speeds above 40 mph.

(ii) You must not employ “lean-on-cruise” strategies during vehicle operation in normal driving conditions, including A/C usage, unless at least one of the following conditions is met:

(A) Such strategies are substantially employed during the FTP, US06, or SC03 duty cycle.

(B) Such strategies are demonstrated not to significantly reduce vehicle emission control effectiveness over the operating conditions in which they are employed.

(C) Such strategies are demonstrated to be necessary to protect the vehicle occupants, engine, or emission control hardware.

(iii) If you propose to use a “lean-on-cruise” strategy, you must describe in the application for certification the circumstances under which such a calibration would be used and the reasons for using it.

(e) through (f) [Reserved]

(g) *Cold temperature exhaust emission standards.* The following standards apply for vehicles tested over the test procedures specified in subpart C of this part:

(1) *Cold temperature CO standards.* These cold temperature CO standards are applicable only to gasoline-fueled vehicles. These standards apply for testing at low-altitude conditions and high-altitude conditions. Cold temperature CO exhaust emission standards apply when measured using the test procedures specified in subpart C of this part, as follows:

(i) For LDV and LDT1, the standard is 10.0 g/mile CO.

(ii) For LDT2, LDT3 and LDT4, the standard is 12.5 grams per mile CO.

(2) *Cold temperature NMHC standards.* Fleet average cold temperature NMHC standards are applicable only to gasoline-fueled vehicles, and apply equally to certification and in-use except as otherwise specified in § 86.1811-10(u) for in-use standards for applicable phase-in models. Testing with other fuels such as a high-level ethanol-gasoline blend, or testing on diesel vehicles, is not required. Multi-fuel, bi-fuel or dual-fuel vehicles must comply with requirements using gasoline only.

(i) The standards are shown in the following table:

TABLE 5 OF § 86.1811-17—FLEET AVERAGE COLD TEMPERATURE NMHC EXHAUST EMISSION STANDARDS

Vehicle weight category	Cold temperature NMHC sales-weighted fleet average standard (g/mile)
LDV and LLDT	0.3
HLDT	0.5

(ii) The manufacturer must calculate its fleet average cold temperature NMHC emission level(s) as described in § 86.1864-10(m).

(iii) The standards specified in this paragraph (g)(2) apply only for testing at low-altitude conditions. However,

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manufacturers must submit an engineering evaluation indicating that common calibration approaches are utilized at high altitudes. 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.

(h) *Small-volume manufacturers.* Small-volume manufacturers may use the following Tier 3 phase-in provisions:

(1) Instead of the fleet-average FTP standards for NMOG+NO_x specified in this section, small-volume manufacturers may meet alternate fleet-average standards of 0.125 g/mile through model year 2021, and 0.051 g/mile for model years 2022 through 2027. The following additional provisions apply for vehicles certified under this paragraph (h)(1):

(i) Vehicles are subject to exhaust emission standards over the useful life as specified in §86.1805-12 through model year 2021, and as specified in this section starting in model year 2022.

(ii) Gasoline-fueled vehicles may use the E0 test fuel specified in §86.113-04 for vehicles certified to bins higher than Bin 70 through model year 2021.

(iii) Vehicles certified under this paragraph (h)(1) may generate emission credits and they may use banked or traded emission credits relative to the alternate fleet-average FTP standard for NMOG+NO_x only in model years 2022 through 2027.

(iv) Vehicles are subject to all the other requirements specified in this section.

(2) Small-volume manufacturers may delay complying with all the requirements of this section until model year 2022, and instead meet all the requirements that apply to Tier 2 vehicles under §86.1811-10 for 2021 and earlier model years.

(3) If meeting the Tier 3 standards would cause severe economic hardship, small-volume manufacturers may ask us to approve an extended compliance deadline under the provisions of 40 CFR 1068.250, except that the solvency criterion does not apply and there is no

maximum duration of the hardship relief.

[79 FR 23713, Apr. 28, 2014]

§86.1813-17 Evaporative and refueling emission standards.

Vehicles must meet evaporative and refueling emission standards as specified in this section. These standards apply for heavy duty vehicles above 14,000 pounds GVWR as specified in §86.1801. The emission standards apply for total hydrocarbon equivalent (THCE) measurements using the test procedures specified in subpart B of this part, as appropriate. Note that §86.1829 allows you to certify without testing in certain circumstances. Except as specified in paragraph (b) of this section, evaporative and refueling emission standards do not apply for diesel-fueled vehicles. Unless otherwise specified, MDPVs are subject to all the same provisions of this section that apply to LDT4.

(a) *Tier 3 evaporative emission standards.* Vehicles may not exceed the Tier 3 evaporative emission standards, as follows:

(1) Measure emissions using the test procedures of subpart B of this part, as follows:

(i) Follow the vehicle preconditioning and exhaust testing procedures as described in subpart B of this part.

(ii) Measure diurnal, running loss, and hot soak emissions as shown in §86.130. This includes separate measurements for the two-diurnal test sequence and the three-diurnal test sequence; however, gaseous-fueled vehicles are not subject to evaporative emission standards using the two-diurnal test sequence.

(iii) For gasoline-fueled vehicles, use E10 test fuel as required in §86.113, except as specified in this section.

(iv) Emissions are generally measured with a flame ionization detector (FID). In the case of diurnal, hot soak, and running loss testing with E10 test fuel, multiply measured (unspeciated) FID values by 1.08 to account for the FID's reduced response to ethanol. You may instead determine total hydrocarbon equivalent for E10 testing based on speciated measurements as described in §86.143-96(c). You must use