

§ 1960.1. Exhaust Emission Standards and Test Procedures - 1981 through 2006 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

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(r) 4000-Mile Supplemental FTP Emission Standards. The Supplemental Federal Test Procedure (SFTP) standards in this section are ~~represent~~ the maximum SFTP exhaust emissions at 4,000 miles + 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1960.1(k), and with the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures ~~and for 2004 2009 through 2016~~ ~~and Subsequent Model~~ Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The SFTP exhaust emission levels from new 2001 through 2020 ~~and subsequent~~ model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class certifying to the LEV II exhaust emission standards in section 1961, and new 2003 through 2020 model ~~and subsequent~~ low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles in the medium-duty class certifying to the LEV II exhaust emission standards in section 1961, shall not exceed:

**SFTP EXHAUST EMISSION STANDARDS
FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND
SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE PASSENGER CAR,
LIGHT-DUTY TRUCK, AND MEDIUM-DUTY VEHICLE CLASSES**
(grams per mile)^{5,6,7,8,9,10,14}

Vehicle Type ¹	Gross Vehicle Weight Rating (lbs.)	Loaded Vehicle Test Weight (lbs.) ²	US06 Test ¹		A/C Test ^{1,45}	
			NMHC ³⁴ + NOx ¹	CO ¹	NMHC ³⁴ + NOx ¹	CO ¹
PC	All	All Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.14	8.0	0.20	2.7
LDT LDT	< 6,000 lbs.	0-3750 Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.14	8.0	0.20	2.7
		3751-5750 Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.25	10.5	0.27	3.5
MDV MDV	6,001-8,500 lbs. ²	3751-5750 Vehicles in this category are tested at their adjusted loaded vehicle weight (average of curb weight and GVWR)	0.40	10.5	0.31	3.5
		5751-8500 ³ Vehicles in this category are tested at their adjusted loaded vehicle weight (average of curb weight and GVWR)	0.60	11.8	0.44	4.0

¹ *Abbreviations and Definitions.* For the purposes of this SFTP standards table only, the following abbreviations and definitions apply:
 "PC" means passenger car.
 "LDT" means light-duty truck, defined as any motor vehicle rated at 6,000 pounds gross vehicle weight or less, which is designed primarily for purposes of transportation of property

or is a derivative of such a vehicle, or is available with special features enabling off-street or off-highway operation and use.

"MDV" means medium-duty truck, defined as any motor vehicle having a manufacturer's gross vehicle weight rating of greater than 6,000 pounds and less than 14,001 pounds, except passenger cars.

"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.

"CO" means carbon monoxide emissions.

"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.

"A/C" means air-conditioning.

² ~~For MDVs, "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.~~

²³ Vehicles with a gross vehicle weight rating over 8,500 pounds are exempted from the requirements of this subsection.

³⁴ *Non-Methane Hydrocarbon Emissions.* Hydrocarbon emissions shall be measured in accordance with Part B (Determination of Non-Methane Hydrocarbon Mass Emissions by Flame Ionization Detection) of the "California Non-Methane Organic Gas Test Procedures" as incorporated by reference in section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

⁴⁵ *A/C-on Specific Calibrations.* A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

⁵⁶ *SFTP.* SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of

Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle, except the test weight shall be that specified in this subsection 1960.1(r), regardless of what may be specified in the Code of Federal Regulations. These sections of the Code of Federal Regulations are incorporated herein by reference.

⁶⁷ *Applicability to Alternative Fuel Vehicles.* These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

⁷⁸ *Air to Fuel Ratio Requirement.* With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions ("tip-in" or "tip-out" conditions), the air to fuel ratio shall not be richer at any time than, for a given engine operating condition (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters), the leanest air to fuel mixture required to obtain maximum torque (lean best torque), with a tolerance of six percent of the fuel consumption. The Executive Officer may approve a manufacturer's request for approval to use additional enrichment in subsequent testing if the manufacturer demonstrates that additional enrichment is needed to protect the vehicle, occupants, engine, or emission control hardware.

⁸⁹ *"Lean-On-Cruise" Calibration Strategies.* In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or
2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or
3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

The above provisions shall not apply to vehicles powered by "lean-burn" engines or Diesel-cycle engines. A "lean-burn" engine is defined as an Otto-cycle engine designed to run at an air-fuel ratio significantly greater than stoichiometry during the large majority of its operation.

⁹⁴⁰ *Phase-In Requirements.* For the purposes of this 1960.1(r) section only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of low-emission and ultra-low-emission PCs and LDTs from 0-5750 pounds loaded vehicle weight sold in California. Each manufacturer's MDV fleet shall be defined as the total projected number of low-emission, ultra-low-emission, and super-ultra-low-emission MDVs less than 8501 pounds gross vehicle weight rating sold in California.

- a. For the 2001 through 2014 model years, manufacturers of PCs, LDTs, and MDVs, except small volume manufacturers, shall certify a minimum percentage of their PC and LDT fleet, and a minimum percentage of their MDV fleet, according to the following phase-in schedule.

Model Year	Percentage	
	PC, LDT	MDV
2001	25	NA
2002	50	NA
2003	85	25
2004	100	50
2005 through 2014 and subsequent	100	100

- b. Manufacturers may use an “Alternative or Equivalent Phase-in Schedule” to comply with the phase-in requirements. An “Alternative Phase-in” is one that achieves at least equivalent emission reductions by the end of the last model year of the scheduled phase-in. Model-year emission reductions shall be calculated by multiplying the percent of vehicles (based on the manufacturer’s projected California sales volume of the applicable vehicle fleet) meeting the new requirements per model year by the number of model years implemented prior to and including the last model year of the scheduled phase-in. The “cumulative total” is the summation of the model-year emission reductions (e.g., a four model-year 25/50/85/100 percent phase-in schedule would be calculated as: $(25\% \times 4 \text{ years}) + (50\% \times 3 \text{ years}) + (85\% \times 2 \text{ years}) + (100\% \times 1 \text{ year}) = 520$). Any alternative phase-in that results in an equal or larger cumulative total than the required cumulative total by the end of the last model year of the scheduled phase-in shall be considered acceptable by the Executive Officer under the following conditions: 1) all vehicles subject to the phase-in shall comply with the respective requirements in the last model year of the required phase-in schedule and 2) if a manufacturer uses the optional phase-in percentage determination in section 1960.1(q) note (9), the cumulative total of model-year emission reductions as determined only for PCs and LDTs certified to this section 1960.1(r) must also be equal to or larger than the required cumulative total by end of the 2004 model year. Manufacturers shall be allowed to include vehicles introduced before the first model year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year before the scheduled phase-in begins would be calculated as: $(10\% \times 5 \text{ years})$ and added to the cumulative total).
- c. Small volume manufacturers of PCs, LDTs, and MDVs shall certify 100% of their PC and LDT fleet in the 2004 through 2014 and subsequent model years, and 100% of their MDV fleet in the 2005 through 2014 and subsequent model years.

¹⁹⁴ *Single-Roll Electric Dynamometer Requirement.* For all vehicles certified to the SFTP standards, a single-roll electric dynamometer or a dynamometer which produces equivalent results, as set forth in the “California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles” as incorporated by reference in section 1960.1(k) or the “California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles,” as incorporated by reference in section 1961(d), as applicable, must be used for all types of emission testing to determine compliance with the associated emission standards.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

