

§86.004-25 Maintenance.

Section 86.004-25 includes text that specifies requirements that differ from §86.094-25. Where a paragraph in §86.094-25 is applicable to §86.004-25, this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see §86.094-25.”-

(a)(1) *Applicability.* This section applies to light-duty vehicles, light-duty trucks, and HDEs.

(2) Maintenance performed on vehicles, engines, subsystems, or components used to determine exhaust, evaporative or refueling emission deterioration factors, as appropriate, is classified as either emission-related or non-emission-related and each of these can be classified as either scheduled or unscheduled. Further, some emission-related maintenance is also classified as critical emission-related maintenance.

(b) Introductory text through (b)(3)(ii) [Reserved]. For guidance see §86.094-25.

(b)(3)(iii) For otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(3)(iii) (A)-(E) of this section shall occur at 50,000 miles (or 1,500 hours) of use and at 50,000-mile (or 1,500-hour) intervals thereafter.

(A) Crankcase ventilation valves and filters.

(B) Emission-related hoses and tubes.

(C) Ignition wires.

(D) Idle mixture.

(E) Exhaust gas recirculation system related filters and coolers.

(iv) For otto-cycle light-duty vehicles, light-duty trucks and otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the oxygen sensor shall occur at 80,000 miles (or 2,400 hours) of use and at 80,000-mile (or 2,400-hour) intervals thereafter.

(v) For otto-cycle heavy-duty engines, the adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(3)(v) (A)-(H) of this section shall occur at 100,000 miles (or 3,000 hours) of use and at 100,000-mile (or 3,000-hour) intervals thereafter.

(A) Catalytic converter.

(B) Air injection system components.

(C) Fuel injectors.

(D) Electronic engine control unit and its associated sensors (except oxygen sensor) and actuators.

(E) Evaporative emission canister.

(F) Turbochargers.

(G) Carburetors.

(H) Exhaust gas recirculation system (including all related control valves and tubing) except as otherwise provided in paragraph (b)(3)(iii)(E) of this section.

(4) For diesel-cycle heavy-duty engines, emission-related maintenance in addition to or at shorter intervals than the following specified values will not be accepted as technologically necessary, except as provided in paragraph (b)(7) of this section:

(i) Minimum Maintenance Intervals for Diesel-Cycle Heavy-Duty Engines:

For 2021 or earlier model-year diesel-cycle heavy-duty engines, and for 2022 or subsequent model-year diesel-cycle heavy-duty engines that are designed for use in vehicles with a GVWR less than or equal to 14,000 pounds, the adjustment, cleaning, repair, or replacement of the ~~following~~ items listed in paragraphs (b)(4)(i) (A)-(D) of this section shall initially not occur before at 50,000 miles (or 1,500 hours) of use and thereafter not more frequently than at intervals of 50,000-miles (or 1,500-hours) intervals thereafter:

For 2022 or subsequent model-year diesel-cycle heavy-duty engines that are designed for use in vehicles with a GVWR greater than 14,000 pounds:

- Adjustment or cleaning frequency. The frequency of manufacturer designated adjustment or cleaning for the items listed in paragraphs (b)(4)(i) (A)-(D) shall be limited by the same minimum maintenance intervals as for 2021 or earlier model-year diesel-cycle heavy-duty engines as stated in this paragraph (b)(4)(i).
- Repair or replacement frequency. The frequency of manufacturer designated repair or replacement for the emission-related components and systems listed in paragraph (b)(4)(vi) shall be limited by the minimum maintenance intervals stated therein.

(A) Exhaust gas recirculation system related filters and coolers.

(B) Crankcase ventilation valves and filters.

(C) Fuel injector tips (cleaning only).

(D) DEF filters.

(ii) [Reserved]

(iii) For 2021 or earlier model-year diesel-cycle heavy-duty engines , and for 2022 or subsequent model-year diesel-cycle heavy-duty engines that are designed for use in vehicles with a GVWR less than or equal to 14,000 pounds, ~~the~~ adjustment, cleaning, repair, or replacement of the items listed in paragraphs (b)(4)(iii) (A)-(G) of this section shall initially not occur before at 100,000 miles (or 3,000 hours) of use and thereafter not more frequently than at intervals of at least 100,000-miles (or 3,000-hours) intervals thereafter for light heavy-duty diesel engines, or, thereafter at intervals of at least 150,000 miles (or 4,500 hours) intervals thereafter for medium and heavy heavy-duty diesel engines.

For 2022 or subsequent model-year diesel-cycle heavy-duty engines that are designed for use in vehicles with a GVWR greater than 14,000 pounds:

- Adjustment or cleaning frequency. The frequency of manufacturer designated adjustment or cleaning for the items listed in paragraphs (b)(4)(iii) (A)-(G) shall be limited by the same minimum maintenance intervals as for 2021 or earlier model-year diesel-cycle heavy-duty engines as stated in this paragraph (b)(4)(iii).
- Repair or replacement frequency. The frequency of manufacturer designated repair or replacement for the emission-related components and systems listed in paragraph (b)(4)(vi) shall be limited by the minimum maintenance intervals stated therein.

(A) Fuel injectors.

(B) Turbocharger.

(C) Electronic engine control unit and its associated sensors and actuators.

(D) Particulate trap or trap oxidizer systems including related components (adjustment and cleaning only for filter element, replacement of the filter element is not allowed during the useful life).

(E) Exhaust gas recirculation system (including all related control valves, and tubing) except as otherwise provided in paragraph (b)(4)(i)(A) of this section.

(F) Catalytic converter (adjustment and cleaning only for catalyst beds, replacement of the bed is not allowed during the useful life).

(G) Any other add-on emissions-related component (i.e., a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade

emissions control and whose function is not integral to the design and performance of the engine.)

(iv) [Reserved]

(v) For engines that use selective catalytic reduction, the diesel exhaust fluid (DEF) tank must be sized so that DEF replenishment can occur at an interval, in miles or hours of vehicle operation, that is no less than the miles or hours of vehicle operation corresponding to the vehicle's fuel capacity. Use good engineering judgment to ensure that you meet this requirement for worst-case operation. For example, if the highest rate of DEF consumption (relative to fuel consumption) will occur under highway driving conditions (characterized by the SET), the DEF tank should be large enough that a single tankful of DEF would be enough to continue proper operation of the SCR system for the expected highway driving range with a single tank of fuel. Conversely, if the highest rate of DEF consumption (relative to fuel consumption) will occur under city or urban driving conditions (characterized by the transient FTP test), the DEF tank should be large enough that a single tank of DEF would be enough to continue proper operation of the SCR system for the expected city driving range with a single tank of fuel. For engine testing in a laboratory, any size DEF tank and fuel tank may be used; however, for our testing of engines, we may require you to provide us with a production-type DEF tank, including any associated sensors.

(vi) For 2022 or subsequent model-year diesel-cycle heavy-duty engines that are designed for use in vehicles with a GVWR greater than 14,000 pounds, repair and replacement for the emission-related components and systems listed below shall initially not occur before the mileage specified in the table, and thereafter not more frequently than as provided in paragraph (b)(4)(vi)(C) of this section :

<u>Component or System</u>	<u>Minimum Initial Repair / Replacement Interval</u>		
	<u>Light Heavy-Duty Diesel Engine</u> <u>14,000 lbs. < GVWR ≤ 19,500 lbs.</u>	<u>Medium Heavy-Duty Diesel Engine</u> <u>19,500 lbs. < GVWR ≤ 33,000 lbs.</u>	<u>Heavy Heavy-Duty Diesel Engine</u> <u>GVWR > 33,000 lbs.</u>
<u>Exhaust Gas Recirculation (EGR) System (valves & cooler - not including hoses)</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>
<u>Exhaust Gas Recirculation (EGR) System (other than valves & cooler)</u>	<u>110,000 miles or 3 years</u>	<u>185,000 miles</u>	<u>435,000 miles</u>
<u>Crankcase Ventilation System</u>	<u>50,000 miles</u>	<u>60,000 miles</u>	<u>60,000 miles</u>
<u>Diesel Exhaust Fluid (DEF) Filter</u>	<u>110,000 miles</u>	<u>150,000 miles</u>	<u>125,000 miles</u>
<u>Fuel Injectors</u>	<u>110,000 miles</u>	<u>185,000 miles</u>	<u>435,000 miles</u>
<u>Turbochargers</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>
<u>Electronic Control Unit, Sensors, and Actuators</u>	<u>110,000 miles</u>	<u>185,000 miles</u>	<u>150,000 miles</u>
<u>Diesel Particulate Filter System (element only)</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>
<u>Diesel Particulate Filter System (other than element)</u>	<u>110,000 miles</u>	<u>185,000 miles or 3 years</u>	<u>435,000 miles or 3 years</u>
<u>Catalytic Converter (bed only)</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>	<u>Not Replaceable</u>
<u>Catalytic Converter (other than catalyst bed)</u>	<u>110,000 miles</u>	<u>185,000 miles</u>	<u>435,000 miles</u>
<u>Any other add-on or new technology emission-related component or system whose primary purpose is to reduce emissions or whose failure will significantly degrade emissions control</u>	<u>See (4)(vi)(D) below.</u>	<u>See (4)(vi)(D) below.</u>	<u>See (4)(vi)(D) below.</u>

(A) For components or systems designated in the table as “Not Replaceable,” manufacturers shall not schedule any repair or replacement maintenance intervals throughout the applicable useful life of the heavy-duty diesel engine as defined in 40 CFR § 86.004-2, as modified by these test procedures, except as noted in (b)(7)(i) of this section.

(B) For components or systems designated in the table with intervals less than or equal to the applicable useful life of the engine, manufacturers may only request more frequent (shorter) minimum initial repair or replacement intervals by demonstrating to the Executive Officer the technological necessity of such intervals to assure in-use

compliance with the emission standards as provided in paragraphs (b)(4) and (b)(7) of this section.

(C) Manufacturers may not schedule subsequent repair or replacement maintenance intervals more frequently than at whole number multiples of the initial repair or replacement maintenance intervals stated in the table.

(D) For add-on or new technology emission-related components or systems, the Executive Officer will evaluate the necessity and appropriateness of manufacturer designated maintenance intervals based on the repair or replacement frequency needed to complete the certification durability demonstration test. All emission-related scheduled maintenance for purposes of obtaining durability data must occur at the same mileage intervals that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser of the motor vehicle or engine. Repair and replacement intervals for add-on and new technology emission-related components will be approved on a case-by-case basis until which time the add-on component or new technology becomes established within the heavy-duty industry and the regulations are updated to specify universal minimum repair and replacement intervals.

(5) [Reserved]

(6)(i) The following components are defined as critical emission-related components:

(A) Catalytic converter.

(B) Air injection system components.

(C) Electronic engine control unit and its associated sensors (including oxygen sensor if installed) and actuators.

(D) Exhaust gas recirculation system (including all related filters, coolers, control valves, and tubing).

(E) Crankcase ventilation valves and filters.

(F) Evaporative and refueling emission control system components (excluding canister air filter).

(G) Particulate trap or trap-oxidizer system.

(H) Components comprising the selective catalytic reduction system (including DEF tank).

(I) Any other component whose primary purpose is to reduce emissions or whose failure would commonly increase emissions of any regulated pollutant without significantly degrading engine performance.

(ii) All critical emission-related scheduled maintenance must have a reasonable likelihood of being performed in-use. The manufacturer shall be required to show the reasonable likelihood of such maintenance being performed in-use, and such showing shall be made prior to the performance of the maintenance on the durability data engine. Critical emission-related scheduled maintenance items which satisfy one of the conditions defined in paragraphs (b)(6)(ii) (A)-(F) of this section will be accepted as having a reasonable likelihood of the maintenance item being performed in-use, except that DEF replenishment must satisfy paragraph (b)(6)(ii)(A) or (F) of this section to be accepted as having a reasonable likelihood of the maintenance item being performed in-use.

(A) Data are presented which establish for the Executive Officer a connection between emissions and vehicle performance such that as emissions increase due to lack of maintenance, vehicle performance will simultaneously deteriorate to a point unacceptable for typical driving.

(B) Survey data are submitted which adequately demonstrate to the Executive Officer that, at an 80 percent confidence level, 80 percent of such engines already have this critical maintenance item performed in-use at the recommended interval(s).

(C) A clearly displayed visible signal system approved by the Executive Officer is installed to alert the vehicle driver that maintenance is due. A signal bearing the message "maintenance needed" or "check engine", or a similar message approved by the Executive Officer, shall be actuated at the appropriate mileage point or by component failure. This signal must be continuous while the engine is in operation and not be easily eliminated without performance of the required maintenance. Resetting the signal shall be a required step in the maintenance operation. The method for resetting the signal system shall be approved by the Executive Officer. For HDEs, the system must not be designed to deactivate upon the end of the useful life of the engine or thereafter.

(D) A manufacturer may desire to demonstrate through a survey that a critical maintenance item is likely to be performed without a visible signal on a maintenance item for which there is no prior in-use experience without the signal. To that end, the manufacturer may in a given model year market up to 200 randomly selected vehicles per critical emission-related maintenance item without such visible signals, and monitor the performance of the critical maintenance item by the owners to show compliance with paragraph (b)(6)(ii)(B) of this section. This option is restricted to two consecutive model

years and may not be repeated until any previous survey has been completed. If the critical maintenance involves more than one engine family, the sample will be sales weighted to ensure that it is representative of all the families in question.

(E) The manufacturer provides the maintenance free of charge, and clearly informs the customer that the maintenance is free in the instructions provided under §86.087-38.

(F) Any other method which the Executive Officer approves as establishing a reasonable likelihood that the critical maintenance will be performed in-use.

(iii) Visible signal systems used under paragraph (b)(6)(ii)(C) of this section are considered an element of design of the emission control system. Therefore, disabling, resetting, or otherwise rendering such signals inoperative without also performing the indicated maintenance procedure is a prohibited act under California Vehicle Code §27156, et seq.

(b)(7)-(h) [Reserved]. For guidance see §86.094-25.

(i) Notwithstanding the provisions of paragraphs (b)(4) and (6) of this section, manufacturers may schedule replacement or repair of particulate trap (or trap oxidizer) systems, ~~or~~ catalytic converters (including NO_x adsorbers, diesel oxidation catalysts, and selective catalyst reduction devices), turbochargers, and exhaust gas recirculation systems provided that the manufacturer demonstrates to the Executive Officer's satisfaction that the repair or replacement will be performed according to the schedule and the manufacturer pays for the repair or replacement.