Appendix C-A-2

Purpose and Rationale for Proposed New Section to Title 13 Regulation Order

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Section 1956.8.2. Exhaust Emission Standards and Test Procedures - 2027 and Subsequent Model Heavy-Duty Engines, Vehicles and Hybrid Powertrains.

Proposed New Section 1956.8.2, Title 13, CCR

Purpose

Section 1956.8.2, titled “Exhaust Emission Standards and Test Procedures - 2027 and Subsequent Model Heavy-Duty Engines, Vehicles and Hybrid Powertrains” is a proposed new section to be added to title 13, California Code of Regulations (CCR). The purpose of this new section is to establish exhaust emission standards and test procedures for 2027 and later model year (MY) heavy-duty engines (HDE) and heavy-duty vehicles (HDV).

California Air Resources Board (CARB) is statutorily mandated to promote and protect public health, welfare, and ecological resources through the effective reduction of air pollutants, while recognizing and considering effects on the economy. (Health & Safety Code, § 39000 et seq.) The purpose of the language at the beginning of this section is to restore regulatory provisions previously adopted pursuant to CARB’s statutory authority under the Administrative Procedure Act, and which are enforceable under federal waivers of preemption.

Rationale

The proposal is necessary to set forth the criteria pollutant and Greenhouse Gas (GHG) emission standards and test procedures for 2027 and subsequent MY HDEs. It is necessary to create a new section since the structure of the proposed requirements that mostly align with the 2027 MY federal criteria pollutant standards is different than the structure currently used in the existing section 1956.8, the applicability of which is now proposed to end in MY 2026.

CARB staff is proposing to make permanent amendments to the medium- and heavy-duty regulations to restore pre-Omnibus provisions and extend their applicability beyond the 2023 model year as a health protective measure and to ensure manufacturers will still be able to sell vehicles and engines covered by the challenged congressional resolution disapproving the Omnibus regulation’s waiver of federal preemption under the Clean Air Act.

Subsection (a)

Purpose

The purpose of this subsection is to describe the general applicability of the proposed requirements in title 13, CCR, section 1956.8.2. In general, the proposed requirements of the new section 1956.8.2 apply to 2027 and subsequent MY medium-duty engines (MDE) and HDEs.

Date of release: September 23, 2025
Date of hearing: November 20, 2025

Rationale

The subsection is necessary to define the various types of engines and vehicles subject to the proposed requirements in this section. In general, the proposed criteria pollutant exhaust emission standards and test procedures in title 13, CCR, section 1956.8.2, apply to 2027 and subsequent MY heavy-duty (HD) compression-ignition (CI) and spark-ignition (SI) engines used in vehicles over 14,000 pounds (lb) gross vehicle weight rating (GVWR), and engines used in medium-duty vehicles (MDV) with GVWR between 10,001 to 14,000 lb. The GHG emission standards and test procedures in title 13, CCR, section 1956.8.2, apply to 2027 and subsequent MY MDEs and HDEs used in vehicles with GVWR over 8,500 lb. These GHG standards are not new, but instead, the preexisting standards are simply relocated into this new section. Furthermore, the subsection is necessary to clarify that the proposed requirements apply to hybrid engines and powertrains as well as to gas turbines and other HDEs that do not meet the definition of CI or SI engines.

Subsections (b)(1)(A) and (B)

Purpose

The purpose of these subsections is to set forth the criteria exhaust emission standards for new 2027 and subsequent MY HD CI and SI engines used in HDVs over 14,000 lb GVWR and medium duty vehicles with GVWR between 10,001 to 14,000 lb.

Rationale

These subsections are necessary to establish exhaust emission standards for Oxides of Nitrogen (NOx), Particulate Matter (PM), Hydrocarbon (HC), and Carbon Monoxide (CO) that 2027 and subsequent MY HD CI and SI engines would have to meet in order to be certified in California. Compliance with the proposed standards over the duty cycles, namely the Federal Test Procedure (FTP), the Supplemental Emission Test (SET), and the Low Load Cycle (LLC), in combination with other requirements, is expected to significantly reduce criteria pollutant emissions over a broader range of HDV operations versus today's standards. In addition, the proposed criteria pollutant emission standards would align with the federal emission standards, enabling manufacturers to certify and produce a single 50-state platform nationwide.

Subsections (b)(2)(A) and (B)

Purpose

The purpose of these subsections is to specify the optional low NOx exhaust emission standards for new 2027 and subsequent model HD CI and SI engines used in HDVs over 14,000 lb GVWR.

Rationale

These subsections are necessary to provide manufacturers with a mechanism that would allow them to certify their 2027 and subsequent MY HDEs to optional low NOx emission standards that are significantly lower than the primary standards.

For both HD CI and SI engines, Options 1 and 2 would allow manufacturers to certify products at an FTP/SET NOx standard of 10 or 20 mg/hp·hr which are below the primary NOx standard of 35 mg/hp·hr. HDEs certified to the optional low NOx standards would further reduce NOx emissions from the HD sector, thereby helping California achieve its air quality goals. The Omnibus regulation previously included the 10 mg/hp·hr optional standard (Option 1), and CARB staff is now adding the 20 mg/hp·hr optional standard (Option 2) because the mandatory standard will now be slightly higher than before.

Subsection (b)(3)

Purpose

The purpose of this subsection is to specify the applicable type of HC emission standard in subsections (b)(1) and (b)(2) depending on the fuel type.

Rationale

The subsection is necessary to indicate the type of HC emission standard in subsections (b)(1) and (b)(2). HC represents non-methane hydrocarbon equivalent emissions for alcohol-fueled engines, non-methane non-ethane hydrocarbon emissions for gaseous-fueled engines, and non-methane hydrocarbon emissions for other engines.

Subsection (b)(4)

Purpose

The purpose of this subsection is to specify the formaldehyde exhaust emission standards for 2027 and subsequent MY MDEs and HDEs.

Rationale

The subsection is necessary to set forth the formaldehyde exhaust emission standards that engines need to meet for each engine type. In 1992, CARB identified formaldehyde as a toxic air contaminant for its potential to contribute to increased mortality and pose a hazard to human health (CARB, 1992). As a result, since 1992, California requires manufacturers to meet specific formaldehyde emission standards for certain MDEs and HDEs.[1] The formaldehyde emission standards in the proposed 13 CCR 1956.8.2 were effective in 2026 and previous MYs, and will continue to be in effect for 2027 and subsequent MYs.

[1] 13 CCR 1956.8 (a)(3), (c)(2), and (h)(2)

Subsection (b)(5)

Purpose

The purpose of this subsection is to require manufacturers to control crankcase emissions from new 2027 and subsequent MY HDEs.

Rationale

The subsection is necessary to ensure crankcase emissions are controlled throughout the useful life (UL) of the engine since it has been demonstrated that HC and CO emitted from an open crankcase can be a significant fraction of overall tailpipe emissions. The subsection would require manufacturers to close the crankcase and route those emissions to the engine intake or aftertreatment system to prevent emissions from being discharged directly to the atmosphere. To address engine hardware damage concerns due to a closed crankcase in certain CI engines, the provision also allows an open crankcase, provided that those emissions are measured and accounted for in the final exhaust emission standards. Furthermore, the subsection is necessary to provide the procedures for measuring and accounting for open crankcase emissions.

Subsection (b)(6)

Purpose

The purpose of this subsection is to establish the idling emissions control requirements in California.

Rationale

The subsection is necessary to maintain existing mandatory idling emissions control requirements, and to revise the Clean Idle NOx standard and test procedures for 2027 and subsequent MY HD CI engines used on HDVs over 14,000 lb GVWR and engines used in MDVs between 10,001 and 14,000 lb GVWR. The proposed Clean Idle NOx standards and associated test procedures align with the corresponding United States Environmental Protection Agency 2027 MY Clean Idle NOx test procedures. Furthermore, the subsection is necessary to establish the engine and vehicle applications that are exempt from the requirements of this subsection.

Subsection (b)(7)

Purpose

The purpose of this subsection is to specify the GHG emission standards for carbon dioxide (CO_2), nitrous oxide, and methane emissions for new 2027 and subsequent MY CI and SI engines.

Rationale

The subsection is necessary to specify the applicable GHG emission standards for 2027 and subsequent MY HD CI and SI engines.

Subsection (c)

Purpose

The purpose of this subsection is to specify the applicable certification and in-use test procedures for 2027 and subsequent MY HD CI and SI engines.

Rationale

The subsection is necessary because it provides the exhaust emission standards and the test procedures that manufacturers would have to follow to certify and sell their engines in California. In addition, the test procedures also provide the requirements for participating in the proposed Averaging, Banking and Trading (ABT) program, proposed family emission limits (FEL), and the proposed off-cycle emission standards as well as the proposed in-use test procedures for compliance with the off-cycle standards.

Subsection (d)

Purpose

The purpose of this subsection is to describe the process that would allow a vehicle manufacturer to file a request for an exemption to sell a limited number of vehicles with federally certified engines.

Rationale

The subsection is necessary to describe the process that a vehicle manufacturer would have to follow in order to be able to sell a limited number of vehicles with federally certified engines. The exemption will be granted if the Executive Officer has determined that a suitable California certified engine is not available for use on the vehicle. This provision was effective in 2026 and previous MYs and will continue to be in effect for 2027 and subsequent MYs.

Subsection (e)

Purpose

The purpose of this subsection is to specify that these exhaust emission standards and test procedures incorporated by reference into the regulations are severable from other regulatory provisions in the event of conflicting requirements, and even if any subsection, sentence, clause, phrase, or portion of this section of the regulation and test procedures were found to be invalid or unenforceable by any court of competent jurisdiction, the remainder of these requirements would remain in full force and effect.

Rationale

The subsection is necessary because it ensures that should a court of competent jurisdiction determine that any portion of this section of the regulation or any incorporated test procedure is invalid, that determination would not void all of the remaining requirements by default, which would ensure that unaffected provisions would continue to reduce emissions from on-road HDEs that threaten the health and welfare of Californians.

Subsection (f)

Purpose

The purpose of this subsection is to establish definitions for terms that are used in title 13, CCR, section 1956.8.2.

Rationale

The subsection is necessary to define terms used in title 13, CCR, section 1956.8.2, and to provide clarity, specificity, and consistency to regulated entities.

"Certified emission level"

Purpose

The purpose of this definition is to describe what "certified emission level" means.

Rationale

The definition is necessary to clarify the meaning of the term "certified emission level" which refers to the highest deteriorated emission level in an engine family for a given pollutant from the applicable transient and/or steady-state testing.

"Compression-ignition"

Purpose

The purpose of this definition is to describe what "compression-ignition" (CI) engine means.

Rationale

The definition is necessary to clarify the meaning of "CI" engine, which refers to a type of reciprocating, internal-combustion engine that is not a SI engine.

"Crankcase emissions"

Purpose

The purpose of this definition is to describe what "crankcase emissions" means.

Rationale

The definition is necessary to clarify the meaning of “crankcase emissions” which refers to airborne substances emitted to the atmosphere from any part of the engine crankcase's ventilation or lubrication systems.

“Deteriorated emission level”

Purpose

The purpose of this definition is to describe what “deteriorated emission level” means.

Rationale

The definition is necessary to clarify the meaning of “deteriorated emission level” which refers to the emission level that results from applying the appropriate deterioration factor to the official emission result of the emission-data engine.

“Deterioration factor”

Purpose

The purpose of this definition is to describe what “deterioration factor” means.

Rationale

The definition is necessary to clarify the meaning of “deterioration factor” which refers to the relationship between emissions at the end of UL (or point of highest emissions if it occurs before the end of UL) and emissions at the low-hour/low-mileage point.

“Engine family”

Purpose

The purpose of this definition is to describe what “engine family” means.

Rationale

The definition is necessary to clarify the meaning of “engine family” which, for the purposes of certification to the standards in this section, refers to a product line of families of engines that are expected to have similar characteristics for criteria emissions throughout the UL of the engine family. It is necessary to further clarify that the engine family is limited to a single MY.

“Family certification level” (FCL)

Purpose

The purpose of this definition is to describe what “family certification level” (FCL) means.

Rationale

The definition is necessary to clarify the meaning of "FCL" which refers to a CO_2 emission level declared by the manufacturer that is at or above the emission test results for all emission-data engines.

"Family emission limit" (FEL)

Purpose

The purpose of this definition is to describe what "family emission limit" (FEL) means.

Rationale

The definition is necessary to clarify the meaning of "FEL" which, for NOx emissions, refers to an emission level declared by the manufacturer to serve in place of an otherwise applicable emission standard under the ABT Program described in the applicable test procedures; and for GHG emission standards, refers to an emission level that serves as the standard that applies for testing individual certified engines.

"Federal Test Procedure" (FTP)

Purpose

The purpose of this definition is to describe what "Federal Test Procedure" (FTP) means.

Rationale

The definition is necessary to clarify the meaning of "FTP" which refers to the applicable transient duty cycle designed to measure exhaust emissions during urban driving. The FTP is the test procedure described in § 1036.512 of the test procedures incorporated by reference in subsection (c).

"Fuel type"

Purpose

The purpose of this definition is to describe what "fuel type" means.

Rationale

The definition is necessary to clarify the meaning of "fuel type" which refers to a general category of fuels such as diesel fuel, gasoline, or natural gas.

"Gross vehicle weight rating" (GVWR)

Purpose

The purpose of this definition is to describe what "gross vehicle weight rating" (GVWR) means.

Rationale

The definition is necessary to clarify the meaning of “GVWR” which refers to 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” (HDE)

Purpose

The purpose of this definition is to describe what “heavy-duty engine” (HDE) means.

Rationale

The definition is necessary to clarify the meaning of “HDE” which refers to any engine which the engine manufacturer could reasonably expect to be used to propel an HDV.

“Heavy-duty vehicle”

Purpose

The purpose of this definition is to describe what “heavy-duty vehicle” means.

Rationale

The definition is necessary to clarify the meaning of “heavy-duty vehicle” which refers to any motor vehicle having a manufacturer's GVWR greater than 8,500 lb, except passenger cars. In addition, the definition is also necessary to describe the specifics of an “incomplete vehicle” in the HDV category.

“Heavy heavy-duty engine” (Heavy HDE)

Purpose

The purpose of this definition is to describe what “heavy heavy-duty engine” (Heavy HDE) means.

Rationale

The definition is necessary to clarify the meaning of “Heavy HDE” which refers to an engine used in a vehicle that normally exceeds 33,000 lb GVWR.

“Hybrid” or “Hybrid Powertrain”

Purpose

The purpose of this definition is to describe what “hybrid” or “Hybrid Powertrain” means.

Rationale

The definition is necessary to clarify the meaning of “hybrid” or “Hybrid Powertrain” which refer to an engine or powertrain that includes a Rechargeable Energy Storage System including plug-in hybrid electric powertrains. It is also necessary to clarify that engine-based systems

that recover kinetic energy to power an electric heater in the aftertreatment are not sufficient to qualify as a hybrid engine.

“Hydrocarbon” (HC)

Purpose

The purpose of this definition is to describe what “hydrocarbon” (HC) means.

Rationale

The definition is necessary to clarify the meaning of “HC” which refers to the HC group on which the emission standards are based for each type of fuel and engine.

“Incomplete vehicle"

Purpose

The purpose of this definition is to describe what “incomplete vehicle” means.

Rationale

The definition is necessary to clarify the meaning of “incomplete vehicle” which refers to a vehicle that is not a complete vehicle. This may include vehicles sold to secondary vehicle manufacturers.

“Light heavy-duty engine” (Light HDE)

Purpose

The purpose of this definition is to describe what “light heavy-duty engine” (Light HDE) means.

Rationale

The definition is necessary to clarify the meaning of “Light HDE” which refers to an engine used in a vehicle that is normally between 14,001 to 19,500 lb GVWR.

“Low-load cycle” (LLC)

Purpose

The purpose of this definition is to describe what “Low-load cycle” (LLC) means.

Rationale

The definition is necessary to clarify the meaning of “LLC” which refers to the applicable transient duty cycle designed to measure exhaust emissions during low load operations such as driving in urban areas and other locations where HDVs operate in stop-and-go traffic or other low-load conditions. The LLC is described in § 1036.514 of the test procedures incorporated by reference in subsection (c).

“Manufacturer”

Purpose

The purpose of this definition is to describe what “manufacturer” means.

Rationale

The definition is necessary to clarify the meaning of “manufacturer” which in general refers to a manufacturer or any person who manufactures or assembles an engine, vehicle, or piece of equipment for sale in California. The definition further clarifies that importers and secondary engine manufacturers can be considered as manufacturers.

“Medium-duty engine”

Purpose

The purpose of this definition is to describe what “medium-duty engine” means.

Rationale

The definition is necessary to clarify the meaning of “medium-duty engine” which refers to HDEs used in medium duty vehicles with a manufacturer GVWR between 8,501 and 14,000 lb.

“Medium-duty vehicle”

Purpose

The purpose of this definition is to describe what “medium-duty vehicle” means.

Rationale

The definition is necessary to clarify the meaning of “medium-duty vehicle” which refers to a vehicle having a manufacturer GVWR between 8,501 and 14,000 lb.

“Medium heavy-duty engine” (Medium HDE)

Purpose

The purpose of this definition is to describe what “medium heavy-duty engine” (Medium HDE) means.

Rationale

The definition is necessary to clarify the meaning of “medium HDE” which refers to an engine used in a vehicle that is normally between 19,501 to 33,000 lb GVWR.

“Model year”

Purpose

The purpose of this definition is to clarify what “model year” means.

Rationale

The definition is necessary to clarify the meaning of “model year” which refers to the manufacturer’s annual new model production period, which must include January 1 of the calendar year for which the MY is named, may not begin before January 2 of the previous calendar year, and must end by December 31 of the named calendar year. Furthermore, the definition is necessary to clarify the restriction that manufacturers may not adjust MYs to circumvent or delay compliance with emission standards or to avoid the obligation to certify annually.

“Power take-off” (PTO)

Purpose

The purpose of this definition is to describe what “power take-off” (PTO) means.

Rationale

The definition is necessary to clarify the meaning of “PTO,” which refers to the secondary engine shaft (or equivalent) that provides substantial auxiliary power for purposes unrelated to vehicle propulsion, such as transmitting power to a hydraulic pump that powers auxiliary equipment like a boom on a bucket truck. The definition is also necessary to further clarify engine operations not considered as PTO, such as drawing power from the engine to operate normal vehicle accessories including air conditioning, power steering, and basic electrical accessories. This definition is needed to clarify the PTO provisions included in the automatic engine shutdown system override requirements specified in subsection (b)(6)(B)2 of title 13, CCR, section 1956.8.2.

“Primary intended service class”

Purpose

The purpose of this definition is to describe what “primary intended service class” means.

Rationale

The definition is necessary to clarify the meaning of “primary intended service class” which refers to the class of the HDE that best describes the vehicle for which the manufacturer designs and markets the engine.

“Secondary engine manufacturer”

Purpose

The purpose of this definition is to describe what “secondary engine manufacturer” means.

Rationale

The definition is necessary to clarify the meaning of “secondary engine manufacturer” which in general refers to a manufacturer who produces a new engine by modifying a complete or

partially complete engine that was made by a different company. The definition is also necessary to distinguish the secondary engine manufacturer from the manufacturer of the base engine. It also helps clarify that importers as well as equipment manufacturers that use engines manufactured by other companies to be considered as secondary engine manufacturers.

“Spark-ignition”

Purpose

The purpose of this definition is to describe what “spark-ignition” engine means.

Rationale

The definition is necessary to clarify the meaning of “SI” engine which refers to a gasoline fueled engine or any other type of engine with spark-plugs or other sparking devices.

“Supplemental Emission Test” (SET)

Purpose

The purpose of this definition is to describe what “Supplemental Emission Test” (SET) means.

Rationale

The definition is necessary to clarify the meaning of “SET” which refers to the supplemental ramped modal cycle covering 13 steady state torque and engine speed points that is intended to measure exhaust emissions over sustained higher load and higher speed operations. The SET cycle is as described in § 1036.510 of the test procedures incorporated by reference in subsection (c).

“Test Procedure”

Purpose

The purpose of this definition is to describe what “Test Procedure” means.

Rationale

The definition is necessary to clarify the meaning of “Test Procedure” which refers to all aspects of engine testing including, but not limited to, the cycle, preconditioning procedures, equipment specifications, calibrations, calculations, and other protocols and specifications needed to measure emissions.

“Tractor”

Purpose

The purpose of this definition is to describe what “tractor” means.

Rationale

The definition is necessary to clarify the meaning of “tractor” which refers to HDVs specifically designed for the primary purpose of pulling trailers but does not include vehicles designed to carry other loads.

“Tractor engine”

Purpose

The purpose of this definition is to describe what “tractor engine” means.

Rationale

The definition is necessary to clarify the meaning of “tractor engine” which refers to an engine certified for use in tractors.

“Vehicle”

Purpose

The purpose of this definition is to describe what “vehicle” means.

Rationale

The definition is necessary to clarify the meaning of “vehicle” which in general refers to a piece of equipment intended for use on highways that includes at least an engine, a transmission, and a frame.

“Vocational engine”

Purpose

The purpose of this definition is to describe what “vocational engine” means.

Rationale

The definition is necessary to clarify the meaning of “vocational engine” which refers to an engine certified for use in vocational vehicles.

“Vocational vehicle”

Purpose

The purpose of this definition is to describe what “vocational vehicle” means.

Rationale

The definition is necessary to clarify the meaning of “vocational vehicle” which refers to any HDV used in a wide range of vocational applications such as urban delivery trucks, dump trucks, cement trucks, refuse haulers, cranes, utility service trucks, concrete mixers, buses, etc.

References

1. (CARB, 1992) Initial Statement of Reasons for Rulemaking, *Final Report on the Identification of Formaldehyde as a Toxic Air Contaminant*, California Air Resources Board and the Office of Environmental Health Hazard Assessment, July 1992.