

**Appendix F-B-5**  
**Purpose and Rationale for**  
**Proposed Amendments to the Tier 4 Off-Road**  
**Compression-Ignition Engines Test Procedures**

**California Exhaust Emission Standards and Test**  
**Procedures for New 2011 and Later Tier 4 Off-Road**  
**Compression-Ignition Engines, Part I-D**

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## **California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D**

### **Part 1039 – Control of Emissions from New and In-Use Off-Road Compression-Ignition Engines.**

#### **§1039.699 Emission standards and certification requirements for 2024 model year and later auxiliary power units for on-road tractors**

##### **Purpose**

The purpose of this amendment is to add a new section §1039.699 to the standard setting part of the “California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D.” The proposed new section specifies the emission standards and certification requirements for 2024 and subsequent model year auxiliary power units (APU) installed on tractors subject to the GHG exhaust emission standards specified in title 17, CCR § 95663(a)(2)(B). The proposed new section is substantively identical to the federal requirements for APUs in 40 CFR §1039.699.

##### **Rationale**

This amendment is necessary to ensure that California’s certification requirements and emissions standards for APUs are as stringent as existing federal requirements and standards (see Chapter III Section 10 of the Staff Report). This amendment is also necessary for CARB to have independent enforcement authority over APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the “California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles,” April 1, 2019. Currently, §1037.106(g)(2) requires tractor manufacturers to install federally certified APUs instead of California certified units. The reason for this requirement is because, unlike the federal provisions, CARB does not yet have a regulation in place requiring APUs to certify to a 0.02 g/kW-hr PM emissions standard. California engines used in APUs are currently required to comply with only a 0.4 g/kW-hr PM standard under the Off-Road Tier 4 regulations. Therefore, CARB staff proposes to incorporate the federal certification requirements for APUs into CARB’s off-road regulations. Explanations for each subsection of §1039.699 are described below, and are based on Federal Register justifications for the adoption of 40 CFR 1039.699 on October 25, 2016. The discussion of these justifications takes place in Chapter III.C.(3) “U.S. EPA’s PM Emission Standards for APUs Installed in New Tractors” of the Federal Register, beginning on page 73576 (81 FR 73576, Oct. 25, 2016).

The current APU requirements are described in Chapter I, Section B.10 of this Staff Report; the need for amendments related to APUs is described in Chapter II, Section

C.10; and the description of proposed APU amendments and their feasibility is included in Chapter III, Section A.10.

### **Subsection (a)**

#### **Purpose**

The purpose of this amendment is to align the scope of California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it specifies the scope of the new standard as applicable to 2024 and subsequent model year APUs installed on on-road tractors as directed by California's Greenhouse Gas regulations. This subsection (a) is substantively identical to the federal requirement in 40 CFR §1039.699(a), except that CARB terminology and regulatory authority have been substituted.

### **Subsection (b)**

#### **Purpose**

The purpose of this amendment is to align California and federal entities who are eligible to certify APUs for installation in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it establishes APU manufacturers and aftermarket emission control installers as the entities who qualify to apply for an Executive Order under §1039.699. This subsection (b) is substantively identical to the federal requirement in 40 CFR §1039.699(b), except that CARB terminology has been substituted and "PM" has been added to qualify the standard, and to identify the pollutant for which installers must install emissions control hardware.

### **Subsection (c)**

#### **Purpose**

The purpose of this amendment is to align California's emission standards with U.S. EPA's emissions standard for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it specifies the emissions standards required under §1039.699 to certify APUs in California. In addition to requiring compliance with the more stringent 0.02 g/kW-hr PM standard, compliance with the existing Tier 4 off-road standards for NMHC, NO<sub>x</sub>, and CO is also stated. This compliance requirement is added for clarity because the federal language does not reference standards other than PM in 40 CFR §1039.699(c); however, it is understood that U.S. EPA also requires APUs to comply with existing Tier 4 standards for NMHC, NO<sub>x</sub>, and CO. Other than stated, this subsection (c) is substantively identical to the federal requirement in 40 CFR §1039.699(c), except that CARB terminology and regulatory authority have been substituted.

**Subsection (d)**

**Purpose**

The purpose of this amendment is to align the emissions credit provisions of California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it allows APU manufacturers to use engines certified to a Tier 4 PM family emission limit of 0.02 g/kW-hr or less to comply with the requirements in §1039.699. In so doing, off-road engine manufacturers may generate emissions credits under the Tier 4 regulation to offset the PM standard for other off-road engine families they produce that are not used in APU applications. The Tier 4 standard for PM in the power category of APUs is 0.4 g/kW-hr. This subsection (d) is substantively identical to the federal requirement in 40 CFR §1039.699(d), except that CARB terminology and regulatory authority have been substituted.

**Subsection (e)**

**Purpose**

The purpose of this amendment is to align the emissions anti-downgrading provision of California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it prohibits APU manufacturers and installers from making any changes to the certified engine in an APU that could increase the engine's emissions, except for the purpose of regenerating a diesel particulate filter. Regeneration requires only a temporary expenditure of power from the APU and ensures that the diesel particulate filter will continue to function properly in reducing PM emissions. This subsection (e) is substantively identical to the federal requirement in 40 CFR §1039.699(e).

### **Subsection (f)**

#### **Purpose**

The purpose of this amendment is to align California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it ensures that APUs are subject to the same requirements as other off-road engines with respect to crankcase venting, defeat devices, warranty coverage, maintenance specifications, the providing of installation instructions to ultimate purchasers, and prohibitions against emission control strategies that could adversely affect other areas of public health, welfare and safety. This subsection (f) is substantively identical to the federal requirement in 40 CFR §1039.699(f), except that CARB regulatory authority has been substituted.

### **Subsection (g)**

#### **Purpose**

The purpose of this amendment is to align the classification of emission families in California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it simplifies the certification process by allowing all of a manufacturer's APUs to be classified into a single emission family. This reduces the amount of resources that would otherwise be required of the manufacturer to certify multiple products with the same general emissions characteristics. Manufacturers retain the option, however, to certify their APUs in multiple emission families if they believe significant differences exist between APU models that would result in substantially different levels of emissions deterioration over the useful life of the APU engine (e.g., one

model is certified with a diesel particulate filter, but the other model isn't). An emission family is analogous to an engine family as described in §1039.230 of these test procedures for the purposes of grouping APU models. Other than the addition of a sentence clarifying what an "emission family" is, this subsection (g) is substantively identical to the federal requirement in 40 CFR §1039.699(g).

### **Subsection (h)**

#### **Purpose**

The purpose of this amendment is to align emissions testing in California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it specifies the proposed testing requirements that APU manufacturers must perform to show that their APUs comply with the proposed PM emission standard in subsection §1039.699(c) of these test procedures. These requirements are in large part analogous to the engine testing requirements described in §1039.235, except that the proposed testing requirements are limited to PM, and the criteria for determining the worst-case conditions for PM emissions are left to the manufacturer's discretion rather than being strictly prescribed as in §1039.235 for off-road engines. This subsection (h) is substantively identical to the federal requirement in 40 CFR §1039.699(h), except that CARB regulatory authority has been substituted.

### **Subsection (i)**

#### **Purpose**

The purpose of this amendment is to align California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it further simplifies the certification of APUs by extending the applicability of the APU Executive Order to any off-road engine within 10 percent of the maximum engine power of the certified APU engine. This provision makes it possible for APU manufacturers to certify units under the same APU Executive Order containing engines from different engine families or even different engine manufacturers. As an added precaution, CARB staff proposes to augment the federal provision by clarifying that applicability within the 10 percent range also requires the engine to be

certified to a PM standard or family emission limit of 0.02 g/kW-hr or less. As written, the federal provision could be misinterpreted as granting an APU manufacturer an Executive Order if the manufacturer installs an engine within 10 percent of the maximum power of the certification engine even though the installed engine may comply with only the obligatory Tier 4 PM standard of 0.4 g/kW-hr. Granting an Executive Order this way is clearly not the intention of the federal provision as 40 CFR §§1039.699(c) and (d) require compliance with a 0.02 g/kW-hr PM emission standard or FEL, respectively. The proposed additional CARB language is meant to avoid any confusion by manufacturers complying under §1039.699(i). Other than stated, this subsection (i) is substantively identical to the federal requirement in 40 CFR §1039.699(i), except that CARB regulatory authority has been substituted.

### **Subsection (j)**

#### **Purpose**

The purpose of this amendment is to align California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

#### **Rationale**

This amendment is necessary because it equates the conditions used to determine compliance with §1039.699 of these test procedures for APU emission families and engine families. The first condition requires that the emission-data APU selected in subsection (h)(1), representing a worst-case condition for PM emissions within the APU emission family, must comply with the emission standards stated in subsection (c) of this section. The second condition requires that the engine family represented by the emission-data APU be certified to remain in compliance with the emission standards in subsection (c) throughout useful life. An emission family is analogous to an engine family as described in §1039.230 of these test procedures for the purposes of grouping APU models. This subsection (j) is substantively identical to the federal requirement in 40 CFR §1039.699(j).

### **Subsection (k)**

#### **Purpose**

The purpose of this amendment is to equate the labeling requirements of California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it specifies the labeling requirements for APUs that are certified for sale in California. In addition to the general requirements for labels specified in 13 CCR §2424 and in §1039.135 of these test procedures, APU manufacturers are required to label their product with corporate identifiers and a statement of compliance to the requirements in 13 CCR §2423(n). The provisions in 13 CCR §2424 and §1039.135 allow California labels to incorporate federal citations to facilitate compliance, and accommodate modified labeling requirements as necessary to ensure harmonization with federal requirements to the extent feasible. The California test procedures do not contain an analogous incorporation of 40 CFR §1068.45(a), but the aforementioned provisions in 13 CCR §2424 and §1039.135 provide sufficient Executive Officer discretion to ensure a harmonized approach to labeling APUs. This subsection (k) is substantively identical to the federal requirement in 40 CFR §1039.699(k), except that CARB regulatory authority has been substituted.

**Subsection (l)**

**Purpose**

The purpose of this amendment is to align the sequential structuring of California's certification requirement with U.S. EPA's certification requirement for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it reserves subsection (l) for possible future use. This subsection (l) is identical to the federal reserved subsection at 40 CFR §1039.699(l).

**Subsection (m)**

**Purpose**

The purpose of this amendment is to align California's certification application with U.S. EPA's certification application for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

**Rationale**

This amendment is necessary because it specifies the information that must be provided to the CARB Executive Officer as part of an APU manufacturer's certification application. This information is in large part analogous to the information described in §1039.205, except that it does not require manufacturers to provide a detailed description of auxiliary-emission control devices. APUs employ constant speed engines, and the need for

auxiliary-emission control devices on such engines is expected to be minimal or nonexistent. Additionally, the proposed submission of information is limited to PM data only, and it does not require the identification of NTE operating parameters due to the steady-state operation of APUs. Other information has been simplified as appropriate for APUs (e.g., the requirements for engines greater than 560kW do not apply because APU engines are typically less than 37 kW). The submission of some information applicable to the certification of off-road Tier 4 engine families is also required, including general requirements for obtaining an Executive Order (e.g., signature of an official representative of the APU manufacturer on the application) in §1039.201, requests for preliminary approval of an application in §1039.210, amendments to the maintenance instructions in §1039.220, amendments to the certification application itself in §1039.225, record keeping and reporting documentation in §1039.250, and CARB's rationale for, and responsibility in, approving or denying a request for an Executive Order in §1039.255. CARB staff does not propose to incorporate the federal provision allowing an Executive Order to remain valid for a production period of up to five years. Manufacturers would be required to reapply for an Executive Order on an annual basis as is the case for other off-road certifications in California. Other than stated, this subsection (m) is substantively identical to the federal requirement in 40 CFR §1039.699(m), except that CARB regulatory authority has been substituted.

## **Subsection (n)**

### **Purpose**

The purpose of this amendment is to align the presumption of liability between California and U.S. EPA's regulations for APUs installed in on-road tractors according to the requirements of §1037.106(g)(2) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019.

### **Rationale**

This amendment is necessary because it identifies the APU manufacturer as the entity "presumed" to be liable for violating 1037.106(g) of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," April 1, 2019, when an improperly certified or labeled APU is installed on an on-road tractor. The presumption is appropriate because APU manufacturers are responsible for providing instructions to vehicle manufacturers to make certain that incorrect installations do not occur. It is important to note that a "presumption" of liability does not establish guilt, but it places the burden of proof on the APU manufacturer to prove innocence rather than on CARB to prove guilt. APU manufacturers could require written correspondence from vehicle manufacturers as an acknowledgement that the vehicle manufacturer understands its responsibilities, and as confirmation that the APU manufacturer has practiced due diligence in discharging its responsibilities to the APU installer. The presumption of liability in this case is necessary to create a starting

point for enforcement and corrective action should they become necessary, but as a presumption, it is also rebuttable. This subsection (n) is substantively identical to the federal requirement in 40 CFR §1039.699(n), except that CARB regulatory authority has been substituted.

**§1039.801 What definitions apply to this part?**

**Purpose**

The purpose of this amendment is to add a definition for “auxiliary power unit” to the “California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D.”

**Rationale**

This amendment is necessary to support the certification requirements for APUs in §1039.699 of the “California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D,” as proposed in this rulemaking. The proposed definition is identical to the existing definition of an “auxiliary power unit” in Part 1037.801 of the “California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles” as well as the existing federal definition in 40 CFR 1037.801. The federal regulations in 40 CFR 1039 do not explicitly define an “auxiliary power unit” despite containing requirements for certifying APUs. Nevertheless, the inclusion of such a definition in the “California Exhaust Emission Standards and Test Procedures for New 2011 and Later Tier 4 Off-Road Compression-Ignition Engines, Part I-D” is necessary for manufacturers to recognize that which must be certified according to the APU regulations without having to search through other regulations for an applicable definition.