Appendix F-12

Section 1968.2 Malfunction and Diagnostic System Requirements - 2004 and Subsequent Model Year Passenger Cars, Light Duty Trucks, and Medium Duty Vehicles and Engines.

Purpose and Rationale

Subsection 1968.2(e)(17.1.5)

Purpose

The purpose of the amendment to this subsection is to indicate the provisions of this subsection apply to Low Emission Vehicle III SULEV20 vehicles.

Rationale

This amendment is needed to distinguish the provisions of this subsection from the new proposed requirements for Low Emission Vehicle IV SULEV20 vehicles in subsection 1968.2(e)(17.1.6).

Subsection 1968.2(e)(17.1.6)

Purpose

The purpose of this subsection is to allow Low Emission Vehicle IV applications to use alternate malfunction criteria in lieu of the malfunction criteria described under each of the applicable monitoring requirements in section 1968.2(e). The following alternate malfunction criteria would apply:

For vehicles certified to the ULEV125, ULEV70, ULEV50, SULEV30, SULEV20, ULEV200, SULEV170, SULEV150, ULEV400, ULEV270, SULEV230, or SULEV200 emission category, the manufacturer would use the malfunction criteria described for the same vehicle emission category for Low Emission Vehicle III applications in Table 1 in the beginning of section 1968.2(e).

For passenger cars, light-duty trucks, and chassis-certified medium-duty passenger vehicles (MDPV) not covered above, the following thresholds would apply:

	Monitor Thresholds (Except Catalyst)			Catalyst Monitor Thresholds
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM Threshold (mg/mi)**	**NMOG+NOx Multiplier**
ULEV60	2.00	1.50	17.50	2.00

ULEV40	2.25	1.50	17.50	2.25
SULEV25	2.80	2.50	17.50	2.80
SULEV15	3.33	2.50	17.50	3.33

For chassis certified medium-duty vehicles with a gross vehicle weight rating (GVWR) of less than 10,000 pounds (lbs.) not covered above, the following thresholds would apply:

	Monitor Thresholds (Except Catalyst)			**Catalyst Monitor Thresholds**
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM Threshold (mg/mi)**	**NMOG+NOx Multiplier**
SULEV125	1.75	1.50	17.50	2.00
SULEV100	1.75	1.50	17.50	2.00
SULEV85	2.00	1.50	17.50	2.50
SULEV75	2.00	1.50	17.50	2.50

For chassis certified medium-duty vehicles with a GVWR between 10,000 and 14,000 lbs. not covered above, the following thresholds would apply:

	Monitor Thresholds (Except Catalyst)			**Catalyst Monitor Thresholds**
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM Threshold (mg/mi)**	**NMOG+NOx Multiplier**
SULEV175	1.50	1.50	17.50	1.75
SULEV150	1.75	1.50	17.50	2.00
SULEV125	2.00	1.50	17.50	2.25
SULEV100	2.00	1.50	17.50	2.50

For vehicles certified to the SULEV20 or SULEV15 standards, in lieu of the standards mentioned above, manufacturers would be allowed to use a higher multiplier of 3.25 or 4.33, respectively, for the first three model years the vehicle is certified to those standards but cannot use these higher multipliers after the 2030 model year. Concerning vehicles that were first certified to the Low Emission Vehicle III SULEV20 standards in the 2024 or 2025 model year and carried over to later model years as Low

Emission Vehicle IV SULEV20 vehicles, the 3.25 multiplier may be used up through the 2026 model year for vehicles first certified to the SULEV20 standards in 2024, and up through the 2027 model year for vehicles first certified to the SULEV20 standards in 2025.

For the malfunction criteria specified for the engine cooling system thermostat monitor in subsection 1968.2(e)(10.2.1)(A)(ii), which allows for a lower coolant temperature malfunction threshold if fuel, sparking timing, and/or other coolant temperature-based modifications to the engine control strategies would not cause an emissions increase of 50 or more percent of the applicable standards, the "applicable standards" would be based on the standards to which the vehicle is certified except as follows:

- For passenger cars, light-duty trucks, and chassis-certified MDPVs certified to the SULEV15 category, the manufacturer would base the "applicable standards" on the SULEV20 standards;
- For chassis certified medium-duty vehicles with a GVWR of less than 10,000 lbs. and certified to the SULEV125, SULEV100, SULEV85, or SULEV75 category, the manufacturer would all base the "applicable standards" on the SULEV150 standards; and
- For chassis certified medium-duty vehicles with a GVWR between 10,000 and 14,000 lbs. and certified to the SULEV175, SULEV150, SULEV125, or SULEV100 category, the manufacturer would base the "applicable standards" on the SULEV200 standards.

Rationale

This subsection is needed to provide clear direction to manufacturers of gasoline/spark-ignited vehicles regarding the applicable OBD II requirements. The proposed subsection is needed to provide modifications to the OBD malfunction criteria to accommodate the proposed lower emission standards for Low Emission Vehicle IV vehicles. Since the majority of the current OBD malfunction criteria are based on a multiple of the emission standards the vehicle is certified to, the proposed lower Low Emission Vehicle IV standards would also require the OBD II system to detect malfunctions at lower emission levels. However, staff have not yet fully evaluated the capability of OBD II monitors to robustly detect failures at the lower emission levels. After discussions with manufacturers, staff have determined that the higher multipliers proposed in this subsection are appropriate until staff can evaluate the use of lower malfunction thresholds in a future OBD II rulemaking update. Additionally, for vehicles certified to the SULEV20 or SULEV15 standards, staff is allowing even higher multipliers for the first three years vehicles are certified to the standards, which is similar to what is currently allowed in subsection 1968.2(e)(17.1.5) for Low Emission Vehicle III SULEV20 vehicles. This would provide manufacturers with more lead time to meet the proposed thresholds, since manufacturers have not had

much experience with designing monitors to detect malfunctions at these lower emission levels.

Regarding the alternate malfunction criteria for the engine cooling system thermostat monitor in subsection 1968.2(e)(17.1.6)(B), for similar reasons to those above, staff believed it was appropriate that the "applicable standards" mentioned in subsection 1968.2(e)(10.2.1)(A)(ii) be based on the lowest standards currently required for Low Emission Vehicle III applications. For example, for passenger cars, light-duty trucks, and chassis-certified MDPVs certified to the SULEV15, staff is proposing that the "applicable standards" apply to the Low Emission Vehicle IV SULEV20 standards, which are equivalent to those of the Low Emission Vehicle III SULEV20 standards. These alternate malfunction criteria would only apply to Low Emission Vehicle IV vehicles certified to new vehicle emission categories that are not currently required for Low Emission Vehicle III vehicles. Staff will revisit this requirement to determine if lower criteria should be applied in a future OBD II rulemaking update.

Subsection 1968.2(f)(17.1.7)

Purpose

The purpose of the amendment to this subsection is to indicate the provisions of this subsection apply to Low Emission Vehicle III SULEV20 vehicles.

Rationale

This amendment is needed to distinguish the provisions of this subsection from the new proposed requirements for Low Emission Vehicle IV SULEV20 vehicles in subsection 1968.2(f)(17.1.8).

Subsection 1968.2(f)(17.1.8)

Purpose

The purpose of this subsection is to allow Low Emission Vehicle IV applications to use alternate malfunction criteria in lieu of the malfunction criteria described under each of the applicable monitoring requirements in section 1968.2(f). The following alternate malfunction criteria would apply:

For vehicles certified to the ULEV125, ULEV70, ULEV50, SULEV30, SULEV20, ULEV200, SULEV170, SULEV150, ULEV400, ULEV270, SULEV230, or SULEV200 emission category, the manufacturer would use the malfunction criteria described for the same vehicle emission category for Low Emission Vehicle III applications in Tables 2 and 3 in the beginning of section 1968.2(f).

For passenger cars, light-duty trucks, and chassis-certified medium-duty passenger vehicles (MDPV) not covered above, the following thresholds would apply:

	Monitor Threshold[1]			Aftertreatment Monitor and Exhaust Gas Sensor Threshold[2] Multiplier		
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM**	**NMOG+NOx**	**CO**	**PM**
ULEV60	2.00	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.00	1.50	2.00
ULEV40	2.25	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.25	1.50	2.00
SULEV25	2.80	2.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.80	2.50	2.00
SULEV15	3.33	2.50	2.00 multiplier[3] or 17.50 mg/mi[4]	3.33	2.50	2.00

1. Applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.1), (f)(9.2.2), (f)(9.2.4)(B), (f)(12)-(f)(14)
2. Applies to (f)(1), (f)(2), (f)(5), (f)(8), and (f)(9.2.4)(A)
3. 2.00 multiplier applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.2), (f)(9.2.4)(B), (f)(12), and (f)(13)
4. 17.50 mg/mi applies to (f)(9.2.1)

For chassis certified medium-duty vehicles with a GVWR of less than 10,000 lbs. not covered above, the following thresholds would apply:

	Monitor Threshold[1]			Aftertreatment Monitor and Exhaust Gas Sensor Threshold[2] Multiplier		
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM**	**NMOG+NOx**	**CO**	**PM**
SULEV125	1.80	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.10	1.50	2.00
SULEV100	2.25	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.63	1.50	2.00
SULEV85	2.65	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	3.09	1.50	2.00
SULEV75	3.00	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	3.50	1.50	2.00

1. Applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.1), (f)(9.2.2), (f)(9.2.4)(B), (f)(12)-(f)(14)
2. Applies to (f)(1), (f)(2), (f)(5), (f)(8), and (f)(9.2.4)(A)
3. 2.00 multiplier applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.2), (f)(9.2.4)(B), (f)(12), and (f)(13)
4. 17.50 mg/mi applies to (f)(9.2.1)

For chassis certified medium-duty vehicles with a GVWR between 10,000 and 14,000 lbs. not covered above, the following thresholds would apply:

	Monitor Threshold[1]			Aftertreatment Monitor and Exhaust Gas Sensor Threshold[2] Multiplier		
Vehicle Emission Category	**NMOG+NOx Multiplier**	**CO Multiplier**	**PM**	**NMOG+NOx**	**CO**	**PM**
SULEV175	1.71	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.00	1.50	2.00
SULEV150	2.00	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.33	1.50	2.00
SULEV125	2.40	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	2.80	1.50	2.00
SULEV100	3.00	1.50	2.00 multiplier[3] or 17.50 mg/mi[4]	3.50	1.50	2.00

1. Applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.1), (f)(9.2.2), (f)(9.2.4)(B), (f)(12)-(f)(14)
2. Applies to (f)(1), (f)(2), (f)(5), (f)(8), and (f)(9.2.4)(A)
3. 2.00 multiplier applies to (f)(3.2.5), (f)(4), (f)(6), (f)(7), (f)(9.2.2), (f)(9.2.4)(B), (f)(12), and (f)(13)
4. 17.50 mg/mi applies to (f)(9.2.1)

For vehicles certified to the SULEV20 or SULEV15 standards, in lieu of the standards mentioned above, manufacturers would be allowed to use a higher multiplier of 3.25 or 4.33, respectively, for the first three model years the vehicle is certified to those standards but cannot use these higher multipliers after the 2030 model year. Concerning vehicles that were first certified to the Low Emission Vehicle III SULEV20 standards in the 2024 or 2025 model year and carried over to later model years as Low Emission Vehicle IV SULEV20 vehicles, the 3.25 multiplier may be used up through the 2026 model year for vehicles first certified to the SULEV20 standards in 2024, and up through the 2027 model year for vehicles first certified to the SULEV20 standards in 2025.

For the malfunction criteria specified for the engine cooling system thermostat monitor in subsection 1968.2(f)(11.2.1)(A)(ii), which allows for a lower coolant temperature malfunction threshold if fuel, sparking timing, and/or other coolant temperature-based modifications to the engine control strategies would not cause an emissions increase of 50 or more percent of the applicable standards, the "applicable

standards" would be based on the standards to which the vehicle is certified except as follows:

- For passenger cars, light-duty trucks, and chassis-certified MDPVs certified to the SULEV15 category, the manufacturer would base the "applicable standards" on the SULEV20 standards;
- For chassis certified medium-duty vehicles with a GVWR of less than 10,000 lbs. and certified to the SULEV125, SULEV100, SULEV85, or SULEV75 category, the manufacturer would base the "applicable standards" on the SULEV150 standards; and
- For chassis certified medium-duty vehicles with a GVWR between 10,000 and 14,000 lbs. and certified to the SULEV175, SULEV150, SULEV125, or SULEV100 category, the manufacturer would base the "applicable standards" on the SULEV200 standards.

For the test-out criteria (i.e., the criteria used to determine if a specific component or function is exempt from the monitoring requirements) specified in subsections 1968.2(f)(1.2.3)(B), (f)(1.2.3)(D), (f)(6.2.6)(C), (f)(9.2.4)(A), (f)(9.2.4)(B), (f)(15.1.2), and (f)(15.2.2)(F)(ii), when determining if no malfunction can cause emissions to increase by the maximum allowed percentage of the applicable standards, the manufacturer would base the "applicable standards" on the standards to which the vehicle is certified except for the same exceptions as mentioned above for the engine cooling system thermostat monitor.

Rationale

This subsection is needed to provide clear direction to manufacturers of diesel/compression-ignited vehicles regarding the applicable OBD II requirements. Similar to the rationale for gasoline vehicles in subsection 1968.2(e)(17.1.6) above, the proposed subsection is needed to provide modifications to the OBD malfunction criteria to accommodate the proposed lower emission standards for Low Emission Vehicle IV vehicles. Since the majority of the current OBD malfunction criteria are based on a multiple of the emission standards the vehicle is certified to, the proposed lower Low Emission Vehicle IV standards would also require the OBD II system to detect malfunctions at lower emission levels. However, staff have not yet fully evaluated the capability of OBD II monitors to robustly detect failures at the lower emission levels. After discussions with manufacturers, staff have determined that the higher multipliers proposed in this subsection are appropriate until staff can evaluate the use of lower malfunction thresholds in a future OBD II rulemaking update. Additionally, for vehicles certified to the SULEV20 or SULEV15 standards, staff is allowing even higher multipliers for the first three years vehicles are certified to the standards, which is similar to what is currently allowed in subsection 1968.2(f)(17.1.7) for Low Emission Vehicle III SULEV20 vehicles. This would provide manufacturers with more lead time to meet the proposed thresholds, since manufacturers have not had

much experience with designing monitors to detect malfunctions at these lower emission levels.

Regarding the alternate malfunction criteria for the engine cooling system thermostat monitor and the alternate test-out criteria, for similar reasons to those above, staff believed it was appropriate that the "applicable standards" be based on the lowest standards currently required for Low Emission Vehicle III applications. For example, for passenger cars, light-duty trucks, and chassis-certified MDPVs, staff is proposing that the "applicable standards" apply to the Low Emission Vehicle IV SULEV20 standards, which are equivalent to those of the Low Emission Vehicle III SULEV20 standards. These alternate malfunction criteria and test-out criteria would only apply to Low Emission Vehicle IV vehicles certified to new vehicle emission categories that are not currently required for Low Emission Vehicle III vehicles. Staff will revisit these requirements to determine if lower criteria should be applied in a future OBD II rulemaking update.

Subsections 1968.2(h)(6.4.2)(B)(i) and (ii)

Purpose

The purpose of the amendments to these subsections are to indicate that the durability demonstration vehicle (DDV) retesting provisions of these subsections apply except as provided in newly proposed subsection 1968.2(h)(6.4.2)(B)(iii) for Low Emission Vehicle IV applications, and to add the word "applicable" before the word "standard" in subsection 1968.2(h)(6.4.2)(B)(ii).

Rationale

The amendments to both subsections are needed to account for the new proposed provisions in subsection 1968.2(h)(6.4.2)(B)(iii), which would include the new DDV testing acceptance criteria for Low Emission Vehicle IV applications. The amendment adding the word "applicable" in subsection 1968.2(h)(6.4.2)(B)(ii) is needed to match the wording used in subsection 1968.2(h)(6.4.2)(B)(i).

Subsection 1968.2(h)(6.4.2)(B)(iii)

Purpose

The purpose of this subsection is to set the acceptance criteria for DDV retesting of the catalyst or PM filter monitors for Low Emission Vehicle IV applications. Specifically, the amendments would indicate that the "applicable standard" mentioned in subsections 1968.2(h)(6.4.2)(B)(i) and (ii) would be based on the standards to which the vehicle is certified except as follows:

- For passenger cars, light-duty trucks, and chassis-certified MDPVs certified to the SULEV15 category, the manufacturer would base the "applicable standard" on the SULEV20 standards;

- For chassis certified medium-duty vehicles with a GVWR of less than 10,000 lbs. and certified to the SULEV125, SULEV100, SULEV85, or SULEV75 category, the manufacturer would base the "applicable standard" on the SULEV150 standards; and
- For chassis certified medium-duty vehicles with a GVWR between 10,000 and 14,000 lbs. and certified to the SULEV175, SULEV150, SULEV125, or SULEV100 category, the manufacturer would base the "applicable standard" on the SULEV200 standards.

Rationale

The amendments are needed to account for the new lower emission standards being proposed for Low Emission Vehicle IV applications in title 13, CCR section 1961.4, since the acceptable emission level boundaries currently specified in subsections 1968.2(h)(6.4.2)(B)(i) and (ii) may be too stringent for some of these applications if based on the emission standards to which the vehicle is certified to. Similar to the rationale provided in subsections 1968.2(e)(17.1.6) and (f)(17.1.8), staff have not yet fully evaluated the capability of OBD II monitors to robustly detect failures at the lower emission levels. Therefore, staff believes it is appropriate that the "applicable standards" be based on the lowest standards currently required for Low Emission Vehicle III applications until staff can evaluate the use of lower criteria in a future OBD II rulemaking update. These alternate DDV acceptance criteria would only apply to Low Emission Vehicle IV vehicles certified to new vehicle emission categories that are not currently required for Low Emission Vehicle III vehicles.