



On-Board Diagnostics Symposium-Europe

March 12-14, 2024 | Amsterdam, Netherlands

Regulatory Update: Light-Duty OBD

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March 12, 2024



Agenda

- Continuous monitors and minimum in-use monitoring performance ratio (IUMPR) requirements
- Exemptions for monitoring requirements of safety-only components or systems
- Current OBD II monitoring requirements for the gasoline particulate filter (GPF)
- OBD II Phase-in: CSERS (cold start emission reduction strategy), PCV/CV (positive crankcase ventilation/crankcase ventilation), and SAE 1979-2 (OBDonUDS)
- LD OBD Certification Reminders



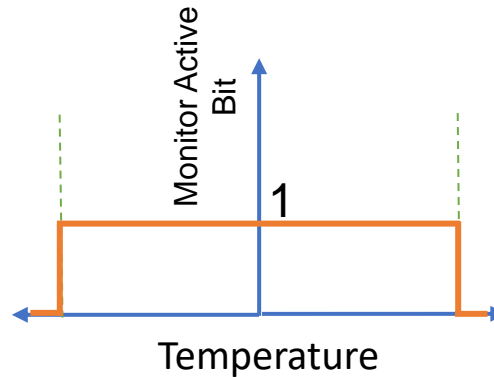
Continuous Monitors and Minimum IUMPR Requirements

Continuous Monitors and Minimum IUMPR Requirements

- OBD II requirements include both continuous monitors and monitors subject to IUMPR.
- It's ironic that continuous monitors, despite their name, do not actually function continuously.
 - In fact, they are only theoretically continuously *enabled*.
- Manufacturers may request Executive Officer (EO) approval to temporarily disable a continuous monitor under necessary conditions to ensure robust detection.
 - Some example sections of the regulation that allow exemptions are (e or f)(6.3.5), (e)(10.3.2)(E), (f)(11.3.2)(E), (e or f)(15.3)(c).
 - Manufacturer must submit data and/or an engineering evaluation for the exemption allowance.

Continuous Monitors and Minimum IUMPR Requirements (cont'd)

- Example (1):
 - Disabling a temperature sensor circuit check monitor under a specific temperature range.
 - Reasoning: The circuit fault is indistinguishable from an actual measurement when the true temperature is outside of the sensor's working range.

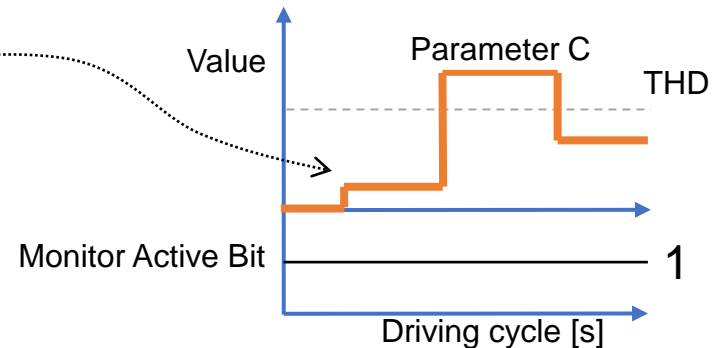
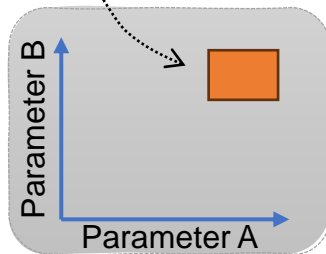


Continuous Monitors and Minimum IUMPR Requirements (cont'd)

- Example (2):

- A monitor that constantly evaluates a threshold against an infrequently updated parameter.
- Reasoning: The evaluation parameter should only be updated when certain conditions are met to ensure accuracy and robustness.
- Such monitors do require clear disclosure and EO exemption approvals because one or more parameters involved in the monitoring logic are not still updated continuously, despite continuous activation of the monitor itself.

Parameter C is only updated in this region.



Continuous Monitors and Minimum IUMPR Requirements (cont'd)

- All non-continuous monitors are subject to IUMPR per (d)(3.2.1)
 - Only some are required to track and report IUMPR per (d)(3.2.2).
- CARB has observed that some continuous monitors if temporarily disabled, may not meet the minimum IUMPR requirements due to the infrequency.
- CARB is considering an explicit requirement for continuous monitors to meet minimum IUMPR requirements in the OBD regulation during the next update.
 - Some "continuous" diesel EGR and boost pressure monitors are now required to meet minimum IUMPR.








Exemptions for Monitoring Requirements of Safety-only Components or Systems.

Monitoring Requirements Exemptions for Safety-only Components or Systems

- Section 1968.2(c) defines “Safety-only component or system” as a component or system designed and intended solely by the vehicle to prevent or mitigate personal injury to the vehicle occupant(s), pedestrians, and/or service technicians.
- Sections 1968.2(e)(15.1.3) and (f)(15.1.3) allow exemption from CCM requirements for safety-only components or systems.
- Points to consider before asking for an exemption:
 - The exemption does not apply to systems and components that might have a safety aspect but are integrated for another reason.
 - The exemption is intended to relieve manufacturers from the burden of *monitoring* safety-only components that may occasionally and infrequently increase emissions.

Monitoring Requirements Exemptions for Safety-only Components or Systems (cont'd)

- A safety-only exemption for fault reactions like AECD, default action, and limp mode affecting emissions or the OBD system won't be granted.
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 - As per (d)(2.2.3), MIL illumination is still required for any default action or limp mode that affects emissions or OBD systems, even for safety-only components.
- OEM should explicitly state the components requested to be exempted from monitoring, even when requesting a system-level exemption.

Accepted Requests 	Unaccepted Requests 
Radar, Lidar, Camera, and GPS components (Collision avoidance systems)	Deactivation of regenerative braking in the event of ABS failure
Driver door switch	Deactivation of the engine start-stop system due to the battery voltage sensor
Max defrost button	Deactivation of the engine start-stop system when the starter reaches a predetermined cycle count.



Current Monitoring Requirements for the GPF

Current Monitoring Requirements for the GPF

- Section 1968.2 does not include specific GPF monitoring requirements in section (e), however section (d)(7.2) specifies manufacturers must propose monitoring plan modeled after the DPF requirements in section (f):

“...the manufacturer shall submit a plan to the Executive Officer for approval of the requirements in section 1968.2 (including the in-use monitor performance requirements in section (d), the monitoring requirements in sections (e) through (f) and the standardization requirements of section (g)), determined by the manufacturer to be applicable to the vehicle...”

- Acceptable plan elements on the following slides

Current Monitoring Requirements for the GPF (cont'd)

• GPF Monitoring Criteria

• (f)(9.2.1) Filtering performance

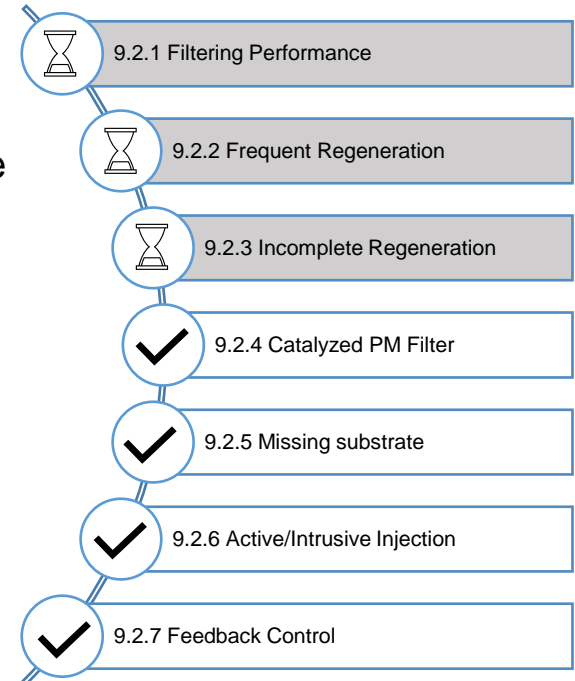
- Most GPF systems will require monitoring in accordance with section (9.2.1)(B) instead of section (9.2.1)(A).
- It is permissible to fulfill the requirements outlined in sections (9.2.1)(B) and (9.2.5) using a single monitor.

• (f)(9.2.2) Frequent Regeneration


- This monitoring requirement is not pursued if
 - *GPF-regenerations are based solely on soot-load models,*
 - *All inputs to the model are monitored, and*
 - *No input from any exhaust sensor is used in the model.*

• (f)(9.2.3) Incomplete regeneration

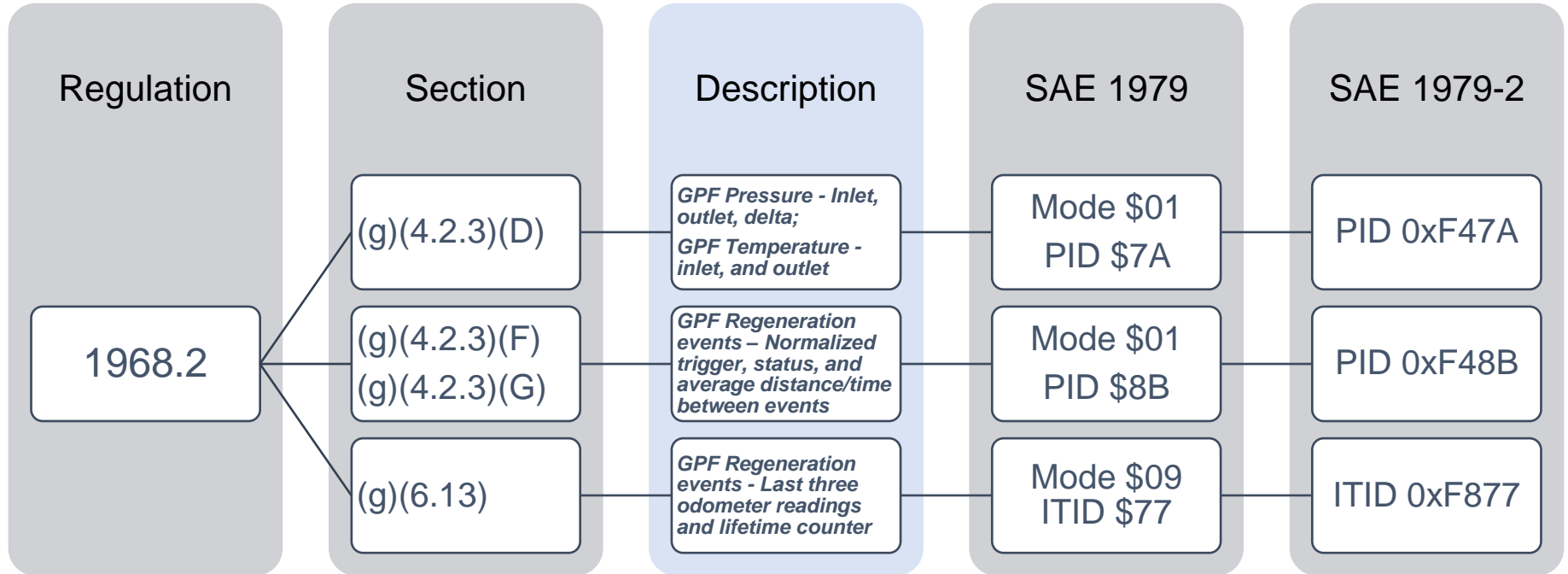
- This monitor won't be pursued if active regeneration events rarely happen. This is to avoid monitors that seldom run and take a long time to heal.



Current Monitoring Requirements for the GPF (cont'd)

- Things to consider in implementing the GPF OBD system
 - Any default action/engine protection activated by any exhaust sensor (pressure, temperature, etc.) due to soot buildup, including those that reduce, or limit power shall illuminate the MIL.

 - Regenerations initiated by any exhaust sensor do require monitoring for frequent and incomplete regenerations.
- GPF data stream and tracking requirements
 - All data streams and tracking required for the diesel particulate filter in the 1968.2(g) section shall also be supported for GPF.

Current Monitoring Requirements for the GPF (cont'd)

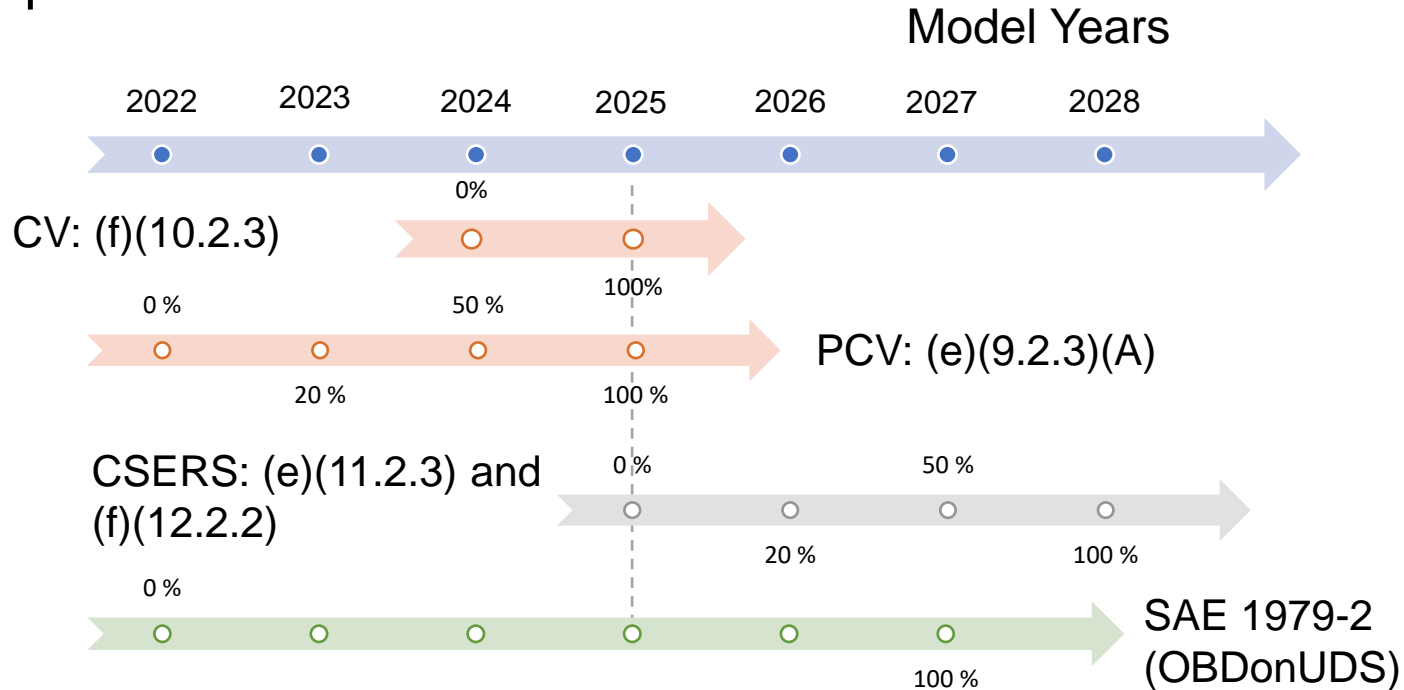




OBD II Phase-in: CSERS, PCV/CV, and SAE 1979-2

OBD II requirements: CSERS, PCV/CV, and 1979-2

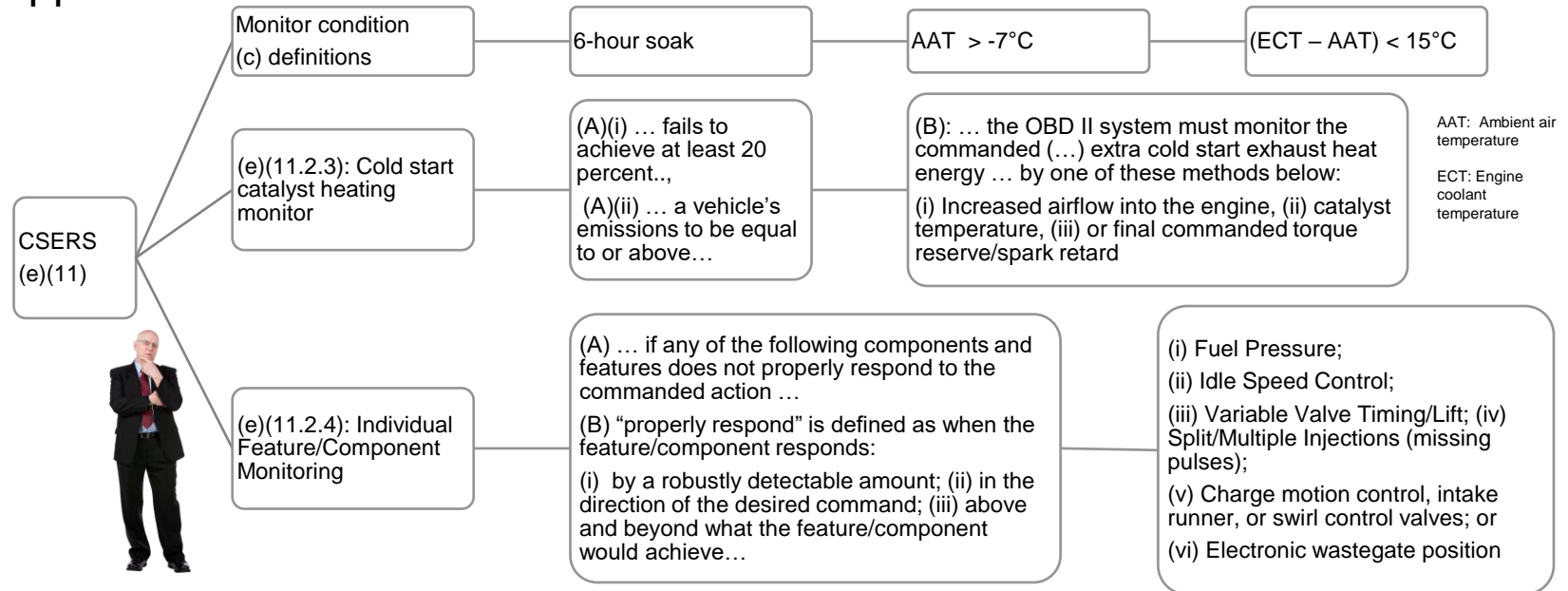
• Implementation Schedule



OBD II Phase-in: CSERS, PCV/CV, and SAE 1979-2 (cont'd)

• CSERS

- OBD has new requirements that will phase in with the 2026 model year applications.



OBDII Phase-in: CSERS, PCV/CV, and SAE 1979-2 (cont'd)

- PCV

- Starting in 2023MY, the OBD system shall detect breaks in any hose, tube, or line that transports PCV vapors, per section 1968.2(e)(9.2.3)(A).
- (e)(9.2.2)(B) PCV disconnect exemption no longer applies.

- SAE 1979-2 (OBDonUDS)

- Beginning with the 2027 model year, manufacturers shall use SAE J1979-2 for the standardized functions specified in sections 1968.2 and 1971.1.
- This protocol provides more information on the emission-related components and extends the diagnostic trouble codes.
- CARB will conduct in-house testing to ensure OEMs comply with the SAE 1979-2 implementation.

CARB Light Duty OBD Regulatory Update Agenda



LD OBD Certification Reminders

LD OBD Application Reminders

Representative Groups

- CCR 1968.2(i)(1.1)

The Executive Officer shall determine whether a selected test group(s) is representative of the OBD II group as a whole. To be approved as representative, the test group(s) must possess the most stringent exhaust emission standards and OBD II monitoring requirements and **cover all of the emission control devices within the OBD II group**

- If the test group chosen to represent all others in the OBD group does not contain all emission control devices present within the OBD group, the application should include **all** missing control devices and monitors
- Currently, some manufacturers are only providing the monitors present on the representative test group!

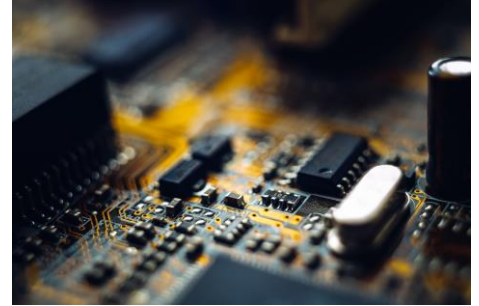
LD OBD Application Reminders (cont'd)

Smart Devices

- OBD application must include a complete written description of monitoring strategies carried out by each smart device

Cover Letter Disclosures

- Specify which SAE J1979 communication standard is being used (e.g., J1979 or J1979-2)



Acknowledgments

- Ashton Hashemi
- Adriane Chiu
- Mike Regenfuss

Contact Info

- Official CARB documents available from
 - <https://ww2.arb.ca.gov/>
- Direct link to OBD webpage
 - <https://ww2.arb.ca.gov/our-work/programs/obd>

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