



# **Proposed Amendments to the Light-Duty, Medium-Duty, and Heavy-Duty On-Board Diagnostics (OBD) Regulations**

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# Overview

- Background
- Proposed OBD Amendments
- Costs and Benefits
- 15-day Changes
- Staff Recommendation



# Background – What is OBD?

- OBD II: 1994+ Model Year (MY), Heavy-Duty (HD) OBD: 2010+ MY
- A system in the vehicle or engine's on-board computer(s) that monitors the performance of emission-related components for malfunction throughout the actual life of the vehicle or engine
- Major OBD monitors detect malfunctions prior to tailpipe emissions exceeding limits (OBD emission thresholds)

# Background – What is OBD? (cont.)

- Notifies vehicle operator with a malfunction indicator light (MIL) and identifies malfunctioning component(s) with stored OBD fault code(s)
- Essential inspection tool for Smog Check and future HD Inspection and Maintenance program
- Cause of MIL may be subject to emissions warranty





# Background – Reason for Changes

- Program updates occur regularly
  - Technology forcing regulation
  - Periodic reviews to check progress
  - Last comprehensive OBD update in 2018
- Proposed changes address:
  - Need for more diagnostic information from vehicles
  - Industry concerns
  - Issues discovered through OBD certification

# Proposed OBD Amendments

- New Communication Protocol SAE J1979-2
- Cold Start Emission Reduction Strategy (CSERS)
- Diesel Monitor Data Submission
- Diesel Particulate Matter (PM) Filter Monitor



# New Communication Protocol

## SAE J1979-2

- Problem: Industry quickly running out of available OBD fault codes using current OBD protocol (SAE J1979)
- SAE J1979-2 is a new standardized communication protocol between the vehicle's OBD system and test or inspection equipment

# New Communication Protocol

## SAE J1979-2 (cont.)

- Proposal: Transition to SAE J1979-2 protocol for OBD II and some HD OBD applications to increase available OBD fault codes and provide more data for the following:
  - Whether individual OBD monitors have completed and how often monitoring occurred in-use
  - Snapshots of engine and vehicle operation conditions when emissions-related malfunctions detected
- Required in the 2027MY, early implementation 2023MY



# Cold Start Emission Reduction Strategies (CSERS)

- Most emissions occur at cold start when the catalyst is cold and catalyst conversion efficiency is low
- “Cold start emission reduction” strategies accelerate catalyst heating to minimize cold start emissions
- OBD systems currently required to monitor CSERS malfunctions

# CSERS (cont.)

- Problem: Lack of regulation clarity on what strategies and components require monitoring and when a fault should be detected
- Proposal:
  - Specify components and strategies subject to monitoring and corresponding malfunction criteria
  - Define conditions when CSERS monitors must operate
  - Require diesel vehicles to track and report CSERS activity
  - Provide adequate lead time (2026-2028MY phase-in) with options for early implementation (2023MY)



# Diesel Monitors Data Submission

- Problem: Lack of clarity on required data to support diesel catalyst thresholds and NOx sensor monitoring compliance
- Proposal: Provide clarity to OBD monitoring requirements and establish standardized procedure for data submission for 2025+MY vehicles and engines
  - Specify the data, information, and timeline for submission
  - Establish approval criteria for catalyst aging protocol
  - Outline failure mode demonstration requirements with deteriorated NOx sensor

# Diesel PM Filter Monitor

- Problem:
  - Light- and Medium-Duty manufacturers have difficulty meeting the current monitoring frequency requirement
  - Current OBD II emission threshold does not reflect PM filter monitoring developments
- Proposal:
  - Near term: adjust OBD II monitoring frequency requirement
  - Longer term: improve OBD II emission threshold and adjust monitoring frequency



# Diesel PM Filter Monitor (cont.)

- Proposed implementation
  - 2022-2025MY: Adjust monitoring frequency to technically feasible level (MIL on in about 4 weeks instead of 2)
  - 2026-2028MY: Back to current monitoring frequency and OBD emission threshold for MIL illumination
  - 2029+MY: Tighten OBD emission threshold (over 40% more stringent) and adjust monitoring frequency (MIL on in about 3 weeks instead of 2)

# Costs

- The cost-analysis is based on known costs, realistic assumptions and conservative estimations
- Calculated incremental costs (per engine/vehicle) to consumers at the time of purchase:
  - Large/Small Light- and Medium-Duty vehicle manufacturer: \$0.67/\$7.37
  - Large/Small Heavy-Duty engine manufacturer: \$14.34/\$25.87



# Benefits

- No new emission reductions claimed
- Amendments better ensure expected emission reductions are realized
- OBD II cost effectiveness:
  - \$4.91 per pound of NMOG+NOx (based on LEV III Program)
- HD OBD cost effectiveness:
  - \$0.21 per pound of NOx and \$29.51-29.92 per pound of PM

# Benefits (cont.)

- Enhanced diagnostic data to accurately repair emission control system malfunctions
- Detailed OBD monitor performance data for state Smog Check inspections, CARB, and future HD Inspection and Maintenance program
- Improved regulation clarity



# 15-Day Changes

- Revise malfunction threshold for the CSERS system monitor
- Change in-use monitoring frequency data submission requirement
- Align deficiency provisions for OBD II and HD OBD and clarify language
- Adjust Emission Increasing Auxiliary Emission Control Device provisions to clarify and align across OBD II and HD OBD regulations
- Minor editorial corrections and clarifications

# Staff Recommendation

- Approve staff's proposal with 15-day changes

