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

July 22, 2021
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