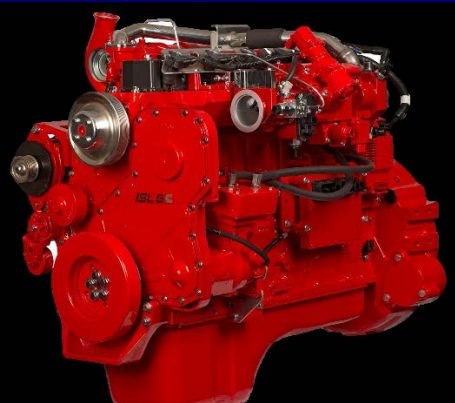


Proposed Certification Flexibility for Innovative Truck and Bus Engines and Hybrid Conversion Systems (Innovative Technology Regulation)

October 20, 2016

Objectives

- Provide certification flexibility to facilitate market launch of advanced truck and bus technologies
- Maintain the ability to ensure anticipated air quality benefits are achieved

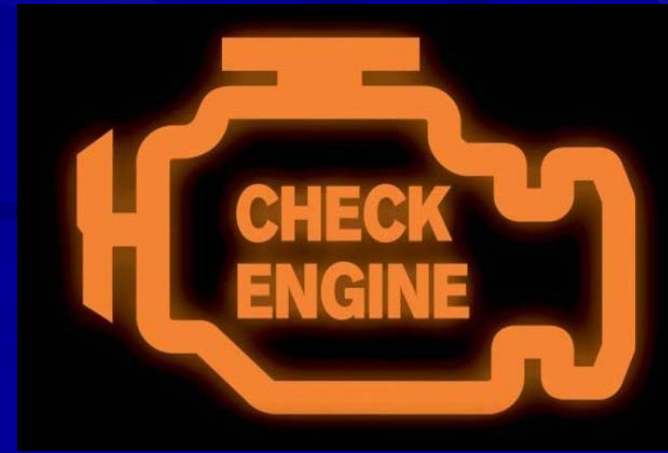


Overview of ARB's Certification Program

- Manufacturer must demonstrate vehicle or engine compliance with applicable emission standards
 - Includes emission testing, on-board diagnostics (OBD), warranty, and other requirements
- Provides rigorous criteria for evaluating vehicle emissions
- Enables development, implementation, and enforcement of stringent emission limits

On-Board Diagnostic Systems

- Monitor all emission-related components
- Identify and address malfunctions
- Phased-in for HD diesel engines in 2010-13 MYs
 - Alternative-fuel engines exempt until 2018 MY



Need for Proposed Regulation

- Some certification requirements may deter manufacturers from voluntarily developing advanced technologies
 - OBD compliance challenges
 - Resources required to certify may deter manufacturer investment
- California must accelerate next generation of truck and bus technology to meet its air quality and climate goals

Proposal Consists of Two Main Parts

1) Certification Flexibility for Innovative New HD Engines

- Engine meeting optional low-NOx standard
- High-efficiency engine
- Engine installed in a HD hybrid vehicle

2) Certification Procedures for Truck or Bus Hybrid Conversion Systems

Benefits of Proposed Approach

- Provides targeted, short-term flexibility while maintaining integrity of certification process
- Encourages manufacturers to introduce critical truck and bus technologies before required
- Complements technology-advancing incentive programs and regulations

Proposed Certification Flexibility for Innovative New Heavy-Duty Engines

Optional Low-NOx Engines

Proposed Certification Flexibility

- Eligible for modest OBD flexibility, and an assigned engine deterioration factor
- Maximum of 3 MYs per manufacturer
 - Through 2021 for spark-ignition engines, and 2024 for compression-ignition engines
- Engine may not participate in NOx averaging, banking, or trading programs

High-Efficiency Engines

Proposed Eligibility Criteria

- Meet proposed new optional low-CO₂ standard
 - 15% lower than 2017 MY HD diesel engine
 - >10% lower than Phase 2 standard for 2027 MY
- Intended to encourage development of more efficient engine architectures



High-Efficiency Engines

Proposed Certification Flexibility

- Manufacturer may phase-in OBD compliance, and use an assigned engine deterioration factor
- Maximum of 6 MYs eligibility per manufacturer, through 2027
- Engine may not participate in GHG averaging, banking, or trading programs

Heavy-Duty Hybrids

Background

- Achieve near-term CO₂ reductions, help pave the way for zero-emission technology
- Limited fleet demand since 2010
- Plug-in hybrids not commercially available
- Lack of manufacturer vertical integration poses OBD compliance challenge

Heavy-Duty Hybrids

Proposed Certification Flexibility

- Manufacturer may phase-in OBD compliance, and use an assigned engine deterioration factor
 - Hybrids with <35 miles all-electric range (AER) eligible for up to 4 MYs, through 2021
 - Hybrids capable of 35+ miles AER eligible for up to 6 MYs, through 2024
- CO₂ reductions must be “surplus” to Phase 1 or Phase 2 requirements

Heavy-Duty Hybrids

Proposed Supplemental Emission Test Requirements

- Must demonstrate no NO_x, HC, or CO emission increase pursuant to chassis-based emission testing
- Proposed portable emission measurement system (PEMS) test criteria enable in-use evaluation
- Could inform future updates to heavy-duty vehicle certification and enforcement protocols



Heavy-Duty Hybrids

Alternate Engine Provisions

- Allows use of a small off-road, or light- or medium-duty engine in a HD hybrid
 - Hybrid must be capable of 35 miles AER
 - For recharging the battery only
 - Other emission and durability criteria apply
- Provisions sunset with 2024 MY
- In-use operational data reported to ARB to inform potential 2025+ MY certification requirements

Proposed Certification and Installation Procedures for Medium- and Heavy-Duty Vehicle Hybrid Conversion Systems

Hybrid Truck and Bus Conversions

Background

- Opportunity to accelerate hybrid technology deployment and demonstrate viable market
- Conversion systems face unique certification challenges
 - OEM proprietary information needed for optimal system integration, OBD compliance
 - Manufacturers may lack significant resources and OBD expertise

Hybrid Truck and Bus Conversions

Proposed Certification Pathway

		Tiers 1 and 2 sunset January 1, 2022 if <35 miles AER... and January 1, 2025 if ≥35 miles AER	Tier 3/Final Certification
Allowable Sales Volume per Manufacturer	<35 Miles AER		N/A
	≥35 Miles AER		
Exhaust Emission Compliance			In-Use Testing
OBD Functionality			Highest
Conversion System Minimum Warranty			7 years, or 70,000 miles

Hybrid Conversion System Certification

Proposed 15-Day Modifications

- Require 2-day rather than 3-day evaporative emission test
- Align hybrid utility vehicle emission test duty-cycle with federal Phase 2 GHG standards
- Update OBD references and technical details
- Minor clarifying editorial updates

Proposed Innovative Technology Regulation

Summary

- Provides targeted, short-term flexibility while maintaining integrity of certification process
- Encourages manufacturers to introduce critical truck and bus technologies before required
- Complements technology-advancing incentive programs and regulations

Staff Recommendation

- Approve the proposed Innovative Technology Regulation, with identified modifications

Proposed Certification Flexibility for Innovative Truck and Bus Engines and Hybrid Conversion Systems (Innovative Technology Regulation)

October 20, 2016

Backup Slides

Proposed Innovative Technology Regulation

Certification Challenges and Extent of Proposed Flexibility

Proposed Eligible Technologies	Potential Certification Issues			Extent of Proposed Short-Term OBD Flexibility
	Initial Cost	Engineering Challenges	Lack of Vertical Integration	
HD Low-NOx Engines	√			Modest
HD High-Efficiency Engines	√	√		High
HD Hybrids	√	√	√	High, especially if ≥35 miles AER
Hybrid Truck or Bus Conversions	√	√	√	High, especially if ≥35 miles AER