On-Road Heavy-Duty

2008 EMA Certification Workshop
April 15, 2008
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Topics

• What’s New For MY2009-2010
• SCR Certification
• Durability Testing - DF Determination for MY2010
• Hybrid Vehicle Certification
• Idle Emission Reduction
• New Engine Family Naming
• Service Information
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What’s New For MY2009-2010

Certification:

• 0.20 g/bhp-hr NOx STD for MY2010 HDDE – expect SCR usage with concomitant issues of durability testing, DF determination, and AECD evaluation
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What’s New For MY2010+

Certification: (continued)

• OBD – MY2010-2012, one engine family with OBD per non SVM (except alternative fueled engines)
  - Parent rating (highest sales) – full OBD
  - Child ratings (others) – extrapolated OBD
    (malfunction criteria per engineering evaluation approved by ARB)
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SCR Driver Inducement

Concerns for continued proper SCR operation:

- Empty tank
- Improper refill (different or dilute reagent)
- No injection / no reagent usage
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SCR Driver Inducement

Empty Reagent Tank

- Initial early warning for low level (1/2 Full)
- Second warning of near empty tank (1/4 Full)
- Third warning at empty tank
- Driver inducement = no start; can be preceded by progressive derating
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SCR Driver Inducement

Improper Refill
(e.g., different or dilute reagent)

• Must detect improper refill
• Immediate alert to driver
• Driver inducement = no start; can be preceded by progressive derating
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SCR Driver Inducement

No Reagent Usage
(e.g., disabled injector, blocked feed line)

- Must detect no reagent usage
- Immediate alert to driver
- Driver inducement = no start ???
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MY2010 Durability

- Bench aging of after-treatment devices (e.g., DOC, SCR, DPF) may be considered with prior approval

Base engine must have stable engine-out emissions
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MY2010 Durability

• Must account for in-use regeneration effects (e.g., increased frequency and/or duration)

• Minimum service accumulation:
  whole engine durability - ½ useful life
  bench aging - full useful life
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Hybrid Certification

Under current procedures, two cert options

• Option 1: Using Certified Engines

• Option 2: Chassis Certification (engine + hybrid system + vehicle)

• No changes planned
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Hybrid Certification

Contact ARB for hybrid certification plans

• Durability and DF plan
• Emission Factor determination plan
• Warranty and Maintenance
• Other related discussions:
  - Special test conditions/procedures
  - Test vehicle configuration
Hybrid Certification

Hybrid Electric Buses (HEBs)

• CA transit agencies (TAs) seeking HEBs to meet fleet rules

• TAs hoping to use MHDD engines in hybrids:
  - needs to work with engine MFRs to certify MHDDE to 220K-mi alternative UL
  - only 1 engine change-out during 435K-mi urban bus UL
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Idle Emission Reduction

MY2008+ HDDEs

• Requirements:
  • Five-minute engine shutdown (ESS), or
  • 30 g/hr NOx (clean idle), or
  • Approved alternatives (APS or Heaters).

• Part of AECD review process

• [http://www.arb.ca.gov/regact/idling/idling.htm](http://www.arb.ca.gov/regact/idling/idling.htm)
Engine Shutdown System (ESS) - MAC 07-03

- ESS required for all CA-only and all 50-state-labeled engines not in exempt vehicles
- ESS disablement for exempt vehicles must be under strict manufacturer control
- ESS disablement using a software toggle is allowed for MY2008-2009. A complete reflash is required for MY2010+
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Idle Emission Reduction

30 g/hr NOx Clean Idle

- ARB approval of “Certified Clean Idle” vehicle label is integral to clean idle certification
- Engine MFR to provide a label to all CA-only-labeled and all 50-state-labeled engines not in exempt vehicles
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Idle Emission Reduction

Engines with ESS recertified to 30 g/hr NOx Clean Idle

• allowed for MY2007 and 2008 engines
• approved via running changes (MY2008 still in production) and field fixes (MY2007-2008 already produced)
• within an engine family, ESS-equipped engines and clean idle engines must be in separate model or engine code designations
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Idle Emission Reduction

MFR-Sanctioned Ducting of Certified APU Engine to Main Engine Exhaust System Upstream of DPF

- ARB approval of “Verified Clean APS” vehicle label is integral to this certification
- Engine MFR to provide a label to all CA-only-labeled and all 50-state-labeled engines not in exempt vehicles
- Regen. of main engine DPF with APU added is part of main engine AECD review
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Idle Emission Reduction

ARB staff considerations for approving “Certified Clean Idle” and “Verified Clean APS” vehicle label

• color, contrast, and holographic effects of CA state outline and background “Clean Skies” lettering

• self destructiveness of label upon removing, e.g., deformation of the removed label and leaving a “VOID”, blank, or some other pattern on the vehicle that bear no resemblance to a valid label from a distance
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Idle Emission Reduction

MY2008 Idle Emission Compliance Status

• 27 families with ESS
• 14 families with clean idle
• 3 families with clean idle plus APU exhausting into main engine exhaust system upstream of DPF
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MY2009+ Engine Family Names

- Use EPA CISD-07-03 for naming EFs.
- Unique ARB requirements indicated at the 10th position by special codes.
- ARB has not specified any such special codes.
- When special codes are needed, guidance letter will be issued in advance.
Heavy-Duty Service Information

Annual Website Reports

• **ALL** heavy-duty engine manufacturers must submit annual reports pursuant to 13 CCR 1969(f)(6) that:
  – Show compliance with minimum website content and criteria in (f)(2)
  – Indicate the website’s performance and effectiveness using Internet metrics

• Reports must be submitted no later than 30 days after the end of each calendar year
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Hybrid Certification

Option 1: Using Certified Engines

Must be used in HEVs in the same service class as the certified engine.

- no need for recertification
- no emission credit from hybrid use
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Hybrid Certification

Option 2: Chassis Certification

Interim HEV Test Procedure Applies

- One party certification
- Hybrid buses and hybrid trucks
- For hybrids using an engine not previously certified or seeking emission credits beyond the emission levels of the certified engine
- Emission factors (EFs) for determining certification compliance
- Determination of EFs requires approval