

Compression- and Spark- Ignition Engine Certification

2013 EMA Certification Workshop
April 23, 2013

California Environmental Protection Agency

 **Air Resources Board**

2013 EMA Certification Workshop

- 2013+ General Certification Topics
- 2014+ On-Road Diesel Certification Topics
- 2013+ Off-Road Diesel Certification Topics
- 2013+ Off-Road Spark-ignition Certification Topics

General Certification Topics

- Alternative Fueled Engines/Vehicles
- Emission Control Label Visibility
- Compliance Reports

Alternative-Fueled Engines

- New alternative-fueled engines—Not sold to ultimate purchaser
 - To convert new gasoline/diesel certified engine to new alt fuel engine, need separate EO
 - EO applies to new alt fuel engine for current MY only
- Existing alternative-fueled engines—Conversion after sold to ultimate purchaser
 - To convert certified gasoline/diesel engines/vehicles, follow aftermarket parts requirements
 - Data from new alt fuel engine may be applicable to aftermarket process
 - EO applies to engine family for all future conversions

Alternative-Fueled Engines

- Additional items needed in the application
 - List of authorized converting facilities
 - Durability information for additional parts
 - Base engine information
- Starting with the 2013 Model Year, all Alternative-Fueled engines require EMD+

Compliance Reports

On-Road	Off-Road
<ul style="list-style-type: none">•End-of-Year ABT (90 days + 180 days to revise)•Certification Fee (Mailout)•Evap. End-of-Year (90 days)	<p><u>Engine Mfr.</u></p> <ul style="list-style-type: none">•Sales Report•Production Line Reports•End-of-Year ABT (90 days)•Final ABT (270 days)•Replacement Engine (conclusion of model year) <p><u>Equipment Mfr.</u></p> <ul style="list-style-type: none">•Flex Sales Report (March 31)

General Diesel Certification Topics

- 2013 MY Diesel Engine Certification – Lessons Learned
- Certification Application Issues
- Emission Control Label Testing

Lessons Learned

From 2012 Diesel Engine Certification

- Revision of Sensors Table
- SCR Strategy Approval for 2013 MY
- Toxic Compound Emissions (TAC Emissions)

Certification Application Issues

- Engine Label Visibility
- Engine Label Testing
- DF Program Options

Emission Control Label

Must be Readily Visible

- Applicable to On-Road and Off-Road Engines.
- If installation obscures the label on the engine, the vehicle/equipment manufacturer shall attach a supplemental label such that it is readily visible
- If vehicle/equipment was produced with labels not readily visible, manufacturers may perform a recall to add supplemental labels – coordinate with ARB

Engine Label Testing

- Labels must not be reusable upon removal
- Durability
 - 10 years or compliance period
 - Engine compartment environment
 - Normal solvent for de-greasing engine
- Provide at least TWO samples for ARB testing

DF Program Options

- 2013+ On-HHDD, Tier4i and Tier4 OFCI Engines
- 2014 MY discussion going on now for new engines, before testing begins
- Staff prefers 50% UL testing using in-use service cycle
- Most manufacturers have already chosen an option

2014⁺ On-Road Certification Topics

2014+ Certification

On-Road Topics

- OBD
- Future Board Items
 - HD Hybrid
 - Phase I HD GHG
 - Optional HD Low NOx Standard

On-Board Diagnostics

- MY2013: all engine families with OBD, except alternative fueled engines (EMD+)
- Submit OBD documents to MSCD directly
- Submit OBD approval letter from MSCD into DMS**

HD Hybrids

- HD Hybrids expected as significant bridging technology to future zero-emission technology
- Planning amendments to test procedure for vehicle certification
- Considering requirements for full hybrid-vehicle certification, building on current on-board diagnostic requirements
- <http://www.arb.ca.gov/msprog/onroadhd/hdhev/hdhevtesting/hdhevtesting.htm>

ARB Harmonizing With EPA

Phase I HD GHG

- ARB adopting same standards
- Requirement for manufacturers of HD vehicles and engines
- ARB goal is to align seamlessly to minimize impact on manufacturers
- Key program websites:

<http://www.epa.gov/otaq/climate/regs-heavy-duty.htm>

<http://www.arb.ca.gov/msprog/onroad/phaseIghg/phaseIghg.htm>

Optional HD Low NOx Engine Standard

- Significant NOx reductions still needed in CA
- ARB goal is to encourage engine manufacturers to produce lower NOx emissions engines to help meet air quality goals
- Proposing three optional low NOx standards at 50%, 75% and 90% below current 0.20 g/bhp-hr standard
- Seeking input on how many manufactures may produce lower NOx engines and estimates of added costs
- <http://www.arb.ca.gov/msprog/onroad/optionnox/optionnox.htm>

2013+ MY OFCI Certification Topics

2013+ MY OFCI

Certification Topics

- **Tier-3 ~ Tier-4i / Tier-4 → Transition Topics**
- **SCR → Implementation Concerns**
- **Sensors Table → All 2013+ MY OFCI Engines**
- **Flex Engines**

2013+ MY OFCI

Tier-3 to Tier-4 Deterioration Factors

- **Carryover of DFs from Tier-3 to Tier-4i, where applicable**
- **Carry-across of on-road DFs to off-road engines, where applicable**
- **Two DFs needed for Tier-4 → NRTC and SS**

2013+ MY OFCI

Selective Catalytic Reduction (SCR)

- **Similar concerns addressed by On-Road SCR**
- **Application specific approval may be possible**
- **Recommend early SCR discussion with agency**
- **Cu and V based SCR catalyst → TAC emissions needs to be quantified**
- **July 2010 workshop slides as guidance**
- **More discussion with Manufacturers needed**

2013+ MY OFCI - AECD Sensors Table

- Speeds up review for 2013+ applications
- Identifies in-appropriate shut-off of critical emissions control systems

Line Number	Sensor Name / Abbreviation	Sensed Parameter Range: High / Low (Units)	Failure Detection Method	Failure Indication (Active Fault)	Default Mode/ Threshold Value (Units)	Failure Consequence (Active Fault)	Emissions Impact (Active Fault) Potential Increase in NOx, NMHC, CO, PM	Failure Response Type/ Bin (Indicate all that apply) Refer to footnote *	Failure Response Justification (Include Engine Derate if Type/Bin # 5 indicated without Type/Bin # 1, 2, 3, or 7)
1	(EDP) EGR Delta Pressure	180 ~ -40 (kPa)	Diagnostics (EMC for Nonroad)	Check engine, code storage	40 (kPa)	None	Yes	1	N.A.

<http://www.arb.ca.gov/msprog/cihd/resources/workshops/workshop--2010-03-24--df--sensortable--updated--2013-01-24.xls>

2013+ MY OFCI – Flex Engines

- ARB responding to EMA questions
- Flex Engine MAC will be updated per discussion with EMA
- Additional guidance for equipment manufacturers forthcoming
 - Submittals
 - DO NOT email to Annette, new email address tpem@arb.ca.gov
 - Reports

Small Spark-Ignition Engines (SSIE)

Exhaust Requirements

SSIE Regulation Changes (December 16, 2011 Board Hearing)

- Applicable to 2013 and Later MY Engine Families
- Harmonized California emission test procedures with that of U. S. EPA
- ARB incorporated many provisions of 40 CFR 1054 and 1065 by reference into California regulations and test procedures

SSIE Regulation Changes (December 16, 2011 Board Hearing)

- No change in emissions standards
- Mfr. to report Port-of-import/Importer information
- Mfr. to report low-hour Greenhouse Gas (GHG) emissions data
 - Carbon dioxide
 - Methane
 - Nitrous oxide (only engines with aftertreatment)
- Additional Warranty Statement requirements

Continued Use Of 2005-2012 MY California Test Procedures and Data

- 2013-2014 MY engines
 - May be used for certification, production-line and in-use testing
- 2015 and Later MY engines
 - Carryover emission data based on 2005-2012 test procedures may be used for certification (1054.235 (d))
 - For these carryover families, production-line testing may be based on 2005-2012 test procedures

Additional SSIE Warranty Statement Requirements

- Must provide and monitor:
 - Toll-free telephone number
 - E-mail address
 - Website address allowed in lieu of e-mail address as long as:
 - There is a link on the website to contact the Mfr.
 - Mfr. monitors site for warranty requests

Supplemental SSIE Exhaust Application 2013 and Later MYs

- New form for manufacturers to submit additional information starting with 2013 MY
- ARB staff worked cooperatively with Engine Manufacturers Association (EMA) and Outdoor Power Equipment Institute (OPEI) to develop Supplemental SSIE Exhaust Application
- Additional data fields harmonized with EPA

Supplemental SSIE Exhaust Application Submission Process

- 2013 MY applications already submitted
 - Submit no later than the end of 2013 MY
 - Submit into DMS under the applicable exhaust application folder
- 2013 and later MY applications not yet submitted
 - Cut and paste contents of Supplemental SSIE Exhaust Application into “Additional Comments” section (Page 14, Item 66) of application

Useful SSIE Exhaust Web Links

- [Supplemental SSIE Exhaust Application Instructions](#)
 - <http://www.arb.ca.gov/msprog/offroad/sore/sorectp/supplemental%20ssie%20exhaust%20application%20instructions.docx>
- [Supplemental SSIE Exhaust Application Form](#)
 - <http://www.arb.ca.gov/msprog/offroad/sore/sorectp/supplemental%20ssie%20exhaust%20application%20form.docx>
- [California Exhaust Emission Standards and Test Procedures for New 2013 and Later SOREs \(Part 1054\)](#)
 - <http://www.arb.ca.gov/regact/2011/soreci2011/part3sore2011fro.pdf>
- [California Exhaust Emission Standards and Test Procedures for New 2013 and Later SOREs \(Part 1065\)](#)
 - <http://www.arb.ca.gov/regact/2011/soreci2011/part4sore2011fro.pdf>