

# Public Workshop: Alternative Fuel Retrofit System Certification for 2004 and Subsequent Model Year In-Use Vehicles and Engines



Air Resources Board Auditorium  
El Monte, California  
November 12, 2013

# Agenda

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- Background
- Certification Paths
- Certification Requirements
- Application Submittal
- Post-Certification Requirements
- OBD Requirements
- Document Management System

# Background

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- Industry requested to update and simplify the alternative fuel retrofit system certification procedures
- At the September 26, 2013 hearing, the Air Resources Board approved amendments to the existing procedures for alternative fuel retrofit systems
- Amendments include testing and compliance flexibilities
- Process to finalize still underway

# Amended Regulations

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- Sections 2030 and 2031, Title 13 CCR
- “California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for On-Road Motor Vehicles and Engines”
- Applicable to alternative fuel retrofit systems for 2004 and subsequent model year in-use vehicles and engines

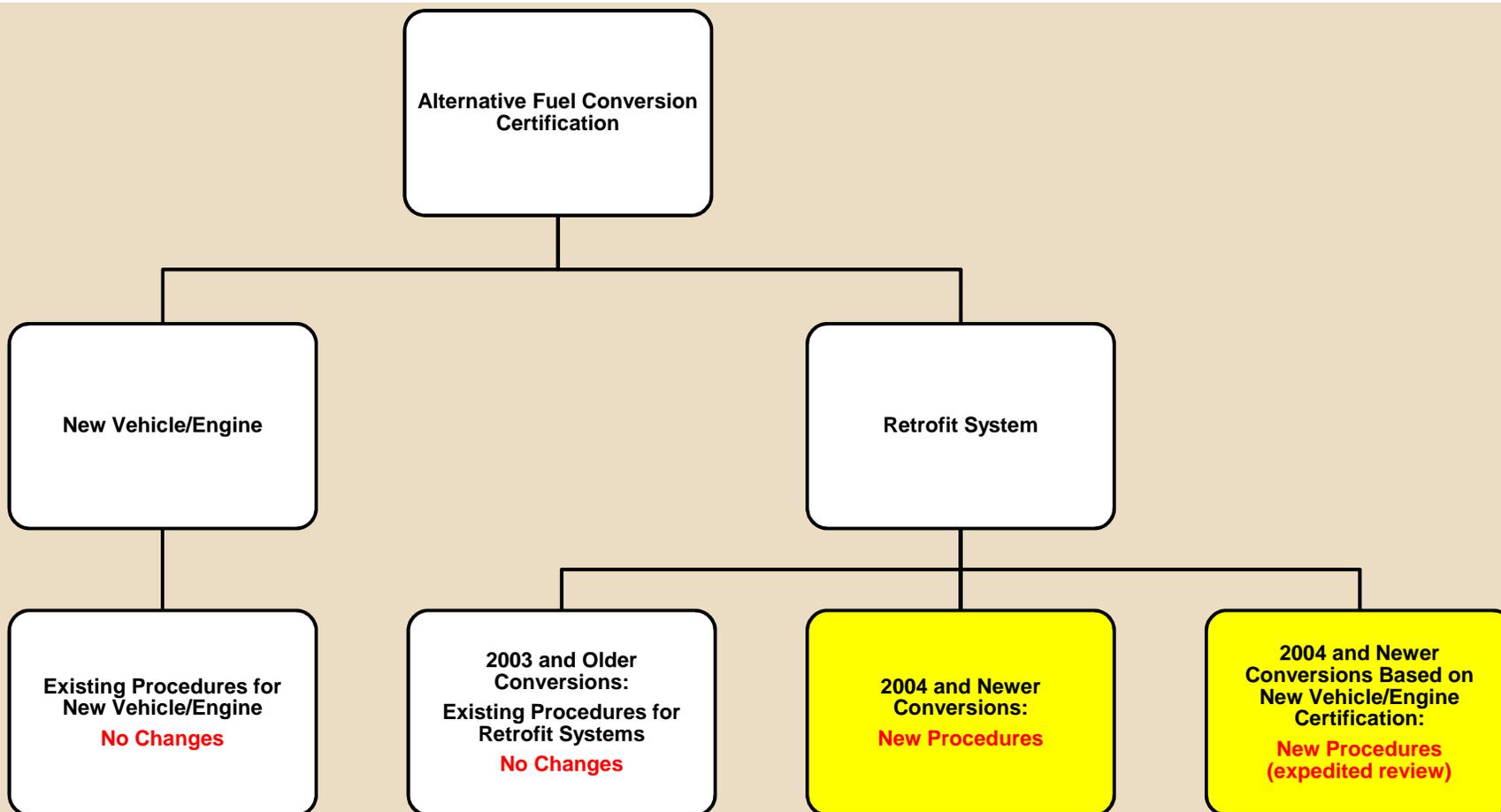
# Applicable Fuels

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- Alternative fuels
  - Compressed natural gas (CNG)
  - Liquefied natural gas (LNG)
  - Liquefied petroleum gas (LPG)
  - Alcohol or alcohol/gasoline blends
  - Hydrogen
  - Hythane
- Systems
  - Dedicated alternative fuel
  - Dual-fuel (operate on either alternative fuel or conventional fuel but one fuel at a time)
  - Bi-fuel (operate on two fuels at once)

# Certification Paths

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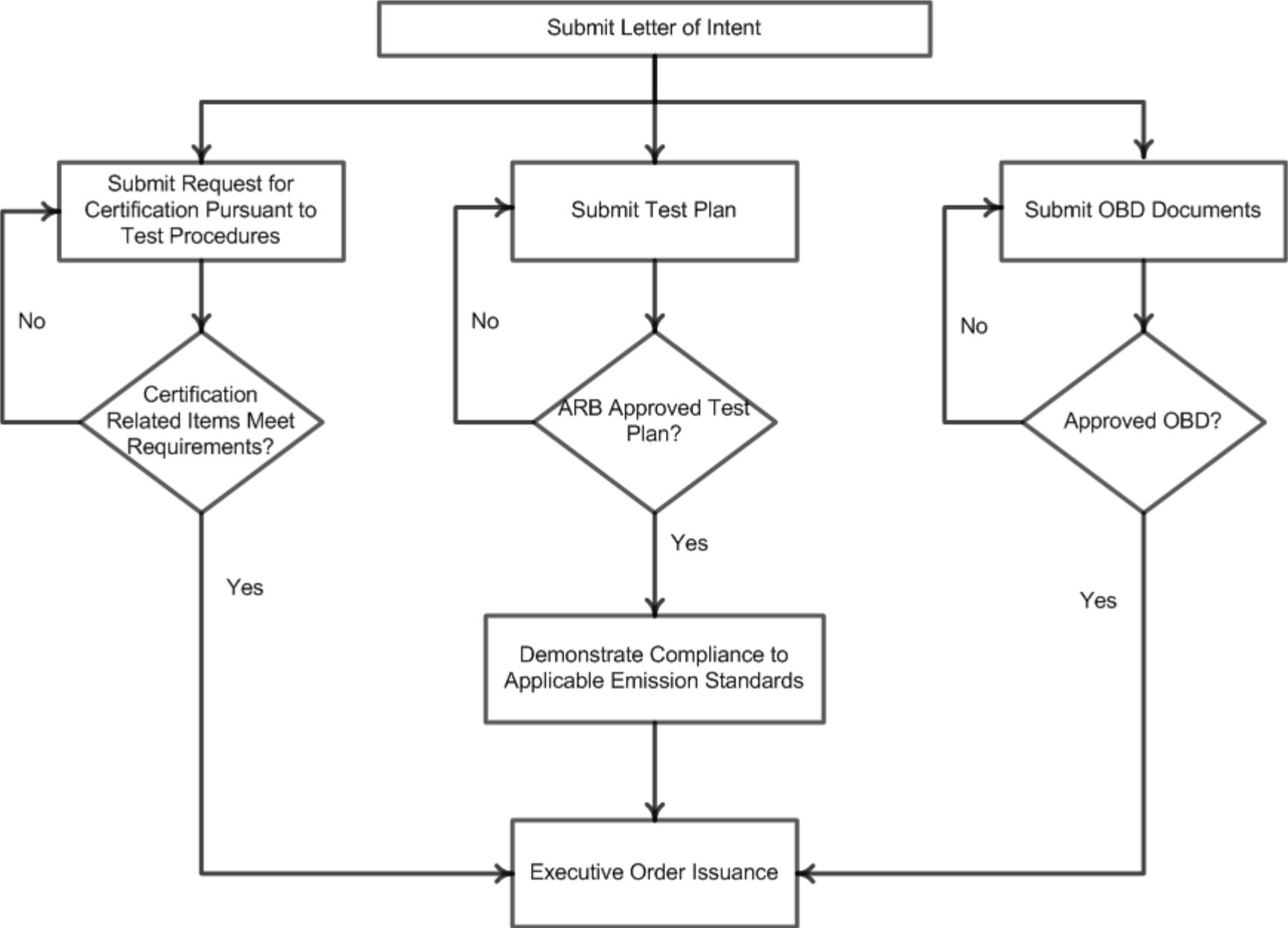


# Certification Process

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- Manufacturer submits letter of intent to certify alternative fuel retrofit system
- Identifies the base vehicle/engine test group/engine family and covered models
- Submits test plan identifying the emission/durability test vehicle/engine for ARB approval
- ARB approves test plan
- Manufacturer conducts testing per ARB approved plan
- Manufacturer submits certification application to ARB's Document Management System (DMS)
- Manufacturer submits On-Board Diagnostic (OBD) system documentation
- ARB evaluates application and issues the Executive Order upon approval

# Certification Process



# Certification Requirements

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- ❑ Retrofitted vehicle/engine must not exceed the exhaust and evaporative emission standards to which the base vehicle/engine was originally certified
- ❑ Retrofitted vehicle/engine must comply with OBD system requirements

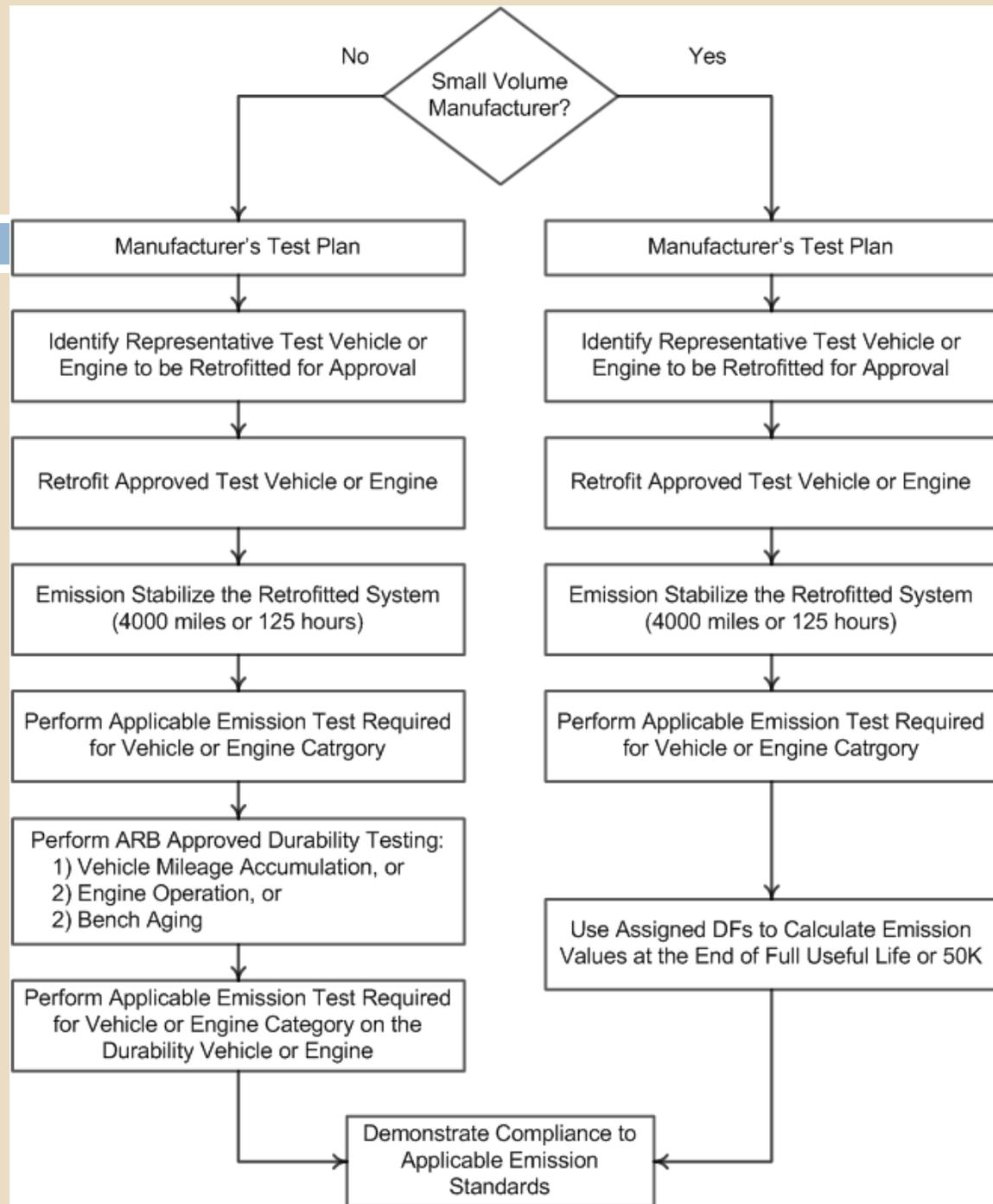
# Durability Demonstration

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- Manufacturer must demonstrate alternative fuel retrofit system durability
  - ▣ Perform vehicle mileage accumulation, engine hour accumulation, or bench aging of retrofit system components to determine deterioration factors (DF), with advance ARB approval.
    - Mileage/hour accumulation shall be representative of actual vehicle/engine use.
    - Bench aging shall result in deterioration equivalent to that from vehicle mileage/engine hour operation.
  - ▣ Perform emission testing after accumulation/aging to determine DFs and emission compliance.
- Small volume manufacturers may use assigned DFs to determine emission compliance

# Durability Demonstration

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# Emission Testing Requirements

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- Retrofit one emission test vehicle/engine per test group/engine family with alternative fuel system
- Accumulate 4,000 miles/125 hours to stabilize emissions
- Perform applicable test procedures to establish 4,000 mile/125 hour emissions

# Retrofit Systems for Passenger Car, Light-Duty Truck, Medium-Duty Passenger Vehicle

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Examples: car, pick-up, SUV, passenger van

## Testing Requirements:

- FTP (NMOG, CO, CO<sub>2</sub>, NO<sub>x</sub>, PM, HCHO); HWFET (NO<sub>x</sub>, CO<sub>2</sub>); 50°F FTP<sup>(1)</sup> (NMOG, CO, NO<sub>x</sub>, HCHO); 20°F FTP<sup>(1)</sup> (CO)
- Evaporative: Diurnal (3-day & 2-day), Hot Soak, Running Loss, ORVR
  - Dedicated CNG and LNG fueled vehicles are exempt
  - MDPVs are ORVR exempt

(1) LPG is subject to the 20°F and 50°F tests; CNG is exempt.

# Retrofit Systems for Medium-Duty Vehicle Complete Vehicle – Chassis Certified

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Examples: full size pick-up, cargo van

Testing Requirements:

- FTP (NMOG, CO, CO<sub>2</sub>, NO<sub>x</sub>, PM, HCHO); HWFET (NO<sub>x</sub>, CO<sub>2</sub>); 50°F FTP<sup>(1)</sup> (NMOG, CO, NO<sub>x</sub>, HCHO)
- Evaporative: Diurnal (3-day & 2-day), Hot Soak, Running Loss
  - Dedicated CNG and LNG fueled vehicles are exempt

LEV-II Regs. Webpage:

[http://www.arb.ca.gov/msprog/levprog/test\\_proc.htm](http://www.arb.ca.gov/msprog/levprog/test_proc.htm)

LEV-III Regs. Webpage:

<http://www.arb.ca.gov/regact/2012/leviiiighg2012/leviiiighg2012.htm>

# Retrofit Systems for Medium & Heavy-Duty Vehicle Incomplete Chassis

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Examples: truck chassis, van chassis

Testing Requirements:

- Evaporative: Diurnal, Hot Soak, Running Loss (compliance by engineering analysis)
- Dedicated CNG and LNG fueled vehicles are exempt

Evaporative Emissions Regs. Webpage:

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

# Retrofit Systems for Medium & Heavy-Duty Engine

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Examples: heavy-duty engines

Testing Requirements:

- HD Otto or Diesel cycle engine test procedures;
  - FTP
  - SET
  - NTE (e.g., tests at 3 mystery points)
  - THC/NMHC, CO, NO<sub>x</sub>, HCHO, PM

Heavy-Duty Engine Regs. Webpage:

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

# Exceptions to Test Procedures

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- ❑ Manufacturers certifying NG or LPG systems may determine NMOG emission using  $\text{NMOG} = 1.5 \times \text{measured NMHC}$
- ❑ Sealed fuel systems demonstrated to have no evaporative emissions are exempt from evaporative and refueling emission testing, subject to ARB approval

# Sunset Provisions

## 2004 – 2017 Model Years

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- Manufacturers of dual-fuel systems may request exemption from testing on original fuel
  - ▣ Manufacturers must demonstrate that the alternative fuel retrofit system does not alter or interfere with base vehicle/engine operation
  - ▣ Demonstration may be based on engineering evaluation and test data
- All requests must be approved in advance by ARB

# Small Volume Manufacturer Provisions 2004 – 2017 Model Years

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- Small volume retrofit system manufacturers have less than 4,500 total annual CA retrofit system sales
- They may use:
  - ▣ Federal NG certification fuel for emission test
  - ▣ ARB motor vehicle LPG for emission test
  - ▣ Assigned DFs to determine compliance in lieu of durability testing
  - ▣ Alternate test procedures with advance ARB approval

# Certification Application Items

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- Letter of intent to certify alternative fuel retrofit system
- Identification and description of the base vehicle/engine
- Description of the retrofit system, including system schematic, parts list, parts removed
- Explanation of how the retrofit system interacts with the base vehicle/engine
- List of modifications made to the base vehicle/engine and OBD system
- OBD approval letter

# Certification Application Items

## (continued)

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- Supplemental emission control information label
- Owner's manual
- Emission warranted parts list
- Emission warranty statements and notification
- Installation and maintenance procedures

# Retrofit System Supplemental Label

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- Affix adjacent to the original emission control information label
- Supplement label shall show:
  - Base vehicle/engine model year; applicable emission standards
  - Retrofit system certification Executive Order number
  - Retrofit system manufacturer name, address, phone number
  - List of base vehicle/engine parts removed during conversion
  - List of retrofit system parts added during conversion
  - Changes to tune-up specifications required by retrofit system
  - Installer name, address, phone number
  - Date and mileage of retrofit system installation
  - Date and mileage at which retrofit system warranty expires
  - Statement that retrofitted vehicle/engine complies with California emission requirements
  - Statement that the vehicle/engine has been retrofitted to operate on a fuel other than gasoline or diesel and identify the alternative fuel

# Manufacturer Warranty

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- Warrant retrofit system to meet California requirements for
  - ▣ 3 years or 50,000 miles or Remaining OEM warranty, whichever is longer
  - ▣ 7 years or 70,000 miles (high cost parts)
- Warranty covers costs of diagnosis, labor, and parts

# Installer Warranty

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Warrant installation work for 3 years or 50,000 miles, whichever first occurs, from date of installation

# Warranty Notification

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- Alternative fuel retrofit system manufacturer must provide notification to its purchaser that installation of the alternative fuel retrofit system may affect OEM warranty
- This notification must be signed by the purchaser prior to sale and must be kept by the manufacturer for the duration of the warranty period

# Manufacturer Post-Certification Requirements

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- Alternative fuel retrofit system manufacturer must maintain records of converted vehicles/engines
  - ▣ Vehicle identification number, engine serial number, license plate number
  - ▣ Installation date, Executive Order number
  - ▣ Vehicle owner name, address, phone number
- Alternative fuel retrofit system manufacturer must report annual sales by March 1 of the following calendar year

# Installer

## Post-Certification Requirements

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- Alternative fuel retrofit system installer must maintain records of converted vehicles/engines
- Prior to releasing a converted vehicle/engine to the consumer, the installer must submit the converted vehicle for BAR inspection and testing
- For fleet installations of multiple retrofit systems, the installer may transfer responsibility for BAR inspection and testing directly to the fleet owner. Installer must notify the fleet owner of the BAR inspection and testing requirement.

# In-Use Enforcement Testing

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- ARB may order in-use enforcement testing
- If required, testing may be performed on no more than 3 retrofitted vehicles/engines per certified retrofit system test group/engine family per year
- For each failing vehicle/engine, 2 more vehicles/engines shall be tested up to a total of 10 vehicles/engines
- If average emissions exceed standards, recall may be ordered

# Retrofit System Certification Based on New Vehicle/Engine Certification

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- Submit request to ARB to certify alternative fuel retrofit system that is identical to the system used in the new vehicle/engine certification
- Base vehicle/engine and retrofit system must be identical in the new and in-use conversions, including part numbers
- Submit copy of new vehicle/engine application into DMS Retrofit folder
- Submit information unique to retrofit system certification, i.e. label, warranty, installation instruction, into DMS Retrofit folder
- A separate alternative fuel retrofit system Executive Order will be issued for the retrofit system

# Contacts

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- OBD:
  - ▣ Mr. John Ellis, Manager, LEV Implementation Section; [jellis@arb.ca.gov](mailto:jellis@arb.ca.gov)
- 2003 and older conversion:
  - ▣ Mr. Tony Martino, Manager, Aftermarket Parts Section; [amartino@arb.ca.gov](mailto:amartino@arb.ca.gov)
- 2004 and newer conversion:
  - ▣ Mr. Duc Nguyen, Manager, On-Road Light-Duty Certification Section; [dnguyen@arb.ca.gov](mailto:dnguyen@arb.ca.gov)
  - ▣ Ms. Kimberly Pryor, Manager, Compression-Ignition and Heavy-Duty Certification Section; [kpryor@arb.ca.gov](mailto:kpryor@arb.ca.gov)

# ARB Electronic Document Management System (DMS)

For Alternative Fuel Retrofit System

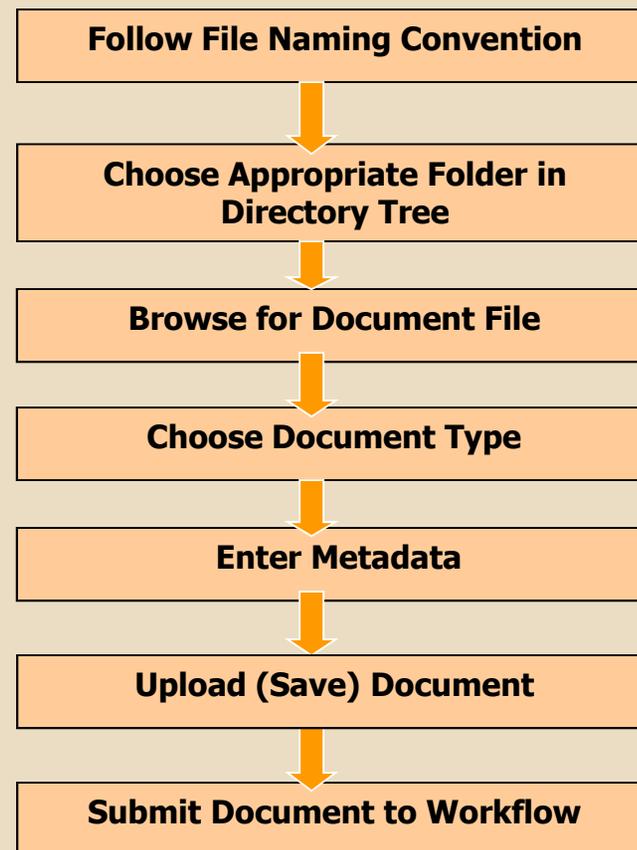
# DMS Overview

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- What is DMS?
  - ▣ System to track and store certification documents electronically
  - ▣ Reduce paperwork
- What documents need to be submitted to DMS?
  - ▣ All certification applications
  - ▣ Certification related documents and materials

# Major Steps of Document Submission to the ARB DMS

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# Obtain DMS Access

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- New manufacturer please contact:
  - (Light Duty) Duc Nguyen, (626) 575-6844, [dnguyen@arb.ca.gov](mailto:dnguyen@arb.ca.gov)
  - (Heavy Duty) Kim Pryor, (626) 575-6640, [kpryor@arb.ca.gov](mailto:kpryor@arb.ca.gov)
- Existing manufacturers please contact:
  - Your ARB Certification Representative to add new accounts or modify accounts

# Register for DMS

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Obtain a DMS Account by providing 3 documents to the appropriate section manager

- A Letter of Intent
- An Original Electronic Signature Letter
- A DMS Excel Contacts List

As indicated at:

<http://www.arb.ca.gov/msprog/dms/dms-4.htm#Accounts> - How to get one

# DMS Training

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DMS Training is provided every month for all manufacturers who are interested

- The training is web-based and goes through the major steps to submit documents
- Contact your certification representative to get more information about training
- Contact a DMS team member if you have any DMS questions
  - James Pang (Heavy Duty), (626) 450-6127, [spang@arb.ca.gov](mailto:spang@arb.ca.gov)
  - Ivonne Guzman-Cicero (Light Duty), (626) 575-6718, [iguzmanc@arb.ca.gov](mailto:iguzmanc@arb.ca.gov)

# DMS Resources

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- DMS Webpage
  - <http://www.arb.ca.gov/msprog/dms/dms.htm>
- DMS User Guide
  - <http://www.arb.ca.gov/msprog/dms/mfrug032707.pdf>
- DMS Tutorials
  - <http://www.arb.ca.gov/msprog/dms/dms2.htm#tutorials>
- DMS FAQ
  - <http://www.arb.ca.gov/msprog/dms/dms-2.htm#faq>

# Question and Answer