Off-Road Small and Large Spark-Ignition Engines

2011 EMA Certification Workshop
May 5, 2011
Small Spark-Ignition Engines (SORE)
SORE Adjustable Parameters

- An adjustable parameter is any device, system, or element of design which is physically capable of being adjusted, and which, if adjusted, may affect emissions or engine performance.
- Example: carburetor air/fuel mixture screws (idle & WOT)
- Listed in the certification application
  - Description of parameter
  - Range of adjustment or tamper resistance method
  - Pictures/schematic
SORE Adjustable Parameters
With Range of Adjustment

- Example: carburetor air/fuel mixture screw (rich to lean setting)
- Engine must meet emission standards at any setting
- Staff may request manufacturer to test at any point in the range of adjustment (rich/lean)
SORE Adjustable Parameters
Equipped with Tamper Resistance Method

- Tamper resistant, not tamper proof (Common sense approach)
- **40 CFR 90.112b**: Not considered adjustable if
  - permanently sealed by manufacturer
  - not normally accessible using ordinary tools
- Manufacturers are encouraged to try themselves to tamper before sending parts to staff
- Examples of tamper resistance methods:
  - Limiter Caps
  - Breakoff Screws
  - Metal Plugs
  - Adjustable using special tools
  - Inaccessible due to parameter recessed in engine housing
SORE Adjustable Parameters
Tamper Resistance Evaluation Protocol

• **Staff tests tamper resistance as a part of certification**
  - Simple tools, e.g. pliers, screwdrivers, hammer
  - Testing done in less than 30 minutes
  - No damage to carburetor or engine
  - At least two staff participate

• **Staff may revisit past approvals**
  - Technology changes
  - Regulatory changes
  - Audit/enforcement findings
  - Production variations
  - Additional lead time provided for existing approvals
SORE Adjustable Parameters
Special Tools

• Availability to consumers
  – Internet
  – Manufacturer specific tool clones
  – Technical progression

• Need to revisit prior approvals?

• Manufacturers have indicated consumers tampering and affecting warranty claims

• Some designs defeated with ordinary tools

• Future industry workshop to solicit input
Large Spark-Ignition Engines (LSI)
LSI ≤ 1.0 Liter Evaporative Requirements  
2011+ MY

- Engines are subject to SORE Evaporative requirements
- LSI regulations incorporate by reference the SORE Regulation and Test procedures
- Evaporative certification procedures and guidelines are the same as those for SORE (except Small Production Volume Tank Exemption)
LSI ≤ 1.0 Liter Evaporative Requirements 2011+ MY

- 11 evaporative families certified to date
- Engine manufacturers should inform equipment manufacturers of new evaporative requirements
- Evaporative certification application and related documents may be found in the "Guidelines" section of the LSI Resource Webpage

http://www.arb.ca.gov/msprog/offroad/lsi/lsictp/lsictp.htm
Off-road Spark-ignited Engine Certification Section
Manager: Kumar Muthukumar, cmuthuku@arb.ca.gov

- Joseph Jegede
- Geeta Osborn
- Alan Chow
- Kevin Curley
- Michael Lin
- Janie Han
- Byron Ng
- Sophia Mahmood
- David Pino