Course #505
Large Spark-Ignition (LSI) Fleet Regulation
Course 505
Large Spark-Ignition (LSI) Engine Fleet Regulation Training

California Environmental Protection Agency
Air Resources Board

Overview

• Need for Emission Reductions
• Regulatory Background
• Applicability
• Emission Requirements
• Special Provisions
• Recordkeeping and Enforcement
• Compliance Extensions
• Resources and Contact Information
Need for Emission Reductions

Most Polluted Regions in the United States Ozone (smog)

1. Los Angeles Region
2. Visalia, CA
3. Bakersfield, CA
4. Fresno, CA
5. Hanford, CA
6. Sacramento, CA
7. San Diego, CA
8. Houston, TX
9. San Luis Obispo, CA
10. Merced, CA

*American Lung Association “State of the Air” Report 2012
Oxides of Nitrogen ($\text{NO}_x$)

- $\text{NO}_x$ is an ingredient of photo-chemical smog / ground level ozone
- Health Effects - inflamed lung tissue, pain breathing, eye/nose/throat irritation, increased risk of heart and lung disease
- Environmental Effects - reduced visibility, stunted plant growth, reduced crop yields

Regulatory Background
California’s LSI Regulations

• First adopted in 1998
  ➢ Attainment of Federal AAQS
  ➢ New Engine Standards and Test Procedures
    – Phase in of 3.0 g/bhp-hr by 2004 model year
    – Represents 75 percent emission reduction

• Amended in May 2006
  ➢ Additional Engine Standards and Test Procedures
    – 2.0 g/bhp-hr in 2007; 0.6 g/bhp-hr in 2010
    – Represents 95 percent emission reduction
  ➢ Retrofit Kit Verification Procedures
  ➢ Fleet Requirements

California’s LSI Regulations (cont.)

• Amended in December 2010
  ➢ Fleet Requirements only
  ➢ Added several new definitions
    – agricultural and forest operations
    – In-field, boneyard, and retired equipment
    – Operations and service equipment definitions
  ➢ Modified airport ground support equipment and fleet average emission level definitions
  ➢ Reinstated limited hours of use provisions
  ➢ Established longer Compliance Extension period

• Became law in December 2011
• Received EPA authorization in April of 2012
Applicability

Who and What is Affected?

Who is Affected?

• Businesses
• Individuals
• Government agencies
What type of equipment is affected?

• Equipment that uses Large Spark-Ignition (LSI) engines or electric motors
  ➢ Forklifts
  ➢ Industrial tow tractors
  ➢ Industrial sweeper scrubbers
  ➢ Airport ground support equipment (GSE)

What is an LSI engine?

• Gasoline, propane, and CNG fuel
  – Not diesel
  – Similar to automotive engines
• Greater than 25 horsepower; and
• Greater than 1 liter displacement
• Self-propelled (No portable equipment)
  – Except some airport GSE
Forklift Definition

For the purposes of the LSI Fleet Regulation

• “Forklift” means:
  – An electric Class 1 or 2 rider truck, or
  – An LSI engine-powered Class 4 or 5 rider truck
  – As defined by the Industrial Truck Association (www.indtrk.org)

• “Forklift” does not mean:
  – An electric Class 3 truck (e.g., pallet jacks & walkies)
  – Man lifts, scissors lifts, and bucket/boom lifts

Class 1 (electric, counter-balanced, all tires)

4 sub-classifications

• Lift Code 1
  – Counterbalanced Rider
  – Stand Up

• Lift Code 4
  – Three wheel
  – Sit Down

• Lift Code 5
  – Counterbalanced Rider
  – Cushion tires
  – Sit Down

• Lift Code 6
  – Counterbalanced Rider
  – Pneumatic/Cushion tires
  – Sit Down
Class 2 (electric, narrow-aisle, solid tires)

5 sub-classifications

• Lift Code 1
  – High Lift Straddle

• Lift Code 2
  – Order Picker

• Lift Code 3
  – Reach Type Outrigger

• Lift Code 4
  – Side Loaders, Turret Trucks, Swing Mast and Convertible Turret/Stock Pickers

• Lift Code 6
  – Low Lift Pallet and Platform (Rider)

Class 4 and 5 Forklifts (LSI engine)

• Class 4; Lift Code 3
  – Counterbalanced Rider
  – Cushion Tire

• Class 5; Lift Code 4
  – Counterbalanced Rider
  – Pneumatic Tire
Class 3 Forklifts (electric, hand trucks)

8 sub-classifications

• Lift Code 1
  – Low Lift Platform

• Lift Code 2
  – Low Lift Walkie Pallet

• Lift Code 3
  – Tractors
  – Draw Bar Pull < 999 pounds

• Lift Code 4
  – Low Lift Walkie/Center Control

Class 3 Forklifts (electric, hand-trucks)

8 sub-classifications (cont.)

• Lift Code 5
  – Reach Type Outrigger

• Lift Code 6
  – High Lift Straddle

• Lift Code 7
  – High Lift Counterbalanced

• Lift Code 8
  – Low Lift Walkie/Rider Pallet
Tow Tractor Definition (non-GSE)

- “Industrial Tow Tractor” means an electric motor or LSI engine Class 6 truck as defined by the Industrial Truck Association
- Designed primarily to push or pull non-powered trucks, trailers, or other mobile loads on roadways or improved surfaces
- Commonly referred to as tow motors or tugs
- Tow tractors used at airports are included in GSE Fleet definition

Sweeper/Scrubber Definition

- “Sweeper/scrubber” means an electric motor powered or large spark-ignition engine-powered piece of industrial floor cleaning equipment
- Designed to vacuum up small debris (litter) and/or scrub and squeegee the floor
Airport Ground Support Equipment

- LSI engine
- electric-powered (can be < 19 kW)
- 23 subcategories (as identified in 11/27/02 MOU)

<table>
<thead>
<tr>
<th>Air Conditioner</th>
<th>Cart</th>
<th>Lavatory Cart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Start</td>
<td>Catering Truck</td>
<td>Lavatory Truck</td>
</tr>
<tr>
<td>Aircraft Tractor</td>
<td>De-icer</td>
<td>Lift</td>
</tr>
<tr>
<td>Baggage Tractor</td>
<td>Fork Lift</td>
<td>Passenger Stand</td>
</tr>
<tr>
<td>Belt Loader</td>
<td>Fuel Truck</td>
<td>Service Truck</td>
</tr>
<tr>
<td>Bobtail</td>
<td>Generator</td>
<td>Sweeper</td>
</tr>
<tr>
<td>Cargo Loader</td>
<td>Ground Power Unit</td>
<td>Water Truck</td>
</tr>
<tr>
<td>Cargo Tractor</td>
<td>Hydrant Truck</td>
<td></td>
</tr>
</tbody>
</table>

- Includes “On-Road Equivalent GSE,” those pieces of GSE designed for, but not licensed for on-road use

Emission Requirements

- Controlling LSI Emissions
- Fleet Average Requirements
- Exemptions & Exclusions
Controlling LSI engines

- Automotive-style controls
- Three-way catalytic converter:
  - Controls HC, NOx, and CO
  - Requires stoichiometric air to fuel ratio
  - Packaged as a catalytic muffler
- Fuel/air control
  - To achieve stoichiometry:
    - OEMs use fuel injection and onboard computers
    - Retrofit kit manufacturers use an Oxygen sensor, solenoid, and electronic controller to do the same thing

Fleet Average Requirements
Fleet Size

- Two separate fleets
  - Forklift
  - Non-forklift
  - For each, include pieces of electric equipment

- Forklift fleets are small (1-3), medium (4-25) or large (26+)
  - Small fleets are exempt

- Fleet Aggregation
  - Equipment must be added together into a single fleet if procurement decisions and/or budgeting for facility location(s) occur at a higher corporate level
  - May be considered different fleets if budgeting and procurement decisions are made independently

LSI Fleet Regulation Exemptions

- Small Fleets
  - 3 or fewer forklifts, and/or
  - 3 or fewer pieces of non-forklift LSI engine equipment

- Rental or lease equipment operated 30 or fewer aggregated calendar days per year

- In-field forklifts (agricultural use ≥50%)

- Tactical support equipment
Fleet Average Emission Level Standards

Fleet Average Emission Level Standard in Grams HC+NOx per kilowatt-hour (brake horsepower-hour)

<table>
<thead>
<tr>
<th>LSI Fleet Type</th>
<th>Number of units</th>
<th>By 1/1/2009</th>
<th>By 1/1/2011</th>
<th>By 1/1/2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forklift – large fleet</td>
<td>26+</td>
<td>3.2 (2.4)</td>
<td>2.3 (1.7)</td>
<td>1.5 (1.1)</td>
</tr>
<tr>
<td>Forklift – mid-size fleet</td>
<td>4-25</td>
<td>3.5 (2.6)</td>
<td>2.7 (2.0)</td>
<td>1.9 (1.4)</td>
</tr>
<tr>
<td>Non-forklift – GSE, tow tractor, sweeper</td>
<td>4+</td>
<td>4.0 (3.0)</td>
<td>3.6 (2.7)</td>
<td>3.4 (2.5)</td>
</tr>
</tbody>
</table>

• GSE forklifts must comply with the forklift standards

Calculating the Fleet Average

• Not based on hours of use, horsepower, or source test
• Straight average of HC+NOx certification/verification standards or a default value for uncontrolled engines

<table>
<thead>
<tr>
<th>Engine Category</th>
<th>HC+NOx Emission Factor</th>
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</thead>
<tbody>
<tr>
<td>Pre-2001 model years</td>
<td>16.0 g/kW-hr (12.0 g/bhp-hr)</td>
</tr>
<tr>
<td>Uncontrolled 2001-2003 MY</td>
<td></td>
</tr>
<tr>
<td>Controlled 2001-2003 MY</td>
<td>4.0 g/kW-hr (3.0 g/bhp-hr)</td>
</tr>
<tr>
<td>2004 to 2006 MY</td>
<td></td>
</tr>
<tr>
<td>2007 to 2009 MY</td>
<td>0.8 - 2.7 g/kW-hr (0.6 - 2.0 g/bhp-hr)</td>
</tr>
<tr>
<td>2010+ MY</td>
<td>0.8 g/kW-hr (0.6 g/bhp-hr)</td>
</tr>
</tbody>
</table>

• Engine labels will indicate model year
  – OEM-certified engines and verified retrofit kits
  – Typically on valve cover or other conspicuous location
2001 – 2003 Uncontrolled Label

2001 – 2006 Controlled Label
2007 and Newer Label

Calculating the Fleet Average (GSE)

• On-Road Equivalent GSE Vehicles
  ➢ Vehicles designed for, but not licensed for, on-road operation
    — Examples: Catering, Fuel, Lavatory, and Water Trucks
  ➢ Must use different emission factors for calculating fleet average

• On-Road Equivalent defaults for calculations:
  ➢ January 1, 2009 fleet standard → 1.5 g/kW-hr (1.1 g/bhp-hr)
  ➢ January 1, 2011 fleet standard → 1.1 g/kW-hr (0.8 g/bhp-hr)
  ➢ January 1, 2013 fleet standard → 0.9 g/kW-hr (0.7 g/bhp-hr)
Fleet Average Calculators

- No ARB calculator
- Several third party calculators including:
  - Pape Material Handling: http://www.papemh.com/carb.aspx
  - Toyota Material Handling: http://tmhnc.com/training/downloads

Fleet Average Exclusions

- Limited hours of use
  - Less than 200 based on prior calendar year
- Rental or lease equipment where:
  - Agreement is less than one year; and
  - Meets a 2.7 g/kW-hr (2.0 g/bhp-hr) standard; and
  - No more than 20 percent of fleet (otherwise, exclusion applies only to first 20 percent)
- Boneyard and Retired equipment
Boneyard & Retired Equipment

- **Boneyard** means a grouping of decommissioned or retired pieces of equipment at a location geographically separated from operational fleets subject to the fleet average requirements and intended for transfer, sale, spare parts, or scrap.

- **Retired** means equipment that has been removed from service and rendered physically inoperable:
  - Must have non-resettable hour meter
  - Remove fuel, starter battery and steering wheel
  - Record initial hour meter reading and quarterly thereafter
  - Employ lockout device or sever battery cable
  - Store away from operable equipment and keep inventory.

Special Provisions
Equipment Dealer Provisions

• Customary business is the rental, leasing, or sale of LSI equipment

• Must include in fleet calculations:
  – All service equipment regardless of hours of operation
  – Operations equipment used >50 hours per year

• Service equipment is:
  – Used >50% to support rental, leasing, or sales business

• Operations equipment is:
  – Used >50% as a rental or lease unit or is designated for sale

GSE Provisions

• Counting of electric GSE in both LSI Rule and Off-Road Diesel Regulation (ORD)
  – Depends on purchased date of vehicle (January 1, 2007)

• LSI GSE may be counted toward the Off-Road Diesel Regulation
  – Must be able to meet LSI fleet average with or without LSI vehicle

• Contact program staff for details
Agricultural Provisions (Definitions)

• Agricultural Operations includes both:
  1) Growing or harvesting of crops from soil (including forest operations) and the raising of plants at wholesale (not retail) nurseries, or the raising of fowl or animals; and
  2) Agricultural crop preparation services
     – For combination use, must be >50% #1 to qualify as in-field

• Forest Operations
  – Fire prevention activities performed by public agencies
  – Cutting and/or removal of timber, other wood products, including Christmas trees, and biomass from forestlands for commercial purposes including the processing into other wood products, together with all the work incidental thereto
  – Does not include conversion of forestlands to other land uses such as residential or commercial developments

Agricultural Provisions (Definitions)

• Agricultural Crop Preparation Services (ACPS)
  – Packinghouses, nut hullers and processors cotton gins, dehydrators, feed and grain mills
  – Milling, peeling, producing particle board and MDF and woody landscape materials
  – Other “postharvest crop activities:”
     • NAICS definitions for Industries 115114, 321113, and 321219:
       – http://www.census.gov/epcd/naics02/def/ND115114.HTM
       – http://www.census.gov/epcd/naics02/def/ND321113.HTM
       – http://www.census.gov/epcd/naics02/def/ND321219.HTM
Agricultural Provisions

- In-field forklifts are exempt
  - Used no more than 50% in ag crop preparation services
- Retrofit each piece of owned uncontrolled 1990 and newer forklifts
  - 4.0 g/kW-hr (3.0 g/bhp-hr) standard or better
  - 20 percent by January 1, 2009
  - Remainder by January 1, 2012
- Alternatively, meet a 4.0 g/kW-hr fleet average
- ACPS operators are not responsible for:
  - Leased forklifts (longer than 1 year rental)
  - Rental forklifts rented on or after January 1, 2009
  - Provided the leased or rental forklifts meet a certified standard

Recordkeeping Requirements

- The LSI Fleet Regulation has no reporting requirements
- Operators must maintain records
  - A baseline inventory due November 12, 2007
  - Contents: vehicle/engine make, model, SN, certification, or verification level as shown on label
- No longer required to obtain fuel quality records
- Records of fleet inventories through June 30, 2016
- Records may be retained at a centralized facility or headquarters
Enforcement

• EPA Authorization granted April 4, 2012
• First visits to start SOON; increasing thereafter
• Performed by ARB and possibly local air districts
• May be conducted in conjunction with other inspections:
  – In-use off-road diesel regulation
  – Cargo handling equipment regulation
  – Other mobile and stationary source regulations
• Demonstrate compliance with fleet standard at any time between January 1, 2009 and December 31, 2015
• Penalty
  – Maximum of $500 per day per piece of equipment

Compliance Extensions

• Two-year compliance extensions may be granted:
  – No verified retrofit emission control system available
    • Safety reasons
    • High-cost specialty equipment
  – Verified retrofit does not achieve fleet average limit
• Operators may request subsequent two-year extension:
  – Still no verified retrofit emission control system available near end of first extension
• At the conclusion of the approved extension(s), must include equipment in fleet average
• No longer available for GSE
Resources and Contact Information

Contacts

• **Website:** [http://www.arb.ca.gov/lsi](http://www.arb.ca.gov/lsi)
  – See “Program Links” for
    ✓ Fact Sheets
    ✓ Frequently Asked Questions
    ✓ Guidance Documents and Advisories
    ✓ Presentations
    ✓ Regulatory Text
    ✓ Verified Retrofit Emission Control System Executive Orders

• **Toll-free number:** *(800) 387-2992*

• **E-mail:**
  – Mark Williams (Lead): mwilliam@arb.ca.gov
  – Elise Keddie, Manager: ekeddie@arb.ca.gov
Join the LSI listserv to get email notifications
ENFORCEMENT OF THE IN-USE OFF-ROAD LARGE SPARK-IGNITION ENGINE FLEET REGULATION

Background

On May 25, 2006, the ARB considered and approved a regulation to reduce emissions from forklifts, industrial tow tractors, industrial sweeper/scrubbers, and pieces of airport ground support equipment (GSE) powered by Large Spark-Ignited Engines (LSI) engines. The locations of, and uses for, this LSI engine-powered equipment are ubiquitous. The largest concentrations of LSI equipment are found in warehousing and manufacturing (primarily forklifts) and in airline operations (GSE are found in both airline and contracted aviation services fleets).

The regulation was formally adopted on April 12, 2007, and became operative under California law on May 12, 2007. The regulation establishes fleet average emission level standards and retrofit requirements for operators of LSI engine-powered equipment. It also establishes recordkeeping requirements. Under section 209(e)(2) of the federal Clean Air Act, California may enforce its own emission standards and other requirements related to the control of emissions from off-road engines and equipment not conclusively preempted by section 209(e)(1) – new locomotives and engines and new off-road engines less than 175 horsepower used in farm and construction equipment and vehicles – so long as it first applies for and receives authorization from the Administrator of USEPA. USEPA granted California authorization to enforce the LSI Fleet Regulation on April 4, 2012. (77 Fed. Ref. 20388, April 4, 2012.)

Recent Amendments to the Regulation:

On December 16, 2010, the Board considered amendments to the LSI Fleet Regulation. Those amendments became effective on December 14, 2011. The amendments include:

- Adding agricultural and forest operations; boneyard, in-field, operations, retired, and service equipment definitions;
- Modifying airport ground support equipment and fleet average emission level definitions;
- Reinstating limited hours of use provisions; and
- Establishing longer compliance extension periods.

Enforcement

When the LSI regulation was filed with the Secretary of State in May 2007, the requirements of the regulations came into effect and were fully enforceable except those parts which required an
authorization under the Clean Air Act. With the issuance of the authorization by USEPA, those provisions are now enforceable as well. **In sum, all affected owners/operators must now be in compliance with all requirements of the LSI regulation.**

For information regarding this advisory or enforcement of the LSI Fleet Regulation, please contact Ms. Lisa Yacoubian at (626) 350-6403 or via e-mail at lyacoubi@arb.ca.gov. If you would like additional information regarding technical requirements of the regulation, please visit our web site at [http://www.arb.ca.gov/lsi](http://www.arb.ca.gov/lsi) or contact Mr. Mark Williams at (916) 327-5610 or via e-mail at mwilliam@arb.ca.gov.
CALIFORNIA AIR RESOURCES BOARD
FREQUENTLY ASKED QUESTIONS (FAQ):
LARGE SPARK IGNITION (LSI) ENGINE FLEET REQUIREMENTS

APPLICABILITY

1. **What equipment is covered by the fleet average portion of the Off-Road Large Spark Ignition Engine Regulation (LSI fleet regulation)?**

   The LSI fleet regulation addresses engines that are fueled by gasoline, CNG, or LPG, rated at 25 horsepower or greater (greater than 19 kilowatts), and used in forklifts and the following non-forklift equipment: industrial tow tractors, airport ground support equipment, and sweeper/scrubbers.

2. **How do I know if the LSI fleet regulation applies to me?**

   You need to determine your fleet size. To do so, you must first determine whether you need to add the equipment in each of your fleets together. If your facilities make their equipment procurement decisions, including budgeting, independent of one another, then their equipment does not have to be added together for the purposes of determining fleet size. However, if procurement decisions and/or budgeting occur at a higher echelon headquarters or corporate level, then all of the equipment at all of the facilities for which the higher echelon level makes procurement decisions must be added or aggregated together to determine fleet size. For example, if you have a main facility where all equipment procurement and budgeting occurs and two satellite facilities and each of the three facilities has three forklifts, then your company has nine forklifts and is considered a medium size fleet.

   If you have a total of four or more forklifts or four or more pieces of non-forklift LSI equipment, then the LSI fleet regulation applies to you.

3. **What if I don’t have four or more forklifts or four or more pieces of non-forklift equipment?**

   If you have three or fewer forklifts and/or three or fewer pieces of non-forklift LSI equipment, then you are exempt from the provisions of the LSI fleet regulation. This means you may have as many as six pieces of LSI equipment and still be exempt.

4. **Do I count electric equipment in my fleet size determination?**

   Yes, except that operators of Agricultural Crop Preparation Services fleets are not required to include electric forklifts in determining their fleet size because their standards are not based upon a fleet average calculation. Electric equipment purchased before January 1, 2007, including airport Ground Support Equipment, that replaced a diesel vehicle may be included in the fleet average for the In-Use Off-Road
Diesel-Fueled Fleets (title 13, California Code of Regulations, section 2449 and following). These vehicles will not be included in the LSI fleet size determination.

5. **Are aerial lifts included in the LSI fleet regulation?**

No, only the four categories of equipment addressed in Question 1 are to be addressed by the LSI fleet regulation.

6. **Does my diesel equipment have to comply with the LSI fleet regulation?**

No, but there are two other regulations for off-road diesel engines that might be applicable. For information regarding those regulations and to determine if they apply to your equipment, please visit the following Air Resources Board (ARB) websites:

http://www.arb.ca.gov/ports/cargo/cargo.htm

http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm

**RECORDKEEPING AND REPORTING**

7. **Do I have to maintain records?**

Yes, the LSI fleet regulation requires LSI fleet operators to conduct a baseline inventory of their fleet by November 12, 2007. To accomplish this, fleet operators must record and maintain on file at their facilities, information on the equipment type, make, model, serial number, and emission certification standard or retrofit verification level. Fleet operators also need to maintain on file fuel quality records (for example, a written statement, product delivery ticket, or receipt from the fuel supplier), if obtainable, that demonstrate that the propane fuel they purchased for their fleet meets all applicable state and federal laws for use in their engines. Operators that maintain multiple facilities may aggregate their records at a centralized facility or headquarters.

8. **How long do I have to maintain these records?**

Fleet operators need to retain information on the baseline inventory and all subsequent inventories showing additions and deletions to the fleet until June 30, 2016. Fleet operators need to maintain fuel quality records during the same period except that individual records need only be retained for a period of three years.

9. **Do I have to report information?**

No, the LSI fleet regulation does not require reporting. However, ARB compliance staff may request records in advance of a site visit, especially if the data for multiple facilities is aggregated together, and staff wants to view a representative sample.
10. What if my engine label no longer exists?

Each 2001 and newer LSI engine will have an engine label, typically on the valve cover. You will see in the following section that this label is critical to your fleet average calculation. If you are unable to find the label, or if the label has been destroyed, you will need to work with your equipment dealer or the equipment manufacturer to obtain a replacement label. The dealer or manufacturer will need to have the engine family or engine serial number to issue a new label.

11. Do I keep records of my lease and rental equipment?

Yes, your baseline inventory and later inventories will need to include your lease and rental equipment. You will also need to be able to demonstrate the lease or rental period for each piece of lease or rental equipment in your fleet.

FLEET AVERAGE CALCULATION

12. Do I have to do “tailpipe testing?”

No. The LSI fleet regulation states that the fleet average is based either upon the standards to which new engines are certified and retrofitted engines are verified, or the assigned default emission rate for LSI engines without emissions controls (three-way catalyst, oxygen sensor, and electronic fuel-air controller).

13. What specific numbers do I use in calculating my fleet average?

The LSI fleet average calculation does not incorporate equipment hours of use, horsepower, or specific emission factors. Instead, it is based upon new engine certification standards, retrofit verification standards, and a prescribed default emission rate for uncontrolled engines.

2000 and older model year (MY) engines and 2001 through 2003 MY engines without emission controls (as evidenced by a label or placard on the engine that states something to the effect of “this engine is a certified noncompliant engine”) are assigned a default hydrocarbon plus oxides of nitrogen (HC+NOx) emission rate of 12.0 grams per brake horsepower-hour (g/bhp-hr). The ARB and many engine manufacturers are now expressing emissions in grams per kilowatt-hour (g/kW-hr). The uncontrolled default HC+NOx emission rate expressed in kilowatt-hour units is 16.0 g/kW-hr.

2001 through 2003 MY engines with emissions controls (as evidenced by a label or placard on the engine that states something to the effect of “this engine complies with California emission standards”) have an HC+NOx emission standard of 3.0 g/bhp-hr (4.0 g/kW-hr).

2004 through 2006 MY engines have an HC+NOx emission standard of 3.0 g/bhp-hr (4.0 g/kW-hr).
2007 and later MY engines have an HC+NOx emission standard of 2.0 g/bhp-hr (2.7 g/kW-hr), and 2010 and later MY engines have an HC+NOx emission standard of 0.6 g/bhp-hr (0.8 g/kW-hr). These engines will actually have the emission standard listed on the label.

Many manufacturers are optionally certifying engines below the 2007 standard, and some have already certified to the 2010 standard. These optional lower emission standard engines will also have the emission standard listed on the label. Be sure to view the engine labels of your new equipment before performing your fleet average calculation.

All Class 1 and 2 forklifts may be included in the fleet average calculation and will be considered to have an HC+NOx emission level of zero. Electric equipment may also be included in the non-forklift fleet average calculations. Electric equipment with a power rating of less than 19 kilowatts may be included in the fleet average calculation provided that the operator can demonstrate that the equipment performs the work equivalent of an LSI engine-powered piece of equipment.

14. I have performed my fleet average calculation. Do I round my result to see if I am in compliance with the LSI fleet regulation? For example, does a fleet average of 2.64 comply with a requirement of 2.6?

The ARB has accepted a common convention for the LSI fleet regulation. That convention specifies that you round up if the last digit is five or more and you round down if the last digit is less than five. Under this rounding convention, a calculated fleet average value of 2.64 would meet a 2.6 standard, but 2.65 would not, as it would be rounded to 2.7.

15. Can I include equipment on order in my fleet average calculation?

Yes, fleet average calculations may include equipment for which purchase orders have been completed but receipt hasn’t occurred.

16. Do I have to include equipment in the fleet average calculation if it is used infrequently?

No, the LSI fleet regulation allows equipment to be excluded from the fleet average calculations until January 1, 2011, if it is used 250 hours per year or less. However, at that time, the exempted pieces of equipment must be retrofitted or repowered. Alternatively, they may be retired.
17. Can I exclude from my fleet average calculation uncontrolled equipment leased or rented for a period of less than one year if it were leased or rented on or before the emission standards for leased or rental equipment becomes effective on January 1, 2009?

Yes, provided that the rental or lease component comprises no more than 20 percent of the operator’s equipment at any time. If your rental or lease component exceeds 20 percent, all equipment in excess of 20 percent must be included in the fleet average calculation.

18. How does the less than 30 days exemption differ from the less than one year exemption discussed in Question 17?

The less than 30 day exemption is for equipment rented from out of state for a period of 30 days or less. For example, if an operator in Truckee needs to rent a forklift and the only one available is an uncontrolled forklift out of Reno, the operator may exclude that forklift from his or her fleet average calculation as long as it does not spend more than 30 aggregated days in one year in the operator’s fleet.

**LIMITED HOURS OF USE (LHU) EQUIPMENT**

19. How do you first designate a piece of equipment as LHU? Do you need to have three years of usage information (an average of 250 hours per year) first?

The intent (and the assumption) of the regulation is that the equipment is to have been LHU at the time the regulations went into effect in May 2007. Equipment used full time after May 2007 is unlikely to meet the three year LHU average. Since operators could not reasonably foresee the requirement to have usage information in advance of the regulation, ARB will allow operators to average as much data as they have for a three-year period. If they don't have three years to average, then they may average whatever period they have beginning with the May 12, 2007 operative date of the LSI fleet regulation. Any records they have to support average use of less than 251 hours per year will support the exemption.

20. How can I get three years of LHU recordkeeping beginning May 12, 2007 when the baseline inventory wasn’t required until November 12, 2007?

The ARB will be flexible with the three-year period for LHU equipment since the LHU provision is only applicable until January 1, 2011.

21. How often should I record my LHU hours?

You should record hours of use annually at a minimum, although quarterly or more often is preferable.
22. Can I, after exempting my uncontrolled LHU equipment from my fleet average calculation for two years, choose to forego retrofit or retirement, and instead include it as uncontrolled equipment in my fleet average calculation?

No. Once an operator elects to exempt a piece of equipment using the LHU provision, that carries forward except LHU equipment controlled to a 3.0 g/bhp-hr (4.0 g/KW-hr) or better standard may be allowed back into the fleet average calculation at any time.

LABELING AND THE CERTIFICATION DATABASE

23. Can I calculate my fleet average using the ARB certification database or the executive order listed for a particular engine family instead of the engine labels?

Yes, BUT USE CAUTION. The LSI fleet regulation says the fleet average calculation should be based upon the labels affixed to certified new engines or verified retrofit emission control systems. However, you may use an engine’s executive order or the LSI certification database (http://www.arb.ca.gov/msprog/offroad/cert/cert.php) provided that you use the emission standard and not the emission certification level. The latter is the emission level achieved during certification testing, while the former is the standard to which the manufacturer actually certified. The manufacturer only warrants emissions performance to the standard, and not the level achieved during testing. If the LSI certification database has triple dashes (---) in the certification level or standard columns for a given engine, then that engine is uncontrolled and must use the default emission rate described in response to Question 13.

24. What if my engine doesn’t have a label?

Please see the response to Question 10.

FUEL QUESTIONS

25. Is CNG-fueled equipment included in the fleet average?

Yes, title 13 CCR section 2775 applies to operators of off-road LSI engine forklifts, sweepers/scrubbers, industrial tow tractors and airport GSE regardless of fuel type.

26. Are there verified retrofit kits for gasoline forklifts? If not, will they be exempted?

At this time, there are no verified retrofit kits for gasoline-fueled LSI engines, but there are kits for engines converted from gasoline fuel to LPG. Thus, the ARB does not plan to exempt gasoline-fueled engines from the requirements of the LSI Fleet Regulation. However, the Executive Officer of the ARB has the authority to grant a one-year extension to equipment operators that find themselves unable to meet the fleet average.
emission level requirements as a result of their gasoline-fueled LSI equipment. Please refer to title 13, CCR, section 2775.2 for details on requesting an extension.

27. **What number is used in fleet average calculations for CNG equipment?**

Just as with new propane-fueled engines, CNG fueled engines will have a label that specifies the emission standard. Verified retrofit emission control system labels will also specify the emission standard to which the system was verified.

28. **Does the default emission rate of 12.0 g/bhp-hr apply to both gasoline and CNG LSI equipment?**

Yes, the assigned default emission rate of 12.0 g/bhp-hr HC+NOx represents uncontrolled LSI equipment operating on gasoline, propane, or CNG.

29. **How do I convert from g/bhp-hr to g/kW-hr? And back?**

To convert from g/bhp-hr to g/kW-hr, you divide by 0.746. For example, 3.0 g/bhp-hr is approximately 4.0 g/kW-hr. And to convert from g/kW-hr to g/bhp-hr, you multiply by 0.746. For example, 2.7 g/kW-hr is approximately 2.0 g/bhp-hr.

**RETROFITS**

30. **What are retrofits?**

The term “retrofit” refers to an emission control device. Retrofit devices for LSI engines are verified using the ARB LSI Verification Procedure regulation and are designed primarily to reduce HC+NOx and carbon monoxide (CO) emissions. The Verification Procedure provides a way to thoroughly evaluate the emission reduction capabilities of the device. It ensures that emission reductions achieved are both real and durable and that production units in the field are achieving emission reductions that are consistent with the unit’s verification.

31. **What retrofits are available for LSI equipment?**

Several retrofit kits have been verified for LSI equipment powered by four, six, and eight cylinder engines. For information on available kits and applications, and links to their manufacturers, visit http://www.arb.ca.gov/msprog/offroad/orspark/verdev.htm

32. **How will I know when new retrofit systems become available?**

You may subscribe to the LSI list serve in order to be notified via e-mail whenever new devices become verified or whenever changes are made to current verifications. To subscribe, just follow the instructions on our website: http://www.arb.ca.gov/msprog/offroad/orspark/lists.htm
33. May I install a retrofit device on an engine that already has emission controls?

Yes, if the retrofit has been verified. Verification can be used in lieu of the ARB’s anti-tampering exemption; i.e. if the part is verified it is also considered exempt from anti-tampering prohibitions.

34. Once I have installed a retrofit system on my engine, will I have to upgrade it to a higher performing system if one becomes available?

No, you will not be required to upgrade your engine. However, you will be allowed to upgrade it as discussed in Question 33 above.

35. May I install an experimental emission control system?

Yes, 13 CCR, section 2775.1(g) discusses the requirements under which an operator may use an experimental emission control system.

36. I have a large fleet of uncontrolled equipment. If there are no retrofit systems available, can I request a compliance extension, or will I be required to replace all of the equipment?

As discussed in response to Question 26, fleet operators may request a compliance extension from the Executive Officer of the ARB. Prior to granting an extension, ARB staff will evaluate the requester’s total circumstances and will develop a plan in cooperation with the requester that will bring the fleet into compliance. An extension with conditions will then be tailored to reflect the unique circumstances and the compliance plan [see the provisions in section 2775.2 (e)(3)]

Extension planning would include a number of factors and strategies including:
(1) the characteristics of the equipment, especially age,
(2) forecasting (with the help of the staff doing the verification) when retrofits might be available for some portion of the fleet,
(3) what emission reductions are likely to be achieved based upon when retrofits become available and the portion of the fleet to be retrofitted,
(4) the purchase of new or used controlled or zero emission (electric) equipment to replace a portion of the older uncontrolled fleet, and.
(5) the reduction in size of the fleet (retirement without replacement).

The goal is to increase operator flexibility and decrease emissions in a cost effective manner while reaching the fleet average standard within the one-year extension period.
RENTALS AND LEASES

37. I’m an equipment dealer. Am I responsible for addressing emissions from equipment in my short-term (less than one year) rental fleet?

There is no direct requirement on dealers unless they operate more than three forklifts or more than three pieces of non-forklift LSI equipment. However, dealers are indirectly affected by customer demand for controlled equipment. By January 1, 2009, (the first fleet average compliance date), the ARB expects that most dealers will have removed the majority of their uncontrolled equipment from their rental fleets.

38. I’m an equipment dealer and some of my equipment is in rental or lease agreements that predate the May 25, 2006 Board hearing. How is this equipment handled?

Equipment operators may exempt this equipment from their fleet average calculation provided that it is leased or rented for less than one year and comprises no more than 20 percent of the operator’s fleet. If the rental or lease component exceeds 20 percent, the additional equipment must be included in the fleet average calculation.

AIRPORT GROUND SUPPORT EQUIPMENT

39. The ARB says that the fleet average calculation for non-forklift equipment should be performed separately. Are forklifts used as airport ground support equipment (GSE) included in the non-forklift calculation, or are they addressed separately?

The Airport GSE definition references 24 categories of equipment contained in the South Coast GSE Memorandum of Understanding (See the list on page 2 of the following web site: http://www.arb.ca.gov/msprog/offroad/gse/appendix-2-final.pdf). Forklifts are one of those categories. However, the LSI fleet regulation requires GSE forklifts to comply with the forklift fleet average. The remaining categories of GSE equipment must comply with the non-forklift fleet average.

40. What is on-road equivalent GSE?

On-road equivalent GSE are vehicles that normally would be operated on-road, but does not require license plates and may have been modified for airport use.

41. Are my GSE with license plates exempt from fleet average calculations?

Yes, on-airport vehicles with license plates are neither off-road nor on-road equivalent vehicles and are excluded from the rule.
42. Are there limits on the use of electric equipment?

Yes, if the electric vehicle is being used in the fleet average calculation for the in-use off-road diesel regulation (see Question 5.), then it cannot be used in the LSI fleet average calculation (and visa versa).

Additionally, golf carts are covered by the off-highway recreational vehicle regulation and not the LSI regulation; thus, they would not be included in the LSI fleet average. An exception is that an electric golf cart performing the duties of an LPG-fueled piece of GSE may be included in the GSE fleet average calculation.

**AGRICULTURAL CROP PREPARATION SERVICES FLEETS**

43. My facility has operations that fall under the Agricultural Crop Preparation Services (ACPS) definition and operations that do not. Can the forklifts performing ACPS duties be treated separately under the ACPS compliance requirements?

If your fleets operate under different companies, then they do not have to be aggregated together, and the fleets operating under the ACPS definition may comply with the ACPS retrofit requirements.

44. Does the LSI fleet regulation apply to my agricultural in-field forklifts?

No, forklifts used exclusively in-field to harvest and maintain crops are excluded from the regulation. But the regulation does apply to forklifts used in and around packinghouses and other post harvest facilities such as cotton gins, nut hullers and processors, dehydrators, feed and grain mills, and other related activities.

45. My ACPS fleet has a lot of electric forklifts. Can I choose to follow the fleet average requirements instead of the requirement to retrofit all of my owned 1990 and newer uncontrolled forklifts?

The LSI fleet regulation requires the control of owned ACPS forklifts. Specifically targeted are those forklifts, model-year 1990 and newer, for which retrofit control systems are available. However, operators with a significant number of electric forklifts may chose to comply by ensuring that their overall fleet meets a 3.0 g/bhp-hr average.
ENFORCEMENT

46. Is my local air district enforcing this regulation?

No, the Air Resources Board is enforcing the LSI regulation.

47. Will I be notified in advance of a pending inspection?

In most cases, an enforcement agent will contact you to schedule an inspection. However, unannounced inspections may also occur.

48. If I retire equipment in order to comply with the regulation, but I'm not able to sell or scrap it right away, will I be cited during an inspection if the equipment is still on my property after my required compliance date?

If the operator cannot remove a retired piece of LSI equipment and it is clear that the equipment has been disabled it by drilling the block or removing the engine, then citations are unlikely to occur. However, if the operator plans to sell the equipment and it is still operational, then citation(s) may occur.

49. Am I correct in my belief that the ARB cannot impose fines until such time as the United States Environmental Protection Agency approves the ARB’s waiver for the LSI fleet regulation?

The ARB believes it has the authority to enforce regulations from the time they become law.

50. What is the penalty for non-compliance?

There are general statutory penalties that apply – California Health and Safety Code (HSC) sections 43016 and 43017 for ARB vehicle requirements and the Business and Professions Code for unfair business practices, respectively. For penalties sought under HSC sec. 43016 the penalty would be $500 per LSI piece of equipment per day since they have a requirement in title 13 CCR section 2775.2 to demonstrate that they meet the applicable fleet average emission level standard in section 2775.1(a) any time between January 1, 2009 and December 31, 2015.

MISCELLANEOUS QUESTIONS

51. What happens if my emission control system fails? Am I responsible for addressing it?

Manufacturers warrant each 2004 and later MY engine to be free from defects in materials and workmanship for a period of three years or 2,500 hours, whichever comes first. High cost warranted parts in these engines must be free from defects in materials and workmanship for a period of five years or 3,500 hours.
If the emission control system fails beyond that time period, you may still use the new engine certification standard or retrofit emission control system verification level in your fleet average calculations.

52. Are Class I electric stand up rider trucks considered in the fleet average calculations? How about equipment with a power rating of less than 19 kilowatts?

These questions are addressed in the response to Question 13.

**ADDITIONAL INFORMATION**

53. How do I stay informed of any new information regarding the LSI fleet regulation?

The best way to stay informed is to subscribe to our e-mail list serve: http://www.arb.ca.gov/msprog/offroad/orspark/lists.htm

54. Who do I contact if I have questions about what the regulation requires or need help determining my required compliance schedule?

Please contact Mark Williams at mwilliam@arb.ca.gov or 916.327.5610, or you can visit our website: http://www.arb.ca.gov/msprog/offroad/orspark/orspark.htm
§ 2775. Applicability.

(a) General Applicability. This article applies to operators of off-road large spark-ignition (LSI) engine forklifts, sweepers/scrubbers, industrial tow tractors or airport ground support equipment operated within the State of California in the conduct of business with:

(1) 25 horsepower or more (greater than 19 kilowatts for 2005 and later model year engines), and

(2) greater than 1.0 liter displacement.

(b) Exemptions.

(1) Small Fleets as defined in subsection (d).

(2) Rental or lease equipment operated in California no more than 30 aggregated calendar days per year shall be exempt from the requirements of this article.

(3) Off-road military tactical vehicles or equipment exempt from regulation under the federal national security exemption, 40 CFR, subpart J, section 90.908, are exempt from the requirements of this article. Vehicles and equipment covered by the definition of military tactical vehicle that are commercially available and for which a federal certificate of conformity has been issued under 40 CFR Part 90, subpart B, shall also be exempt from the requirements of this article.

(4) In-field equipment shall be exempt from the requirements of this article.

(c) Each part of this article is severable, and in the event that any part of this chapter or article is held to be invalid, the remainder of the article shall remain in full force and effect.

(d) Definitions. The definitions in Section 1900 (b), Chapter 1, and Section 2431 (a), Chapter 9 of Title 13 of the California Code of Regulations apply to this article. In addition, the following definitions apply to this article:

(1) “Aggregated Operations” means all of an operator’s California facilities for which equipment purchasing decisions are centrally made. Facilities that budget and make equipment purchasing decisions independent of a government or corporate headquarters are assumed to be independent and therefore are not required to be aggregated for the purpose of determining fleet size.
(2) “Agricultural Crop Preparation Services” means packinghouses, cotton gins, nut hullers and processors, dehydrators, feed and grain mills, and other related activities that fall within the United States Census Bureau NAICS (North American Industry Classification System) definition for Industry 115114 – “Postharvest Crop Activities,” as published in the North American Industry Classification System – United States, 2002. For forest operations, “Agricultural Crop Preparation Services” means milling, peeling, producing particleboard and medium density fiberboard, and producing woody landscape materials and other related activities that fall within the United States Census Bureau NAICS definition for Industries 321113 (Sawmills) and 321219 (Reconstituted Wood Product Manufacturing,” as published in the North American Industry Classification System – United States, 2007.

(3) “Agricultural Operations” means (1) the growing or harvesting of crops from soil (including forest operations) and the raising of plants at wholesale nurseries, but not retail nurseries, or the raising of fowl or animals for the primary purpose of making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution, or (2) agricultural crop preparation services.

For purposes of this regulation, a piece of equipment that is used by its operator for both agricultural and non-agricultural operations is considered to be a piece of equipment engaged in agricultural operations, only if over half of its annual operating hours are for agricultural operations.

(4) “Airport Ground Support Equipment,” “Ground Service Equipment,” or “GSE” means any large spark-ignition engine or electric-motor powered equipment capable of and used for performing the work normally performed by an LSI engine-powered piece of equipment contained in the 24 categories of equipment included in section B.3. of Appendix 2 of the South Coast Ground Support Equipment Memorandum of Understanding, dated November 27, 2002 except that equipment that falls into the “other” category shall not be considered GSE for the purposes of this regulation. Specifically included in this definition are those categories of GSE equipment designed for on-road use, but not licensed for on-road use (“On-Road Equivalent” GSE).

(5) “Baseline Inventory” means an inventory of equipment as defined in this subdivision that reflects all equipment operated at the time of the inventory.

(6) “Boneyard” means a grouping of decommissioned or retired pieces of equipment at a location geographically separated from operational fleets subject to the fleet average requirements and intended for transfer, sale, spare parts, or scrap. These pieces of equipment are not generally operational.

(7) “Certification Standard” means the level to which an LSI engine is certified, in grams per kilowatt-hour of hydrocarbon and oxides of nitrogen, combined, as identified in an Executive Order (EO) issued by the Executive Officer of the California Air Resources Board.
(8) "Dehydrators" means sun drying of fruits, vegetables, tomatoes, dates, prunes, raisins and olives, or artificially drying and dehydrating fruits, vegetables, tomatoes, dates, prunes, raisins, grapes, and olives.

(9) "Emission Control System" means any device or system employed with a new or in-use off-road LSI-engine powered piece of equipment that is intended to reduce emissions. Examples of LSI emission control systems include, but are not limited to, closed-loop fuel control systems, fuel injection systems, three-way catalysts, and combinations of the above.

(10) "Equipment" or "Pieces of Equipment" means one or more forklifts, industrial tow tractors, sweater/scrubbers, or pieces of airport ground support equipment as defined in this section powered by an LSI engine or electric motor.

(11) "Executive Officer" means the Executive Officer of the California Air Resources Board, or his or her delegate.

(12) "Executive Order" means a document signed by the Executive Officer that specifies the standard to which a new LSI engine is certified or the level to which an LSI retrofit emission control system is verified.

(13) "Facility" means any structure, appurtenance, installation, and improvement on land that operates and/or garages one or more pieces of equipment.

(14) "Facility Sample" means the selection of one or more individual facilities from an operator’s California facilities for comparison to the operator’s aggregate fleet inventory for fleet average calculation.

(15) "Fleet Average Emission Level" means the arithmetic mean of the combined hydrocarbon plus oxides of nitrogen emissions certification standard or verification absolute emissions level for each applicable LSI engine with an emission control system and the default emission rate for each uncontrolled LSI engine comprising an operator’s fleet. LSI engines installed in equipment meeting the boneyard or retired equipment definitions shall not be included in fleet average emission level compliance calculations. For the purposes of calculating the fleet average, electric- motor powered equipment shall be considered to have combined hydrocarbon plus oxides of nitrogen emissions level of zero (0). Electric-motor powered equipment of less than 19 kilowatts shall be allowed to be included in the fleet average calculation provided that it meets the airport ground support equipment, forklift, industrial tow tractor, or sweater/scrubber definition and performs, with similar efficiency, the same function as an LSI engine-powered piece of equipment. For the purposes of calculating the fleet average for a non-forklift fleet, each piece of On-Road Equivalent GSE shall be considered to have a combined hydrocarbon plus oxides of nitrogen emissions level as follows: 1.1 g/bhp-hr (1.5 g/kW-hr) for purposes of determining compliance with the 1/1/2009 standard; 0.8 g/bhp-hr (1.1 g/kW-hr) for purposes of determining compliance with the 1/1/2011 standard; and 0.7 g/bhp-hr (0.9 g/kW-hr) for purposes of determining compliance with the
1/1/2013 standard. For the purpose of calculating the fleet average, fleet operators shall be permitted to exclude at their discretion any electric-motor powered equipment that could otherwise be used to lower the LSI fleet’s average emission level.

(16) “Forest operations” means (A) forest fire prevention activities performed by public agencies, including but not limited to construction and maintenance of roads, fuel breaks, firebreaks, and fire hazard abatement or (B) cutting or removal or both of timber, other solid wood products, including Christmas trees, and biomass from forestlands for commercial purposes, together with all the work incidental thereto, including but not limited to, construction and maintenance of roads, fuel breaks, firebreaks, stream crossings, landings, skid trails, beds for falling trees, fire hazard abatement, and site preparation that involves disturbance of soil or burning of vegetation following forest removal activities. Forest operations include the cutting or removal of trees, tops, limbs and or brush which is processed into lumber and other wood products, and or for landscaping materials, or biomass for electrical power generation. Forest operations do not include conversion of forestlands to other land uses such as residential or commercial developments.

(17) “Forklift” means an electric motor powered Class 1 or 2 rider truck or a large spark-ignition engine-powered Class 4 or 5 rider truck as defined by the Industrial Truck Association. Electric Class 3 trucks are not forklifts for the purposes of this regulation.

(18) “Industrial Tow Tractor” means an electric motor powered or large spark-ignition engine-powered Class 6 truck as defined by the Industrial Truck Association. Industrial tow tractors are designed primarily to push or pull non-powered trucks, trailers, or other mobile loads on roadways or improved surfaces. Industrial tow tractors are commonly referred to as tow motors or tugs. Industrial tow tractors are distinct from airport ground support equipment tugs for the purposes of this regulation.

(19) “In-field equipment” means agricultural operations or forest operations equipment that is used no more than half of its annual operating hours in agricultural crop preparation services.

(20) “Label” means a permanent material that is welded, riveted or otherwise permanently attached to the engine block or other major component in such a way that it will be readily visible after installation of the engine in the equipment. If the equipment obscures the label on the engine, the equipment manufacturer must attach a supplemental label such that it is readily visible. The label will state the emission standard or verification absolute emissions level to which the engine was certified.

(21) “Large Fleet” means an operator’s aggregated operations in California of 26 or more pieces of equipment.
(22) “Leased forklift” for use in agricultural crop preparation services means a forklift under a contract or agreement for a term or period of one year or more that may include an option to purchase the forklift.

(23) “Limited Hours of Use equipment or LHU equipment” means a piece of equipment that, on a year-by-year basis, was operated in California fewer hours than the prescribed threshold established for the preceding calendar year (the 12-month period running from January 1 to December 31). The threshold for the 2010 calendar year is 251 hours. The threshold for 2011 and subsequent calendar years is 200 hours. For example, an operator would only consider that a piece of equipment had met the requirements of the LHU provisions for exclusion from a fleet average emission level calculation performed in 2014 if the piece of equipment were used fewer than 200 hours between January 1, 2013 and December 31, 2013.

(24) “LSI Retrofit Emission Control System” means an emission control system employed exclusively with an in-use LSI- engine powered piece of equipment.

(25) “Manufacturer” means the manufacturer granted new engine certification or retrofit emission control system verification.

(26) “Medium Fleet” means an operator's aggregated operations in California of 4 to 25 pieces of equipment.

(27) “Memorandum of Understanding Signatories” or “MOU Signatories” means any of the airlines that entered into the South Coast Ground Support Equipment Memorandum of Understanding, dated November 27, 2002.

(28) “Military tactical vehicles or equipment” means vehicles or pieces equipment that meet military specifications, are owned by the U.S. Department of Defense and/or the U.S. military services or its allies, and are used in combat, combat support, combat service support, tactical or relief operations, or training for such operations.

(29) [“Model Year” means the manufacturer’s annual production period, which includes January 1 of a calendar year or, if the manufacturer has no annual production period, the calendar year.]¹

(30) [“New Engine” means an engine’s ownership has not been transferred to the ultimate consumer.]

(31) “Non-forklift fleet” means an operator’s aggregated operations in California of four (4) or more sweeper/scrubbers, industrial tow tractors, or pieces of airport ground support equipment, alone or in combination.

¹ Bracketed definitions are replicated for ease of use and presentation clarity from Section 1900 (b), Chapter 1, or Section 2431 (a), Chapter 9, of Title 13 of the California Code of Regulations.
“Nut hullers and processors” means facilities where nuts are received, hulled, aspirated, shelled, sized, stored, packaged and shipped. Facilities that blanch, slice, dice, roast, salt, or smoke nuts or nut meats are not included in the "nut hullers and processors" definition.

[“Off-Road Large Spark-ignition Engines” or “LSI Engines” means any engine that produces a gross horsepower of 25 horsepower or greater (greater than 19 kilowatts for 2005 and later model years) or is designed (e.g., through fueling, engine calibrations, engine speed modifications, etc.) to produce 25 horsepower or greater (greater than 19 kilowatts for 2005 and later model years). If an engine family has models at or above 25 horsepower (greater than 19 kilowatts) and models below 25 horsepower (at or below 19 kilowatts), only the models at or above 25 horsepower (above 19 kilowatts) would be considered LSI engines. The engine’s operating characteristics are significantly similar to the theoretical Otto combustion cycle with the engine’s primary means of controlling power output being to limit the amount of air that is throttled into the combustion chamber of the engine. LSI engines or alternate fuel-powered LSI internal combustion engines are designed for powering, but not limited to powering, forklift trucks, sweepers, generators, and industrial equipment and other miscellaneous applications. All engines and equipment that fall within the scope of the preemption of Section 209(e)(1)(A) of the Federal Clean Air Act, as amended, and as defined by regulation of the Environmental Protection Agency, are specifically excluded from this category. Specifically excluded from this category are: 1) engines operated on or in any device used exclusively upon stationary rails or tracks; 2) engines used to propel marine vessels; 3) internal combustion engines attached to a foundation at a location for at least 12 months; 4) off-road recreational vehicles and snowmobiles; and 5) stationary or transportable gas turbines for power generation.]

“Operations equipment” as used in the “Operator” definition means equipment that is operated by a person whose usual and customary business is the rental, leasing, or sale of equipment and is used more than 50 percent of the time for rental or lease, or is designated for sale.

“Operator” means a person with legal right of possession and use of a piece of equipment including a person whose usual and customary business is the rental, leasing, or sale of equipment as provided below:

A person whose usual and customary business is the rental, leasing, or sale of equipment will be deemed an operator of:

(A) all service equipment (as defined in section 2775(d)(40) regardless of hours of operation, and

(B) any operations equipment (as defined in section 2775(d)(33) they use more than 50 hours per year.
“Rental forklift” for use in agricultural crop preparation services means a forklift under a contract or agreement for a term or period of less than one year that may include an option to renew the contract or agreement.

“Repower” means a new or remanufactured engine and parts offered by the OEM or by a non-OEM rebuilder that has been demonstrated to the ARB to be functionally equivalent from a durability standpoint to the OEM engine and components being replaced.

“Retired equipment” means equipment with an operational non-resettable hour meter that has been removed from service and rendered inoperable using the following procedures:

(A) Remove fuel and the starter battery from the piece of equipment. For propane-fueled LSI engines, the operator may simply remove the fuel canister.

(B) Remove the steering wheel from the piece of equipment.

(C) Store the retired equipment at a central location, apart from operational equipment, either within the facility or elsewhere, and employ lockout/tagout controls. At a minimum, place a lockout box on either the propane connector or the positive cable to the starter battery. Operators planning to scrap a piece of equipment need not use a lockout box, but may instead sever the positive battery cable more than six inches from the connector.

(D) Record the initial hour meter reading at the time of decommission and write the date of decommission and the initial meter reading in permanent ink in a readily visible location on a non-removable surface of the piece of equipment. Additionally, record the hour meter serial number, if available. Continue to record meter readings at quarterly intervals (every three months), and sign under penalty of perjury. Retain records in accordance with the LSI record keeping requirements in section 2775.2.

(E) Develop an inventory for all retired pieces of equipment at the date of first retirement and sign, under penalty of perjury, that the equipment is retired for the purposes of the LSI Fleet Regulation.

Retired equipment may remain at the facility for up to one year. After one year, the retired equipment must either be removed from the facility or reentered into FAEL standards calculations.

“Retrofit” means the application of an emission control system to a non-new LSI engine.
“Serial Number” means an engine serial number and date of engine manufacture (month and year) that are stamped on the engine block or stamped on a metal label riveted or permanently attached to the engine block. Engine manufacturers must keep records such that the engine serial number can easily be used to determine if an engine was certified for the applicable model year, and beginning January 1, 2007, the standard to which the engine was certified.

“Service equipment” as used in the “Operator” definition means equipment that is operated by a person whose usual and customary business is the rental, leasing, or sale of equipment and is used more than 50 percent of the time for yard operations necessary to support the equipment rental, leasing, or sales business.

“Small Fleet” means an operator’s aggregated operations in California of 1 to 3 forklifts and/or 1 to 3 pieces of non-forklift equipment.

“Sweeper/scrubber” means an electric motor powered or large spark-ignition engine-powered piece of industrial floor cleaning equipment designed to brush and vacuum up small debris and litter or scrub and squeegee the floor, or both.

“Specialty Equipment” means a piece of equipment with unique or specialized performance capabilities that allow it to perform prescribed tasks and as approved by the Executive Officer.

[“Ultimate Purchaser” means the first person who in good faith purchases a new LSI engine or equipment using such engine for purposes other than resale.]

“Uncontrolled LSI Engine” means pre-2001 uncertified engines and 2001-2003 certified uncontrolled LSI engines. The default emission rate for an uncontrolled LSI engine is 12.0 grams per brake horsepower-hour (16.0 grams per kilowatt-hour) of hydrocarbon plus oxides of nitrogen.

“Verification” means a determination by the Executive Officer that the LSI emission control system meets the requirements of this Procedure. This determination is based on both data submitted or otherwise known to the Executive Officer and engineering judgement.

“Verification Level” means one of four emission reduction classifications that apply to the performance capability of retrofit emission control systems as described in Title 13, California Code of Regulations, Section 2782(f), Table 1, as set forth in Table 1:
Table 1. LSI Engine Retrofit System Verification Levels

<table>
<thead>
<tr>
<th>Classification</th>
<th>Percentage Reduction (HC+NOx)</th>
<th>Absolute Emissions (HC+NOx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSI Level 1 (1)</td>
<td>&gt; 25% (2)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>LSI Level 2 (1)</td>
<td>&gt; 75% (3)</td>
<td>3.0 g/bhp-hr (4.0 g/kW-hr)</td>
</tr>
<tr>
<td>LSI Level 3a (1)</td>
<td>&gt; 85% (4)</td>
<td>0.5, 1.0, 1.5, 2.0, 2.5 g/bhp-hr (0.7, 1.3, 2.0, 2.7, 3.4 g/kW-hr)</td>
</tr>
<tr>
<td>LSI Level 3b (5)</td>
<td>Not Applicable</td>
<td>0.5, 1.0, 1.5, 2.0 g/bhp-hr (0.7, 1.3, 2.0, 2.7 g/kW-hr)</td>
</tr>
</tbody>
</table>

Notes:
(1) Applicable to uncontrolled engines only
(2) The allowed verified emissions reduction is capped at 25% regardless of actual emission test values
(3) The allowed verified reduction for LSI Level 2 is capped at 75% or 3.0 g/bhp-hr (4.0 g/kW-hr) regardless of actual emission test values
(4) Verified in 5% increments, applicable to LSI Level 3a classifications only
(5) Applicable to emission-controlled engines only


§ 2775.1. Standards.

(a) Operators of forklift and/or non-forklift fleets shall first determine the size of their fleets, using the equipment definitions in Section 2775. Equipment meeting the boneyard and retired equipment definitions shall not be included in fleet size determinations. Then, except as provided in subdivisions (c), (d), (e), and (f), operators of medium and large forklift fleets and operators of non-forklift fleets with more than three pieces of equipment shall comply with the fleet average emission level standards in Table 2 by the specified compliance dates.
Table 2: Fleet Average Emission Level Standards
in grams per kilowatt-hour (brake-horsepower-hour)
of hydrocarbons plus oxides of nitrogen

<table>
<thead>
<tr>
<th>Fleet Type</th>
<th>Initial Compliance Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/1/2009</td>
</tr>
<tr>
<td></td>
<td>1/1/2011</td>
</tr>
<tr>
<td></td>
<td>1/1/2013</td>
</tr>
<tr>
<td>Large Forklift Fleet</td>
<td>3.2 (2.4)</td>
</tr>
<tr>
<td></td>
<td>2.3 (1.7)</td>
</tr>
<tr>
<td></td>
<td>1.5 (1.1)</td>
</tr>
<tr>
<td>Medium Forklift Fleet</td>
<td>3.5 (2.6)</td>
</tr>
<tr>
<td></td>
<td>2.7 (2.0)</td>
</tr>
<tr>
<td></td>
<td>1.9 (1.4)</td>
</tr>
<tr>
<td>Non-forklift Fleet</td>
<td>4.0 (3.0)</td>
</tr>
<tr>
<td></td>
<td>3.6 (2.7)</td>
</tr>
<tr>
<td></td>
<td>3.4 (2.5)</td>
</tr>
</tbody>
</table>

(1) Fleet operators subject to the fleet average provisions shall include in their fleet average calculations any piece of equipment that the operator has rented or leased or reasonably expects to rent or lease for a period of one year or more.

(2) Fleet operators may exclude from the fleet average calculation uncontrolled 2003 and 2004 model year rental equipment (if the equipment is rented for a period of less than one year) until January 1, 2010.

(3) In addition to the provisions of (a)(2) above, fleet operators may exclude from the fleet average calculation rental or leased equipment if:

   (A) the rental or lease is for a period of less than one year, and
   (B) the rental or lease component comprises no more than 20 percent of the operator's equipment at any time, and
   (C) the equipment rented or leased during the period from January 1, 2009 through December 31, 2010 is controlled to a 4.0 g/kW-hr (3.0 g/bhp-hr) standard or better and equipment rented or leased on or after January 1, 2011 is controlled to a 2.7 g/kW-hr (2.0 g/bhp-hr) standard or better.

(4) Fleet operators shall comply with the applicable fleet average standard in Table 2 with the following exceptions:

   (A) if through business expansion, a fleet meets the definition of a larger size category, the fleet may continue to comply with the applicable fleet standard for the initial size category until the subsequent compliance date, at which time the fleet must meet the applicable fleet standard for the new fleet size category, or
(B) if through retirement or other fleet size reduction mechanism the fleet would otherwise be required to comply with a less stringent fleet standard, then the less stringent fleet standard becomes effective immediately.

(b) Operators of mixed fleets comprised of forklifts and non-forklift equipment shall determine fleet size individually for forklift fleets and non-forklift fleets; a mixed fleet with three or fewer forklifts and three or fewer non-forklift pieces of equipment shall be considered to be a small fleet.

(c) Except as provided in subdivisions (d), (e) and (f), each operator of a forklift fleet used in agricultural crop preparation services shall address emissions from their owned forklifts with uncontrolled LSI engines as follows:

(1) by January 1, 2009, identify that portion of the 1990 and newer LSI engine powered forklift fleet for which retrofit emission control systems have been verified and control 20 percent of that portion as prescribed in subsection (3) below; and

(2) by January 1, 2012, control 100 percent of the 1990 and newer LSI engine powered forklift fleet for which retrofit emission control systems have been verified as prescribed in subsection (3) below.

(3) To comply with subsections (1) and (2) of this section, operators shall retrofit or repower the LSI engine powered forklift to a Level 2 or Level 3 verification level as described in Title 13, California Code of Regulations, Section 2782 (f).

(4) Operators of fleets used in agricultural crop preparation services may exclude from their LSI engine powered forklift fleet:

(A) leased forklifts provided the forklifts meet a 4.0 g/kW-hr (3.0 g/bhp-hr) standard or better. Forklifts under a lease agreement that was initiated prior to May 25, 2006 may also be excluded from the 4.0 g/kW-hr standard for the life of the lease, or until January 1, 2010, whichever is earlier, and

(B) rental forklifts rented on or after January 1, 2009, provided the forklifts meet a 4.0 g/kW-hr standard or better. Forklifts with an uncontrolled 2003 or 2004 model year engine may be excluded from the requirements of this subpart until January 1, 2010.

(d) Limited Hours of Use Provisions.

(1) Forklift and non-forklift equipment in medium and large fleets shall be exempted from the provisions of subdivision (a) of this section provided that:

(A) the equipment meets the limited hours of use equipment definition as defined in section 2775(d)(23), and

(B) the equipment is equipped with an operational non-resettable hours of use meter, and
(C) the operator maintains hours of use records for the piece of equipment at a facility.

(2) Forklifts used in agricultural crop preparation services fleets shall be exempted from the provisions of subdivision (c) of this section provided that they are used, on average over any three year period, less than 251 hours per year and meet the requirements of subdivisions (d)(1)(B) and (d)(1)(C).

(e) Specialty Equipment Exemption.

(1) Forklift and non-forklift specialty equipment shall be exempt from the requirements of subdivisions (a) through (c) of this section provided that:

(A) the replacement cost exceeds the replacement cost of a “typical” piece of equipment from that category by 50 percent or the retrofit cost exceeds the “typical” retrofit cost of a piece of equipment from that category by 100 percent, and

(B) they are used, on average over any three year period, less than 251 hours per year and meet the requirements of subdivisions (d)(1)(B) and (d)(1)(C), and

(C) the Executive Officer approves the listing of the piece of equipment as specialty equipment.

(f) Alternate Compliance Option for Operators of Fleets used in Agricultural Crop Preparation Services.

(1) Operators of forklift fleets used in agricultural crop preparation services shall be exempted from the provisions of subdivision (c) of this section provided that the forklift fleet complies with a 4.0 g/kW-hr (3.0 g/bhp-hr) fleet average emission level.

(g) Use of Experimental Emission Control Strategies.

(1) An operator may use an experimental emission control strategy provided by or operated by the manufacturer in no more than ten percent of his total fleet for testing and evaluation purposes. The operator shall keep documentation of this use in records as specified in Section 2775.2(b).

(h) Severability. If any provision of this section or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of the section that can be given effect without the invalid provision or application, and to this end the provisions of this section are severable.

§ 2775.2. Compliance Requirements for Fleet Operators.

(a) Fleet operators subject to the fleet average emission level requirements contained in Table 2 of section 2775.1(a) shall conduct a baseline inventory of their fleet within six months of May 12, 2007 and shall maintain records at their facilities of their baseline inventory and subsequent inventories indicating accessions and retirements until June 30, 2016.

(b) At a minimum, fleet operators subject to the fleet average emission level requirements contained in Table 2 of section 2775.1(a) shall record and maintain on file for each piece of equipment operated at their facilities, information on the equipment type, make, model, serial number, and emission certification standard or retrofit verification level. Operators that maintain multiple facilities may aggregate the records at a centralized facility or headquarters. Records for all equipment at all facilities shall be made available to the Air Resources Board within 30 calendar days upon request. Compliance staff may then select a facility sample for inspection purposes.

(c) Medium and large fleets shall be required to demonstrate at any time between January 1, 2009 and December 31, 2015, based on actual inventory, and reconciled against inventory records, that they meet the applicable fleet average emission level standard in Section 2775.1(a).

(d) Agricultural crop preparation services fleets shall be required to demonstrate at any time on or after June 1, 2007, based on actual inventory and reconciled against inventory records, that they have addressed their 1990 and newer uncontrolled LSI engines as prescribed in Section 2775.1(c).

(e) Compliance Extensions. An operator may be granted an extension to a compliance deadline specified in Section 2775.1 for one of the following reasons:

(1) Compliance Extension based on No Verified Retrofit Emission Control System

(A) If the Executive Officer has not verified a retrofit emission control system, or if one is not commercially available for a particular engine and equipment combination, the Executive Officer may grant a two-year extension in compliance if prior to each compliance deadline specified in subsections 2775.1(a), (c), and (d), the Executive Officer finds that insufficient numbers of retrofit emission control systems are projected to be available. If the Executive Officer still finds that insufficient numbers of retrofit emission control systems are projected to be available near the end of the first two-year extension, the Executive Officer may grant a subsequent two-year extension in compliance. At the conclusion of the approved extension(s), the operator must include the LSI piece of equipment in their FAEL standards calculations.
(2) Compliance Extensions for GSE

(A) Compliance Extension based on no Verified or Commercially Available Retrofit Emission Control Systems for GSE. GSE of model year 1990 or newer with an uncontrolled LSI engine for which there is no verified retrofit as of January 1, 2007, or for which such verified retrofits are not commercially available by that date, shall be excluded from the GSE fleet average emission level standards contained in section 2775.1(a) until January 1, 2011. GSE of model year 1990 or newer with an uncontrolled LSI engine for which there is still no verified retrofit as of January 1, 2009, or for which such verified retrofits are not commercially available by that date, shall be excluded from the GSE fleet average emission level standards contained in section 2775.1(a) until January 1, 2013.

(B) Other Compliance Extensions for GSE. Operators may apply to the Executive Officer for an initial compliance extension of up to two years and one or more compliance extension renewals of up to one year in circumstances other than those addressed in subsection 2(A) above. The Executive Officer shall grant such applications if the applicant has made a good faith effort to comply with the fleet average emission level standards contained in section 2775.1(a) in advance of the compliance dates contained in the same section and documents either that it meets one of the following criteria independently, or that, when considering any combination of the criteria, the documentation justifies granting the application:

(i) due to conditions beyond the reasonable control of the applicant, sufficient numbers of tested and reliable emission-controlled GSE are not projected to be available at a commercially reasonable cost;

(ii) due to conditions beyond the reasonable control of the applicant, use of available emission-controlled GSE would result in significant operational or safety issues;

(iii) any other criterion that reasonably relates to whether the application should be granted.

(C) Compliance extensions granted under subsections (e)(2)(A) and (e)(2)(B) shall not extend beyond January 1, 2013. After January 1, 2013, all uncontrolled GSE shall be included in calculations for determining compliance with the GSE fleet average emission level standards contained in section 2775.1(a).

(3) If an extension to the compliance deadline is granted by the Executive Officer, the operator shall be deemed to be in compliance as specified by the Executive Officer’s authorization.
(f) Continuous Compliance. An operator is required to keep his equipment in compliance with this regulation, once it is in compliance, so long as the operator is operating the equipment in California.

(g) Severability. If any provision of this section or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of the section that can be given effect without the invalid provision or application, and to this end the provisions of this section are severable.
