

Fleet Rule for Transit Agencies



Implementation Update

April 2008

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Retrofit Implementation Section

California Environmental Protection Agency



Air Resources Board

Today's Presentation

- Fleet Rule for Transit Agencies Requirement Review
 - Urban Bus
 - Transit Fleet Vehicles
- 2009 & 2010 Compliance Deadlines
- Revised Web Based Reporting
- Other Regulations

“Urban Bus”

- Passenger carrying vehicle
- Owned or operated by a transit agency (includes contract fleet)
- Powered by a heavy HD diesel engine or of a type normally powered by a heavy HD diesel engine
- “Normally powered” defined as:
 - Thirty-five feet or longer
 - > 33,000 (lbs) GVWR

“Emergency Contingency Vehicle”

- Emergency contingency vehicle is an urban bus placed in an inactive contingency fleet for energy or other local emergencies, after the urban bus has reached the end of its normal minimum useful life.
- Not included in the urban bus compliance calculations.

2007 Urban Bus Engine Standard

- “Urban Bus” service certification still required
- Align with 2007 truck HHD standard
 - Section 1956.8

Choose A Fuel Path

- Fuel path affects future vehicle purchases
- Determines PM reductions timeline
- Other requirements

Alternative Fuel Path

- At Least 85% Annual UB purchases
 - Includes contracted, leased, used, and newly purchased
 - Alternative fuels include
 - Compressed Natural Gas (CNG)
 - Liquefied Natural Gas (LNG)
 - Propane (LPG)
 - Gasoline Hybrids (gHEBs)
 - And other fuels that do not rely on diesel fuel

Diesel Path

2007+ MY Purchasing Requirement

- Diesel Path Agencies With >30 Urban Buses
- One-to-one Requirement for Each 2007 to 2009 MY Engine Purchased Certified Above 0.2 g NO_x
- One NO_x Retrofit for Each New Purchase
 - 40%+ NO_x reduction if available; otherwise 25%
 - Limited to available vehicles within transit agency, includes TFV

Urban Bus Compliance Deadlines

Fuel Path	2007	2008	2009
Diesel	85% or meet .01g/bhp-hr standard	-	-
Alternative Fuel	60%	-	85% or meet .01g/bhp-hr standard

- PM Reduction from January 1, 2002 Baseline
- As of October 1, 2002: NOx Fleet average not to exceed 4.8g/bhp-hr

“Transit Fleet Vehicle”

- Greater than 8,500 (lbs) GVWR
- Powered by heavy-duty engine fueled by diesel or alternative fuel
- Owned or operated by a transit agency (includes contract fleet)
- Not an urban bus

“Commuter Service Bus”

Defined as Transit Fleet Vehicle if:

- Powered by a heavy duty diesel engine or of a type normally powered by a heavy duty diesel engine or alternative fuel
- Operates on a fixed route primarily during peak commute hours
- No passenger-initiated stops
- No more than 10 stops per day, excluding Park-and-Ride lots.

TFV Compliance Deadlines

Date	% PM reduction from 2005 baseline	Fleet NOx Average
December 31, 2007	40%	3.2 or retire 1997 and earlier M Y
December 31, 2010	80%	2.4 or retire 2001 and earlier M Y

Available Extensions For 2009 & 2010

- Financial Hardship
 - <30 in transit fleet (both UB and TFV)
 - Application 30 days prior to compliance deadline
- Unavailability of Technology for PM
 - Application required 90 days prior to compliance deadline
- Delay of Implementation for PM
 - <20 in transit fleet in 1 hour Ozone attainment

Transit Fleet Vehicles Only

- Extension
 - Service Contracts: Up to 1 year delay
 - Termination of equipment and service contracts defined by FTA: vehicle lease, maintenance/lease, turnkey
 - Application no later than 90 days prior to the deadline.
- Exemption
 - Low Usage Vehicle: non-revenue with <1000 miles per year usage
 - Mileage documentation required

Calculating the Emission Standards

Particulate Matter Emission Standards

	Urban Bus Engine	Heavy-Duty Diesel Engine
Engine Model Year	(g/bhp-hr)	(g/bhp-hr)
Pre-1988	1.0	1.0
1988-1990	0.6	0.6
1991-1993	0.1	0.25
1994-1995	0.07	0.1
1996-2002	0.05	0.1
2003-2006	0.01	0.1
2007+	0.01	0.01

NOx Emission Standards

	Urban Bus Engine	Heavy-Duty Diesel Engine
Engine Model Year	(g/bhp-hr)	(g/bhp-hr)
Pre-1988	10.0	10.0
1988-1990	6.0	6.0
1991-1995	5.0	5.0
1996-1997	4.0	5.0
1998-2003	4.0	4.0
Oct. 2002-2003 (Settlement Agreement)	2.2 ₍₁₎₍₂₎	2.2 ₍₁₎₍₂₎
2004-2006 / Diesel	0.5	2.2 ₍₁₎
2004-2006 / Alt-fuel	2.2 ₍₁₎	2.2 ₍₁₎
2007-2009	1.2 ₍₃₎	1.2 ₍₃₎
2010+	0.2	0.2



Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE ¹	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS ²	ECS & SPECIAL FEATURES ³
2007	7CEXH0505CAA	8.3	Diesel	Diesel	MHDD	DDI, TC, CAC, ECM, EGR, PTOX, OC
ENGINE (L)		ENGINE MODELS / CODES (rated power, in hp)				
8.3		ISC 360 / 8786;FR91902 (350)				
*		.				
*		.				
*		.				

¹ =not applicable; GVWR=gross vehicle weight rating; 13 CCR xyz=Title 13, California Code of Regulations, Section xyz; 40 CFR 86.abc=Title 40, Code of Federal Regulations, Section 86.abc;
² =liter; hp=horsepower; kw=kilowatt;
³ CNG/LNG=compressed/liquefied natural gas; LPG=liquefied petroleum gas; E85=85% ethanol fuel; MF=multi fuel a.k.a. BF=bi fuel; DF=dual fuel; FF=flexible fuel;
L/MH HDD=light/medium/heavy heavy-duty diesel; UB=urban bus; HDG=heavy duty Otto;
ECS=emission control system; TWC/OC=three-way/oxidizing catalyst; WU (prefix) =warm-up catalyst; DPF=diesel particulate filter; PTOX=periodic trap oxidizer; HO2S/O2S=heated/oxygen sensor; HAFS/AFS=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); TBI=throttle body fuel injection; SFI/MPFI=sequential/multi port fuel injection; DGI=direct gasoline injection; GCARB=gaseous carburetor; ID/DDI=indirect/direct diesel injection; TC/SC=turbo/super charger; CAC=charge air cooler; EGR=exhaust gas recirculation; PAIR/AIR=pulsed/secondary air injection; SPL=smoke puff limiter; ECM/PCM=engine/powertrain control module; EM=engine modification; 2 (prefix)=parallel; (2) (suffix)=in series (2005DEC22)

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.1 (urban bus) or 13 CCR 1956.8 (other than urban bus); 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, in g/bhp-hr, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.1 or 13 CCR 1956.8 are in parentheses.)

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	0.14	0.14	*	*	*	*	15.5	15.5	0.01	0.01	*	*
FEL	*	*	1.25	1.25	1.2	1.2	*	*	*	*	*	*
CERT	0.02	0.000	1.06	0.84	1.1	0.8	0.1	0.00	0.001	0.000	*	*
NTE	0.21		1.88		1.8		19.4		0.02		*	

* g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: The listed engine models have been certified to the split engine family standards under 13 CCR 1956.8(b) [Diesel engines] or 13 CCR 1956.8(d) [Otto engines] and the incorporated 40CFR 86.007-15(m)(9).

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels) and 13 CCR 2035 et seq. (emission control warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 2 day of March 2007.

Annette Hebert, Chief
Mobile Source Operations Division

Average, Banking & Trading (ABT) Program

- Title 13, section 1956.8 of the California Code of Regulations
- 2007+ model year engines with certified above 0.01g PM standard
- Additional PM and NO_x control needed?

ABT Engines

Model Year	Make/Model	Service Class	Engine Family Name	Executive Order Number
2007	Cummins ISM	HHDD	7CEXH0551MAC	A-021-0452
2007	Ford E-Series	MDDE	7NVXH06.0AED	A-010-1456
2007	Ford E-Series	MDDE	7NVXH06.0AED	A-010-1456-1
2007	Ford 6.0 E-Series	MDDE	6NVXH06.0AED	A-010-1379
2007	General Motors 6.6	MDDE	7GMXH06.8590	A-006-1414
2007	General Motors 6.6	LHDD	7GMXH06.6590	A-006-1426
2007	International 6.0	LHDD	7NVXH06.0AEC	A-004-0314
2007	International 6.0	MDDE	7NVXH06.0AED	A-004-0315
2008	Cummins ISM	HHDD	8CEXH0661MAC	A-021-0466
2008	Cummins ISM	HHDD	8CEXH0661MAC	A-021-0466-1
2008	Ford 6.0 E-Series	MDDE	8NVXH06.0AED	A-010-1461
2008	International 6.0	MDDE	8NVXH06.0AED	A-004-0323

Exhaust Emissions Standards (ABT Engine-Diesel Fuel)

in g/bhp-hr	NMHC		NO _x		NMHC+NO _x		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	0.5	0.5	*	*	*	*	15.5	15.5	*	*	*	*
FEL	*	*	*	*	2.5	2.5	*	*	0.10	0.10	*	*
CERT	0.1	0.1	*	*	2.4	2.3	1.0	0.4	0.10	0.06	*	*
NTE	0.6		*		3.1		19.4		0.12		*	

* g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle, including RMCSET=ram mode cycle supplemental emissions testing; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NO_x=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

Exhaust Emissions Standards (CNG Fuel)

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	*	*	*	*	1.2	*	15.5	*	0.01	*	*	*
FEL	*	*	*	*	*	*	*	*	*	*	*	*
CERT	*	*	*	*	1.0	*	0.1	*	0.00	*	*	*
NTE	*	*	*	*	*	*	*	*	*	*	*	*

* g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; EURO=Euro III European Steady-State Cycle; NTE=Not-to-Exceed; STD=standard or emission test cap; FEL=family emission limit; CERT=certification level; NMHC/HC=non-methane/hydrocarbon; NOx=oxides of nitrogen; CO=carbon monoxide; PM=particulate matter; HCHO=formaldehyde;

NOx Emission Calculation (Transit Fleet Vehicles)

Engine Model Year	Number of Vehicles	NOx Standard	Total NOx Emission
1991-1997 Diesel	enter data here 1	5	5.00
1998-2003 Diesel	enter data here 4	4	16.00
Oct. 2002-2003 Diesel (Settlement Agreement)	enter data here	2.2	
2004-2006 Diesel	enter data here 5	2.2	11.00
2007-2009 Diesel	enter data here 2	1.2	2.40
Optional Standard			
identify engine model here	number of engines	optional standard	
Total Engines:	12	Total NOx:	34.40
Fleet NOx Average	Compliant 12/31/2007		2.87

Engine Inventory

(1) 1997 Cummins ISB

(4) 2001 ITEC 7.6L

(5) 2006 ITEC 6.0L

(2) 2007 DDC 7.2L

PM Emission Calculation (Transit Fleet Vehicle)

Diesel Engine Model Year	Number of Diesel Engines	PM % Reduction	Total PM Emission
1994-2006 (0.1g)			
	enter data here		
No DECS	5		0.500
Level 3 DECS	5	85%	0.075
Level 2 DECS		50%	
Level 1 DECS		25%	
2007+ (0.01g)			
	enter data here		
No DECS	2		0.020
Other 0.01g engine			
	enter data here		
No DECS			
Total Engines:	12	Total PM Emissions:	0.595
2005 PM Baseline		enter baseline	1.000
Percent Reduction	Compliant 12/31/2007		40.50%

Engine Inventory

- (1) 1997 Cummins ISB
- (4) 2001 ITEC 7.6L
- (5) 2006 ITEC 6.0L
- (2) 2007 DDC 7.2L

Annual Reporting

Annual Reporting

- Annual Report Due January 31 through 2017
- Separate report for Urban Buses and TFV:
 - Number, engine mfr & make, engine model year for all engines in buses, and fuel used as of January 1st of that year

Reporting Requirements (continued)

Urban Bus:

- Alternative NOx Strategy Transit Agencies
 - Provide update of compliance plan
- Alternative Fuel Path: Percentage of Alt. Fuel Buses Purchased or Leased
- ZEB Reporting

Diesel Path:

- Document each filter installed for each 2007-2009 model year diesel UB purchased

The Reporting Process

- Web Based
www.arb.ca.gov/msprog/bus/rptg/rptg.htm
- Update Existing Report Information
 - PM and NOx Average Calculated

Annual Report New Format

VEHICLE INFORMATION										
Urban Bus Fleet Summary None Reported										
Transit Fleet Vehicle Summary View Legend										
#Grp	Name	Qty Vehicle	Engine	Fuel	DECS Family Name	Eng Cert *	PM Std **	PM Emission	NOx Std **	NOx Emission
1		3	2004 TFV 2004 Ford 6.8G	LPG or Propane		HDE	-	-	2.2	6.8
2		7	2005 TFV 2005 Cummins ISBG	LPG or Propane		HDE	-	-	2.2	15.4
TFV PM Emissions Summary <input type="button" value="Enter Baseline"/>										
Total PM Emissions: 0 (g/bhp-hr)										
2005 PM Baseline: (g/bhp-hr)										
PM Reduction: PM Baseline Needed %										
TFV NOx Emissions Summary										
Total NOx Emission: 22 (g/bhp-hr)										
Total Number of (NOx) Engines: 10 units										
Total Number of 1997 or Earlier Engines: 0 units										
NOx Fleet Average (total NOx/# Engines):2.2 (g/bhp-hr / unit)										
12/31/2007 Compliance Status: Compliant										
Vehicles Equipped with DECSs None Reported										
Low Usage Vehicles - Low Mileage(LM) or Emergency Contingency(EC) None Reported										
Retired Vehicles None Reported										

Hybrid Buses?

- **Urban Bus Hybrid Certification Procedures**
 - Medium Heavy-duty engine can not be used in Urban Bus service unless certified to the Urban Bus Service Class
 - One-Party Certification
- **Other Hybrid-engines**
 - No modification of engine, including computer settings, otherwise must be a part of the engine certification

Biodiesel

- **Advisory on Biodiesel Use**
 - Up to 20 % Biodiesel (B20) with CARB diesel
 - Biodiesel must meet ASTM D975
- **Biodiesel Advisory Committee**
 - Developing standards and conducting research
 - www.arb.ca.gov/fuels/diesel/altdiesel/altdiesel.htm
- **ARB Fleet and Fuel Regulations**
 - Not an alternative fuel, an alternative diesel fuel
 - Check DECS verification for B20 use
 - Check with your engine manufacturer

Other Regulations You Need to be Aware of



Fleet Rule for Public Agencies and Utilities **(Title 13, California Code of Regulations, sections 2022 and 2022.1)**



Fleet Rule for Public Agencies and Utilities

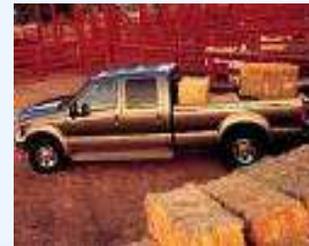
- Own, operate, or lease
- Model year 1960 through 2006
- Greater than 14,000 GVWR
- Medium or heavy heavy-duty on-road diesel-fueled engines
- Apply Best Available Control Technology (BACT)

What is BACT?

- **Retire**
 - low-usage, scrap, sale out-of-state
- **Repower**
 - Engine meeting 0.01g/bhp-hr PM, clean gasoline, alternative fuel
 - Existing Alternative Fuel OK (2004-2006 MY must meet 1.8g/bhp-hr NO_x Optional Standard or less)
- **Retrofit**
 - Highest level Diesel Emission Control Strategy

Excluded from Regulation

- Vehicles with GVWR less than 14,000 lbs
- Emergency vehicles
- School Buses
- Vehicles regulated under the Fleet Rules for Transit Agencies & SWCV



Implementation schedule

Group	Engine Model Years	Applies to All Fleets		Option for Fleets Located in a Low Population County ² or Granted Low-Population County Status	
		Percentage ¹ of Group to use BACT	Compliance Deadline, as of December 31	Percentage of Group to use BACT	Compliance Deadline, as of December 31
1	1960 –1987	20%	2007	20%	2009
		60%	2009	40%	2011
		100%	2011	60%	2013
				80%	2015
100%		100%	2017		
2	1988-2002	20%	2007	20%	2008
		60%	2009	40%	2010
		100%	2011	60%	2012
				80%	2014
100%		100%	2016		
3	2003-2006 (Includes dual-fuel and bi-fuel engines)	50%	2009	20%	2011
		100%	2010	40%	2012
				60%	2013
		100%		80%	2014
				100%	2015

Statewide Truck & Bus Regulation



Concrete Mixer



Dump Truck



Drill Rig



Water Truck



Hay Squeeze



Tow Truck



Reefer Van



Fuel Tank Truck



Passenger Bus

Statewide Truck & Bus Regulation Scope

- Diesel vehicles operating in California
 - Trucks, buses, yard trucks, other
 - Interstate, intrastate, international
- **Shuttle Vehicles - Any GVWR which transports passengers for hire**
- Vehicles greater than 14,000 GVWR
- Any person, business, or government agency who owns or sells a vehicle in California

Excluded from Scope of Regulation

- Pickups and other vehicles with GVWR less than 14,000 lbs except shuttle buses
 - Regardless of towing capability or combined weight rating
- Emergency vehicles
- Tactical military vehicles
- Personal use motor homes



Statewide Truck & Bus Regulation

- **Upgrade requirements phase-in 2010-2021**
 - 2007 model year engine emissions (2010-2013)
 - 2010 model year engine emissions (2017-2021)
- **Exhaust retrofits if equivalent emissions**
- **Compliance options**
 - Best available control technology schedule or
 - Fleet average
- **Certain special provisions**

Upcoming Public Workshops

- To discuss revised proposed regulatory language, preliminary results from vehicle surveys, economic impacts, inventory, and additional outreach efforts
- Six Rounds of Workshops
 - Twenty-Four meetings since April 2006
- Next Workshops
 - Late May/Early June & July

Statewide Truck and Bus Regulation

www.arb.ca.gov/msprog/onrdiesel/workshops.htm

www.arb.ca.gov/dieseltruck

Hotline #: 1-866-6Diesel

Diesel Programs and Activities

www.arb.ca.gov/diesel/diesel.htm

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Fleet Rule for Transit Agencies – www.arb.ca.gov/msprog/bus/bus.htm

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In-Use Control Measures Section

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Statewide Truck and Bus Regulation - www.arb.ca.gov/dieseltruck

Hotline # : 1-866-6Diesel

ARB Listserver Website

www.arb.ca.gov/listserv/listserv.php

Regulation

Solid Waste Collection:

Public Transit Agencies:

Public Agencies and Utilities:

In-Use Off Road:

Statewide Truck & Bus:

Email List

swcv

bus-tfv

bus-ub

publicfleets

ordiesel

onrdiesel

Questions ?

