

Course #504: In-Use Off-Road Diesel Vehicle Regulation Training



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California Environmental Protection Agency
Air Resources Board



Outline

- Need for Emission Reductions
- Regulatory Background
- Applicability
- Regulation Requirements
 - Currently In Effect
 - Future
- Other Provisions
- Resources and Contact Information

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Need for Emission Reductions



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Most Polluted Regions in the United States*

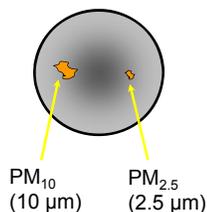
Ozone (smog)	Particulates (PM)
1. Los Angeles Region	1. Bakersfield, CA
2. Visalia, CA	2. Merced, CA
3. Bakersfield, CA	3. Fresno, CA
4. Fresno, CA	4. Hanford, CA
5. Hanford, CA	5. Los Angeles Region, CA
6. Sacramento, CA	6. Modesto, CA
7. Houston, TX	7. Visalia, CA
8. Dallas, TX	8. Pittsburgh, PA
9. Washington, DC	9. El Centro, CA
10. El Centro, CA	10. Cincinnati, OH

*American Lung Association "State of the Air" Report 2013

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Particulate Matter (PM)

- PM is any solid or liquid particles that are suspended in the air
- Causes asthma attacks, causes or aggravates bronchitis and other lung diseases, and reduces the body's ability to fight infections
- Reduces visibility



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Oxides of Nitrogen (NO_x)

- 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

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Regulatory Background



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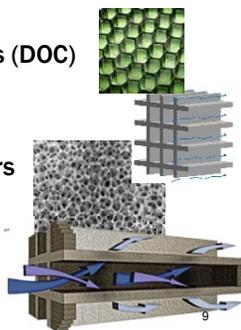
Diesel Risk Reduction Plan

- ARB identified Diesel PM as Toxic in 1998
 - Contains many harmful chemicals
 - 70% of all airborne cancer risk
- Diesel Risk Reduction Plan in 2000
 - Stricter new engine standards
 - Cleaner diesel fuel (≤ 15 ppm)
 - Accelerated replacement of existing diesel engines and installation of Verified Diesel Emission Control Strategies (VDECS) through regulations

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Verified Diesel Emission Control Strategies (VDECS) for Particulate Matter

- Level I Devices
 - Diesel Oxidation Catalysts (DOC)
 - Monolith (25 – 49%)
- Level II Devices
 - Diesel Flow-Through Filters
 - Wire Mesh (50 – 84%)
- Level III Devices
 - Diesel Wall-flow Filters
 - Wall-Flow ($\geq 85\%$)



In-Use Off-road Diesel Vehicle Regulation

- Adopted on July 26, 2007, major revisions December 2010
- Will reduce diesel PM and NO_x emissions
- Affects existing off-road heavy-duty diesel vehicles in California
- Vehicles used in construction, mining, industrial operations and others

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Applicability

Who and What is Affected?



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Who is Affected?

- Businesses
- Individuals
- Government agencies

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What is Affected?

- Single-engine off-road vehicles in California that are:
 - Diesel and alternative diesel fueled (including biodiesel); and
 - Self-propelled (no generators, etc.); and
 - 25 horsepower or greater
- Oilfield & natural gas workover rigs
- Two-engine cranes and water well drilling rigs
- Certain other two-engine vehicles

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What is an Off-road Vehicle ?

- Vehicles intended to be used off-road
- Designed for off-road use, have off-road engines
- Cannot be registered to operate on-road regardless of use

NOT Off-Road:

On-road vehicle, even if not currently licensed



Water truck

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Two-Engine Vehicles Subject to the Off-Road Regulation

- Auxiliary engine ≥ 50 bhp
- Two-engine water-well drilling rigs and Two-engine cranes
 - Including those with Tier 0 engines
- Other types of two-engine vehicles
 1. With certified auxiliary engine (Tier 1 - 4)
 2. Not subject to PAU Fleet Rule
 3. Excludes two-engine sweepers
 4. Fully integrated into design

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Two-Engine Vehicles Subject to the Off-Road Regulation

- Both engines must be reported under the Off-Road reporting system (DOORS)
- Auxiliary engine may require PERP or local air district permit
 - Check with local district to see if required
 - Permit or registration fees
 - Meet current eligibility requirements
 - Auxiliary engine with both EIN and PERP
- Use FAQ and check with ARB if unsure

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Exemptions

Completely Exempt from Off-Road Regulation:

- Locomotives
- Marine engines (incl. commercial vessels)
- Recreational Vehicles
- Personal use vehicles
- Combat and tactical support equipment
- Two-engine street sweepers
- Equipment at ports or intermodal rail yards subject to mobile cargo handling rule

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Exemptions (con't.)

Exempt from all but recordkeeping, reporting and labeling:

- Low-use vehicles (used < 200 hrs/yr)
- Emergency vehicles
- Dedicated snow removal vehicles
- Equipment used a majority of the time for agricultural purposes (>50%)
 - 100% ag use equipment completely exempt

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Regulation Requirements



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Requirements Vary by Fleet Size

- Determine fleet size by adding up all horsepower subject to the regulation
 - Must include all horsepower under common ownership or control
- Exclude:
 - Low use vehicles (used < 200 hrs/year)
 - Emergency use vehicles
 - Dedicated snow removal vehicles
 - Vehicles used > 50% of the time for agricultural operations

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Fleet Size Categories

Fleet Size Category	Description
Small	Fleet <= 2,500 hp, or Municipality <= 2,500 hp, or Municipality fleet in low population* county, captive attainment area fleet, regardless of total hp
Medium	Fleet with 2,501 to 5,000 hp
Large	Fleet with more than 5,000 hp All state and federal government fleets

* Low population counties and fleets are listed online at:
<http://www.arb.ca.gov/msprog/ordiesel/lowpopulation.htm>

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Captive Attainment Area Fleets

- Fleets or fleet portions that operate only in listed attainment counties (clean air areas)
- Considered small fleets, regardless of total hp in fleet or fleet portion
- Fleets can travel within multiple attainment counties
- Optional provision, but if complying as a captive attainment area fleet, a fleet must:
 - Designate itself as a captive attainment area fleet in DOORS
 - Comply with the captive attainment area fleet labeling requirements - green label required

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Captive Attainment Area Fleets

Attainment counties:

Alpine, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Monterey, Plumas, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz, Shasta, Sierra, Siskiyou, Trinity, Tehama, Yuba, and the portion of Sonoma County that lies within the boundaries of the North Coast Air Basin.

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Captive Attainment Areas



Fleet Portions

- Departments or divisions of large fleets can comply as separate fleet portions
 - Based on separate management, locations, organizational structure, etc.
 - Stay under parent company in DOORS
- Cannot be determined arbitrarily
 - Based on separate management, locations, organizational structure, etc.
 - Stay under parent company in DOORS
- Each portion must still follow the timeline determined by the overall company's fleet size (except for portions in captive attainment areas)

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Fleet Portion Example

- Example Company is large fleet (7,100 hp) comprised of 3 fleet portions:
 - Fleet A: 2,000 horsepower
 - Fleet B: 2,000 horsepower
 - Fleet C: 3,100 horsepower
- Compliance options:
 - Example company can comply as one large 7,100 hp fleet, or
 - Fleet A, B, and C (or any combination thereof) can comply as separate fleets, BUT, must meet the large fleet requirements/deadlines (because overall, Example Company is a large fleet)

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Rental and Leased Vehicles

- Rented/leased < 1 year
 - Owner's responsibility
- Rented/leased \geq 1 year
 - Owner's responsibility, unless stated otherwise in contract
- Leases occurring before June 15, 2008
 - If in a year long "lease" (or more) starting on or before June 15, 2008, vehicle must be included in the lessee's fleet (not owner)

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Requirements Currently in Effect

- Limit on Idling
- Idling Policy
- Sales Disclosure
- Initial Reporting
- Labeling
- Annual Reporting & Recordkeeping

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5 Minute Limit on Idling

- Exemptions include:
 - Queuing, testing, and servicing
- Can apply to ARB Executive Officer (EO) to idle > 5 minutes
- Enforcement of 5 minute idling limit is in effect
 - issued to vehicle owner, not operator, except for rentals
- Enforcement Advisory:

www.arb.ca.gov/enf/advs/advs377.pdf

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Written Idling Policy

- Required for medium and large fleets only
- Policy must be available to all vehicle operators
- Guidance document for idling policy available at:
www.arb.ca.gov/msprog/ordiesel/knowcenter.htm
- Enforcement Advisory:
www.arb.ca.gov/enf/advs/advs391.pdf

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Disclosure of Applicability (Sales Disclosure)

- Disclosure of regulation to buyer
- Specific language must be included on the bill of sale, invoice, or price quote
- Persons selling in California to California buyer (except for manufacturers selling to dealers) – not for sales out of state
- Keep sales records for 3 years
- Auction sales:
 - If sold to auction house, disclose to auction house
 - If auction house sells on owners' behalf, then must ensure ultimate purchaser receives disclosure

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Disclosure Language

- “When operated in California, any off-road diesel vehicle may be subject to the California Air Resources Board In-Use Off-road Diesel Vehicle Regulation. It therefore could be subject to retrofit or accelerated turnover requirements to reduce emissions of air pollutants. For more information, please visit the California Air Resources Board website at <http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm>”

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Initial Reporting

- Initial reporting was required back in 2009
- Report using the Diesel Off-road On-line Reporting System (DOORS)
 - Reporting tool accessible via internet
 - Compiles & retains fleet data (including emissions)
 - No data validation → make sure it is correct!
 - Enforcement can access your fleet information
- Missed your reporting deadline? Self-report now rather than be caught in the field
 - Small & medium fleets will not be fined

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The image shows two screenshots from the California Air Resources Board website. The top screenshot is the 'In-Use Off-Road Diesel Vehicle Regulation' page, dated Thursday, August 26, 2010. It features a navigation menu on the left with categories like 'Air Laws', 'Programs', and 'Mobile Sources'. The main content area has a 'Knowledge Center' with links for 'DOORS Reporting', 'Free Training Seminars', and 'Emissions Inspection'. The bottom screenshot shows the 'Diesel Off-road On-line Reporting System (DOORS)' login page. It has three main sections: 'New to DOORS? START HERE' with a 'Create an Account' button, 'Already have an account? SIGN IN HERE' with a login form for 'User Name' and 'Password', and 'Fleet Reporting' with instructions for existing fleets. A URL www.arb.ca.gov/ordiesel is also visible.

Accessing DOORS

www.arb.ca.gov/ordiesel

https://ssl.arb.ca.gov/ssldoors/doors_reporting/doors_login.html

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Reporting Vehicle Additions/Removals

- Vehicles added or sold/retired must be reported to ARB within 30 days
 - Includes purchases/sales, and
 - bringing vehicles in or out of CA
- Report vehicle additions/removals online through DOORS
- Hardcopy forms also available
 - Call or email the DOORS Hotline

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DOORS Reporting Help

- Contact the DOORS hotline!
 - Toll free: 877-59DOORS (877-593-6677)
 - Email: doors@arb.ca.gov
 - DOORS technical help
 - Regulatory questions too!
 - Request hardcopy forms



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DOORS – Compliance Snapshot

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Fleet Compliance Snapshot

As of Today (August 29, 2012) [Refresh Fleet Data](#)
(or click the "Refresh Fleet Data" button if the numbers don't look correct or if data doesn't show.)

Your fleet, as currently reported, has met the off-road regulation requirements through the January 1, 2014 compliance date because it has earned BACT credits that will be applied towards the required BACT amounts through the January 1, 2014 compliance date. You will need to take action prior to December 31, 2014 in order for your fleet to be in compliance on January 1, 2015.

*This determination is based on the make up of your CURRENT fleet in DOORS, which includes age and horsepower of engines, rebills (if any), vehicles sold (credits, if any), exempt vehicles such as Low Use (if any), outfalls (if any), and other credits (if any).

Current Fleet Statistics

Fleet Size	Large
Number of vehicles:	
In Fleet Average	12
Low Use	0
Exempt/Low Use	0
Total Vehicles	12
Total horsepower (in fleet average)	5,750
First Compliance Date	January 1, 2014
Next Required Compliance Date	January 1, 2015

Fleet Target and Average Emission Rates (g/bhp-hr)

Target Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Target	5.9	5.5	5.1	4.5	4.0	3.4	2.8	2.2	1.7	1.5	
Average (current)	8.3										

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Requirements	
Your Current Fleet Average	8.3
2014 Fleet Target	5.9
Exemption from 2014 requirements (Check Requirements for Early Compliance)	No
Required BACT for January 1, 2014	276 hp (4.8% of fleet hp at the end of 2012)
Current BACT Credit	500 hp
By using your credit your fleet can comply through	2014
In which case your smallest credit would be	224 hp
Required BACT for January 1, 2015	492 hp (8% of current fleet hp)

To be in compliance each year, the fleet average must be lower than or equal to the fleet target, and the fleet must exceed the required BACT amount.

Compliance Summary					
Calendar Year	Begin Credit	Credit Use	End Credit	Compliance Method	BACT Requirement
2014	500	276	224	Credit used	4.8% * 5750 = 276

Credit Summary

Reference Regulation Section	These credits are provided in sections of the regulation cited in the right column. You may stop or hide individual credit details by clicking the labels of Show All Credit Details .	Horsepower Credit (Rounded)
(13) Early Repairs/Rebills		500
(14) Early Replacement		0
(15) Early VCECS Double Credit - Highest level PM VCECS credit - HD + Not highest level PM VCECS credit - HD + Highest level PM VCECS credit		0
(16) Early Reduced Fleet hp (only to be used after 2014)		0
(17) 2010-2011 Reduced Fleet hp		0
(18) Idemem Replacement/Retirement		0
(19A) Turnover - Beginning on January 1, 2013 - Retirement - Permanent Low Use - Repower (Retrofit higher hp)		0
(19B)(i) VCECS - Beginning on January 1, 2013 - Highest level PM VCECS credit - HD + Not highest level PM VCECS credit - HD + Highest level PM VCECS credit		0
(19) Excess PM VCECS credit used for compliance with the off-road and the truck and bus regulations - Credit from Truck and Bus = 0 hp - Credit Given to Truck and Bus = 0 hp		0
Total Credits		500 hp

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DOORS – Compliance Planning Tool

- Uses a fleet's information in DOORS to generate compliance plans
- Automated and manual compliance planning options
- Currently in the testing phase

Interested in testing the DOORS compliance planning tool? Let us know! doors@arb.ca.gov

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DOORS – Fleet Calculator

- Spreadsheet based program
- Allows for input of DOORS data
 - Follow appendix A of user guide
- Only Medium & Large Fleets for now
 - Help plan for 2014 deadline and beyond
 - Coming soon for small fleets
- Works for both Fleet Average and BACT

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Vehicle Labeling

- All vehicles subject to the regulation must be labeled
- ARB assigns Equipment Identification Number (EIN) after initial reporting
- Vehicles must be labeled within 30 days of receiving EIN
- EIN stays with vehicle for life (even after sales)



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Vehicle Labeling

- As of January 1, 2013:
 - BOTH sides of vehicles must be labeled
 - Captive attainment area fleets must have **green** labels
- Labels are not issued by ARB
- Labeling specifications:
 - www.arb.ca.gov/msprog/ordiesel/knowcenter.htm
- List of label vendors:
 - <http://www.arb.ca.gov/msprog/ordiesel/labelvendors.htm>

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Annual Reporting

- Annual reporting required:

Fleet Size	Annual Reporting (due by March 1 st of year)
Large	2012 - 2023
Medium	2016 - 2023
Small	2018 - 2028

- Responsible Official Affirmation of Reporting (ROAR)
 - First one was due by March 1, 2012 for large fleets!
- Hour meter readings
 - Vehicles reported as low-use
 - Vehicles used a majority of time for agricultural operations
- Changes since initial reporting

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Record Keeping

- Records must be kept between reporting periods:
 - Changes in the fleet since last reported
 - Newly purchased vehicles
 - Rebuilt engines to a cleaner standard
 - VDECS serial numbers
 - VDECS failures
 - Manufacturer delays
 - Executive Officer approvals for extensions, approval of alternative fuels, idling exceptions, etc.
- Records must be kept until 2030 (even if sold)

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Future Requirements

- Received EPA authorization 9/13/13
 - Advisory #MSC 14-1
- Restrictions on adding vehicles
- Performance requirements (to reduce emissions)
 - Turnover to cleaner engines/vehicles; and/or
 - Install highest level VDECS

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Restrictions on Adding Vehicles

- **Ban on adding Tier 0**
 - Begins January 1, 2014 (see advisory)
 - All fleet sizes
- **Ban on adding Tier 1**
 - Begins January 1, 2014 (see advisory) for large and medium fleets, 2016 for small fleets
- **Ban on adding Tier 2**
 - Begins 2018 for large and medium fleets, 2023 for small fleets

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Restrictions on Adding Vehicles

Lowest Tier That Can Be Added To A Fleet

Fleet Size	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Medium/Large	T2			T3						
Small	T1	T2						T3		

- If purchasing an entire fleet, then it depends on compliance status
 - In compliance → no restrictions
 - Non-compliant → each vehicle meet min. tier

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Performance Requirements

- Must be met by January 1st of each compliance year
 - Except for first year for large fleets – July 1st
- Must meet one of the below options:
 - Fleet average requirements
 - Best Available Control Technology (BACT)

Fleet Size	Compliance Dates
Large	2014-2023
Medium	2017-2023
Small	2019-2028

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Fleet Averaging Requirements

- Compare fleet average index to fleet average target
 - DOORS shows this in Compliance Snapshot
- Index/target are horsepower weighted averages of NO_x emissions (g/bhp-hr)
- Targets get more stringent with time
- One set of targets for large/medium fleets, a separate set for small fleets
- Example calculations located at the end of this presentation

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Fleet Average Targets

NO_x (g/bhp-hr)

Large and Medium Fleets Only

Compliance Date: January 1 of Year	25-49 hp	50-74 hp	75-99 hp	100-174 hp	175-299 hp	300-599 hp	600-750 hp	>750 hp
2014 (Large Fleets Only)	5.8	6.5	7.1	6.4	6.2	5.9	6.1	7.2
2015 (Large Fleets Only)	5.6	6.2	6.7	6	5.8	5.5	5.6	6.8
2016 (Large Fleets Only)	5.3	5.8	6.2	5.5	5.3	5.1	5.2	6.5
2017	5.0	5.4	5.5	4.9	4.7	4.5	4.6	6.0
2018	4.7	5.0	4.8	4.3	4.1	4.0	4.0	5.5
2019	4.4	4.6	4.1	3.7	3.5	3.4	3.4	5.0
2020	4.1	4.2	3.4	3.1	2.9	2.8	2.9	4.5
2021	3.8	3.8	2.7	2.5	2.3	2.2	2.3	4.0
2022	3.5	3.4	2.0	1.9	1.7	1.7	1.7	3.5
2023	3.3	3.0	1.4	1.3	1.5	1.5	1.5	3.4

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Fleet Average Targets

NO_x (g/bhp-hr)

Small Fleets Only

Compliance Date: January 1 of Year	25-49 hp	50-74 hp	75-99 hp	100-174 hp	175-299 hp	300-599 hp	600-750 hp	>750 hp
2019	5.8	6.5	7.1	6.4	6.2	5.9	6.1	7.2
2020	5.6	6.2	6.7	6.0	5.8	5.5	5.6	6.8
2021	5.3	5.8	6.2	5.5	5.3	5.1	5.2	6.5
2022	5.0	5.4	5.5	4.9	4.7	4.5	4.6	6.0
2023	4.7	5.0	4.8	4.3	4.1	4.0	4.0	5.5
2024	4.4	4.6	4.1	3.7	3.5	3.4	3.4	5.0
2025	4.1	4.2	3.4	3.1	2.9	2.8	2.9	4.5
2026	3.8	3.8	2.7	2.5	2.3	2.2	2.3	4.0
2027	3.5	3.4	2.0	1.9	1.7	1.7	1.7	3.5
2028	3.3	3.0	1.4	1.3	1.5	1.5	1.5	3.5

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Emission Factors

- Emissions are based on the engine model year, not vehicle year.
- Model year determined by looking at emission control label for certified engines
- Emission factors for diesel off-road engines listed in the Regulation (Appendix A)
- For on-road and alt-fuel engine emission factors, please contact off-road staff
- Flex engines use the same emission factor as a regular certified engine (model year)

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Best Available Control Technology (BACT) Requirements

- Option for fleets in lieu of meeting the fleet average targets
- Fleet must turn over or install VDECS on a certain percent (BACT rate) of fleet horsepower each year
- Must apply BACT to Tier 0/1 vehicles first
- Actions must be completed before January 1st of compliance year

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Best Available Control Technology (BACT) Requirements

- Turnover:
 - Retire or sell
 - Replace with cleaner vehicle
 - Make permanent low-use (within deadline)
 - Repower with cleaner engine
 - Rebuild to a more stringent emission standard
- VDECS:
 - Highest level PM VDECS
 - NOx VDECS

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BACT Compliance Rates

Large Fleets

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BACT Rate	4.8%	8%	8%	8%	10%	10%	10%	10%	10%	10%

Medium Fleets

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BACT Rate	-	-	-	8%	10%	10%	10%	10%	10%	10%

Small Fleets

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
BACT Rate	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

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Example BACT Calculation

- For 1/1/15 deadline must turnover 8%
- Fleet size at end of 2013 = 5,300 hp
- $0.08 \times 5,300 \text{ hp} = 424 \text{ hp}$ must be turned over
- 6 vehicles meet BACT exemptions = 1,450 hp
- Fleet subject to BACT for 2015 = 3,850 hp
- 424 hp chosen from 3,850 hp vehicles
- 3 vehicles turned over for 630 hp (200, 130, 300)
- 206 hp carryover credit for 1/1/16 deadline

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Exemptions from BACT Requirements – Large/Med Fleets

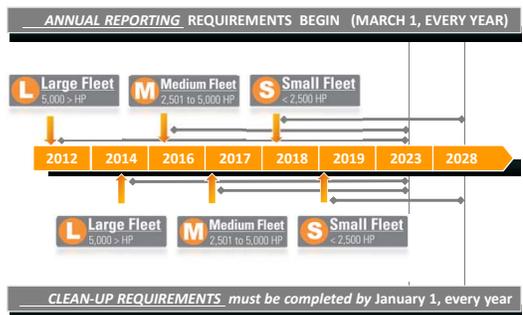
- Vehicles less than 10 years old
- Specialty vehicles if certain criteria are met
- Vehicle has OEM diesel particulate filter
- Tier 4 or Tier 4 Interim vehicles
- Highest level PM VDECS installed in past 6 years
 - Highest level at time of installation
- Highest level PM VDECS installed before January 1, 2013
 - Can only apply to 15% of 12/31/12 total hp

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Exemptions from BACT Requirements – Small Fleets

- Vehicles less than 10 years old
- Specialty vehicles if certain criteria are met
- Vehicle has OEM diesel particulate filter
- Tier 4 or Tier 4 Interim vehicles
- No highest level VDECS available 10 months prior to compliance date
- Highest level PM VDECS installed available at time of installation

Compliance Timeline



Other Provisions



Alternative Compliance Option for Smallest Fleets

- Optional path (i.e., not required)
- For small fleets with less than 500 hp (must include vehicles exempt from performance requirements i.e. low-use, emergency-use, etc.)
- Phase out Tier 0 and 1 vehicles

Compliance Date: January 1 of Year	Percent of Fleet (by horsepower) Which Must Have a Tier 2 or Higher Engine
2019	25
2022	50
2026	75
2029	100

Low-use Vehicle Exemption

- Must be operated < 200 hours/yr
 - Each engine on 2-engine vehicles
- Equipped with non-resettable hour meter
- Year-by-year low use vehicle
 - If used > 200 hours entered into fleet average
 - Must show < 200 hours for previous year OR
 - Can choose a 3-year rolling average (optional)
- Permanent low use vehicle
 - BACT credit for these vehicles (**within deadline**)
 - Citation will be issued for >200 hours
 - If >200 hrs/yr, meet adding vehicle requirements

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Early Credits – Available NOW!

- Full credit given for previous repowers
- Some credit given for fleets that have reduced their total horsepower, or replaced vehicles
- Double credit deadline for PM and NOx exhaust retrofits:
 - Large fleets: January 1, 2013
 - Medium fleets: January 1, 2016
 - Small fleets: January 1, 2018

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Compliance Extensions

- No penalties for manufacturer delays of new equipment
 - Includes VDECS
 - Includes installation delays
 - Proof of purchase by Nov. 1st before compliance year
- ARB will grant extensions for delays in availability of Tier 3/4 vehicles

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New and Out-of-State Fleets

- Stricter requirements than existing fleets apply immediately upon entry
- If a new fleet forms or enters California after January 1, 2014, they must
 - meet the first fleet average; and
 - meet the adding vehicle restrictions
- Report vehicles within 30 days of purchase or entry into the State

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Resources and Contact Information



Air Resources Board Financial Incentive Programs

- Funding may be available for the following:
 - Vehicle replacements
 - Engine retrofits
 - Engine repowers
 - Engine hybrid technologies

- Carl Moyer Funding

www.arb.ca.gov/msprog/moyer/moyer.htm

Knowledge Center

In-Use Off-Road Diesel Vehicle Regulation
This page last revised August 12, 2013

Knowledge Center
Overview, Advisories, Fact Sheets

What's New?!

www.arb.ca.gov/ordiesel

Knowledge Center for the Off-Road Diesel Vehicle Regulation
This page last revised August 2, 2013

Fact Sheets

- **Off-Road Fact Sheet: Basic explanation of the regulation timeline and requirements**
 - December 2010 Amendments Fact Sheet: Summary of the off-road regulation as amended in December 2010

Requirements in Effect Now - Enforcement and Regulatory Advisories

- **Whitney-944-vehicle-weighing**
 - Advisory 316: Dealer/Seller Disclosure
 - Advisory 315: Written idling Policy
 - Advisory 304: Reporting Vehicles
 - Advisory 414: Enforcement Delay
 - Advisory 12-02: Annual Reporting for Large Fleets Due March 1, 2012
 - Advisory 12-08: New Labeling Requirements Effective January 1, 2013
 - Advisory 12-25: On-Road Vehicles with Two Engines View Required to Report by March 1, 2012 (This is an updated version of the old advisory 12-02 B)

Free Training Seminars

- **Course 504: In-Use Off-Road Diesel Vehicle Regulation Training**
 - Register to attend a free training class. New classes will be added soon.

Frequently Asked Questions (FAQs)

Thursday, August 28, 2013

In-Use Off-Road Diesel Vehicle Regulation

The page last revised August 15, 2013

Knowledge Center
Operator, Assessor, Fact Sheets

Exhaust Retrofits

DOORS
Reporting Forms

Free Training Seminars

Regulation Language

Retrofit Safety A
Exemptions

On July 26, 2007, the Air Resources Board (ARB) adopted a regulation to reduce diesel particulate matter (PM) and oxides of nitrogen (NOx) emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulatory language and information on reporting and compliance tools can be accessed by clicking the quick links buttons above. For more information, please contact the Diesel Hotline.

Enforcement Delayed: On February 11, 2010, ARB issued a delay of the regulation's NOx and PM requirements pending further notice. Reporting, labeling, idling and disclosure requirements are still in effect. For more information, please see the [enforcement advisory](#).

What's New?:

- Posted April 23, 2013**
 - The revised **Fleet Average Calculator for large fleets** is now available. The calculator is for the large fleet January 1, 2014 compliance date only, and can be found [here](#).

Fleet owners utilizing the calculator are advised to first read the revised [User Guide](#) in order to familiarize themselves with the calculator.

The **Fleet Average Calculator** is an Excel spreadsheet designed to assist fleet owners in calculating their Fleet Average Index and Fleet Average Targets, based on the equipment model year and horsepower input. The calculator allows fleets to experiment with different turnover, repair, and retrofit strategies to plan for compliance with the in-use off-road diesel vehicle regulation.

- Posted February 21, 2013**
 - March 1, 2013 deadline for ROMs and locking some data in DOORS.** By March 1, 2013, large fleets must submit a signed Responsible Official Affirmation of Reporting (ROAR) to ARB. By the same date, large fleets must designate appropriate vehicles as low-use for 2012, and submit low meter readings.

Also, as of March 1, 2013, fleets will no longer have the ability to use the "Dogs Unleashed" or "Dogs Restrain" features for ROM.

Course Summary

- **Off-road Regulation Applicability**
 - 25 bhp, two-engine vehicles, exemptions
- **Administrative Requirements**
 - DOORS, labelling, idling, sales disclosure, records
- **Fleet Emission Reductions**
 - vehicle adding restriction, fleet average, BACT
- **Resources and Contact Information**
 - DOORS hotline, website knowledge center



Appendix: Example Fleet Average Calculations



Steps in Calculating Fleet Average Index/Target

1. Determine which vehicles to include
2. Find emission factors
3. Calculate Fleet Average Index
4. Determine fleet targets
5. Calculate Fleet Average Target
6. Compare Index to Target

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1. Determine Which Vehicles to Include

Example Fleet:

Vehicle 1: MY 1996, 100 hp

Vehicle 2: MY 2000, 200 hp

Vehicle 3: MY 2002, 300 hp

Vehicle 4: MY 1998, 200 hp, low-use vehicle

Vehicle 5: MY 2001, 200 hp, emergency use

NO VDECS installed on any vehicle

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1. Determine Which Vehicles to Include

Example Fleet:

Vehicle 1: MY 1996, 100 hp

Vehicle 2: MY 2000, 200 hp

Vehicle 3: MY 2002, 300 hp

~~Vehicle 4: MY 1998, 200 hp, low use vehicle~~

~~Vehicle 5: MY 2001, 200 hp, emergency use~~

Low-use and emergency use vehicles don't count towards the fleet averages

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2. Find Emission Factors

- Emission Factor table located in Appendix A of the Off-Road regulation
- Use engine model year and horsepower to determine emission factor of vehicle
- From Emission Factor table:
 - Vehicle 1: 1996, 100 hp, EF = 9.3
 - Vehicle 2: 2000, 200 hp, EF = 6.9
 - Vehicle 3: 2002, 300 hp, EF = 4.2

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Emission Factors*

Engine Model Year	Emissions Factors by Horsepower and Year (g/bhp-hr)							
	Horsepower Groups							
	25-49	50-74	75-99	100-174	175-299	300-599	600-750	750+
1900	7.2	14.8	14.8	15.9	15.9	15.2	15.2	15.2
1969	7.2	14.8	14.8	15.9	15.9	15.2	15.2	15.2
1970	7.2	14.8	14.8	14.8	14.8	14.1	14.1	14.1
1972	7.2	14.8	14.8	13.6	13.6	13.0	13.0	13.0
1980	7.2	14.8	14.8	12.5	12.5	11.9	11.9	11.9
1988	7.1	9.9	9.9	9.3	9.3	8.9	8.9	8.9
1989	7.1	9.9	9.9	9.3	9.3	8.9	8.9	8.9
1996	7.1	9.9	9.9	9.3	9.3	8.9	8.9	8.9
1997	7.1	9.9	9.9	6.9	6.9	6.9	6.9	6.9
1998	7.1	6.9	6.9	6.9	6.9	6.9	6.9	6.9
1999	6.2	6.9	6.9	6.9	6.9	6.9	6.9	6.9
2000	6.2	6.9	6.9	6.9	6.9	6.9	6.9	6.9
2001	6.2	6.9	6.9	6.9	6.9	4.2	4.2	6.9
2002	6.2	6.9	6.9	6.9	6.9	4.2	4.2	6.9

* Only partial chart shown

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3. Calculate Fleet Average Index

Fleet average index =

[SUM of (max hp for each engine in fleet multiplied by emission factor multiplied by the VDECS factor for each engine in fleet) for all engines in fleet] divided by [SUM of (max hp) for all engines in fleet]

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3. Calculate Fleet Average Index

Table 2 - VDECS Factor (section 2449.1(a))

VDECS	VDECS Factor
No VDECS Installed or Level 1 VDECS	1
Level 2 PM VDECS, not highest level	0.82
Level 2 PM VDECS, not highest level, with NOx reduction	1 Minus (0.18 + (Verified Percent NOx Reduction Divided by 170))
Highest Level PM VDECS	0.7
Highest Level PM VDECS with NOx Reduction	1 Minus (0.3 + (Verified Percent NOx Reduction Divided by 170))
NOx Reduction only	1 Minus (Verified Percent NOx Reduction Divided by 170)

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3. Calculate Fleet Average Index

No VDECS, so VDECS Factor = 1

Fleet average index =

$$\begin{aligned}
 &= [(100 \times 9.3 \times 1) + (200 \times 6.9 \times 1) + (300 \times 4.2 \times 1)] / (100 + 200 + 300) \\
 &= [930 + 1380 + 1260] / 600 \\
 &= 3570 / 600 \\
 &= 5.95 \text{ (round to the nearest 0.1)} \\
 &= 6.0
 \end{aligned}$$

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2. Determine Fleet Targets

- Different for each compliance year
- Target tables located in section 2449.1(a) of the Off-Road regulation
 - Table 3, for large and medium fleets
 - Table 4, for small fleets
- Use compliance year and engine horsepower to determine target rates for each vehicle
- From Fleet Target table:
 - Vehicle 1 (100 hp): 2014 target = 6.4
 - Vehicle 2 (200 hp): 2014 target = 6.2
 - Vehicle 3 (300 hp): 2014 target = 5.9

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4. Determine Fleet Targets

Large and Medium Fleet Targets Table

Compliance Date: January 1 of Year	25-49 hp	50-74 hp	75-99 hp	100-174 hp	175-299 hp	300-599 hp	600-750 hp	>750 hp
2014 (Large Fleets Only)	5.8	6.5	7.1	6.4	6.2	5.9	6.1	7.2
2015 (Large Fleets Only)	5.6	6.2	6.7	6	5.8	5.5	5.6	6.8
2016 (Large Fleets Only)	5.3	5.8	6.2	5.5	5.3	5.1	5.2	6.5
2017	5.0	5.4	5.5	4.9	4.7	4.5	4.6	6.0
2018	4.7	5.0	4.8	4.3	4.1	4.0	4.0	5.5
2019	4.4	4.6	4.1	3.7	3.5	3.4	3.4	5.0
2020	4.1	4.2	3.4	3.1	2.9	2.8	2.9	4.5
2021	3.8	3.8	2.7	2.5	2.3	2.2	2.3	4.0
2022	3.5	3.4	2.0	1.9	1.7	1.7	1.7	3.5
2023	3.3	3.0	1.4	1.3	1.5	1.5	1.5	3.4

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5. Calculate Fleet Average Target

Fleet average target =
 [SUM of (max hp for each engine in fleet multiplied by the target for each engine in fleet) for all engines in fleet] divided by [SUM of (max hp) for all engines in fleet]

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5. Calculate Fleet Average Target

Fleet average target (for 2014) =
 = [(6.4*100)+(6.2*200)+(5.9*300)]/(100+200+300)
 = [640 + 1240 + 1770] / 600
 = 3650 / 600
 = 6.0833 (round to nearest 0.1)
 = 6.1

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6. Compare Index to Target

Fleet average index = 6.0

Fleet average 2014 target = 6.1

$$\underline{6.0 < 6.1}$$

Since the fleet average index is less than the fleet average target for 2014, the fleet is in compliance