

NJ Diesel Retrofit Law:



Solid Waste Collection Vehicles

Diesel Retrofit Overview

- Directed at reducing diesel emissions and the health impacts associated with diesel exhaust
- Components of the rules:
 - Provides for installation of closed crankcase ventilation systems (school bus)
 - Provide tailpipe retrofits for certain heavy duty diesel engines
 - Reimbursement of purchase and installation costs

Intent of the Diesel Retrofit Law

- ❑ Reduce 150 tons of diesel particulate matter from the air every year.
- ❑ Target vehicles that have large operational presence in neighborhoods and have potential to directly expose citizens to diesel particulate matter.
- ❑ Prioritizes the reduction of fine particulate matter (PM_{2.5}) in urban communities

Retrofit Law Components

- Compliance burden on vehicle owner
- Submit Inventory / Cost Estimate
 - March 2008 for Solid Waste Collection Vehicles
- State pays for retrofits
 - State Contract
 - Authorized installers
- Retrofit warranty

Compliance Tools

- Guidance Document
- State Contract - Authorized Installers
- Electronic Submittal including web portal in 12/07
- Workshops
- www.Stopthesoot.org website
- Listserver messaging system
- Program Staff

Devices on Contract

- ❑ Designed to capture solids, liquids, and gaseous emissions and treat before exhaust
- ❑ Designed to replace muffler
- ❑ Application design based on engine/chassis manufacturer for sizing & plumbing
- ❑ Particle Filters, Oxidation Catalysts, Flow-Through Filters
- ❑ Meet definition of BART
- ❑ USEPA or CARB verified

Authorized Installers

- A person/entity who holds a written agreement – service, sales, etc... with one or more retrofit manufacturer
- Must be on State Contract as per regulations
- Provide Best Available Retrofit Technology that has been verified by California or USEPA to meet standards referenced in NJ regulations.

Authorized Installer Tasks

- Needs to confirm the device will work with target engine/chassis combination
- Must be manufacturer authorized & trained
- Can provide turnkey cost estimate
- Warranty Service
- Product information and training
- Coordinate Reimbursement with State

Choosing an Authorized Installer

- Listed on the state contract
 - DEP will make available a list of authorized installers who are eligible to perform the retrofits
- Familiarity/Comfort Level
 - One of the installers has performed work on your vehicles previously
 - You use the brand of products being offered by an installer on your vehicles
- Interviews

Reimbursement

- ❑ Reimbursement direct to Authorized Installer on State Contract
- ❑ Covered cost
 - BART & ancillary items for turnkey
 - Installation
- ❑ Not covered
 - Consumable items such as replacement filters
 - Remedial repairs necessary to retrofit vehicle
 - Existing damage, wear and tear, or modifications precluding installation of BART.
 - Non-contract installations unless under approved grant.

Regulated Vehicles

- ❑ School Buses
- ❑ Solid Waste Collection Vehicles
- ❑ Public & Private Commercial Buses
- ❑ Publicly Owned On-Road Vehicles
 - Includes Recycling Trucks
- ❑ Publicly Owned Off-Road Equipment

Diesel Retrofits- Regulated Vehicles

- Solid Waste Collection Vehicles (SWCV) that meet the following criteria
 - Publicly owned
 - or
 - In a contract with a public entity

- Includes Solid Waste Cabs and Solid Waste Transport Units

Diesel Retrofits- Regulated Vehicles

- Regulated solid waste vehicle means any diesel solid waste vehicle registered in the State, that is owned by the State, or any political subdivision thereof, or a county or municipality or any political subdivision thereof, or that is owned by a person providing solid waste services with the vehicle pursuant to a contract with the State or any political subdivision thereof, or a county or municipality or any political subdivision thereof.

Diesel Retrofits- Regulated Vehicles

Vehicle Types and General Designation of Scope:

Vehicle Description	Contract Type (Issuer)	Regulated?
Publicly-Owned Solid Waste Collection Vehicle	None	Yes
Privately-Owned Solid Waste Collection Vehicle	Public	Yes
Privately-Owned Solid Waste Collection Vehicle	Private	No
Solid Waste Cab and Solid Waste Transport Unit	Public	Yes
Solid Waste Cab and Solid Waste Transport Unit	Private	No
Construction Truck – Solid Waste	Public	No
Construction Truck – Solid Waste	Private	No

Retrofit Law-General exemptions

- 2007 & newer model year on-road engines
 - Engines meeting the 0.01 g/bhp*hr standard
- Off-road engines meeting 0.015 g/bhp*hr PM standard (~2011 to 2014 phase in)
- First aid, emergency, ambulance, rescue & fire
- Agricultural Vehicles
 - Farm Equipment

What are the retrofits?

- Best Available Retrofit Technology (BART)
 - Attached to exhaust pipe in place of existing muffler
 - 3 main types – Diesel Oxidation Catalyst (DOC), Flow Through Filter (FTF), and Diesel Particulate Filter (DPF)
- Minimum exhaust PM (particulate) emission reductions established by DEP
 - 3 PM reduction levels called BART Levels
- USEPA or CARB verified diesel retrofit emission control and reductions (%)
 - USEPA and CARB restrictions apply on model, year, use, fuel & temperature restrictions

BART Minimum Control Efficiency

BART Level	<u>Minimum</u> Control Efficiency (particulate matter reduction by weight %)
3	85
2	50
1	25

Control Efficiency determined according to verification results from USEPA or CARB

Steps to Compliance

Basic Program Steps

- Owner identifies Regulated Vehicles
- Determine appropriate BART & Installer
- Submit Inventory Form (includes cost estimates)
- DEP review/approve cost estimates
- Installation
- Submittals and Recordkeeping
- One-Time Compliance Inspections

Develop Inventory

- After obtaining the inventory/cost estimate form for each vehicle
 - Determine desired BART model
 - Installer input
 - Independent research
 - Choose installer(s) from the state contract
 - Installers offer 1-2 BART brands
 - Can use more than one installer
 - May be needed for unique applications
 - Some exceptions based on vehicle design – space constraints

Determining BART

- Type of vehicle and Engine Model Year
 - SWCV – 1987 & older engines – BART 1
 - SWCV – 1988–2006 engines – BART 2
 - SWCV – 2007 & newer engines – Exempt
- Examination and Observations by Authorized Installer
 - Exhaust Temperature Profiles
 - Backpressure Monitoring
 - Sizing Concerns


BART Levels for Solid Waste Collection Vehicles

Engine Model Year	Minimum BART Level	Minimum control efficiency (particulate emission reduction by weight)
2007 and newer	Not applicable	Not applicable
1988-2006	BART 2	50%
1987 & older	BART 1	25%

Control Efficiency determined according to verification results from USEPA or CARB

Cost Estimate Info

- Installer provides cost estimate amount for each vehicle
- BART Kit at contract discount
 - Labor hours & rate
 - Mobile Install cost– optional
- Exemption or Lower BART Level
 - Document indicated required BART Level is infeasible.
- Owner puts info into form.
 - Form is electronic only

 <p>State of New Jersey Department of Environmental Protection</p>			<p>Best Available Retrofit Technology (BART) Initial Inventory and Cost Estimate</p>	
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			(Primary Location)	
Owner	Vehicle / Equipment Designation	VIN / Serial Number	Street Address, Line 1	Street Address
Foster's Hauling				

What's on the Form?

- General Information
 - Owner/Contact Person
 - Address/Location of Vehicle
- General Vehicle Information
 - Vehicle Type/Model/Year
 - License Plate/Vehicle Identification Numbers
- Engine Information
 - Horsepower
 - Manufacturer/Year
 - EPA Engine Family Number

What's on the Form?

- BART Information
 - Manufacturer/Make/Model
 - Authorized Installer
- Cost Estimate
 - BART Cost/ Labor Rate and full estimated cost quoted from authorized installer on State Contract
 - Estimated Install Time
- Choose Compliance Method
 - Notice of Intent to Comply
 - One of the Fleet Plan Types

Submittal Process

- Owners submit one of four submittal types & full diesel inventory
 - Notice of Intent to Comply (NIC) / Fleet Plan
 - Combined Fleet Plan
 - Fleet Averaging Plan
 - Combined Fleet Averaging Plan

DEP has the authority to reject unreasonable cost estimates

Notice of Intent to Comply

- The regulated vehicle will meet the prescribed BART level
- Includes cost estimate per vehicle as provided by the authorized installer
- Inventories submitted with NICs need to include all of the diesel vehicles in the fleet

Fleet Plan

- When prescribed BART level is not feasible for at least one vehicle
- Allows alternate (lower level) BART, repower, rebuild, retirement or exemption
 - Need reports from multiple Authorized Installers
 - DEP has to approve “drop down” application for lower BART level
- Inventory includes other diesel vehicles
 - and Notice of Intent to Comply vehicles
 - And cost estimates for all retrofits

Combined Fleet Plan

- ❑ Two or more fleets can combine all of their diesel vehicles into one submission
- ❑ Trigger- one vehicle that cannot meet BART
- ❑ Can be a mixture of NICs or Fleet Plans
- ❑ All owners involved have Shared Liability
- ❑ May be beneficial for smaller diesel fleets
 - For example a municipality combining with county fleet
- ❑ Includes cost estimate per vehicle as provided by the authorized installer

Fleet Averaging Plan

- ❑ Option if fleet has 75+ regulated vehicles
- ❑ Submitted when one or more vehicle in a fleet cannot meet BART
 - fleet plan trigger
- ❑ Allows alternate (lower level) BART, repower, rebuild, or retirements.
- ❑ Can use non-regulated vehicles and equipment as a means of achieving the required diesel emissions reduction
 - All vehicles in plan then become regulated vehicles

Fleet Averaging Plan

- ❑ Requires emissions modeling submittals to show same or greater benefit and better cost benefit
- ❑ Submittal includes all diesel vehicles in fleet
- ❑ Includes cost estimate per vehicle as provided by the authorized installer

Combined Fleet Averaging Plan

- Used to reach minimum 75 vehicle for a fleet averaging plan
- All involved will sign the Joint and Severable Liability Statement
- Includes all diesel vehicles in fleet
- Include cost estimate per vehicle as provided by the authorized installer

Multiple Types of Regulated Vehicles

- All diesel vehicles in the fleet have to be submitted with this inventory
 - Non-regulated diesels
 - Diesels that will be regulated later, such as off-road equipment
- Choose “Non-Regulated/Due Later”
 - As a compliance option in the inventory
- Early Retrofits
 - Only done in special cases as per policy

Why Collect This Information?

- Information is needed to
 - Determine correct BART
 - Prevent fraud
 - Pre-populate Compliance Form
 - Verify BART and Authorized Installer, satisfy procurement process
 - Determine funds availability

DEP review

- Reasonable cost based on state contract rates
- Fleet plan and Exemption and requests – technical soundness.
- Evaluate Fleet averaging plans
- Outcome is approval, partial approval
 - Rejected portions must resubmit

Notification

- If costs are reasonable--> Letter
 - Approval for purchase and installation
- If costs are unreasonable--> Letter
 - The DEP will work with owner to identify mutually acceptable BART
 - If no agreement can be reached, then DEP will issue final determination:
 - Identify alternative BART
 - Or provide an exemption

Cost Estimate Approval

- Letter of approval sent to owner
- Letter must be presented to installer
- No installations shall be performed until the DEP confirms that funds are set aside (approval letter)

Install Timeframes

- DEP provides owner with a Notification to retrofit
 - Install timeframes based on fleet size
 - < 75 regulated vehicles - install required within 120 days of notification
 - 75 - 150 regulated vehicles - install required within 180 days of notification
 - > 150 regulated vehicles - install required within 270 days of notification

Installation

- Letter from DEP noticing to begin installation
 - Has location for downloading compliance form
- Use authorized installer on cost estimate
 - Owner coordinates with installer
 - DEP does not coordinate installations
- Compliance form must be submitted to DEP w/in 5 days of installation with owner signoff – VERY IMPORTANT

Compliance Form

- Pre-populated with inventory info
- Key tracking document for state contracting process and program monitoring
 - Documents from owner that the vehicle has been retrofitted
 - MVC signoff at next regularly scheduled inspection
 - Steps required in Diesel Retrofit Statute
- Keep on vehicle at all times
 - Copy at central office location and DEP

Compliance Form

- Compliance form
 - Owner signs after install
 - copy to DEP, original with vehicle
 - Form due to DEP 5 days after retrofit installation is complete (Owner signature)
- Installation verified at next MVC inspection
 - Inspector signs compliance form
 - Owner sends copy of signed form to DEP
 - Form due 30 days after inspection
 - Must have Inspector signature
 - Original stays with vehicle

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIESEL RISK REDUCTION PROGRAM

DRRP0001

Vehicle Owner:
Telephone No.:
Address:

Vehicle Description and GVWR: _____

VIN/Serial Number: _____

Vehicle License Plate State & Number: _____

Engine Manufacturer and Model Year: _____

EPA Engine Family: _____

Retrofit Design/Fleet Plan Option: _____

Retrofit Make & Model: _____

Retrofit Serial Number: _____

Retrofit Cost (incl. Installation): _____

Installation Certification:

I hereby certify that the required retrofit devices have been installed on the aforementioned vehicle on the following Date: _____.

I certify under penalty of law that I believe the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information.

(Vehicle Owner)

(Date)

Vehicle Inspector:

I hereby certify that the retrofit requirement has been met in accordance with the inspection procedure at N.J.A.C. 7:27-32.21.

I certify under penalty of law that I have personally examined an am familiar with the information submitted in this document and all attached documents and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate or incomplete information.

(Vehicle Inspector)

(Date)

(DEIC license number - if applicable)

Annual Submittals

- Required by Diesel Retrofit Law
- A supplement or modification is due annually
 - Anniversary date based on NIC or Fleet Plan
- Update of NIC or Fleet Plan
 - Additions, subtractions to the fleet
 - Changes in compliance methods
- Similar form to the inventory
- Can be completed on-line

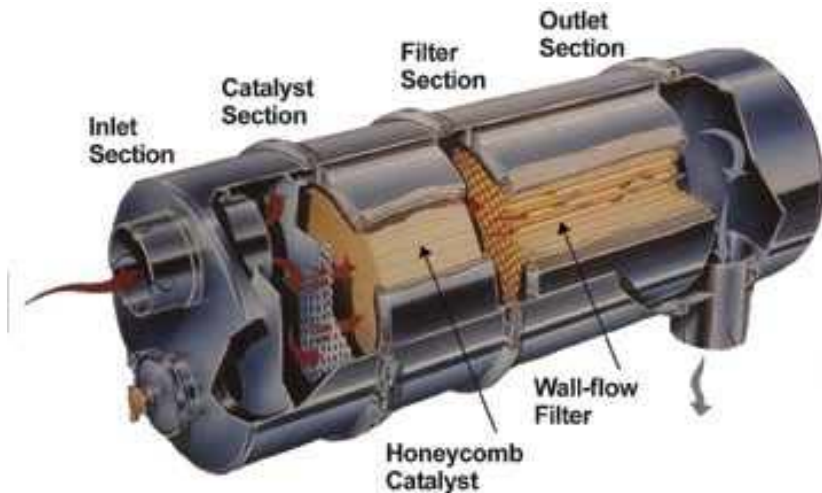
Reimbursement

- ❑ Direct reimbursement to installer – state contract
 - No out of pocket costs to vehicle/fleet owner
 - Public fleet - may self-install if “authorized installer”
 - ❑ Labor costs reimbursed by grant
 - ❑ Hardware purchased from state contract
- ❑ Ineligible = Fuel, maintenance, & repairs

Particulate Control Technology

Tailpipe technologies

- ❑ **3 main categories: DOC** (diesel oxidation catalyst), **FTF** (flow through filter), **DPF** (diesel particulate filter)
- ❑ Mostly muffler replacements + ancillary



An example of an oxidation catalyst which can reduce particulate matter by 20 - 50 percent.

Photo Courtesy of Johnson Matthey

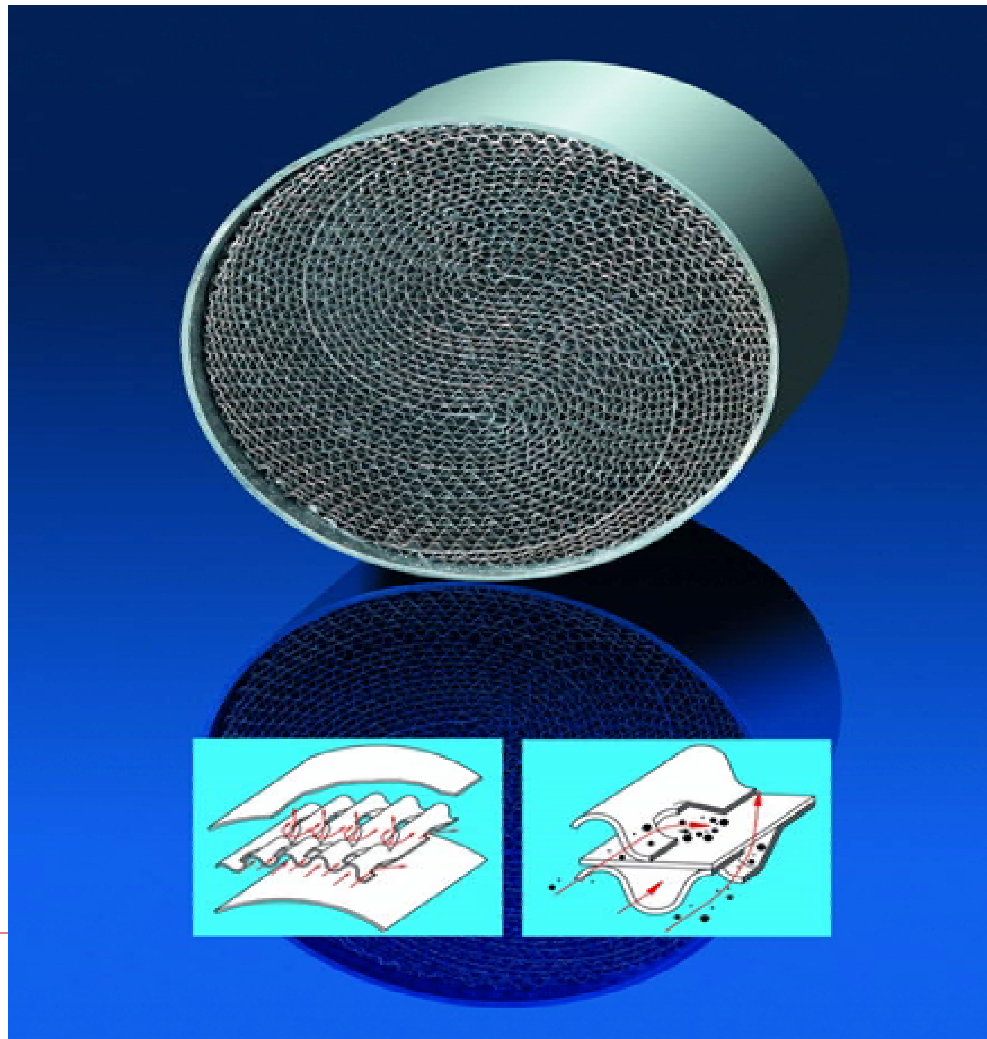
Diesel Oxidation Catalyst (DOC)

- BART Level 1 Devices
 - Have a PM reduction capability of 25%
- Uses a catalytically induced reaction that converts PM, CO and Hydrocarbons to CO₂ and H₂O (usually platinum catalyst)
- Does not use a filter
- Often used in combination with other devices to achieve a higher PM reduction

Flow Through Filter (FTF)

- BART Level 2 Devices
 - Have a PM reduction capability of 50%
- Exhaust flows through a filter medium (wire mesh) that has flow channels which create a turbulent condition
- Filter medium typically treated with a catalyst
- PM that is not treated flows out with exhaust

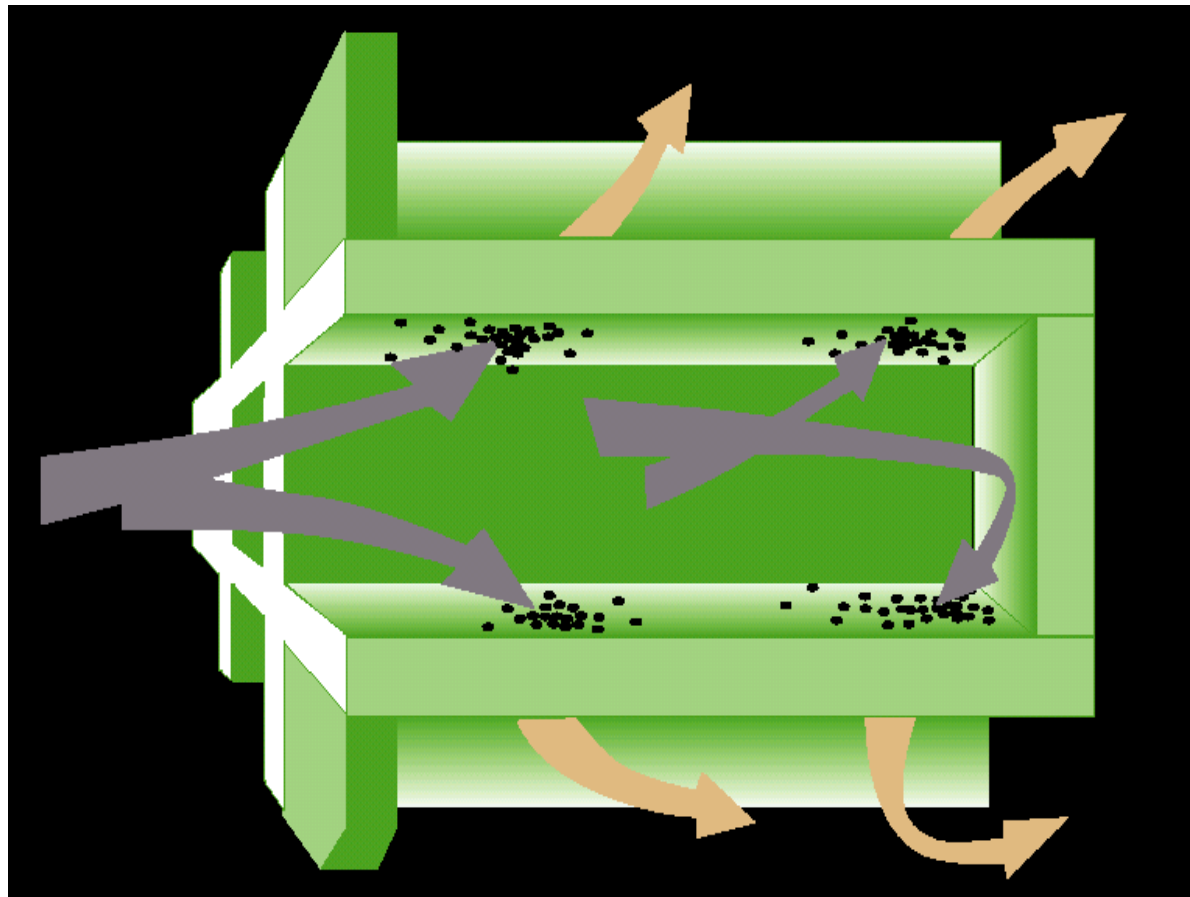
FTF - Cutaway



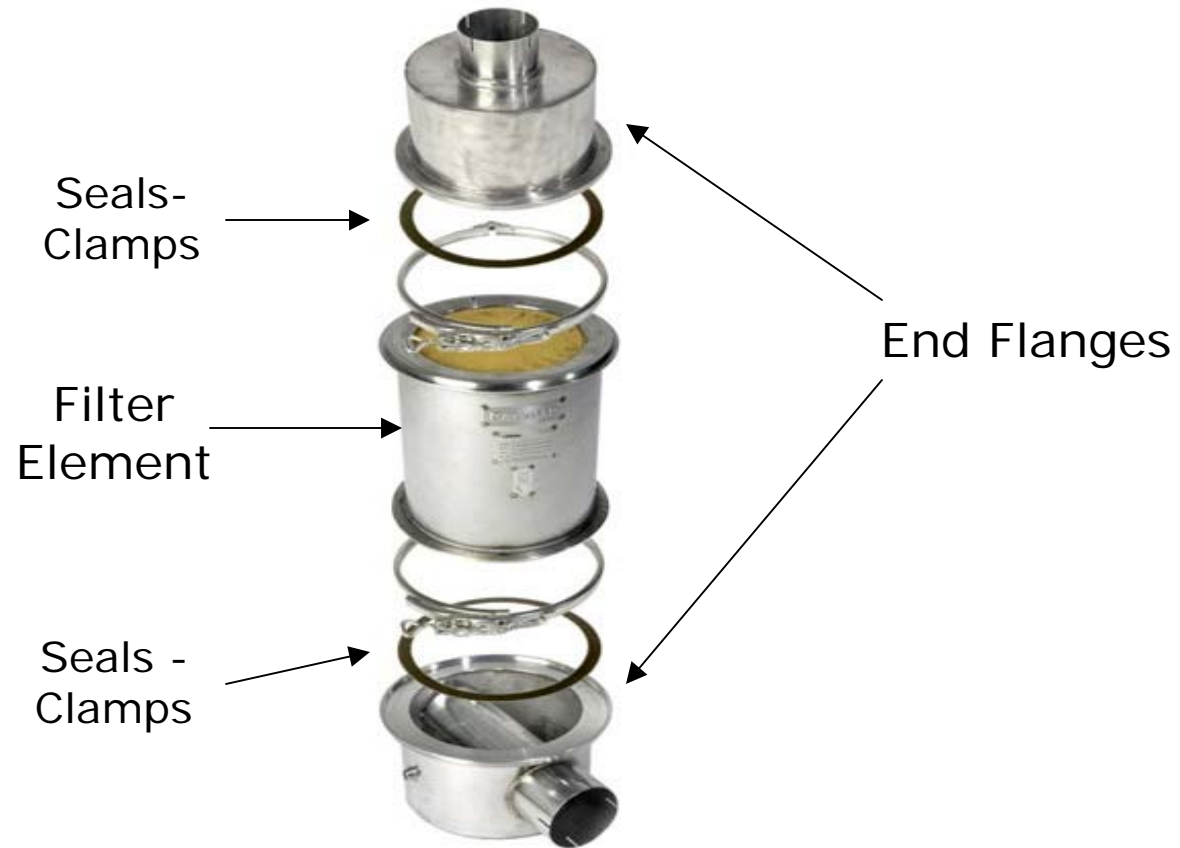
Diesel Particulate Filter (DPF)

- BART Level 3 Devices
 - Have a PM reduction capability of > 85%
- Uses a filter to “trap” PM particles in the exhaust
- Two styles of filters
 - Passive
 - Uses a catalyst to reduce PM ignition temperature and PM is incinerated using exhaust heat
 - Active
 - Uses an external source of heat to incinerate the PM trapped in the filter

DPF Flow

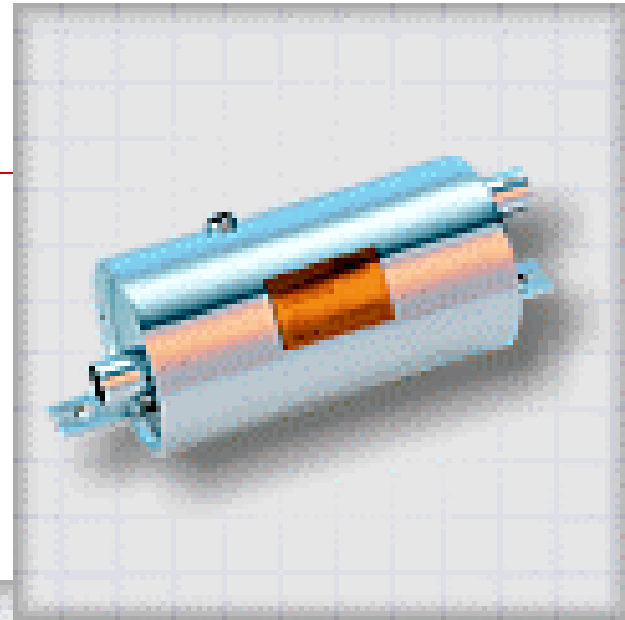


DPF - Disassembled



BART Examples

Flow Through Filter



DOCs and DPFs

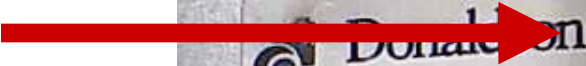


DOC



Retrofit Device Label

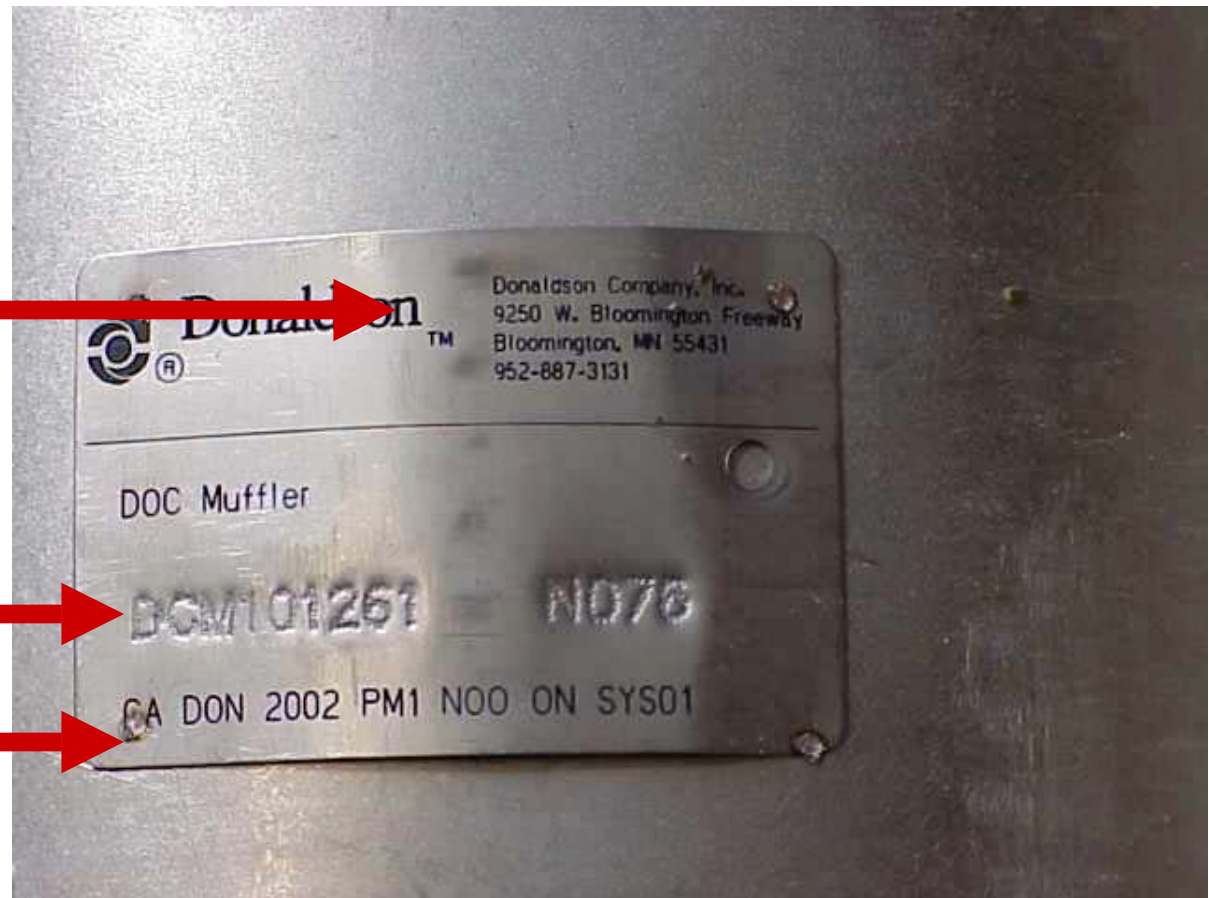
Manufacturer Information



Serial Number



Family Name



Particulate Retrofit Resources

- CARB – California Air Resources Board
www.arb.ca.gov/diesel/verdev/verdev.htm
- USEPA - National Clean Diesel Campaign
<http://www.epa.gov/otaq/retrofit/verif-list.htm>
- Retrofit manufacturers' websites:
 - Caterpillar, Donaldson, Engelhard, HUSS, Engine Control Systems, Cummins Filtration (Fleetgard), Johnson Matthey etc.

Warranty, Maintenance, On-Road Requirements

BART Warranty & Installation Requirements

- Retrofit Device Manufacturer
 - Warranty for retrofit and engine damage
 - Must repair any damage to vehicle caused by normal use of retrofit
- Authorized Installer
 - Warranty for installation
 - Must repair any damage to vehicle caused by the installation

BART Warranty & Installation Requirements

□ Vehicle Owner

- Must be installed by a manufacturer's authorized installer to be eligible for reimbursement (Statutory requirement)
- Vehicle has to be in good working order
- Must maintain BART retrofit device in accordance with manufacturer specifications

Retrofit Device Warranties

Engine Size & Gross vehicle Rating	Minimum Warranty Period
70-170 HP; GVWR < 19,500 pounds	Five years or 60,000 miles
170-250 HP; GVWR ≥19,500 pounds and ≤33,000 pounds	Five years or 100,000 miles
>250 HP; GVWR >33,000 pounds	Five years or 150,000 miles
>250 HP; GVWR >33,000 pounds; typically driven >100,000 miles per year; <300,000 miles on odometer at time of installation	Two years, unlimited mileage

Maintenance

- Owners are responsible for
 - Retrofit Maintenance
 - Varies by retrofit type
 - includes visual inspection, ash removal
 - General condition
 - Proper operation
 - Repair damage

On-Road Standards

- N.J.A.C. 7:27-14.3- Emissions control devices shall not be:
 - Disconnected
 - Detached
 - Deactivated or in any way be rendered inoperable or less effective
- Except for the purposes of diagnostics, maintenance, repair or replacement
- Enforceable

Diesel Risk Reduction Program

Submittal Dates (anticipated)

Inventory, NICs, Fleet plans, Averaging Plans

Solid Waste Vehicles March 6, 2008

NJ Transit 9/08

Private Commercial Bus 3/09*

Other gov't vehicles/Equipment 9/11

School Bus Tailpipe ??/??

*Or after NJ Transit submittal, whichever is later

Ultra Low Sulfur Diesel

- ❑ Must use with 2007 on-road engines & most BART applications
- ❑ EPA mandates on refineries mean ULSD widely available since mid-October 2006
- ❑ ULSD Issues
 - Meets ASTM D975
 - Lubricity same
 - No fuel penalty- energy content is same
 - Pump labeling requirements for ULSD & standard 2D

Responsibility

Owners

- Select correct BART for your fleet
- Fill-out, submit and maintain forms
- Annual supplements
- Maintain BART

DEP

- Work with owners and installers to solve problems
- Maintain website for data
- Store documentation
- Guidance to regulated community
- Ensure compliance

Support Information

□ Website at

<http://www.stopthesoot.org>

- Program Info
- Guidance Documents
- Contacts
- Portal for document submittals/updates
- View state retrofit contracts
- List Server

CONTACTS

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How to complete a BART submittal