

Faster Freight Cleaner Air

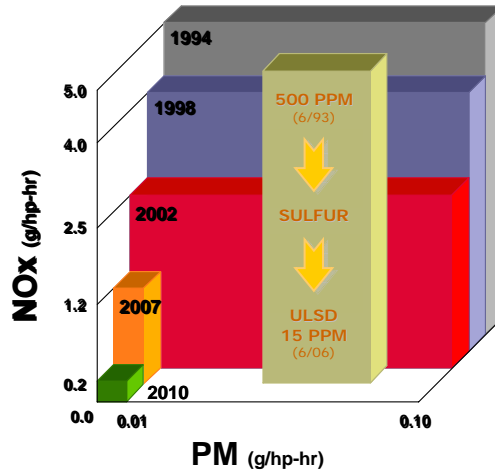
Gregg Wallinder
May 16, 2007



Agenda

- 2007 On Highway Review
- Off Highway Retrofit
- Natural Gas Alternative

EPA Standards Have Evolved



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1984

2002



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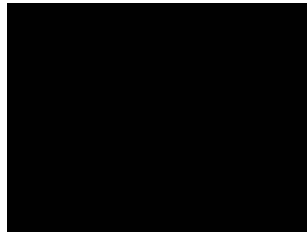
2007

1984



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2007 ISX

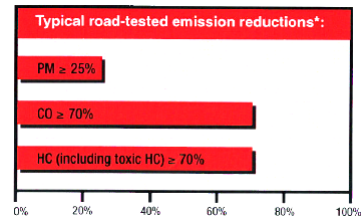


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Diesel Oxidation Catalyst (DOC)

■ Overview

- No monitoring equipment required
- No maintenance required
- Form, fit, function replacement of existing muffler – no major exhaust system modifications required
- Acceptable fuel sulfur content dependant upon design



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Diesel Oxidation Catalyst (DOC)

■ Substrate Design (catalyst brick)

- Flow through design

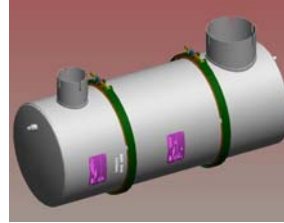


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Off-Road Standard Line

22 Interchangeable Inlets/Outlets

- Inlet and Outlet sections are identical
- Two configurations - End in/out & Side in/out
- $\varnothing 3.0"$, $\varnothing 4.0"$, and $\varnothing 5.0"$ tube sizing for each catalyst body diameter

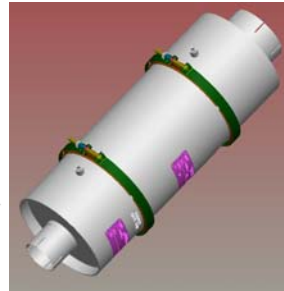


4 Catalyst Sections

- Ceramic Substrates
- 7.5", 8.5", 10", & 11" body diameters
- 40-370 hp range

Minimized Length

- 23.2" – 26.0" (590 mm – 662mm), depending on configuration

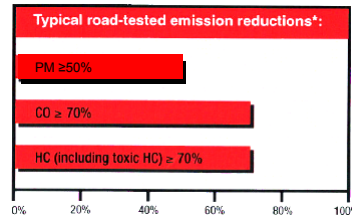


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Partial Flow Filter (Metallic substrate)

▪ Overview

- No monitoring equipment required
- No maintenance required
- Sound attenuating device- minor modifications may be required for installation
- Fuel requirements vary by device type



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Partial Flow Filter (Metallic substrate)

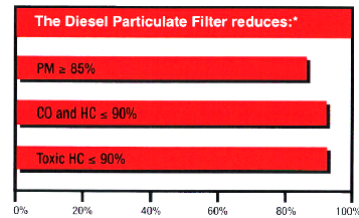
- Substrate Design
 - Tortured path flow



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Diesel Particulate Filter (DPF)

- Overview
 - Monitoring equipment required – hardware & software training provided to insure product success
 - Maintenance required – service interval varies with duty cycle and application
 - S-15 (ULSD) fuel required

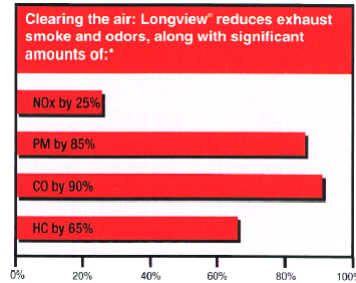


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Lean NOx Catalyst

Overview

- Monitor-Logger-Controller (MLC) equipment required; controls the diesel fuel injection to reduce NOx
- Maintenance required- service interval varies with duty cycle and application
- S-15 (ULSD) fuel required



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Why Natural Gas Engines for Buses & Trucks?

Emissions Leadership

- Meet 2010 EPA Emissions in 2007

**EVERY
ALTERNATIVE.**



ISL G

Economic Benefits

- Continued reliability improvement
- Improved Efficiency
- Greatest benefits in high fuel use applications

Energy Security

- Reduced reliance on imported oil
- Pathway to hydrogen

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ISL G Applications/OEMs

REFUSE



URBAN TRANSIT



VOCATIONAL



FUTURE

