TERMS

EPA

Environmental Protection Agency

NOx

Nitrogen Oxides

g/bhp-hr

Grams Per Brake Horsepower Hour

PM

Particulate Matter (soot and ash)

EGR

Exhaust Gas Recirculation

ATD

After Treatment Device

DOC

Diesel Oxidation Catalyst

DPF

Diesel Particulate Filter

ULSD

Ultra Low Sulfur Diesel Fuel

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5 Things You Need To Know About

EPA07

1 EPA MANDATES NITROGEN OXIDE AND PARTICULATE MATTER LEVELS BE REDUCED.

The Environmental Protection Agency (EPA) has mandated that all engines built after 12.31.06 must reduce the level of Nitrogen Oxides and other particulate matter below current levels. The Nitrogen Oxides (NOx) exhausted by the engine will be limited to just over 1.0 grams per brake horsepower hour (g/bhp-hr). Particulate matter (PM) cannot exceed .01g/bhp-hr.

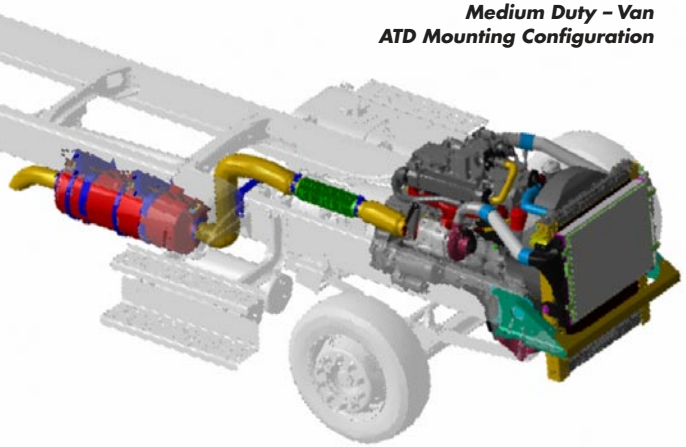
NOx will be reduced by increasing the percentage levels of exhaust gas recirculation (EGR) and, in some installations, with the addition of a diesel oxidation catalyst (DOC). PM, made of soot and ash, will be reduced through the use of a diesel particulate filter (DPF). Both the DPF, and when required, the DOC will be housed in an After-treatment Device (ATD).

2 NEW AFTER-TREATMENT DEVICE REPLACES MUFFLER.

The ATD is a canister that replaces the muffler. It houses a Cordierite ceramic substrate brick called a diesel particulate filter (DPF) and, if required by the engine manufacturer, another substrate brick called a diesel oxidation catalyst (DOC). As exhaust gas passes through the ATD, the DOC oxidizes hydrocarbons and reduces NOx and the DPF traps PM.

Per EPA mandate the ash must be cleaned from the DPF, no more often than every 150,000 miles or 4,000 to 6,000 hours of service. Soot is also collected in the ATD but is converted to basic elements and a small amount of ash by an event called Regeneration.

Medium Duty – Van
ATD Mounting Configuration



3 REGENERATION PROCESS ELIMINATES PM.

There are two types of Regeneration — Passive and Active. Both involve a temperature increase within the ATD.

Passive Regeneration takes place inside the ATD when temperatures reach 300-degrees Celsius. The process is ongoing when the truck is being driven and exhaust gas temperatures are no higher than normal.

Active Regeneration occurs when the Inside temperature of the ATD reaches 600-degrees Celsius. The process is achieved by diesel fuel passing through the DOC or by igniting diesel fuel with a burner. The two basic types of active regeneration are:

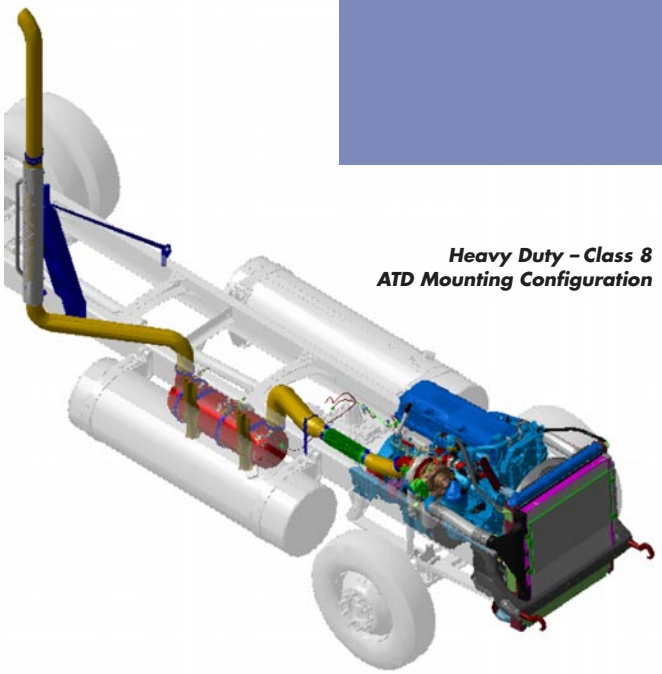
- Active In-Transit Regeneration — Truck is traveling at speeds greater than 20 miles per hour. Discontinued under 10 mph.
- Stationary Active Regeneration — Truck is truck parked and in neutral. Driver or maintenance technician performs necessary tasks.

4 NEW FUELS AND LUBRICANTS REQUIRED IN 2007.

Ultra Low Sulfur Diesel (ULSD) Fuel and Low Ash Engine Oils will be required.

Available in the fall of 2006, ULSD is 15-ppm diesel fuel that can be used in all diesel engines, has the same level of lubricity, but will have slightly less energy than fuel currently used.

Low ash engine oils will also be usable in all diesel engines. Because burnt oil is the primary source of ash in the exhaust of a truck, low ash engine oils will contain less than 1% ash.



Heavy Duty – Class 8
ATD Mounting Configuration

5 ATD TECHNOLOGY TO CHANGE EXHAUST SYSTEMS.

The ATD will only be available in a chassis mounted configuration. All of the piping will now be stainless steel and a stainless steel bellows will replace the strip-wound flex pipe between the turbocharger and the ATD.

The distance between the turbo and the ATD is important to maintain the exhaust temperatures required for a passive regeneration. This piping is part of the EPA certification and should not be altered.

Piping between the ATD and the exhaust pipe is also critical due to higher exhaust gas temperatures and increased back-pressure and should only be modified using specific guidelines.

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