



Technical Highlights

Questions and Answers on Using a Diesel Oxidation Catalyst in Heavy-duty Trucks and Buses

The pollution emitted by diesel engines contributes greatly to our nation's air quality problems. Even with more stringent heavy-duty highway engine standards set to take effect in 2004 and 2007, existing trucks and buses will continue to emit large amounts of nitrogen oxides (NO_x) and particulate matter (PM), both of which contribute to serious public health problems in the United States. Fortunately, there are several techniques and technologies designed to reduce diesel pollution from existing trucks and buses. Using pollution control devices such as a diesel oxidation catalyst (DOC) is one way existing engines can be upgraded (or "retrofitted") to pollute less. This fact sheet discusses diesel oxidation catalysts.

What are the health and environmental effects of diesel exhaust?

Heavy-duty trucks and buses account for about one-third of NO_x emissions and one-quarter of PM emissions from mobile sources. In some urban areas, the contribution is even greater. The fine particles in diesel exhaust (known as particulate matter) can penetrate deep into the lungs and pose serious health risks including aggravated asthma, lung damage, and other serious health problems. In addition, diesel exhaust is a likely human carcinogen. Children are more susceptible to air pollution than healthy adults because their respiratory systems are still developing and they have a faster breathing rate.

Diesel exhaust also has environmental impacts. PM from diesel engines contribute to haze, which restricts visibility. In addition, diesel exhaust contributes to ozone formation (a component of smog), acid rain, and global climate change.

What is a Diesel Oxidation Catalyst?

A DOC is a device that uses a chemical process to break down pollutants in the exhaust stream into less harmful components. More specifically, it is a physical device with a porous ceramic honeycomb-like structure that is coated with a material that catalyzes a chemical reaction to reduce pollution.

What are the benefits of a DOC retrofit?

DOCs reduce emissions of particulate matter by at least 20 percent. DOCs also reduce emissions of hydrocarbons by 50 percent and carbon monoxide by 40 percent.

Does the EPA verify these emission reductions?

Yes, EPA evaluates the emission reduction performance of retrofit technologies such as DOCs, including their durability, and identifies engine operating criteria and conditions that must exist for these technologies to achieve those reductions. For a list of DOCs and other technologies that EPA has verified, visit: www.epa.gov/otaq/retrofit/retroverifiedlist.htm. For more information about EPA's verification process, visit: www.epa.gov/otaq/retrofit/retrofittech.htm.

How much does a DOC cost?

DOCs for school buses cost about \$1,000 - \$2,000. Field experience suggests DOCs take about 1-3 hours to install.

What type of fuel does a DOC require?

DOCs can be used with regular diesel fuel, but the effectiveness of a DOC may be increased with the use of ultra low sulfur diesel (ULSD – 15 parts per million sulfur). Currently, ULSD costs between 8 and 25 cents per gallon more than regular diesel. ULSD is available in many parts of the country now and will be available nationwide beginning in June 2006.

Can a DOC be used on any engine?

Yes. DOCs have been used for years on a variety of diesel vehicles including trucks, buses and construction equipment.

Are there special maintenance requirements for a DOC?

No. Much like a catalytic converter on a car, once a DOC is installed, it rarely requires maintenance.

How long does a DOC last?

Most DOCs come with a 100,000 to 150,000 mile warranty, and can last 7 to 15 years.

Where can I get a DOC?

For more information about manufacturers of DOCs or other retrofit equipment visit our Web site at: www.epa.gov/otaq/retrofit/cont_retromfrs.htm.

Where can I find more information?

For more information on these topics, please visit these EPA Web sites:

- Voluntary Diesel Retrofit Program: www.epa.gov/otaq/retrofit
- Clean School Bus USA – Basic Information on Retrofit Options: www.epa.gov/otaq/schoolbus/retrofit.htm
- Clean Diesel Independent Review Panel: www.epa.gov/air/caaac/clean_diesel.html
- Health Assessment Document for Diesel Engine Exhaust: <http://cfpub.epa.gov/ncea/cfm/recorddisplay.cfm?deid=29060>

You can also contact the Office of Transportation and Air Quality library for document information at:

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