



# Clean Construction Equipment

## In brief

Diesel exhaust is very harmful to human health. In 2008, new federal standards will require construction firms such as yours to reduce diesel emissions. These standards are being phased in now. Some bid documents are already specifying clean diesel options be followed. So now is the time for your company to look at which changes you'll make and when so that you can stay ahead of your competition.

## How can you protect your employees and your community?

- 1) Use **cleaner fuels**: Two great fuel choices, used alone or in combination, will reduce diesel pollution. Ultra-low sulfur diesel (ULSD) and biodiesel are available and cost effective.
- 2) **Don't idle**: Save on fuel and maintenance costs and reduce emissions by adopting an anti-idling policy while on the job. Most modern equipment doesn't need the time to warm up that older equipment required. Every hour of reduced time saves money in fuel costs.
- 3) **Replace or retire old equipment**: Maintain a greater level of efficiency while achieving measurable emissions reductions by performing routine maintenance and rebuilding engines. Harmful emissions tend to increase over the life of the equipment.

## EarthWise Excavation -- Snohomish, Washington

One firm with extensive experience using biodiesel blends in their construction vehicles is Earthwise Excavation. For many years they have used several biodiesel blends including blends of b-99 biodiesel (99% biodiesel and 1% petroleum diesel) in their construction equipment. As a result, employee turnover has decreased because several employees no longer experience the headaches traditionally associated with with daily exposure to diesel exhaust. They have reported no loss in horsepower and no mechanical breakdowns.

For more information go to:  
[www.postema.com/index2.html](http://www.postema.com/index2.html)

- 4) **Install new engines**: Extend the life of your equipment and improve performance by upgrading to newer low-emission engines. Newer engines are built to higher emission reduction standards and provide another option to improve overall performance.
- 5) **Install emission control devices**: You can retrofit your engines with a variety of pollution control devices. These devices require the use of ULSD, but have the biggest positive impact on air quality and employee health.

## Cleaner Fuel, Less Pollution and Healthier Air

This chart shows the pollution reduction benefits of switching to a cleaner fuel. Pure biodiesel offers the greatest benefit, but a 20% blend of biodiesel (B20) or ultra-low sulfur diesel (ULSD) can also substantially improve air quality. Reductions compared to off-road diesel, commonly used in construction, are even greater.

*Reductions Compared to Highway (500 ppm sulfur) Diesel*

	Particulate Matter	Hydro-carbons	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides
<b>B100</b>	30%	93%	50%	100%	+13%
<b>B20</b>	10%	21%	11%	20%	+2%
<b>ULSD</b>	13%	13%	6%	95%	3%

*Data From EPA Studies*

## Retrofit devices

The most popular and cost-effective device is a **diesel particulate filter**, which collects particulate matter and oxides them into less harmful components. These work best on engines built after 1995 and require the use of ULSD.

**Exhaust gas recirculation (EGR)** equipment reduces nitrogen oxides (NOx) by reducing the temperature at which fuel burns in the combustion chamber. These engines recycle a portion of engine exhaust back to the engine air intake. The oxygen-depleted exhaust gas is mixed into the fresh air that enters the combustion chamber, which dilutes the oxygen content in the chamber. The reduction produces a lower temperature burn, reducing NOx emissions by as much as 40%.

Another retrofit device is the **diesel oxydation catalyst** which acts much like the catalytic converter on a car to reduce hydrocarbon emissions by nearly 50% over standard construction equipment. Oregon firms which install these devices might be eligible for pollution control tax credits from DEQ.

## Diesel's most toxic components

Diesel exhaust is made up of particles and gases, many of which have harmful health effects. These are just two of the most dangerous of diesel's over 40 toxic components:

**Particulate Matter (PM:)** These tiny particles slip past the body's defenses and deep into the lungs, causing respiratory illnesses. They also carry traces of heavy metals and other toxins. The EPA recognizes diesel PM as a likely carcinogen.

**Polynuclear Aromatic Hydrocarbons (PAHs) and nitrated PAHs (nPAHs):** These organic compounds are known carcinogens and can cause damage to internal organs.

## Why clean up your construction equipment?

Emissions from diesel-fueled engines include more than 40 air toxins, many of which are carcinogenic or known to cause birth defects and other cancers. EPA data indicates that diesel is probably the main air pollutant contributing to Oregon's cancer risk. Diesel pollution has been linked to lung cancer, upper respiratory illnesses, allergies, asthma attacks and death from heart disorders. Communities with elevated levels of particulate matter are beginning to adopt more clean diesel practices to reduce their health risks.

## Fuel Choices

**Ultra-Low Sulfur Diesel:** The more sulfur there is in diesel fuel, the greater the emissions of particulate matter, sulfur dioxides (which cause smog) and other pollutants. Diesel containing sulfur at levels of 15 ppm or less is classified as ULSD. As of fall 2006 all on-road diesel fuel will be ULSD.

**Biodiesel** is an American-grown, renewable fuel made from new or recycled vegetable oils and animal fats. Some biodiesel is being pressed from canola, sunflower and other oil seed crops grown locally. It can be blended with petroleum diesel in any combination (20% biodiesel and 80% petroleum diesel is most common) or burned in its pure form B-99.

## Resources:

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Kevin Downing DEQ Air Quality Program  
503-229-6549 or [downing.kevin@deq.state.or.us](mailto:downing.kevin@deq.state.or.us)

To find a biodiesel distributor, visit OEC's Oregon Biofuels Network website at:  
[www.biofuels4oregon.org](http://www.biofuels4oregon.org).

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