BIODIESEL

A Better Choice for Business

www.nwbiofuels.org

BIODIESEL NORTHWEST Facts

Air Quality & Health Benefits

Biodiesel is a significantly cleaner-burning fuel than petroleum diesel. Using biodiesel reduces the amount of harmful emissions released into the air, including polycyclic aromatic hydrocarbons, sulfur dioxide, carbon monoxide, and a variety of toxic and carcinogenic compounds found in diesel exhaust. Meaningful air quality and health benefits can be realized with blends of 20% biodiesel (B20) or more.

Biodiesel promotes better health for drivers, mechanics, construction workers, and others working around diesel equipment by improving their workplace air quality. Emissions from diesel fueled engines include more than 40 air toxics, creating a serious health threat that has been linked to lung cancer, upper respiratory illnesses, allergies, asthma attacks and death from heart and respiratory disorders. Along with workers, members in the community also benefit from the reduction in these air pollutants.

THE DATA: Biodiesel is the first and only alternative fuel to have a complete evaluation of emission results and potential health effects submitted to the U.S. Environmental Protection Agency under the Clean Air Act Section 211(b). These programs include the most stringent emissions testing protocols ever required by EPA for certification of fuels or fuel additives.

CARBON DIOXIDE: Biodiesel has a closed carbon cycle, creating 78% lower lifecycle CO2 emissions than petroleum diesel.[1] A closed carbon cycle means that the plants grown for biodiesel take CO2 from the air as a nutrient. The oil is then extracted from the plant and is converted into biodiesel. When the biodiesel is burned, it produces CO2 which returns to the atmosphere. This cycle does not add to the net CO2 concentration in the air because the next crop will reuse the CO2 in order to grow. Conversely, when diesel fuel is burned, 100% of the CO2 released comes from finite sources and adds to the CO2 concentration levels in the air. Because some fossil fuels are used in the production and transportation of biodiesel, the recycling of CO2 with biodiesel is down rated from 100% to 78%. When biodiesel is made from used cooking oil, the CO2 lifecycle emissions are even lower.

SULFUR: Exhaust emissions of sulfur oxides and sulfates are major contributors to smog and acid rain. Biodiesel does not contain sulfur other than by trace contamination, so sulfur emissions are essentially eliminated by using pure biodiesel (B100).[3]

NITROGEN OXIDES: Nitrogen Oxides (NOx) is a class of gaseous chemicals that are formed by high temperature reactions of nitrogen and oxygen. It includes nitric oxide (NO), nitrogen dioxide (NO2), and a few other less prevalent compounds such as nitrous oxide (N2O). The primary concern with NOx is its contribution in smog formation.

Research has varied regarding NOx emissions from biodiesel. Initial studies showed that depending on what source the biodiesel is made from, NOx emissions can either increase by 4-13% or be eliminated entirely.[4] NOx emissions also increase or decrease depending on the engine family and testing procedures. Research into biodiesel and NOx emissions is ongoing. At this time, however, researchers note that there are insufficient data to draw any conclusions, even directionally. If NOx emissions are a concern, they can be reduced with additives or oxidative converters.

Tests have shown the following results: Average biodiesel emissions compared to conventional diesel[2]

	B99	B20
Total unburned hydrocarbons	-67%	-20%
Carbon Monoxide	-48%	-12.6%
Carbon Dioxide*	-78%	-15%
Particulate Matter	-47.4%	-12%
Air Toxics	-60-90%	-12%-20%
Sulfates	-99%	-20%**
TPAH(Polycyclic Aromatic Hydrocarbons)***	-80%	-13%
nPAH (nitrated PAH's)***	-90%	-50%
Ozone potential of speciated HC	-50%	-10%
Mutagens	-89%	-20%

*Lifecycle / **Estimated from B100 result / ***Average reduction across all compounds measured

[1] National Biodiesel Board website, www.nbb.org.
[2] U.S. Environmental Protection Agency, (2002) "A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions, Draft Technical Report." U.S. Department of Energy website, www.eere.energy.gov/afdc/altfuel/biodiesel.html
[3] University of Idaho Tech Notes
[4] William McCormick of the National Renewable Energy Labs, personal communication.

Go to www.nwbiofuels.org for information on: Biodiesel distributors • Maintenance procedures • Engine performance • Fleet success stories • Using B20 and B99 blends • Fuel quality • Air quality and health benefits • Engine warranties

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