

Section 1 – Fuel 101

Biodiesel

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Biodiesel Basics

- A diesel displacement fuel made from plant oils, animal tallow or recycled cooking oils through a chemical process to remove glycerin and yield methyl or ethyl esters optimized for combustion
- Renewable, agriculturally produced replacement fuel to displace imported petroleum diesel
- Biodiesel itself is non-toxic, non-flammable and non-volatile, making it safe to handle & store
- Biodiesel contains no sulfur and no aromatics
- When blended with petroleum diesel or burned as a pure fuel, biodiesel can significantly reduce diesel engine exhaust PM, CO, HC, S & air toxics

Biodiesel and Blends

- B100 (neat) biodiesel used by City of Berkeley, National Park Service and specialty fleets plus individual consumers
- B20 is most common blend in US and CA for Federal EPact fleets, military, UC Davis, Counties of Alameda & Marin, city fleets
- B2 low blend used in Minnesota as lubricity additive for ULSD by a new mandate
- In France, ALL diesel fuel used in the country is pre-blended as 5% biodiesel

Biodiesel Infrastructure

- Biodiesel or blends of biodiesel use existing petroleum storage and distribution system; over 4 million gallons were sold in CA last year
- NO modifications to engines for B20 or lower blends; B100 requires fuel hose upgrades and clean fuel tanks; good housekeeping practices
- B20 blend is “transparent” – No changes to fuel infrastructure or engines – keep fuel dry, clean

Biodiesel Storage & Handling

- Conventional storage tanks and trucks but essential to them keep clean & dry
- B100 is non-flammable, non-volatile, non-toxic fuel, but treat it as if were diesel!
- Recommend upgrading fuel transfer lines and engine fuel hoses if using blends of biodiesel greater than B20 as precaution
- Recommend biocides to deter growth of bacteria and mold if moisture is present

Biodiesel Compatibility/Solvency

- B20 or low blends of biodiesel are FULLY compatible with all diesel engines in use among hundreds of fleets across the US and Europe
- Most engine warranties are unaffected by B5-B20
- Higher blends of biodiesel can cause some rubber hoses to weep fuel after months; easy to change
- Pure Biodiesel (B100) has solvent activity that can damage fuel hoses; however, ordinary marine grade fuel lines or other commercially available fuel hoses are fully compatible with the B100 neat biodiesel

Biodiesel Stability

- Neat B100 biodiesel is stable for years if kept dry and clean (sealed drums, tanks)
- B20 and blends of biodiesel have the same stability as the diesel fuel, but biocides are recommended to deter growth of mold and bacteria in case moisture contaminates the fuel; biodiesel is more susceptible to fouling by microbes if contaminated with water

Availability of Biodiesel

- Biodiesel B100 and blends of biodiesel are available state-wide through local biodiesel suppliers as well as petroleum distributors
- Biodiesel also available at a few retail fuel pumps; see the National Biodiesel Board website map of retailers and distributors at www.biodiesel.org
- 4 biodiesel plants in California currently, another 4-8 planned or under construction to process local used cooking oils into ASTM grade biodiesel
- **BE CAREFUL** to ascertain quality of the fuel!
Insist on documentation and data for ASTM spec

Biodiesel Emission Benefits

	Air				
	CO	HC	PM	Toxics	NOx
B2/B5	<-5%	<-5%	<-5%	<-5%	neutral
B20* Soy	-12%	-11%	-18%	-12-20%	+1.2%
B20**	-32%	-40%	-24%		-5%
B100*	-43%	-56%	-55%	-60-90%	+5.8%

*Source: Shaine Tyson, NREL Report, March 2001 based on test averages

** Source: Dr. Robert McCormick, NREL, May 2005 bus chassis dynamometer testing of conventional city buses with Cummins ISM 2000 engines – No EGR

Biodiesel Pricing

- Biodiesel prices currently about \$0.20 per gallon more than regular petroleum diesel for B20 blend, about \$0.90 per gallon more than diesel for the neat B100 biodiesel (about 1 cent per % of biodiesel in blend)
- New Federal Excise Tax Credit (\$1 per gal), other incentives, and local production will start to drop prices of biodiesel this year
- B20 biodiesel is already cheaper than diesel fuel in some states with lower fuel taxes