



## OEM Support

### Top 10 Reasons Smart Customers Are Using Biodiesel:

1. Biodiesel is America's first domestically produced, commercially available Advanced Biofuel and meets EPA requirements for inclusion and use under the new Renewable Fuel Standard (RFS-2).
2. U.S. biodiesel reduces lifecycle carbon emissions by more than 50 percent compared to petrodiesel, making it the best carbon reduction tool of any liquid fuel commercially available.
3. Biodiesel has the highest energy balance of any commercially available fuel, returning 5.54 units of renewable energy for every one unit of fossil energy needed to produce it.
4. Biodiesel is produced from a variety of renewable resources, such as plant oils, animal fats, recycled grease, and even algae, making it one of the most sustainable fuels on the planet. And with biodiesel, you don't sacrifice food for fuel. Oils and fats for biodiesel are a minor by-product of producing high-protein feeds (soybean meal) and quality meats.
5. Biodiesel production reduces our dependence on foreign oil from unstable parts of the world, while expanding and diversifying our domestic refinery capacity.
6. Biodiesel is biodegradable, non-toxic, burns much cleaner than petrodiesel and is better for your health. Compared to petrodiesel, biodiesel reduces black smoke (particulates), carbon monoxide, and harmful unburned hydrocarbons that cause smog.
7. Biodiesel helps our U.S. economy and improves our balance of trade. Using biodiesel creates added outlets for farm-based products and high-paid manufacturing jobs in rural parts of our country.
8. Using biodiesel is easy! B20 and lower blends are a drop-in replacement for petrodiesel. They can be used in any diesel vehicle without modification, according to manufacturers' recommendations, and dispensed through existing fueling stations. For a listing of OEM Warranty Statements on biodiesel, visit [www.biodiesel.org/using-biodiesel/oem-information](http://www.biodiesel.org/using-biodiesel/oem-information).
9. Biodiesel production is guided by stringent ASTM fuel specifications, developed through years of testing. ASTM D6751 is the standard for B100 biodiesel for use as a blend stock with petrodiesel; ASTM D7467 is the standard for B6-B20 blends. The diesel fuel specification ASTM D975 now includes an allowance for up to 5 percent biodiesel as part of the standard diesel fuel pool.
10. The biodiesel industry has an excellent fuel quality program called BQ-9000 ([www.bq-9000.org](http://www.bq-9000.org)). BQ-9000 Certified Biodiesel Producers, Marketers, Retailers and Laboratories help ensure that only the highest quality biodiesel meeting ASTM specifications gets put into your fuel tanks.

For more information on biodiesel and for a complete listing of biodiesel retailers and distributors, visit the National Biodiesel Board (NBB) website at [www.biodiesel.org](http://www.biodiesel.org) or call NBB at (800) 841-5849.

OEMs Supporting B100	OEMs Supporting B20	OEMs Supporting B5
CNH (Most models)	Arctic Cat (2006)	Audi * (Allow up to B20 in IL and MN)
Deutz AG (2012)	Buhler (2007)	BMW
Fairbanks Morse (2007)	Caterpillar (All model years)	Detroit Diesel (DD13, DD15, DD16 and MBE900 / 4000 engine models)
	Fiat Chrysler (FCA) – Ram (2007) & Jeep (2013)	Hustler Turf Equipment
	Cummins (2002)	Mercedes-Benz * (For blends over B5, see MB brochure)
	Daimler Trucks - Including: (2012)	Mitsubishi Fuso *
	- Detroit Diesel (Series 60 engines only)	Nissan (B10)*
	- Freightliner / * Custom Chassis (models with Cummins engines)	Volkswagen * (Allow up to B20 in IL and MN)
	- Thomas Built Buses	
	- Western Star (w/ Cummins engines)	* = Actively Researching B20
	Ferris (2011)	
	Ford (2011)	
	GMC & Chevrolet (2011 all; SEO available since 2007)	
	HDT USA Motorcycles (2008)	
	Hino Trucks (2011)	Biodiesel Position Not Yet Announced:
	Navistar - International / MaxxForce (2007)	JCB
	IC Bus (2007)	Jaguar / Land Rover
	Isuzu Commercial Trucks (2011)	Mahindra
	John Deere (2004)	Mazda
	Kubota (2006)	Porsche
	Mack (EPA 2007 & EPA 2010 models)	Toyota
	Monaco RV (2007)	
	PACCAR - Including: (All model years)	
	- Kenworth (All model years)	
	- Peterbilt (All model years)	
	Perkins (2008)	
	Tomcar (2008)	
	Toro (2008; SEO kits for <2008)	
	Volvo Trucks (EPA 2010 models)	
	Workhorse (2007)	
	Yanmar (2011)	

- Dates indicated in ( ) above describe when the OEM first approved B20 or higher biodiesel blends
- All major OEMs producing diesel vehicles for the U.S. market support at least B5 and lower blends, and in the GVW Class 5-8 vehicles that account for 92% of on-road diesel fuel use, nearly 90 percent of the medium- and heavy-duty truck OEMs support B20.
- The biodiesel component must meet ASTM D6751, the approved standard for pure biodiesel, and the B20 blends must meet ASTM D7467 specifications. Many OEMs also recommend the use of a BQ-9000 supplier. For a complete detailed listing of OEM position statements on biodiesel, visit: [www.biodiesel.org/using-biodiesel/oem-information](http://www.biodiesel.org/using-biodiesel/oem-information).

# BISP Study Executive Summary

There is growing enthusiasm around the topic and use of biodiesel, and there should be. Made from a variety of feedstocks such as vegetable oil, waste cooking oil, animal tallow or even algae, biodiesel is a renewable source of energy and a viable alternative to fossil fuels. It burns clean, reducing greenhouse gas and tailpipe emissions. It is considerably less toxic and as biodegradable as sugar. It can be locally produced in Canada, helping strengthen key industries such as energy and agriculture. It can efficiently fuel the machines that drive our local and national economy with far less harm to the air that we breathe. Biodiesel is one of the only viable alternatives to conventional fossil fuels and a clear path to reducing our nation's reliance on non-renewable resources.

The primary drawback to the use of biodiesel in Canada is it has a higher viscosity than petroleum diesel. B100 is not an effective source of fuel in colder temperatures, which means that its use is limited during lower temperatures characteristic of Canadian winters. Countering this effect is critical to promoting the use of this renewable fuel source in our country.

Beginning in 2007, Kyoto Fuels and JK Trucking collectively sought to provide information through an intensive study that would demonstrate the feasibility and operability of *biodiesel blends* in the Canadian climate. We called this study the **Biodiesel Integration Strategy Pilot (BISP)**. The goal of this intensive project was to integrate biodiesel at 10% (B10) volumes in the JK Trucking fleet, which is comprised of 52 Class 8 units. Prior to this collaboration, fleet-wide integration of biodiesel blends coupled with an in-depth study has never been done in the world.

The integration component of the study involved making available B10 at the JK Trucking home yard. During 2008, the home yard tank farm was expanded to accommodate biodiesel storage, increased diesel storage and storage of biodiesel blends. During the period of this study, when the units were on the road through normal operations, conventional diesel was used to power them. When a unit returned to the home yard biodiesel blends were used. Integration simulated the reality of a renewable fuel standard in Alberta and nationwide.

The preparations were completed by early 2008 and the project began June 1, 2008, operating until August 31, 2009. The interim report includes the cold weather experienced during the winter of 2008 and 2009, specifically, December 14, 2008 to March 14, 2009. During this interim period, the JK Trucking fleet traveled throughout Western Canada and the Western United States. It is important to note that during the course of this project, there were no unit shut downs resulting from biodiesel blend use at the higher B10 concentration.

We were aware that operating the units in the Canadian climate would not in itself be sufficient to demonstrate the feasibility of biodiesel blends. Accurate and precise data would be required to reveal the effects of biodiesel blends through all Canadian seasons.

To ensure data integrity for our study, Olds College was involved to provide 3rd party invigilation, ensuring the data collection process, data collected and interpretation of the data satisfied scientific standards.

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In addition to Olds College invigilation services, multiple sources of data were used to cross-reference each data group. These sources of data included:

- GPS technology
- Environment Canada weather data
- oil/fuel ample analysis
- ECM engine information
- JK Trucking logistics department data
- JK Trucking driver log sheets

The purpose of this document is to report the results of operating biodiesel blends in the Canadian environment at a significantly higher concentration than the renewable fuel standard. The ultimate goal of our *project* is to facilitate the integration of biodiesel in a trucking fleet that operates in all environmental conditions and the majority of transportation modes in Canada.

## Conclusion

The key conclusion of the BISP is that *biodiesel blends can be integrated in the Canadian climate through all seasonal conditions provided quality biodiesel is used, proper injection blending techniques are employed, and equipment is adequately maintained.*

Other significant findings:

There were no engine performance or maintenance issues related to the use of biodiesel blends during the study period.

Based on the above analysis the JK Trucking fleet integrating B10 caused no mechanical or performance related concerns.

The JK Trucking fleet operated from December 14, 2008 to March 14, 2009 and experienced no change in operation while employing a B10 blend.

JK Trucking continues to operate a B10 in the trucking fleet. To date the fleet has used more than 2,500,000 litres of biodiesel-blended fuel.

*“Biodiesel blends can be integrated in the Canadian climate through all seasonal conditions provided quality biodiesel is used, proper injection blending techniques are employed, and equipment is adequately maintained.”*