



# National Biodiesel Board

South Dakota Energy Conference

May 13, 2009

## **Biodiesel...Revitalizing America's Future & Fuel Needs**

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South Dakota Soybean

Association/National Biodiesel Board

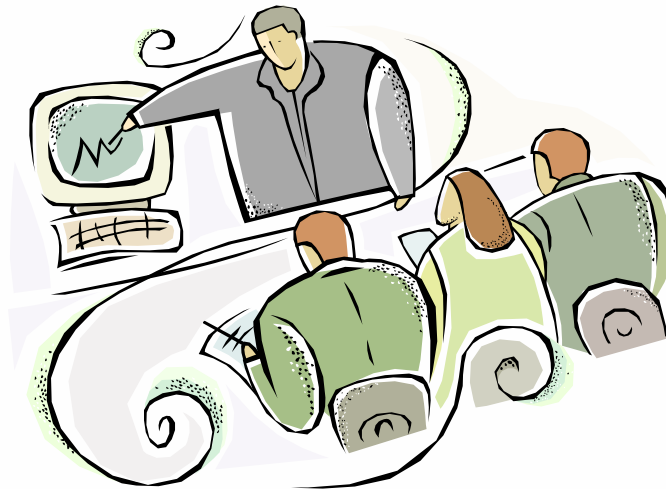


# Syllabus

- Biodiesel 101
- Benefits of Using Biodiesel
- Biodiesel Industry Trends
- Using Biodiesel in Diesel Engines
- Handling and Storage
- Biodiesel Standards and Fuel Quality
- National Fuel Quality Survey
- Original Equipment Manufacturers
- Educational Resources



# "Biodiesel 101"





## What is Biodiesel?

- A clean burning alternative fuel, produced from domestic, renewable resources such as soybean oil
- Contains no petroleum, but can be blended at any level with petroleum diesel to create a biodiesel blend
- Can be used in compression-ignition (diesel) engines with little or no modifications
- Simple to use, biodegradable, nontoxic, free of sulfur and aromatics



## Biodiesel Defined

- Biodiesel, n. -- a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100, and meeting the requirements of ASTM D 6751.
- Biodiesel blend, n. -- a blend of biodiesel fuel meeting ASTM D 6751 with petroleum-based diesel fuel designated BXX, where XX is the volume percent of biodiesel (e.g. B20)





# Industry Status: USA

- Biodiesel fully registered with the US EPA
  - ◆ Clean Air Act 211(b) Tier 1 and Tier 2 testing complete
- ASTM Specification for B100 for Blending: D 6751
  - ◆ B20 blended specification in progress and moving fast
  - ◆ Incorporation of B5 into petrodiesel spec: D 975
  - ◆ D 6751 being modified
    - Address lingering stability concerns of OEMs
    - Insure compatibility with 2007/2010 diesel technology
- National Quality Program (BQ-9000) Launched for Biodiesel Marketers and Producers







# US Biodiesel Industry Direction

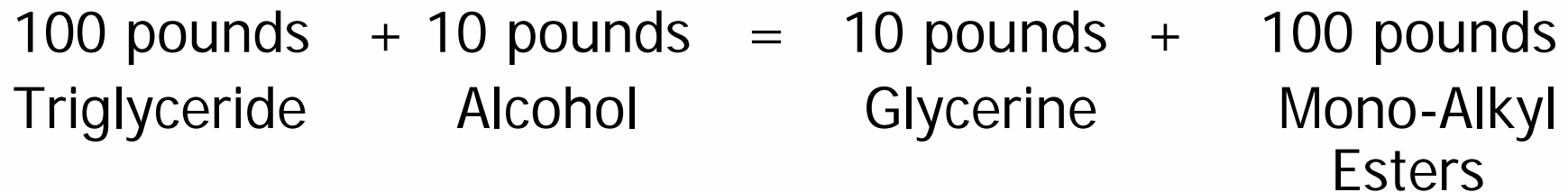
- **B2** as the preferred lubricity component for 2006 Ultra Low Sulfur Diesel fuel
- **B5** generally accepted blend level among the major automakers / engine manufacturers; moving toward B20
- **B20** in niche markets and for fleet use – over 600 fleets using B20 nationwide
  - ◆ Government / Military / Municipal Fleets
  - ◆ School Buses / City Transit
  - ◆ Garbage Trucks
  - ◆ Home Heating Fuel
  - ◆ Agriculture



# Making Biodiesel

## *Transesterification*

(Catalyst)



*Soy oil*

*Methanol*

*Soap*

*Biodiesel*

- Raw Vegetable Oil is NOT Biodiesel!
- Other 'biomass' products aren't Biodiesel
- Must meet ASTM D 6751







# Biodiesel Raw Materials

## Oil or Fat

Soybean

Corn

Canola (rapeseed)

Cottonseed

Sunflower

Beef tallow

Pork lard

Used cooking oils

## Alcohol

Methanol

Ethanol

## Catalyst

Sodium hydroxide

Potassium hydroxide



# Biodiesel Credentials

- B100 has a full ASTM standard (D 6751) in place
- ASTM standard setting is currently in process for B20
- The biodiesel industry has implemented a voluntary quality control program – BQ9000 – for biodiesel producers and marketers
- Designated as an alternative fuel by the Department of Energy (DOE) & US Department of Transportation (DOT)
- Energy Policy Act (EPAct) regulations allow fleets to earn EPAct credits by using biodiesel – the least cost option for EPACT compliance
- Registered as a fuel & fuel additive with the Environmental Protection Agency (EPA)
- Biodiesel is the only alternative fuel to have fully completed the health effects testing requirements of the 1990 Clean Air Act Amendments



# Benefits of Using Biodiesel





# Biodiesel

- High Cetane (avg. over 50)
- Ultra Low Sulfur (avg ~ 2 ppm)
- High Lubricity, even in blends as low as 1-2%
- High Energy Balance (3.24 to 1)
- Low Agriculture Inputs: Soybeans
- 78% Life Cycle CO<sub>2</sub> Reduction
- Renewable, Sustainable
- Domestically Produced
- Reduces HC, PM, CO in existing diesel engines
- And reduces NO<sub>x</sub> in boilers and home heating

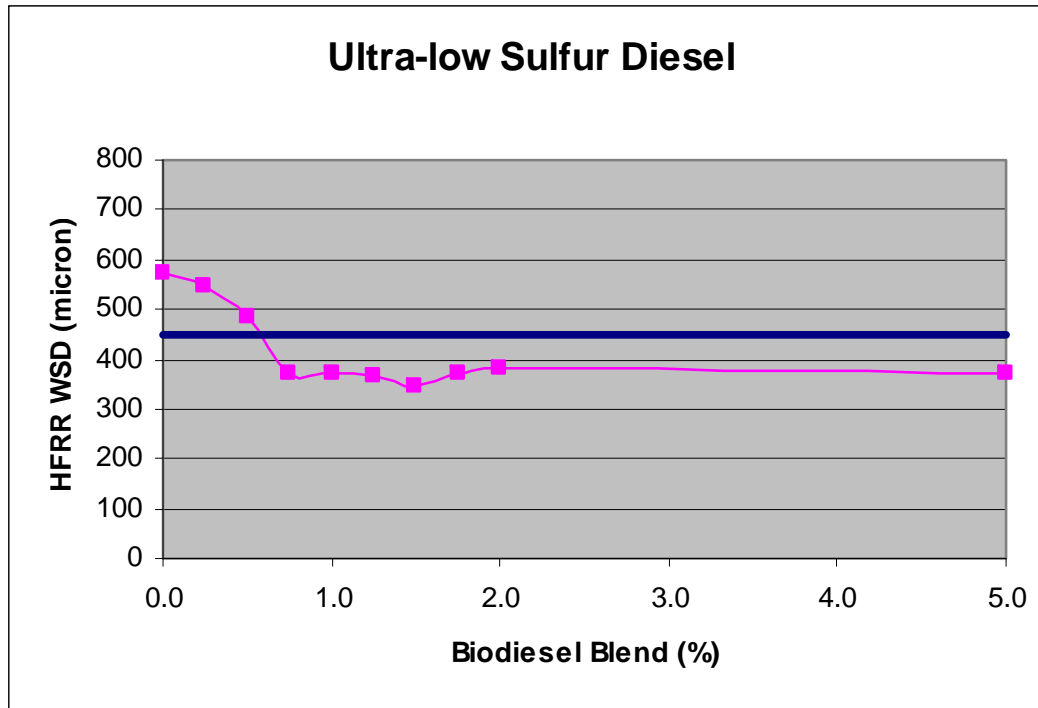


# EPA HD Emissions Averages

Emission Type	B100	B20	B2
Total Unburned Hydrocarbons	-67%	-20%	-2.2%
Carbon Monoxide	-48%	-12%	-1.3%
Particulate Matter	-47%	-12%	-1.3%
Oxides of Nitrogen (NO <sub>x</sub> )	+10%	+2%	+.2%



# Enhanced Lubricity



- Equipment benefits
  - ◆ Superior lubricity
  - ◆ B2 has up to 66% more lubricity than #2 Diesel
- EPA requires sulfur reduction in 2006
- No overdosing concerns



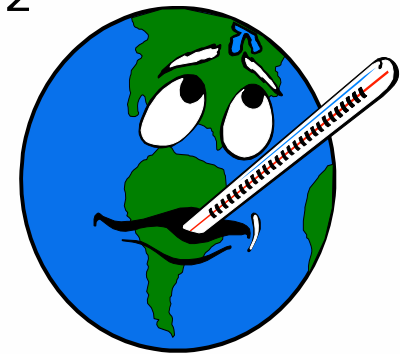


# Biodiesel and Global Warming

➤ Closed Carbon Cycle: CO<sub>2</sub> Used to Grow Feedstock is Put Back Into Air

- 78% Life Cycle Decrease In CO<sub>2</sub>

➤ Energy Balance 3.24 to 1

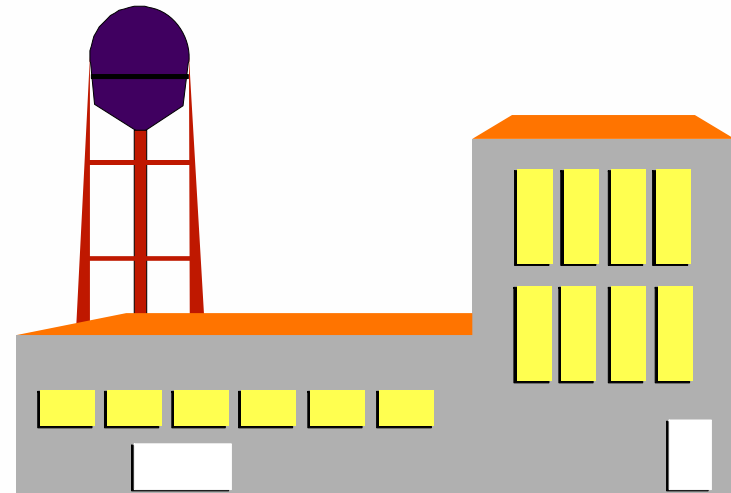


➤ Compression Ignition Platform 30% to 40% More Efficient Than Spark Ignition



# Economic Development-- Biodiesel

- Creates Manufacturing Jobs
- Reduces Energy Imports
- Improves Balance of Trade
- Creates Expanded Markets for Agriculture



## Benefits of Using Biodiesel



- Renewable, domestic resource that helps support American agriculture industry and decreases our dependence on foreign oil
- Biodiesel has the highest energy balance of any fuel, further increasing its value in our energy portfolio; every unit of fossil fuel it takes to make biodiesel results in 3.24 units of energy gain
- Tax incentive helps close the gap between the cost of biodiesel and regular diesel



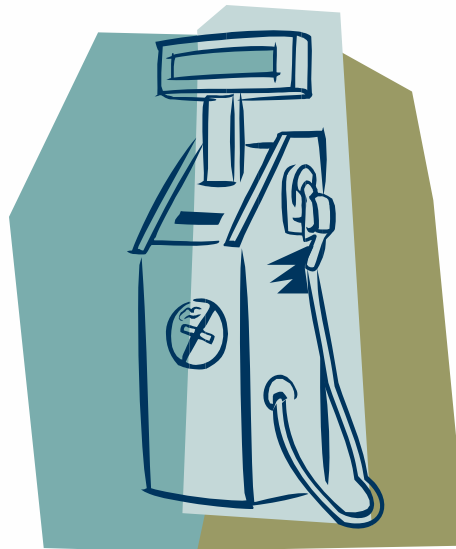
# Benefits of Using Biodiesel



- Safer, Cleaner Alternative to Petroleum
  - ◆ Exhaust has less harmful impact on human health
  - ◆ Reduces emissions of lifecycle CO<sup>2</sup> by 78%
  - ◆ Reduces emissions of unburned hydrocarbons, carbon monoxide and particulate matter
- Simple to use, biodegradable, nontoxic, free of sulfur and aromatics
  - ◆ Less toxic than table salt and biodegrades as fast as sugar
  - ◆ Biodiesel exhaust comparable to the smell of French fries



# Biodiesel Industry Trends





# Current Market Drivers

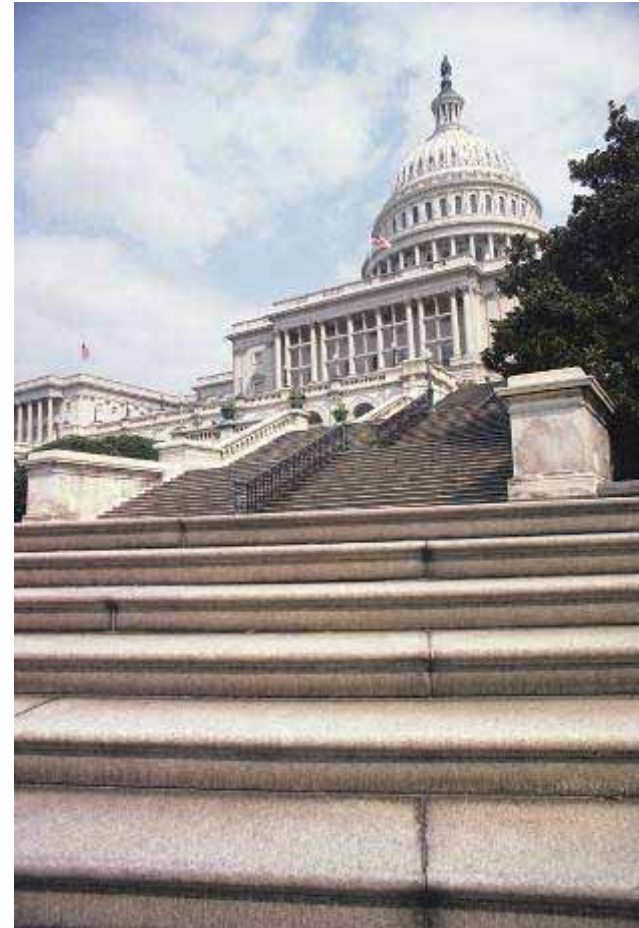
- Environmental Benefits
- Energy Independence
  - ◆ Biodiesel Tax Incentives / Legislation
  - ◆ Energy Policy Act of 1992 (EPACT)
  - ◆ Executive Order 13149 (20% reduction in Fed fleet fuel usage compared to 1999 levels)
- Enhanced Lubricity
  - ◆ Premium Diesel Market Grows as Consumers Demand More From the Fuel They Use
- Market Competition Among OEMs
  - ◆ Biodiesel announcements from GM, DaimlerChrysler, VW, and John Deere; more in the works





# Biodiesel Legislation

- Federal Excise Tax Credit
  - ◆ Signed into law on 10/22/04 as part of H.R. 4520, the American JOBS Creation Act of 2004
  - ◆ Tax incentive effective as of 1/1/05 (*expires 12/31/08*)
  - ◆ One penny per percentage of biodiesel per gallon for “agri-biodiesel” made from first-use veg oils and animal fats, and ½ penny per percentage of biodiesel made from recycled oil feedstocks
  - ◆ Lowers cost of biodiesel to consumers in taxable and tax exempt markets



# Biodiesel Tax Incentive

- The benefits are available to fuel blenders / distributors and other diesel excise tax payers, who carry an excise tax liability
- The incentive is applied toward road tax or income tax liability of the blending company
- The incentive applies to any blend of biodiesel



## 2005 Energy Bill

- Extends the Federal Tax Incentives to 12/31/08
- Establishes a Renewable Fuel Standard (RFS)
  - ◆ Doubles the use of biodiesel and ethanol by 2012
  - ◆ Mandates a 7.5 billion gallon RFS by 2012





# Federal Biodiesel Legislation

## ➤ EPACT

- ◆ 75% of light-duty vehicle purchases must be alternative fuel vehicles (AFV)
- ◆ 50% of light duty AFV purchase requirements can be met with biodiesel
- ◆ Can earn 1 AFV purchase credit for each 2,250 gallons of B20 used or for each 450 gallons of B100 used



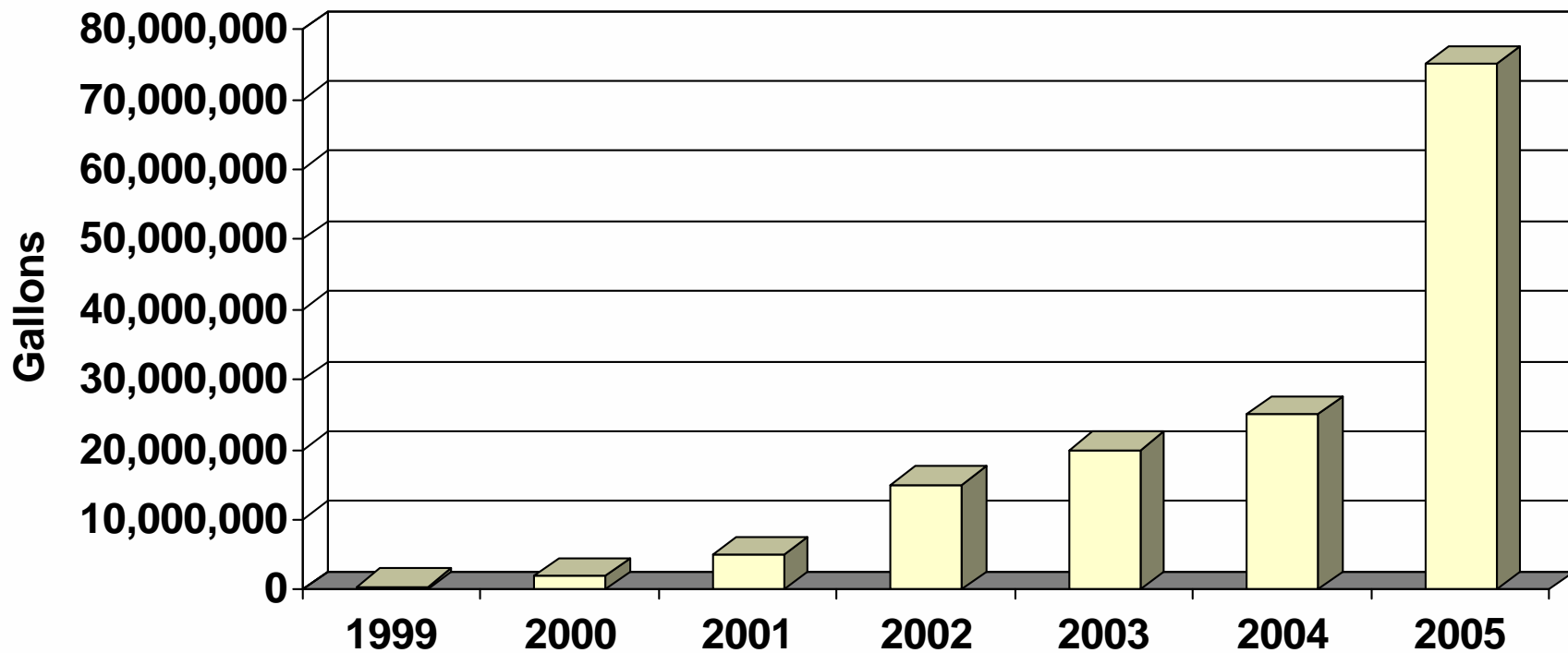
## Infrastructure

- Fuel available through direct shipment or from over 1,000 petroleum distributors nationwide
- About 400 public retail filling stations nationwide
- Movement towards biodiesel at the terminal





# Biodiesel Demand / Production



**150 Million Gallons+ projected sales of B100 for 2006**







# Biodiesel Production Capacity

- 86 active plants currently –
  - ◆ 552.1 million gallons capacity
- 65 plants under construction plus 13 expansions –
  - ◆ 1.29 billion gallons capacity
- Potentially over 1.6 billion gallons capacity inside 2 years



# Biodiesel Feedstock Supplies

- There is enough to make a difference
  - ◆ 1.7 billion annual gallons resource of feedstock supplies currently
  - ◆ 3.6 billion annual gallons feedstock supplies by 2020
  - ◆ Long-term potential: 10 billion annual gallons by 2030
  - ◆ U.S. On-Road Market: 40 billion annual gallons





# Using Biodiesel In Diesel Engines



Kansas farmer Harold Kraus  
fuels up with B20



## Using B20 and Lower Blends

- B20 operates in conventional engines, just like petroleum diesel
- Few or no modifications needed to engine or fuel system
  - ◆ Most common measures include initial fuel storage tank cleaning or fuel filter replacement
- Higher cetane and lubricity than diesel
- Similar horsepower, torque and mileage as diesel



## Using B20 and Lower Blends

- B20 can be stored and distributed using existing petroleum diesel tanks and fueling stations
- “Start today, stop tomorrow” technology
- Biodiesel the least cost, best alternative to diesel
  - ◆ New Tax Incentive brings cost of biodiesel blends in line with or sometimes lower than #2 Diesel
  - ◆ No special equipment or modifications to vehicle
  - ◆ Using B20 results in lower total annual costs than other alternative fuels



# Handling and Storage

From the National Biodiesel Board

summer 2004

## 10 steps for successful biodiesel handling and storage

**In this Issue:**

- page 1**  
10 steps for biodiesel handling & storage
- page 2**  
How do algae get in my fuel?
- page 3**  
Minimum handling temp to pre-heat oil tank
- page 4**  
Minimum distributor storage tank

**ask ben**  
Biodiesel Education Network  
www.biodiesel.org

So how do you get an underlying adding biodiesel, the nation's fastest growing clean liquid fuel, to your product line. It's clean, safe and delivers performance benefits that generate diesel engine cost savings. Plus, it enables you to offer a unique product and to a demand that your competition may not.

Like conventional diesel, biodiesel should be handled properly to ensure a positive experience. There are 10 steps to make biodiesel distribution a seamless part of your business.

- 1. Quality is critical.** Don't just assume you are receiving a good product. Biodiesel has earned a full specification from the American Society of Testing and Materials (ASTM), a major milestone in ensuring fuel quality. Examine and take receipt of your ASTM D 6751 biodiesel and ASTM D 6752 diesel fuel.
- 2. Professionally test your fuel.** Working in partnership with a local fuel testing laboratory, include a semi-annual or annual tank management program for your site to examine the status of your fuel quality and see if it meets ASTM target values.
- 3. Take Samples.** If you intend on using an existing diesel or petroleum tank for storage of your biodiesel, either pure or blended, make sure that you take a bottom sample of the proposed tank and verify lack of moisture, varnish and microbial activity.
- 4. Ensure Material Compatibility.** Biodiesel in its pure form (B100) has excellent material characteristics. Let

water through your facilities to biodiesel. Heavy petroleum sediment formation in your systems may increase the probability of plugging system filter prematurely. Pre-treated B20 would have less of an effect. Exercise the procedures detailed in your material data, and to ensure compatibility, store biodiesel in only steel and aluminum tanks. Any galval or alloys that would come in contact with pure biodiesel should be manufactured from steel or

continued on page 2

**Biodiesel Education Network (848) BIODIESEL (373) 835-7913 fax: www.biodiesel.org**







# BQ 9000 Accreditation Mark





## BQ-9000 Status

- BQ-9000 is a unique combination of the ASTM standard for biodiesel, ASTM D-6751, and a comprehensive quality control system that includes storage, sampling, testing, blending, shipping, distribution, and fuel management practices.
- To receive accreditation, companies must develop a quality control manual and pass a rigorous review of their quality control processes by an independent auditor.
- 3 BQ-9000 certified biodiesel marketers
- 14 certified biodiesel producers
- Together these producers account for more than 40 percent of the biodiesel produced in the U.S.



## Accredited Producers

- Peter Cremer
- SoyMor Biodiesel
- Dow Haltermann Custom Processing
- Eastman Chemical Company
- Imperial Western Products
- Cargill Inc.
- AGP
- Huish Detergents
- Organic Fuels
- World Energy
- Griffin Industries
- FUMPA Biofuels
- Minnesota Soybean Processors
- Renewable Energy Group



## Certified Marketers

- Peter Cremer
- Sprague Energy
- Metro Fuel Corp.



## BQ-9000 Audits in Process

### ➤ Accredited Producers

- ◆ Bioenergy of Colorado
- ◆ Peach State Labs
- ◆ Stepan
- ◆ Carolina Biofuels
- ◆ Eastern Biofuels
- ◆ Xenerga

### ➤ Certified Marketers

- ◆ TransMontaigne
- ◆ Western States Petroleum
- ◆ Pro Petroleum
- ◆ FUMPA Biofuels
- ◆ Xenerga







# www.BQ-9000.org

**BQ-9000 Quality Management Program** info@BQ-9000.org

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Home search...

<b>MAIN MENU...</b> <ul style="list-style-type: none"><li>■ Home</li><li>■ Program Description</li><li>■ Program Costs</li><li>■ Registration Process</li><li>■ Companies<ul style="list-style-type: none"><li>■ Certified Marketers</li><li>■ Accredited Producers</li><li>■ Consulting Companies</li></ul></li><li>■ NBAC</li><li>■ Contact Us</li></ul>	<b>HOME...</b> <p>The National Biodiesel Accreditation Program is a cooperative and voluntary program for the accreditation of producers and marketers of biodiesel fuel called BQ-9000. The program is a unique combination of the ASTM standard for biodiesel, ASTM D 6751, and a quality systems program that includes storage, sampling, testing, blending, shipping, distribution, and fuel management practices.</p> <p>BQ-9000 is open to any biodiesel manufacturer, marketer or distributor of biodiesel and biodiesel blends in the United States and Canada.</p> <p>About the National Biodiesel Accreditation Commission:</p> <ul style="list-style-type: none"><li>● Commissioners represent wide scale of interested parties</li><li>● Nominated by the NBB President, and approved by the NBB Board of Directors</li><li>● Although committee of NBB, NBAC has full authority for design and implementation of BQ-9000</li><li>● Developed BQ-9000 as it stands today</li><li>● Responsible for on-going improvements to BQ-9000</li></ul>	<b>EVENT CALENDAR...</b> <ul style="list-style-type: none"><li>■ <b>Understanding &amp; Implementing BQ-9000 Seminars:</b><ul style="list-style-type: none"><li>May 4—Kansas City</li><li>May 18—Dallas</li><li>June 8—Philadelphia</li><li>July 19—Calgary</li><li>August 10—Atlanta</li></ul></li></ul>
<b>HOW TO GET STARTED ...</b> <ol style="list-style-type: none"><li>1. <a href="#">Review Program Descriptions</a></li><li>2. <a href="#">Review Registration Process</a></li><li>3. <a href="#">Complete Application</a></li></ol>	<b>TWO CATEGORIES OF CONFIDENCE...</b>	<b>ITEMS OF INTEREST...</b> <ul style="list-style-type: none"><li>■ Seminar Schedule &amp; Registration <a href="#">USA</a> <a href="#">Canada</a> <b>NEW!</b></li><li>■ <a href="#">BQ-9000 Sample Quality Manual</a></li><li>■ <a href="#">Program Requirements</a></li><li>■ <a href="#">Application Package</a></li></ul> <b>CONTACT US...</b> <p>PO Box 104898 Jefferson City, MO 65110 573.635.3893 <a href="mailto:info@bq-9000.org">info@bq-9000.org</a></p>



# Fuel Filters and Solvency

## B100

- Monitor filters closely
- Strong cleaning effect
- Storage tanks may need to be cleaned, or keep extra filters on hand at start up
- Wipe painted surfaces immediately

## B20 & Under

- Monitor filters, less than 2% need to be changed
- Mild cleaning effect
- Storage tanks may need to be cleaned, or keep extra filters on hand at start up
- Housekeeping protocols for generic diesel equally important prior to blending



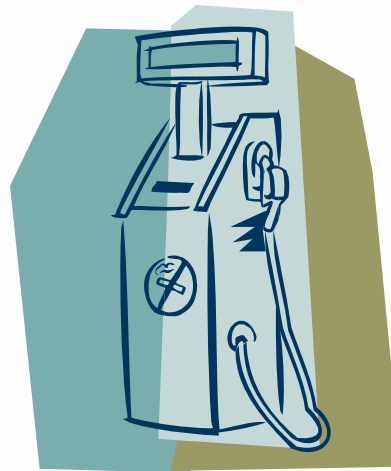


## Material Compatibility-Hoses

- B100 may adversely affect some elastomers such as natural or nitrile rubbers over time
- Many elastomers used after 1993 are compatible with B100 (Viton, etc.)
- Blends (B20) effect is less, or non-existent
  - ◆ Normal monitoring of hoses and gaskets for leaks appears sufficient with B20
- No special precautions needed for B2 – B5



# Biodiesel Standards and Fuel Quality





# ASTM D 6751 for B100

<u>Property</u>	<u>ASTM Method</u>	<u>Limits</u>	<u>Units</u>
Flash Point	93	130 min.	degree C
Water & Sediment	2709	0.05 max.	vol. %
Carbon Residue (100% sample)	4530	0.05 max.	wt. %
Sulfated Ash	874	0.02 max.	wt. %
Kin. Viscosity, 40C	445	1.9 - 6.0	mm <sup>2</sup> /sec.
Sulfur	5453	0.05 max.	wt. %
Cetane	613	47 min.	
Cloud Point	2500	By Customer	degree C
Copper Corrosion	130	No. 3 max.	
Acid Number	664	0.80 max.	mg KOH/g
Free Glycerin	6854	0.020	wt. %
Total Glycerin	6854	0.240	wt. %
Phosphorous	4951	10 max	ppm
Distillation, T90 AET	1160	360 max	degree C



# Biodiesel Specifications Status

## ➤ **ASTM Specifications**

- ◆ The existing **ASTM D6751 standard for B100** is being modified with new oxidation stability parameters and other updates.
  - B5 ballot passed at Subcommittee vote in December 2006
  - New working groups established for cold flow & sterol glucosides
- ◆ Concurrently, a **new ASTM specification for B20 blends** is being revised for balloting in mid-January 2007

## ➤ **Engine Manufacturers Association (EMA)** has approved test specifications for B20 biodiesel

- ◆ Helping to pave the way toward acceptance of the ASTM B20 standard

- ◆ To view the EMA press release and test specifications, visit:

[http://www.biodiesel.org/pdf\\_files/fuelfactsheets/EMA\\_Biodiesel\\_Blend\\_PR&Statement.pdf](http://www.biodiesel.org/pdf_files/fuelfactsheets/EMA_Biodiesel_Blend_PR&Statement.pdf)



# Biodiesel Standards & Quality

- Fuel quality is of the utmost concern and importance to the biodiesel industry
- ASTM D 6751 is the quality specification for biodiesel fuels irrespective of the feedstock source and/or processing method
- National Quality Program (**BQ-9000**) Launched for Biodiesel Marketers and Producers
  - ◆ Ensures that biodiesel is produced according to ASTM specifications, and that contamination or degradation does not occur during distribution, storage or blending





# National Fuel Quality Survey

Performed by National Renewable Energy Lab  
November 2005 – July 2006

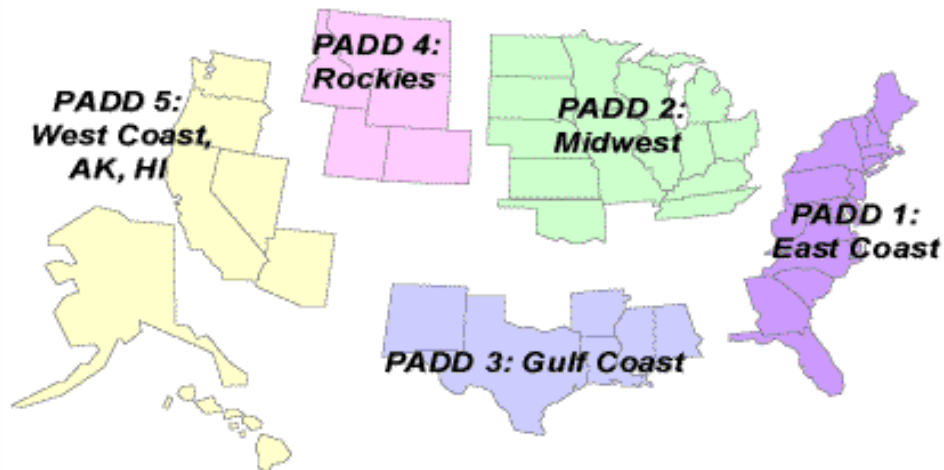




# 2006 Quality Survey Sample Collection

- Samples were collected randomly in several campaigns by PADD
- A subcontractor visited the site of a biodiesel blender, usually a terminal operator or jobber to collect the B100 sample
- 32 B100s, 6 B99s, and 1 B50

**Petroleum Administration  
for Defense Districts**



- PADD 1
  - ◆ 6 samples
  - ◆ FL, GA, MA, PA(2), RI
- PADD 2
  - ◆ 18 samples
  - ◆ IA(3), IL(2) IN, MI(2), MN(3), MO(3), NC, ND, TN, WI
- PADD 3
  - ◆ 5 samples
  - ◆ LA(2), TX(3), VA
- PADD 4
  - ◆ 1 sample
  - ◆ CO
- PADD 5
  - ◆ 4 samples
  - ◆ CA (2), WA (2)





# B100 Quality vs. Specifications

- A national fuel quality testing project, co-funded by NBB and the National Renewable Energy Laboratory, found that 50 percent of biodiesel samples pulled between Nov. 2005 and July 2006 were out of spec on at least one parameter.
  - Typically failing for total glycerin or flash point
- One-third of all the samples were out of spec for total glycerin, the same property that caused issues in Minnesota last year.
- A combination of challenges with Ultra Low Sulfur Diesel (ULSD) and these biodiesel fuel sampling results make conditions right for caution when blending and using biodiesel this winter.





# Ultra Low Sulfur Diesel (ULSD)

- Some Petroleum Marketers Association (PMAA) members have expressed concerns about the cold flow performance of ULSD when blended with cold flow additives
  - ◆ Some are noting no differences in cold flow performance, others are noting approx. 10°F increase in CFPP
  - ◆ Problem can be exacerbated when ULSD is blended with biodiesel
  - ◆ ULSD now on market has some different properties than the ULSD test fuels that were previously available
- NBB is addressing this issue by:
  - ◆ Working with the biodiesel and petroleum communities to share data they have with biodiesel/ULSD blends
  - ◆ Contracting with laboratories to test and confirm blended fuel properties with ULSD and biodiesel





# Industry Response

- The NBB and PMAA released a **Biodiesel Winter Weather Advisory** in response to the fuel quality testing results and introduction of ultra low sulfur diesel.
- **The industry's response included the following actions:**
  - ◆ Stepped up a Fuel Quality Outreach Program to federal and state agencies with authority to test biodiesel at the plant / terminal levels to enforce fuel quality (IRS, EPA, USDA, state Departments of Weights & Measures)
  - ◆ Developed an online Fuel Quality Enforcement Guide, as well as posted the NBB Fuel Quality Policy at [www.biodiesel.org/resources/fuelqualityguide](http://www.biodiesel.org/resources/fuelqualityguide)
  - ◆ Issued recommendations to users that include buying fuel from BQ-9000 certified marketers and accredited producers





# Biodiesel Winter Weather Advisory

- **The NBB and PMAA have advised their members & biodiesel users to take the following precautions:**
  - ◆ Buy fuel from BQ-9000 accredited producers or certified marketers.
  - ◆ Work with a reputable supplier who you have a good relationship with who will stand behind the product.
  - ◆ Require an actual certificate of analysis on every load.
  - ◆ Know cold flow properties of both the ULSD and biodiesel before blending.
  - ◆ Observe all proper handling and storage procedures, and carefully review the materials available online. Those materials include:
    - Fuel Quality and Performance Guide
    - Biodiesel Handling and Use Guidelines
    - Cold Weather Blending Report
    - Fuel Handling Training Video



# NBB Stance on Biodiesel Fuel Quality

- Ensuring that consumers have a high level of confidence in the biodiesel they purchase is a top priority for the National Biodiesel Board and a key element for the industry's continued growth.
- As the industry ramps up to meet the vast increase in demand for biodiesel, this growth simply cannot occur at the expense of fuel quality.







# Cold Flow





## Cold Weather Performance

- B100 freezes faster than most US petrodiesel
- Untreated B20 freezes about 2-10 °F higher than #2 petrodiesel
- The same precautions taken with petrodiesel can be used to insure trouble free operation with biodiesel



## Cold Weather Performance

- Various options exist to insure the fuel does not gel:
  - ◆ Pour and cloud points can be addressed with kerosene blending
  - ◆ Desirable CFP results can be attained with conventional flow improver technology, although additives don't work as well on B100 as they do with B20 or petrodiesel
  - ◆ Fuel heaters or indoor vehicle storage can also be substituted for the use of kerosene or additives



## Biodiesel Fuel Stability

- Fuel stabilizers generally are not needed in biodiesel blended fuel that is being used on a frequent basis
- When using biodiesel in vehicles that sit unused for 6 months or longer, a stability additive can help ensure trouble-free use:
  - ◆ NBB recommends Tenox 21, by Eastman
  - ◆ Stability additive should be mixed with B100 before blending with petro diesel



# High Profile Cold Weather Users

- ◆ Glacier National Park (MT)
- ◆ Yellowstone
- ◆ Grand Teton National Park (WY)
- ◆ Salt Lake City Airport
- ◆ CO Ski Resorts
- ◆ CU Boulder
- ◆ Peterson AFB (CO)



## ...Fueling the Famous

➤ Neil Young



➤ Willie Nelson



➤ Lollapalooza



➤ Indigo Girls



➤ Bonnie Raitt







# Original Equipment Manufacturers





# OEM Support for Biodiesel

DAIMLERCHRYSLER





# Major OEMs' Biodiesel Positions

John Deere	Accepts up to B5; B2 factory fill for all US diesels
CNH	Accepts up to B20 in both Case IH & New Holland brands for most equipment
Caterpillar	Accepts up to B30 in most equipment; B5 for remainder
DaimlerChrysler	Accepts up to B5 in most vehicles; B5 factory fill in Jeep Grand Cherokee; B20 approved for fleet use in Dodge Ram
General Motors	Accepts up to B5; B20 offered as SEO for fleets
Ford	Accepts up to B5; working toward B20
VW	Accepts up to B5; working toward B20





# OEMs: What You Need To Know

- Most OEMs support up to B5, some moving toward B20 as soon as ASTM standard for B20 is in place
  - ◆ John Deere – B2 factory fill for all U.S. diesel vehicles; support up to B5; trying to implement biodiesel use across Ag industry
  - ◆ DaimlerChrysler – B5 factory fill for Jeep Liberty CRD; supports fleet use of B20; proactively support biofuels
  - ◆ VW – Covers up to B5 under warranty; researching B20 performance; some VW customers use higher blends at own risk
  - ◆ GM – Supports B20 for fleet use only in heavy trucks & vans
  - ◆ Ford – Reluctant support of up to B5; slow to adopt



# OEM Warranty Statements

- All engine and vehicle manufacturers provide a material and workmanship warranty on the products they manufacture. **Such warranties do not cover damage or problems caused by external factors or elements they don't produce or control, such as the type of fuel or additives used in the engine.** Thus, if an engine experiences a failure that is caused by a fuel or a fuel additive – no matter if the fuel or additive is biodiesel, regular petroleum diesel, or an aftermarket additive - the damage generally will not be covered by the OEM's equipment and workmanship warranty.
- **Federal law, called the Magnuson Moss Act, prohibits the voiding of an OEM warranty just because an aftermarket additive—or biodiesel—was used.** The additive or biodiesel must be the cause of the failure for the issue not to be covered by the warranty.
- **Most OEM dealers and customer service departments currently tell their customers the use of up to 5% biodiesel (B5) is acceptable,** with the requirement the pure biodiesel fuel adhere to the quality standards specified by American Society of Testing and Materials standard (ASTM D 6751) prior to blending.



## NBB 2007/2010 OEM Goals

- B20 will be approved by all major diesel engines and vehicles with the new 2007 and later model year engines
- Engine and vehicle companies will incorporate B20 into all future designs
- Engine and vehicle companies will help to promote and encourage B20 and lower blends





## Goal of OEM Outreach Program

- Increase OEM knowledge about the benefits and use of biodiesel
- Foster enthusiastic support for biodiesel both within their organizations and externally (dealers, customers, etc.)
- Demonstrate how the use of biodiesel benefits their customers, and how the support of biodiesel benefits their company
  - ◆ Environmental stewardship & domestic energy security
  - ◆ Readily available solution to emissions reduction challenges
- Encourage current & future involvement with biodiesel
  - ◆ More positive positions / warranty statements re: B20
  - ◆ Incorporation of B20 into all short- and long-term R&D programs
  - ◆ Involvement in biodiesel promotional efforts





# New Technology

- Biodiesel provides SIGNIFICANT benefits with new diesel technology
- 2% biodiesel restores the lubricity of the poorest lubricity diesel
- Although similar in size/distribution, B20 particles are different than petrodiesel particles
- Break Even Temperature of PM Traps reduced by 30 to 50 degrees F with B20
  - ◆ May increase fuel economy w/ PM traps
  - ◆ May lengthen PM trap life
- Engine out PM reduced
  - ◆ Helps EGR, reduces engine oil soot levels





- New diesel engines in 2007/2010 w/ after-treatment and 15 ppm sulfur fuel will have over 90% less NOx and PM than today's engines
- This is much cleaner than CNG today
  - ◆ Diesel will be 'clean technology'
  - ◆ While increasing fuel economy 25-30%
- Biodiesel is already 15 ppm sulfur level
- Biodiesel is an 'implementing' technology for new diesel engines by eliminating the lubricity problems, while already being 15 ppm sulfur, zero aromatics, and high cetane







# US Biodiesel Industry Direction

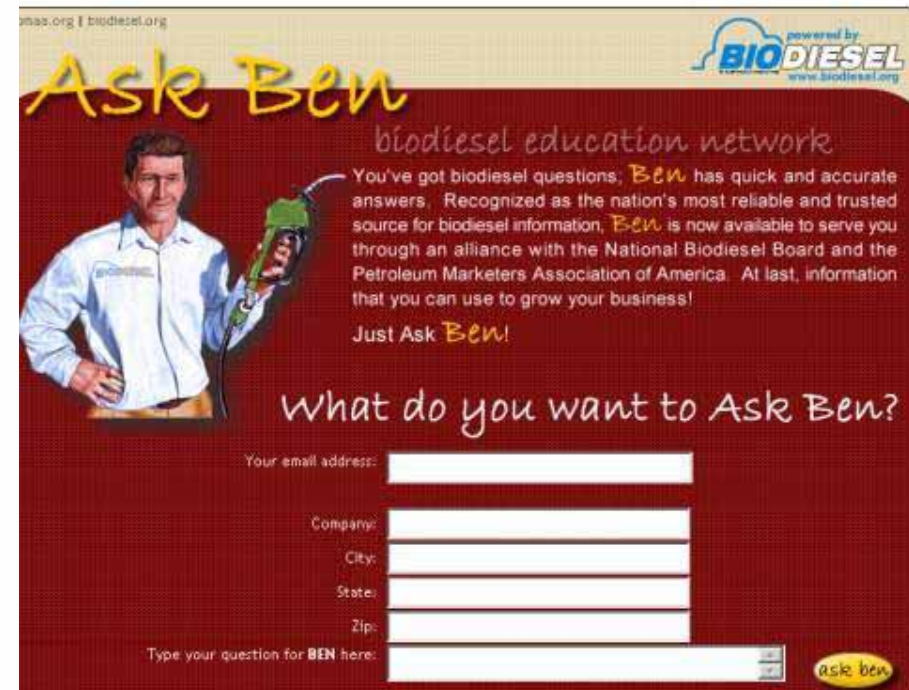
- B2 as the preferred lubricity component for 2006 Ultra Low Sulfur Diesel fuel
- B5 in home heating fuel
- B20 in niche markets
  - ◆ Government Fleets
  - ◆ School Buses
  - ◆ Garbage Trucks
  - ◆ Mines
  - ◆ Agriculture
  - ◆ Stationary Electricity Generation
  - ◆ Others????





# Educational Resources

- BEN: Biodiesel Education Network
- Web-based resource specifically for petroleum marketers
- Partnership between NBB/PMAA
- [www.pmaa.org](http://www.pmaa.org)
- [www.biodiesel.org](http://www.biodiesel.org)



pmma.org | biodiesel.org

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www.biodiesel.org

## Ask Ben

*biodiesel education network*

You've got biodiesel questions. **Ben** has quick and accurate answers. Recognized as the nation's most reliable and trusted source for biodiesel information, **Ben** is now available to serve you through an alliance with the National Biodiesel Board and the Petroleum Marketers Association of America. At last, information that you can use to grow your business!

Just Ask **Ben!**

What do you want to Ask Ben?

Your email address:

Company:

City:

State:

Zip:

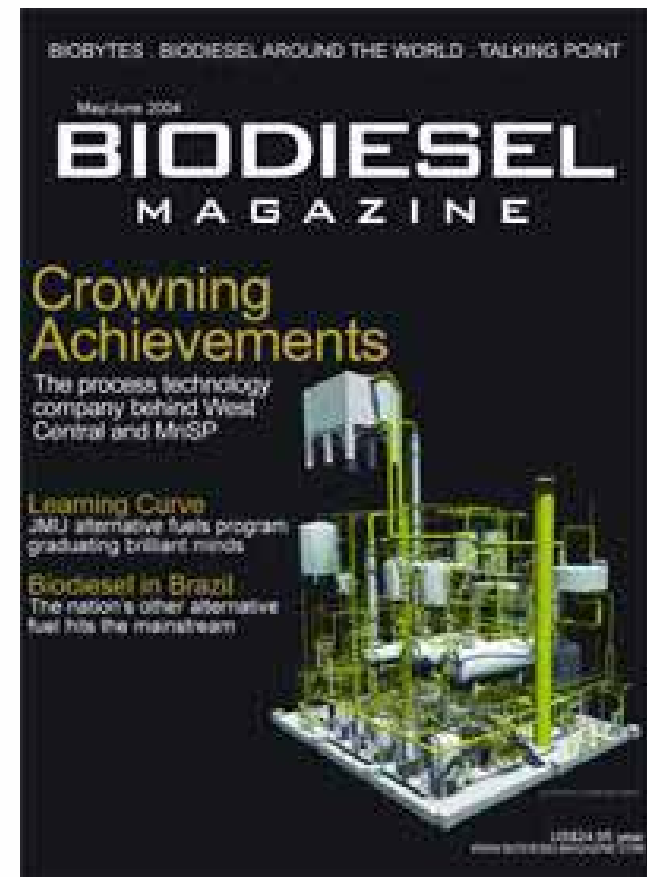
Type your question for **BEN** here:

ask ben



## Other Biodiesel Resources

- [www.bbibiofuels.com](http://www.bbibiofuels.com)
- Biodiesel Magazine
  - ◆ A **MUST HAVE**' magazine
- Biodiesel Industry Directory On-Line







# NBB Technical Library

**National Biodiesel Board**

**[www.biodiesel.org](http://www.biodiesel.org)**

**1-800-841-5849**



- Educational Videos Available
- Informational Resources
- Technical Resources
- On-line Database & Spec Sheets





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