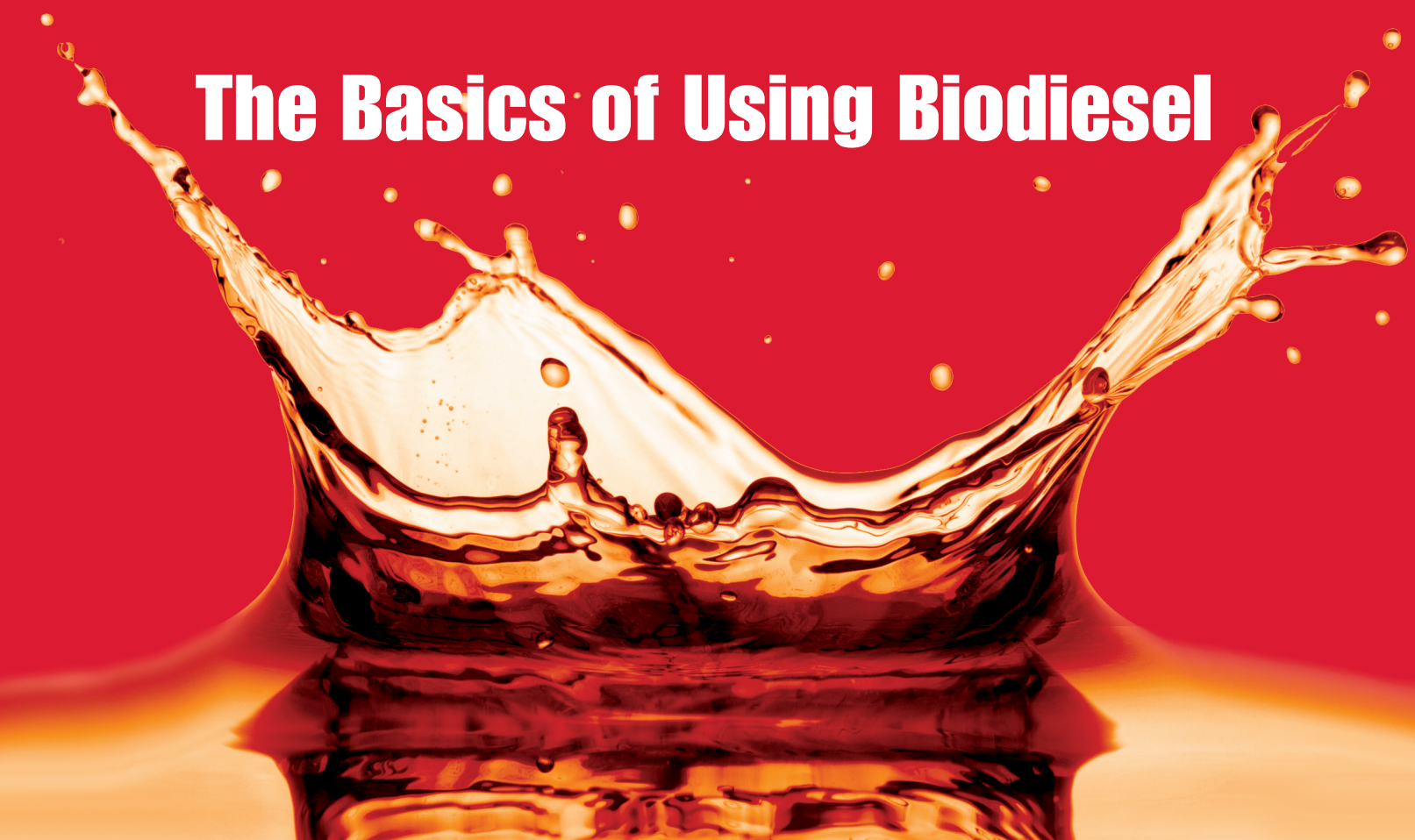
BIODIESEL In Nebraska

Biodiesel is a clean-burning alternative fuel made from domestic, renewable sources. The term biodiesel refers to pure, unblended fuel and is also referred to as B100. Biodiesel itself contains no petroleum, however it can be blended with petroleum-based diesel at any percentage. Think of it as a drop-in replacement to petroleum diesel. Biodiesel blends are indicated by a "B", followed by a number representing the percentage of biodiesel in a gallon of fuel. For example, B20 means 20% biodiesel blended with 80% petroleum diesel.

Biodiesel is made from diverse feedstocks including vegetable oils like soybean oil, distillers corn oil and canola oil, as well as used cooking oils and animal fats. These oils and fats are converted into fatty acid methyl esters (FAME) by a chemical process called transesterification. Soybean oil is the feedstock for approximately half the biodiesel produced in the U.S. today. Raw vegetable oil is not biodiesel.

The Basics of Using Biodiesel



COMMON BIODIESEL BLENDS

Blends like B5, B11 and B20 are the most common biodiesel blends for a variety of reasons.

B5: The physical properties of biodiesel blends up to five percent (B5) do not change from the physical properties of ultra-low sulfur diesel (ULSD) and therefore are included in the same fuel specification, ASTM D975. Blends up to B5 should be treated the same as No. 2 diesel (B0) and are used year-round throughout the country.

B11: States like Illinois and Iowa have implemented incentives to help increase use of B11 or higher blends. These incentives reduce or eliminate certain fuel taxes, putting the higher biodiesel blends at a price advantage to diesel with low or no biodiesel blends.

B20: Diesel vehicles and equipment can use biodiesel blends up to B20 with no modifications. Fleets, fuel marketers, farmers and other end users utilize B20 to maximize the renewable content, local economy, energy security and emissions reduction benefits biodiesel provides. The state of Minnesota requires a 20 percent biodiesel blend during warm weather months and a 5 percent blend during cold months of the year. Retail chains throughout the country offer higher biodiesel blends like B20 to maximize profit margin, taking advantage of biodiesel's often lower price.

BIODIESEL AT THE PUMP

Because No. 2 diesel fuel can contain up to 5% biodiesel, B5 does not require additional labeling at the pump.

Blends from B6 to B20 require the FTC-compliant label "Biodiesel Blend" or "B-20 Biodiesel Blend." If the biodiesel blend varies during the year but does not drop below five percent, this decal can remain on the dispenser. If the biodiesel blend does drop below five percent, this decal must be removed.

Dispensers offering biodiesel blends above 20 percent must post a decal stating the specific blend. For example, a dispenser offering a 50 percent biodiesel blend would require a decal stating B-50.

Biodiesel Blend	B-20 Biodiesel Blend	B-XX Biodiesel
contains biomass-based diesel or biodiesel in quantities between 5 percent and 20 percent	contains biomass-based diesel or biodiesel in quantities between 5 percent and 20 percent	contains more than 20 percent biomass-based diesel or biodiesel

COLD WEATHER OPERABILITY

The cloud point of a fuel is the temperature at which the first solids form and are visible to the naked eye. Typical Nebraska No. 2 diesel fuel has a cloud point of approximately 10°F. That means without the use of additives to improve cold flow properties, No. 2 diesel will begin to gel and plug filters at the cloud point. No. 1 diesel fuel has a cloud point of -40°F or less. Blends of No. 1 and No. 2 diesel fuel, cold flow additives and/or fuel heating systems are used to keep fuel from gelling at temperatures below the cloud point.

Biodiesel blends are used year-round, even in northern cold climates. Like petroleum diesel fuel, biodiesel blends will gel in very cold temperatures. The cloud point of biodiesel blends up to 5% will be virtually the same as those of the diesel fuel used in the blend. Biodiesel blends over 5% will have higher cloud points and require the use of additional cold flow additives or No. 1 diesel in order to operate in cold climates. All diesel fuel is different. Work with your fuel distributor to achieve the desired cold weather protection through the use of a blend of No. 1 and cold flow additives as needed. Proper tank maintenance and housekeeping practices will further ensure cold weather operability.

BIODIESEL QUALITY

Biodiesel must meet strict quality standards before it is accepted into the fuel distribution system. B100 must meet the American Society for Testing and Materials (ASTM) standard D6751. It is then blended with petroleum diesel to meet the corresponding ASTM specification: B5 - ASTM D975, or B6 to B20 - D7467. As diesel fuel and engines have changed over the years, the biodiesel ASTM specification is continuously reviewed and adjusted to ensure successful operation.

The biodiesel industry implemented a quality assurance program called BQ-9000 that ensures that biodiesel is produced, maintained and sold against the current ASTM D6751 specification. More than 92 percent of biodiesel now in the market is produced and handled by BQ-9000 approved companies. Recent surveys by the National Renewable Energy Lab show biodiesel production consistently meets and exceeds strict quality standards. Fuel marketers should purchase biodiesel from a BQ-9000 accredited producer.

BIODIESEL
Cleaner Fuel For Nebraska

Nebraska Biodiesel Tax Credit Act

- Provides a 14-cent per gallon credit for the sale of biodiesel
- The credit is applied to a Nebraska fuel retailer's income tax liability

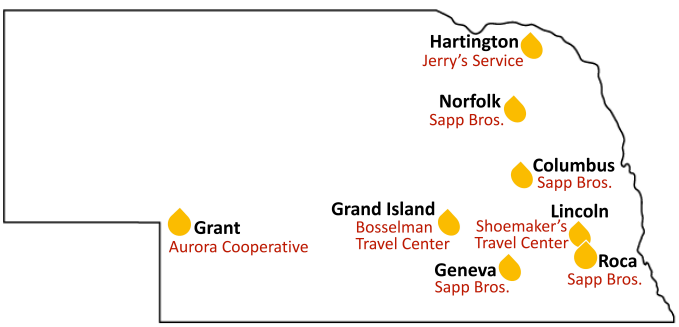
Biodiesel is an economic driver for Nebraska

- 5,885 full time equivalent jobs supported by biodiesel[1]
- $253.9 million in household income supported by biodiesel[1]
- $833.2 million in economic activity supported by biodiesel[1]

Soybeans contain approximately 80% meal and 20% oil

- A 60-pound bushel of soybeans yields about 48 pounds of protein-rich meal and 11 pounds of oil
- 48% of soybean oil is used for biofuels and bioheat, 43% is used for food and 9% for industrial uses[2]
- 1 bushel of soybeans can make 1.5 gallons of biodiesel

Biodiesel Blending Infrastructure



Nebraska Soybean Board has partnered with several companies to expand biodiesel availability.

Sources: 1. Clean Fuels Alliance America; 2. United Soybean Board Market View Database, 2022/2023

Visit BiodieselNE.com for more on biodiesel in Nebraska

BIODIESEL FREQUENTLY ASKED QUESTIONS

Q Can I use biodiesel blends in my vehicle?

A Biodiesel blends up to B20 can be used in diesel vehicles and equipment without modification. Most major engine companies have formally stated that use of blends up to B20 will not void their parts and workmanship warranties. Some manufacturers based outside of the U.S. do not recommend blends above B5, however in states like Illinois and Minnesota where higher biodiesel blends are common, those manufacturers have sent letters to registered car owners stating that higher biodiesel blends can be used in their vehicles. Original Equipment Manufacturer (OEM) information can be found at: http://biodiesel.org/using-biodiesel/oem-information.

Q Will I void my warranty if I use a biodiesel blend?

A Vehicle warranties cover parts and workmanship, not fuel. Unless use of a higher-than recommended blend of biodiesel is the cause of engine or parts failure, the warranty must be honored. However, if the engine parts fail because of out-of-specification diesel or biodiesel, the failure may not be covered by the warranty.

Q Do biodiesel blends have similar performance to petroleum diesel?

A Diesel vehicle drivers should see no loss of power or performance when using blends up to 20 percent. Biodiesel enhances the lubricating properties of diesel fuel, reducing wear and prolonging engine life. Biodiesel has a detergency effect to keep injectors and fuel systems clean. Using B11-B20 with DPF filters results in longer intervals between regeneration, resulting in less fuel consumption.

Q Does biodiesel have a shorter shelf life than ultra-low sulfur diesel?

A As with ultra-low sulfur diesel fuel (ULSD), biodiesel without additives has a shelf life of six months. Biodiesel producers utilize stabilizing additives to prevent product degradation. With these additives and proper housekeeping, the shelf life of biodiesel blends can be extended up to two years.

Q Does biodiesel use increase risk of microbial contamination?

A Federal regulations reduced sulfur levels in diesel fuel in 1993 – from 5000 or more parts per million (ppm) before then, to 15 ppm or less by 2006. Though high sulfur levels negatively impacted the environment, health and vehicle pollution control equipment, it acted as a natural anti-microbial in diesel fuel, preventing growth of bacteria and fungus. The reduction of sulfur removed these anti-microbial properties and bacteria and fungus are now able to grow in the water-fuel interface, whether a biodiesel blend is used or not. Preventing water contamination is key to preventing microbial growth.

Q Does biodiesel production compete with food?

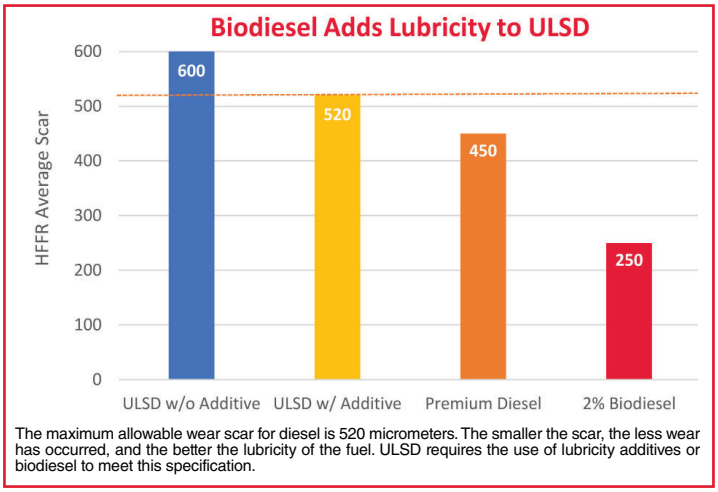
A Produced from a variety of renewable resources, such as plant oils, fats and recycled grease, biodiesel is the most diverse fuel on the planet. Soybean-based biodiesel actually has a positive impact on the world's food supply. Processing biodiesel from soybeans uses only the oil portion of the soybean (20%), leaving all of the protein available to nourish livestock and humans. By creating a new market for the soybean oil, we increase the availability of protein-rich meal for human and animal consumption.

Q Is renewable diesel the same as biodiesel?

A While both fuels can be made from the same feedstocks, renewable diesel and biodiesel are not the same. Biodiesel is produced through transesterification and contains oxygen atoms (oxygenates). Renewable diesel is produced through the hydrotreating process, which removes oxygen and other atoms, converting the triglyceride molecules into paraffinic hydrocarbons. Renewable diesel is chemically similar to petroleum diesel.

BIODIESEL BENEFITS

- Biodiesel is made from renewable sources. More feedstock is produced each year.
- Biodiesel has the highest energy balance of any commercially available fuel, returning 3.5 units of energy for every one unit of energy used to produce it.
- Removing sulfur from diesel to produce ultra-low sulfur diesel (ULSD) also removes important lubricity from the fuel. Biodiesel increases lubricity and its high cetane rating provides for quicker starts with less smoke.
- Made in the U.S., biodiesel production reduces our dependence on oil, while expanding and diversifying our domestic fuel supply.
- Biodiesel production bolsters local jobs, incomes and economies, in agriculture, biofuel production and businesses that support these industries. According to a recent study by LMC International for Clean Fuels Alliance America, the U.S. market for biodiesel and renewable diesel reached 3.1 billion gallons in 2021, supporting 75,200 U.S. jobs and generating more than $23 billion in economic activity.
- Biodiesel is recognized as an Advanced Biofuel by the U.S. Environmental Protection Agency, reducing lifecycle greenhouse gas emissions by 57 to 86 percent compared to petroleum diesel. Biodiesel blends are an easy way for individuals and businesses to reduce their carbon footprint.
- Biodiesel blends can reduce tailpipe emissions from diesel vehicles and equipment, including particulate matter and other harmful pollutants, reducing risk of exacerbating asthma and other respiratory diseases.



The maximum allowable wear scar for diesel is 520 micrometers. The smaller the scar, the less wear has occurred, and the better the lubricity of the fuel. ULSD requires the use of lubricity additives or biodiesel to meet this specification.



BEST PRACTICES FOR DIESEL VEHICLE AND EQUIPMENT OWNERS

- For best performance, follow oil and fuel filter change intervals as directed by the owner's manual.
- If the vehicle/equipment will not be driven for a period of time, fill the tank to capacity to prevent fuel degradation.
- Monitor engine oil levels. If they rise, take the vehicle in for an oil change.
- Avoid water absorbing fuel filters.

BEST PRACTICES FOR DIESEL STORAGE TANK OWNERS

- Before introducing a biodiesel blend into a storage tank, sample the tank to make sure there is no water or sediment present.
- Always install a high capacity, 30-micron paper-pleated dispenser filter on a storage tank to keep contaminants from reaching vehicle tanks. Water-absorbing and fiberglass filters are not recommended.
- Check tank bottoms twice a year (April and October) with a Bacon Bomb tank sampling device. If water is found, have it removed.
- Routinely check fill and vapor caps, hoses, and gaskets for leaks.
- Check fill area for water regularly and remove if found.
- Keep tanks as full as possible to reduce the amount of air and water entering the tank.
- Before colder weather sets in:
  - Check tank bottoms for water.
  - Install a new dispenser filter, 30-micron or higher, to handle the increased viscosity of the fuel.
  - Make sure fuel meets cold flow operability by discussing your needs with your supplier prior to purchase.
  - Winter fuel additives need to be administered when the fuel is a minimum of 15 degrees above the cloud point of the fuel.
- Buy your biodiesel blend pre-blended from your fuel supplier to ensure proper blending.
- As with any ultra-low sulfur diesel fuel (ULSD), biodiesel has a shelf life of 6 months to avoid product degradation. With the proper housekeeping and additives, the shelf life can be extended. Consult your fuel supplier.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DIESEL HELPLINE: (800) 929-3437 • info@megcorpmn.com

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NEBRASKA SOYBEAN BOARD

The Diesel Helpline assists diesel users with diesel and biodiesel-related questions, troubleshoots and diagnoses filter plugging problems, and provides guidance on proper fuel handling and tank maintenance practices.