

# MINNESOTA B20 HANDLING GUIDE

Biodiesel has the highest energy balance of any commercially available fuel, returning 5.5 units of energy for every one unit of energy needed to produce it.



In 2002, Minnesota became the first state to mandate the use of biodiesel when the legislature passed a law requiring that diesel fuel sold in Minnesota contain at least two percent biodiesel (B2). That law was implemented September 29, 2005. In 2009, the minimum requirement increased to five percent biodiesel (B5). In 2014, the minimum requirement increased to ten percent (B10) in the warmer months, reverting back to B5 in the colder months. Minnesota continues to be a renewable fuels leader by increasing the biodiesel content of diesel fuel in 2018.

Beginning May 1, 2018, Minnesota law requires that diesel fuel sold in Minnesota contain 20 percent biodiesel (B20) during warmer months, reverting back to five percent for the colder months.

Biodiesel is a clean-burning alternative fuel made from domestic, renewable sources. In Minnesota, the primary feedstocks for production are soybean and corn oil, but is also be produced from other vegetable oils, animal fats, and used cooking oil. The term biodiesel refers to pure, unblended fuel and is referred to as B100. Like petroleum diesel, 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. Biodiesel itself contains no petroleum but it can be blended with petroleum-based diesel at any percentage. Biodiesel blends up to B20 can be used in diesel engines without modifications. Biodiesel blends are indicated by a "B" and followed by a number which represents the percentage of biodiesel in a gallon of fuel. For example, B20 means 20% biodiesel blended with 80% petroleum diesel.

## B20 BASICS

- Starting May 1, 2018, all No. 2 diesel fuel sold for use in combustion engines must contain a minimum of 20% biodiesel until September 30, 2018.
- Each subsequent year starting in 2019, all No. 2 diesel fuel must contain a minimum of 20% biodiesel from April 1 through September 30.
- From October 1 to March 31, the minimum biodiesel requirement for No. 2 is 5%.
- No. 1 diesel is exempt from the biodiesel requirement year-round

In accordance with the Americans with Disabilities Act, this information is available in alternative forms of communication upon request by calling 651-201-6000. TTY users can call the Minnesota Relay Service at 711. The MDA is an equal opportunity employer and provider.



# MINNESOTA B20 HANDLING GUIDE

## Retrieving a Tank Bottom Sample

The Bacon Bomb sampler is a very reliable device and will retrieve the best bottom sample from a fuel storage tank. It is available in several sizes to fit almost all tank openings.

Make sure that you are sampling the lowest point of the tank. Underground storage tanks can shift and settle over time. Free water and sediment will settle to the lowest point of the tank. If possible, it is recommended to sample both ends of the tank to determine which end is the lowest point.



## STORAGE TANKS AND MATERIALS COMPATIBILITY

- Underground storage tanks are preferred to avoid temperature extremes.
- Aboveground storage tanks should be sheltered or painted with reflective paint to resist excessive heat in the summer. High temperatures during storage accelerate fuel degradation.
- Most elastomers are compatible with biodiesel blends of 20% or less and normal monitoring of seals and gaskets is sufficient; however, when replacing these parts, use Teflon® or Viton®.

## COLD WEATHER OPERABILITY

Like petroleum diesel fuel, biodiesel blends will gel in very cold temperatures. The cloud point of a fuel is the temperature at which the first solids form and are visible to the naked eye. Typically, No. 2 diesel fuel has a cloud point in the range of -5°F to 5°F and No. 1 diesel fuel has a cloud point of -40°F or less. 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. Diesel users must utilize blends of No. 1 and No. 2 diesel fuel, cold flow additives and/or fuel heating systems to keep fuel from gelling at temperatures below the cloud point.

**Remember to transition to B5 during October.** 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 Minnesota winters. All diesel fuel is different. Work with your fuel distributor to achieve the desired cold weather protection through the use of a ratio of No. 1 and cold flow additives as needed. Proper tank maintenance and housekeeping practices will further ensure cold weather operability.

## FUEL TANK MAINTENANCE

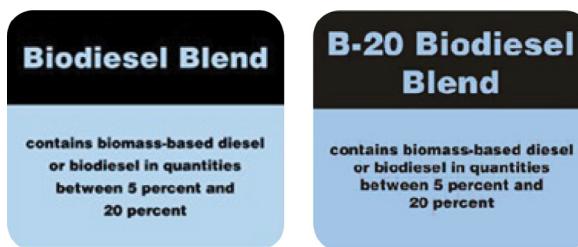
The importance of keeping your tank and fuel system free of contaminants has become more important with the introduction of ultra-low sulfur diesel (ULSD) and biodiesel. Water and sediment can cause fuel filters to plug prematurely and/or cause fuel quality issues. The presence of free water (water separated from the fuel) can promote fuel system corrosion and microbial growth. Microbes live in the interface that forms between the fuel and the free water. Since the introduction of ULSD, microbial contamination in diesel fuel has become a more common problem. It is recommended that storage tanks have a dispenser filter installed to keep any contamination from being passed along to vehicles. Inspections and basic housekeeping practices will help promote a problem-free experience. Tank venting is a source for water and contaminants to enter into the tank. Vents should be inspected for proper operation and to make sure that water cannot enter the tank.

### Checking Tanks for Water and Sediment

At minimum, it is recommended that storage tanks be checked for water and sediment twice a year, spring and fall. The tank should be checked by obtaining a tank bottom sample. This sample should be visually inspected for water and sediment. Use a clear mason jar for visibility. The sample should look clear and bright. If any free water and/or sediment are found or the sample appears hazy, the water should be removed. If free water is present, the fuel should be tested for microbial contamination. Your fuel supplier should be able to provide this test for a fee or refer you to a lab.

# RETAIL PUMP LABELING

Dispensers selling between B5 and B20 require the FTC-compliant label “Biodiesel Blend” or “B-20 Biodiesel Blend.”



During the B20 time period, **ALL** dispensers require the FTC-compliant label “Biodiesel Blend” or “B-20 Biodiesel Blend” (starting May 1, 2018 and April 1, 2019 and beyond).

- If the dispenser continues to sell a biodiesel blend between B5 and B20 after September 30, it may remain labeled “Biodiesel Blend” or “B-20 Biodiesel Blend”.

## BEST MANAGEMENT PRACTICES

- Always install a dispenser filter on a storage tank to keep contaminants from reaching vehicle tanks.
- Routinely check fill and vapor caps, hoses and gaskets for leaks.
- Check fuel containment area for water regularly. Remove water when needed.
- Buy your biodiesel blend pre-blended from your fuel supplier to ensure proper blending.
- Keep tanks as full as possible to reduce the amount of air and water entering the tank.
- Before winter, install a new dispenser filter, 30 micron or higher, to handle the increased viscosity of the fuel.
- As with any ultra-low sulfur diesel fuel (ULSD), biodiesel has a recommended shelf life of 6 months to avoid product degradation. With proper housekeeping and additives, the shelf life can be extended. Consult your fuel supplier.
- Before colder weather sets in, check tank bottoms for water. Transition to a lower biodiesel blend in winter months.
- Make sure fuel meets cold flow operability by discussing your needs with your supplier prior to purchase. Consider how long your fuel will be in storage. Fuel purchased in July does not contain cold flow additives unless requested. If you will be using this fuel in winter months, you may need to add cold flow additives or blend the fuel with No. 1 diesel.
- Winter fuel additives need to be administered when the fuel is a minimum of 10 degrees above the cloud point of the fuel.
- No. 1 diesel is lighter than No. 2 diesel. When using No. 1 to increase cold flow operability, put No. 1 in the tank first and No. 2 on top to achieve a better blend.

Using biodiesel is easy! B20 and lower blends are a drop-in replacement for petroleum diesel. They can be used in any diesel vehicle without modification, according to manufacturers’ recommendations and dispensed through existing fueling equipment.



# COMMON FUEL RELATED PROBLEMS

**Water Contamination/Icing** – Water is the number one cause of filter plugging issues in diesel engines. High water concentration in the fuel can lead to a buildup of water in the filters, causing filter plugging. Icing occurs when temperatures get below 32°F. At this temperature and below, excess water on the filter freezes and blocks the flow of fuel through the filter. The presence of water can also attract monoglycerides to the filter, causing it to plug. Routinely checking and removing water in tanks and filters can help minimize problems with plugged filters. Keep vehicle, equipment and storage tanks full to eliminate air space. Fleets should fill at the end of the day. Keep fuel caps on tight and regularly check hoses and gaskets for leaks. If using a water separating filter, check and drain if water is found. Avoid water absorbing filters.

**Microbial Contamination** – Since the introduction of ULSD in 2006, microbial contamination has become a more common problem associated with diesel fuel. Prior to ULSD, higher sulfur levels acted as a natural antimicrobial. Now, bacteria and fungus grow in the water/fuel interface. They can be present in supply tanks and lines, vehicle tanks and fuel system components. A distinct, pungent odor is normally present on a filter with microbial contamination. To prevent microbial contamination, follow the recommendations to prevent water contamination. If microbial contamination is suspected, it is recommended that you treat the contamination with a universally soluble (meaning soluble in fuel and water) biocide at the kill rate.

**Oxidation** – ULSD is more prone to thermal breakdown. High pressure common rail engines have also compounded this problem. Oxidation is characterized by fine, black sediment on the filter. It looks as if the pleats have been covered by permanent marker. The black filter is caused by hot fuel return which causes coking of the fuel (burning of the fuel causing it to break down and create sediment) and leads to filter plugging. Oxidation on the filter may look similar to microbial contamination, however will not have the distinct, pungent odor of microbial contamination. Premium diesel with a stability or anti-coking additive is recommended. If anti-coking additive is already being used, check for a mechanical reason that the engine is running hot.

**Paraffin Wax** – Paraffin is a naturally occurring material in diesel fuel. It does not come from biodiesel. Since the introduction of ULSD, diesel is less soluble, meaning it cannot hold the paraffin in solution. When the temperature of the fuel is at or below its cloud point, paraffin material can precipitate out and collect on the bottom of the tank. Wax anti-settling agent additives (WASA) are used to keep paraffins suspended in solution rather than collecting at the bottom of the tank where they can cause filter plugging.

**Monoglyceride Buildup** – Filters plugged with a substance similar to petroleum jelly can indicate one of three possible situations:

- Use of water absorbing filters which hold water on the filter media and then attract monoglycerides;
- Sediment on the filter which also attracts monoglycerides;
- Biodiesel that does not meet the specification of ASTM D6751.

Monoglycerides will continue to accumulate and do not go back into liquid form. Unlike the wax precipitation caused by paraffin, it takes temperatures of 150°F or more to melt monoglycerides back into liquid. In each of the first two instances, monoglycerides may not be the result of off-specification biodiesel. Regularly check tanks and equipment for water and contaminants and remove when necessary. Use particulate filters instead of water absorbing filters.

For More Biodiesel Information  
[www.mda.state.mn.us/biodiesel](http://www.mda.state.mn.us/biodiesel)

**DIESEL HELPLINE: 1-800-929-3437**

This helpline exists to assist diesel users with diesel- and biodiesel-related questions, troubleshoot and diagnose filter plugging problems and provide guidance on proper fuel handling and tank maintenance practices.

Biodiesel production reduces our dependence on foreign oil from unstable parts of the world, while expanding and diversifying our domestic refinery capacity.

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.