

Biodiesel Checklist



Biodiesel is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease. It can be blended at any level with petroleum diesel to create a biodiesel blend to be used in compression-ignition (diesel) engines. Biodiesel is often referred to as B100 or neat biodiesel in its pure, unblended form but most commonly blended as B5 (up to 5% biodiesel) and B20 (6 to 20% biodiesel). Biodiesel is cleaning-burning and a renewable substitute for petroleum diesel. Overall, using biodiesel as a vehicle fuel increases energy security, improves air quality and the environment, and provides safety benefits.



Benefits of Using Biodiesel

Energy Security and Balance: Because biodiesel is produced in the U.S. and is used in conventional diesel engines, it directly substitutes for or extends supplies of traditional petroleum diesel. Biodiesel has a positive energy balance meaning that it yields 4.56 units of energy for every unit of fossil energy consumed over its lifecycle.

Air Quality: Using biodiesel reduces emissions because carbon dioxide released from biodiesel consumption is offset by the carbon dioxide absorbed from growing soybeans or other feedstocks used to produce the fuel. B100 use reduces CO2 emissions by 74% compared with petroleum diesel.

Engine Operation: Biodiesel improves fuel lubricity (the ability to lubricate fuel pumps and fuel injectors which keeps moving parts from wearing prematurely) and raises the cetane number of the fuel (a measure of the ignition value of diesel fuel) compared to conventional diesel. Overall, it combusts easier and lubricates the fuel system better.

Safety: Biodiesel causes far less damage than petroleum diesel if spilled or released to the environment. It is also safer than petroleum diesel because it is less combustible, and safer to handle, store, and transport. The flashpoint for biodiesel is higher than 130°C, compared with about 52°C for petroleum diesel.

Biodiesel Blends

B5 and Low-Level Blends:

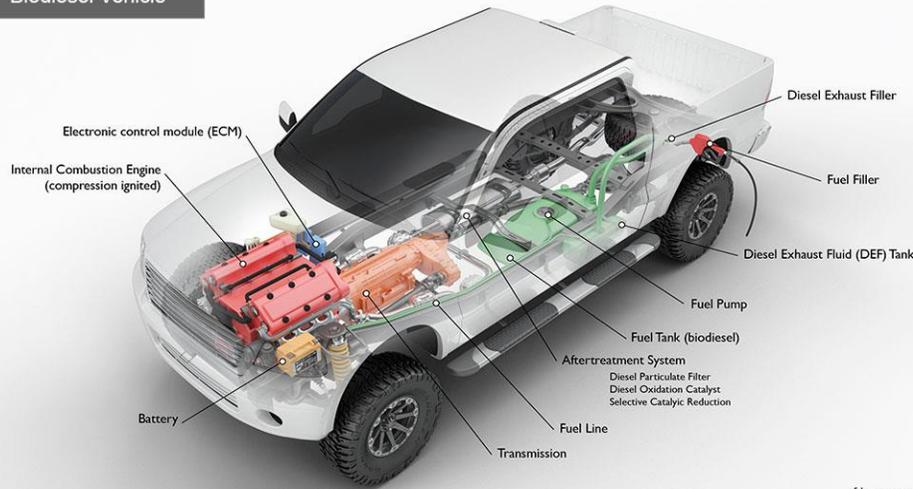
Low-level biodiesel blends such as B5 are ASTM approved for safe operation in any compression-ignition engine designed to be operated on petroleum diesel.

B20: This is a common and popular biodiesel blend in the U.S. because it represents a good balance of cost, emissions, cold-weather performance, materials compatibility, and ability to act as a solvent.

B100 and High-Level Blends:

Blends: These blends are less common than B20 and lower blends due to a lack of regulatory incentives and pricing. Pure biodiesel contains less energy on a volumetric basis than petroleum diesel and thus not used as a transportation fuel. Therefore, the higher the percentage of biodiesel, the lower the energy content per gallon.

Biodiesel Vehicle



Vehicle & Engine Warranties

All diesel engine companies warranty the engines that they make so if there is a problem with an engine part or with engine operation due to an error in manufacturing or assembly with the prescribed warranty period, the problem will be covered by the engine company.

Most major engine companies have stated formally that the use of blends up to B20 will not void their parts and workmanship warranties. This includes blends below 20% biodiesel, such as the 2% biodiesel blends that are becoming more common. Some engine companies have already specified that the biodiesel must meet ASTM D-6751 as a condition, while others are still in the process of adopting D-6751 within their company or have their own set of guidelines for biodiesel use that were developed prior to the approval of D-6751. It is anticipated that the entire industry will incorporate the ASTM biodiesel standard into their owner's manuals over time.



Production & Distribution

Production: Biodiesel is produced from vegetable oils, yellow grease, used cooking oils, or animal fats and through a process called transesterification – converting fats and oils into biodiesel and glycerin.

Distribution: Biodiesel is distributed from the point of production to fuel terminals and wholesalers by truck, train, or barge. B5 is sometimes shipped by pipeline and most biodiesel distributors will deliver B20 or B100 depending on the retailer's preference.

Performance & Operational Parameters

Biodiesel Performance in Cold Weather: The cold-flow properties of biodiesel blends vary depending on the blend of the biodiesel, the feedstock, and the petroleum diesel characteristics. In general, blends with smaller percentages of biodiesel perform better in colder temperatures. Both diesel and biodiesel blends can have compounds that crystallize in very cold temperatures, causing operational issues if not properly monitored. Users should work with their fuel provider to ensure the blend is appropriate.

Biodiesel in Diesel Engines: Currently, all OEMs of diesel vehicles approve the use of B5; however, it is important to check the OEM engine warranty to ensure that higher-level blends of this alternative fuel are approved. B20 and lower-level blends can be used in current engines without requiring modifications. Engines operating on B20 have similar fuel consumption, horsepower, and torque to engines running on petroleum diesel. B20 with 20% biodiesel content will have 1% to 2% less energy per gallon than petroleum diesel, but most B20 users report no noticeable difference in performance or fuel economy.

Emissions: Biodiesel also has some emissions benefits, especially for engines manufactured before 2010. For engines equipped with selective catalytic reduction (SCR) systems, the air quality benefits are the same whether running on biodiesel or petroleum diesel. However, biodiesel still offers better greenhouse gas benefits compared to conventional diesel fuel. The emissions benefit is roughly commensurate with the blend level; that is, B20 would have 20% of the emissions reduction benefit of B100.

Vehicles: Biodiesel and conventional diesel vehicles are one in the same. They have the same internal combustion engine and components. Although light, medium, and heavy-duty diesel vehicles are not technically alternative fuel vehicles, almost all can run on biodiesel. Biodiesel can be used in many diesel vehicles without any engine modification by using either B5 or B20.

Fueling Stations & Storage Equipment

Biodiesel blends are available at hundreds of stations across the country and some state laws require petroleum diesel to contain a small percentage of biodiesel. **Above-ground equipment** must be UL Listed for the fuel dispensed and below-ground equipment must comply with federal code. Most existing above-ground fuel storage tanks are compatible with biodiesel blends up to B100. If an existing tank is compatible, it must be cleaned prior to storing any blend above B5.

Underground storage equipment found under fueling stations prevent, detect, and contain leaks. Many installed pipes and underground storage tank equipment are compatible with higher level biodiesel blends.

Handling & Use

Blending Process

Splash Blending is appropriate for locations where the biodiesel and diesel fuel are loaded separately or at the same time through different incoming sources.

In-Line Blending occurs when the biodiesel is added to a stream of diesel fuel as it travels through a pipe or hose in such a way that the two become thoroughly mixed.

Storage & Stability

Blends should be stored in tanks that can ensure the fuel temperature will remain above the cloud point of the blend. 20 blends made from in-specification B100 can be stored for one year and possibly longer. The base diesel used to prepare a blend also influences the storage stability of the blended fuel. Again, we recommend the use of a synthetic antioxidant and monitoring of the fuel periodically if you store fuel for longer than 6 months.

Checklist for using Biodiesel

<input type="checkbox"/>	Know the Benefits of Biodiesel
<input type="checkbox"/>	Know Different Biodiesel Blends
<input type="checkbox"/>	Biodiesel Vehicle & Engine Warranties
<input type="checkbox"/>	Biodiesel Performance & Operational Parameters
<input type="checkbox"/>	Biodiesel Fueling Stations/Handling & Use