



Biodiesel Material Compatibility

With increased interest in reducing the use of petroleum distillate based fuels, many governments and regulating bodies encourage the use of biofuels, such as biodiesel. Biodiesel is the most accepted and widely used biofuel today, in part because of the ability to operate in standard diesel engines with little or no modifications. Not only is biodiesel environmental friendly, it also provides horsepower, torque, and mileage similar to conventional diesel, as well as improved lubricity. To meet the growing customer demand for filtration products compatible with biodiesel, Cummins Filtration certifies many of their products for use with Biodiesel blends. The information provided in this bulletin should be used as a guideline to determine compatibility of Cummins Filtration products.

Cummins Filtration products are biodiesel certified using only the prescribed Environmental Protection Agency (EPA) and European Certification Fuels. Equipment users should only use fuels recommended by the manufacturer and allowed by EPA or other local regulatory agencies. In the United States, EPA allows only registered fuels and fuel additives to be entered into commerce.

Biodiesel Terminology

- Biofuels - Fuels produced from renewable resources.
- Biodiesel - A fuel comprised of methyl or ethyl ester-based oxygenates of long chain fatty acids derived from the transesterification of vegetable oils, animal fats, and cooking oils. These fuels are commonly known as Fatty Acid Methyl Esters (FAME) or Fatty Acid Ethyl Esters (FAEE). Biodiesel properties are similar to those of diesel fuel, as opposed to gasoline or gaseous fuels, and thus are capable of being used in compression ignition engines.
- B100 - A fuel containing 100 percent biodiesel.
- Petrodiesel - Diesel fuel produced purely from petroleum. Petrodiesel can also be referred to as distillate diesel.

- Biodiesel Blend - A fuel comprised of a mixture of petrodiesel and B100 biodiesel. A biodiesel blend is typically designated by the percentage of biodiesel in the blend. For example: B5 is a fuel containing 95 percent petrodiesel and 5 percent B100.
- Rapeseed Methyl Ester (RME) diesel - Biodiesel derived from rapeseed oil. RME diesel is the most common biodiesel used in Europe.
- Soy Methyl Ester (SME or SOME) diesel - Biodiesel derived from soybean oil. SME diesel is the most common biodiesel used in the United States.
- BQ-9000 - The National Biodiesel Accreditation Program, which is called BQ-9000, is a cooperative and voluntary program for the accreditation of producers and marketers of biodiesel fuel. The program is a unique combination of the ASTM standard for biodiesel, ASTM D6751, and a quality systems program that includes storage, sampling, testing, blending, shipping, distribution, and fuel management practices.

Using Biodiesel

To successfully use biodiesel, it is imperative that the fuel be of high quality and meet or exceed the specifications outlined in this bulletin or filtration performance may be negatively impacted and engine damage will occur.

Requirements for Use with Cummins Filtration Products

Cummins Filtration requires that all biodiesel fuel blends be comprised of petrodiesel meeting ASTM D975, and B100 meeting either ASTM D6751 or EN14214. Diesel fuel and biodiesel blends up to B5 must meet the specifications found in Table 1: Cummins Inc. Required Diesel Fuel Specifications. For biodiesel blends above B5 and up to B20, Cummins Filtration requires that the fuel meet the specifications outlined in ASTM D7467. These specifications are summarized in Table 2: Summary of ASTM D7467 Requirements for B6 to B30 Biodiesel Blends.

Cummins Filtration standard service interval products (up to 500hr service interval) will perform acceptably when used with Biodiesel fuel blended with an acceptable diesel fuel up to 20 percent volume-concentration (B20).

Cummins Filtration Life of the Engine parts (parts that are not replaced regularly such as fuel pumps, primers, etc) will perform acceptably with Biodiesel fuel blended with an acceptable diesel fuel up to a 20 percent volume concentration (B20) only if the gaskets and seals are composed solely of a Viton or Fluorosilicone material. For information on the compatibility of a specific part, please contact Cummins Filtration Technical Assistance.

Special Note for North American Customers

For North American markets, Cummins Filtration requires that the biodiesel fuel blend be purchased from a BQ-9000 Certified Marketer. The B100 biodiesel fuel used in the blend must be sourced from a BQ-9000 Accredited Producer. Certified Marketers and Producers can be found at the following website: <http://www.bq-9000.org>. For areas outside of North America, consult your local Cummins Filtration representative for applicable fuel quality standards.

Biodiesel Use & Cummins Filtration Warranty

Cummins Filtration standard product warranty applies in the event that all of the specifications included in this bulletin are met. Engine damage, service issues, and/or performance issues determined by Cummins Filtration to be caused by the use of biodiesel fuel not meeting the specifications outlined in this Service Bulletin and supported by the EPA and local regulating authorities are not considered to be defects in product material or workmanship and are not covered under Cummins Filtration warranty.

Specifications

Table 1: Cummins Inc. Required Diesel Fuel Specifications	
Viscosity	1.3 to 4.1 centistokes at 40°C [104°F]
Cetane Number	42 minimum above 0°C [32°F]; 45 minimum below 0°C [32°F]
Sulfur Content	Not to exceed 5000 ppm. Other regional regulations may apply. In the US and Canada, 2007 and later on-highway engines require the use of ULSD (15 ppm maximum). ¹
Active Sulfur	Copper Strip Corrosion not to exceed Number 3 rating after 3 hours at 50°C [122°F]
Water Sediment	Not to exceed 0.05 volume-percent
Carbon Residue	Not to exceed 0.35 mass-percent on 10 volume-percent residuum
Density	0.816 to 0.876 grams per cubic centimeter (g/cc) at 15°C [59°F]
Cloud Point	6°C [10°F] below lowest ambient temperature at which the fuel is expected to operate
Ash	Not to exceed 0.02 mass-percent. For vehicles equipped with exhaust aftertreatment, there shall be no detectable ash in the fuel.
Distillation	10 volume-percent at 282°C [540°F] maximum, 90 volume-percent at 360°C [680°F] maximum, 100 volume-percent at 385°C [725°F] maximum. The distillation curve must be smooth and continuous.
Lubricity (HFRR or SLBOCLE)	HFRR: Maximum of 0.46 mm [0.018 in] Wear Scar Diameter (WSD) at 60°C [140°F]. SLBOCLE: Minimum of 3100 grams.

Table 2: Summary of ASTM D7467 Requirements for B6 to B20 Biodiesel Blends

Item	Performance Characteristics	Requirements		Test Procedure
		D1 Blends	D2 Blends	
1	Flash Point, °C minimum	38	52	ASTM D93
2	Water and sediment volume %, maximum	0.05	0.05	ASTM D2709
3	Physical Distillation, T90 °C, maximum	343	343	ASTM D86
4	Kinematic Viscosity, cSt at 40°C	1.3 - 4.1	1.9 - 4.1	ASTM D445
5	Ash, mass %, maximum	0.01	0.01	ASTM D482
6	Sulfur, st %, maximum	Per regulation (reference Table 1)	Per regulation (reference Table 1)	ASTM D5453, D2622, or D129, depending on sulfur content
7	Copper strip corrosion rating, maximum	Number 3	Number 3	ASTM D130
8	Cetane Number, minimum ¹	40	40	ASTM D613
9	Cloud Point ²	Per foot note	Per foot note	ASTM D2500, D4539, D6371
10	Ramsbottom carbon residue on 10% distillation residue, wt%, maximum	0.15	0.35	ASTM D524
11	Lubricity, HFRR at 60°C,	520	520	ASTM D6079

Table 2: Summary of ASTM D7467 Requirements for B6 to B20 Biodiesel Blends

Item	Performance Characteristics	Requirements		Test Procedure
		D1 Blends	D2 Blends	
13	Biodiesel content % (V/V)	6-20	6-20	D7371
14	Oxidation stability, induction time, hours, minimum	6	6	EN14112 (Rancimat)
15	One of the following must be met			
(a)	Cetane index, minimum	40	40	D976-80
(b)	Aromaticity, %vol, maximum	35	35	D1319-03
¹ Low ambient temperatures, as well as operation at high altitudes may require the use of fuels with higher cetane ratings.				
² The maximum cloud point temperature shall be equal to or lower than the tenth percentile minimum ambient temperature in the geographical area and seasonal time frame as defined by ASTM D975.				

For additional information, reference:

- 3379001-17 Cummins® Service Bulletin: Fuels for Cummins Engines
- www.epa.gov/otaq > Consumer Information > Fuels & Fuel Additives > Alternative/Clean Fuels
- www.biodiesel.org > Market Segments > Fleets



For more information, visit us at cumminsfiltration.com

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