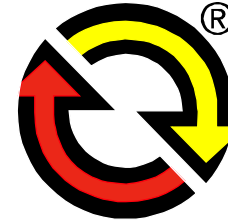


DETROIT DIESEL



DDC Prospective on Biodiesel

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DDC Biodiesel Overview

- DDC Biodiesel Position Statement
- Biodiesel Specifications
- Concerns and With Biodiesel Fuels (B5, B20)

DDC Biodiesel and Position Statement

DDC supports the development of alternative and renewable fuels because:

- It helps to reduce America's dependence on foreign oil
- It helps to reduce environmental contaminant concerns
 - Reduction in particulate matter
 - Reduction in carbon monoxide
 - Reduction in volatile organic compounds
 - Reduction in sulfur dioxide

Biodiesel Blends

- Most engine and vehicle manufacturers allow **biodiesel blends*** in concentrations up to five percent provided those blends meet accepted (**ASTM D6751**) fuel quality standards.
- To ensure proper quality, consumers should use only biodiesel-ULSD fuel blends that are properly mixed by a qualified biodiesel blender (**BQ9000 certified**).
- Consumers should not create their own biodiesel blends by adding biodiesel to ULSD fuel in a vehicle's fuel tank.
- There should be no operational problems if consumers switch from a biodiesel-ULSD fuel blend to ULSD fuel without biodiesel.

* **Biodiesel blends** are mixtures of petroleum-based diesel fuels and fuels produced from soybean oil, waste cooking grease, or other organic matter. These fuels may contain biodiesel in concentrations ranging from two percent to levels approaching 100 percent by volume.

DDC Biodiesel and Position Statement, Cont

DDC Lubricating, Fuel and Filter Requirements, 7SE 270 0107

Biodiesel fuels are alkyl esters of long chain fatty acids derived from renewable resources. Detroit Diesel Corporation highly recommends biodiesel fuels made from soybean or rapeseed oil through the proper transesterification reaction process. Other feedstock sources of biodiesel fuels such as animal fat and used cooking oils are not recommended by DDC. Biodiesel fuels meeting ASTM D 6751 specification, sources prior to blending can be mixed-up to 5% maximum by volume in petroleum diesel fuel. The resulting mixture must meet the fuel properties listed in Table 5-1 and ASTM D 975 specification.

Failures attributed to the use of biodiesel fuel will not be covered by Detroit Diesel product warranty. Also, any engine performance problem related to the use of biodiesel fuel would not be recognized nor considered DDC's responsibility

Detroit Diesel's Position on Biodiesel in 2007

B5 B20* Fuel Additive

Series 60			
• EPA'04 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel
• EPA'07 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel
MBE 4000			
• EPA'04 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel
• EPA'07 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel
MBE 900			
• EPA'04 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel
• EPA'07 Additives	Yes	No*	Not required. See comments on Fuel Additives and Supplemental Fuel

* Detroit Diesel does not approve B20 at this time, but is proactively testing B20 fuels to determine the long term effects upon EGR systems and particulate filter life.

Biodiesel Specifications

- ❑ Inconsistent quality across the nation is a significant concern
 - Promote the use of BQ-9000 or similar programs intended to provide consistent product
 - Greater enforcement of standards nationwide
- ❑ B5 and B20 Specifications
 - DDC supports the inclusion of B5 into ASTM D 975
 - Collaborate with biodiesel community, FIE and fuel filter manufacturers to develop needed specifications
- ❑ Industry Specification for Final B20 Blend
 - Support B20 EMA test specification
 - Develop stand alone ASTM B20 specification
 - ASTM D 6751 for biodiesel (B100) is nearly complete but lacks:
 - Density
 - Filter plugging point
 - Oxidation stability
- ❑ Desirable to harmonize ASTM D 6751 and EN14214 European spec for B100 and blends for all testing parameters

Future Testing Plans with B20 In 2007 Engines

- ❑ DDC continues to investigate the impact of B20 on current 2007 hardware including:
 - Overall engine durability
 - High pressure fuel injection systems
 - Aftertreatment devices
 - Seal compatibility with ULSD blends
 - Performance and emission compliance

Biodiesel Effect and Concerns On 2007 Engines

- ❑ Engine Emissions
 - Engines are certified with petroleum ULSD Fuel
 - NOx effect must be investigated
- ❑ EPA willingness to support biodiesel
 - Concerns about recommendations without sufficient data on emissions effect
- ❑ Long-term field experience
 - Engine seal compatibility with the reduction of aromatics in the ULSD fuel and biodiesel
 - DPF contamination and ash loading
 - Fuel system performance & risk (deposits, corrosion, oxidation stability)
 - Potential decrease in oil drain interval
 - sludge formation, viscosity increase/decrease, TBN depletion
 - Reduced cold flow properties
 - Fuel filter plugging
 - Microbial and water contaminations
 - Acid number increase with time
 - B20 solvency effect (biodiesel stronger solvent than conventional diesel), may require higher level of filter change