



## PERFORMANCE

**Successful alternative fuels fulfill environmental and energy security needs without sacrificing operating performance. Operationally, biodiesel blends perform very similar to low sulfur diesel in terms of power, torque, and fuel without major modification of engines or infrastructure.**

**Biodiesel offers similar power to diesel fuel.** One of the major advantages of biodiesel is the fact that it can be used in existing engines and fuel injection equipment with little impact to operating performance. Biodiesel has a higher cetane number than most U.S. diesel fuel. In more than 50 million on-road miles and countless marine and off-road applications, biodiesel shows similar fuel consumption, horsepower, torque, and haulage rates as conventional diesel fuel.

**Biodiesel provides significant lubricity improvement over petroleum diesel fuel.** Lubricity results of biodiesel and petroleum diesel using industry test methods indicate that there is a marked improvement in lubricity when biodiesel is added to conventional diesel fuel. Even biodiesel levels as low as one percent can provide up to a 65 percent increase in lubricity in distillate fuels.

**Compatibility of biodiesel with engine components.** The switch to low sulfur diesel fuel has caused most OEMs to switch to components suitable for use with biodiesel, but users should contact their OEM for specific information. In general, pure biodiesel will soften and degrade certain types of elastomers and natural rubber compounds over time. Using high percent blends can impact fuel system components (primarily fuel hoses and fuel pump seals), that contain elastomer compounds incompatible with biodiesel. Manufacturers recommend that natural or butyl rubbers not be allowed to come in contact with pure biodiesel. Blends of B20 or lower have not exhibited elastomer degradation and need no changes. If a fuel system does contain these materials and users wish to fuel with blends over B20, replacement with compatible elastomers is recommended.

**Biodiesel in cold weather.** Cold weather can cloud and even gel any diesel fuel, including biodiesel. Users of a 20 percent biodiesel blend with #2 diesel will usually experience an increase of the cold flow properties (cold filter plugging point, cloud point, pour point) approximately 2 to 10° Fahrenheit. Precautions employed for petroleum diesel are needed for fueling with 20 percent blends. Neat (100 percent) biodiesel will gel faster than petrodiesel in cold weather operations. Solutions for winter operability with neat biodiesel are much the same as that for low-sulfur #2 diesel (i.e., blending with #1 diesel, utilization of fuel heaters, and storage of the vehicle in or near a building). These same solutions work well with biodiesel blends, as do the use of cold flow improvement additives.

For more information, see the following report "[Quantification of the Cold Flow Properties of Biodiesels Blended with ULSD.](#)"