UltraClean BlenD®

Chevron

Renewable Energy Group

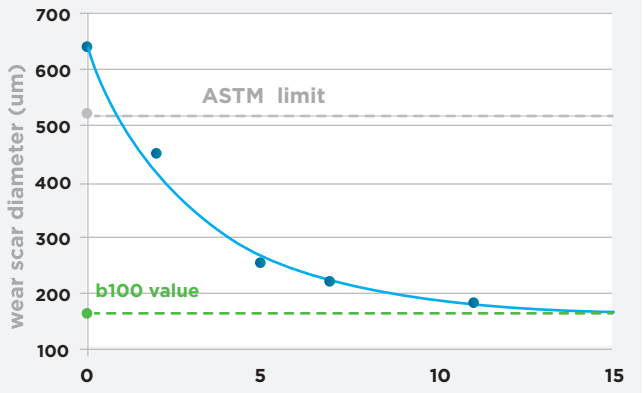
UltraClean BlenD® is a combination of our renewable diesel and our high-quality biodiesel. The result is a lower carbon intensity, high-performing, 100% renewable fuel. Renewable diesel is good fuel, but our biodiesel makes it even better. Renewable diesel may begin to freeze at temperatures higher than No. 2 petroleum diesel (ULSD) and form solid material that can clog vehicle fuel filters which can interfere with vehicle operation. By including high quality, low cloud point Chevron biodiesel in the renewable fuel blend the fuel's freezing point can be decreased to levels comparable to—or even better than—some ULSD fuels. UltraClean BlenD® has superior lubricity to renewable diesel and can even have a lower freezing point.

Benefits of UltraClean BlenD®:

- **One of the lowest** carbon intensity liquid fuels on the market today
- **Higher Cetane**, added lubricity, and lower carbon engine emissions than Ultra-Low Sulfur Diesel (ULSD)
- **A "drop in fuel"** that typically requires no vehicle or fuel infrastructure changes
- **Blending renewable diesel** with biodiesel adds beneficial properties while extending competitive renewable diesel supplies

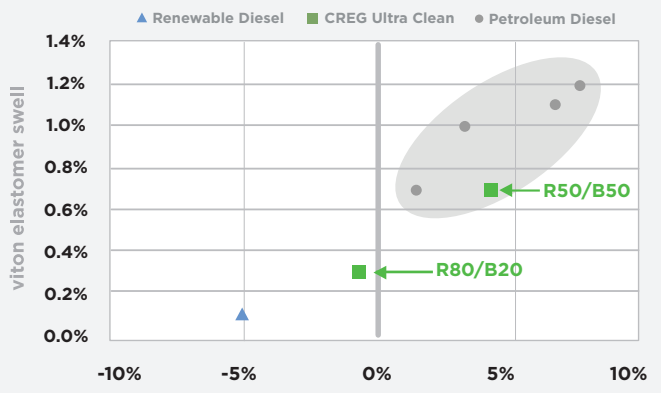
BD/RD blends offer enhanced lubricity for less wear on engine parts & fuel pumps

Lubricity Graph



BD/RD blends better match elastomer swell expected from petroleum diesel

Elastomer swell graph:



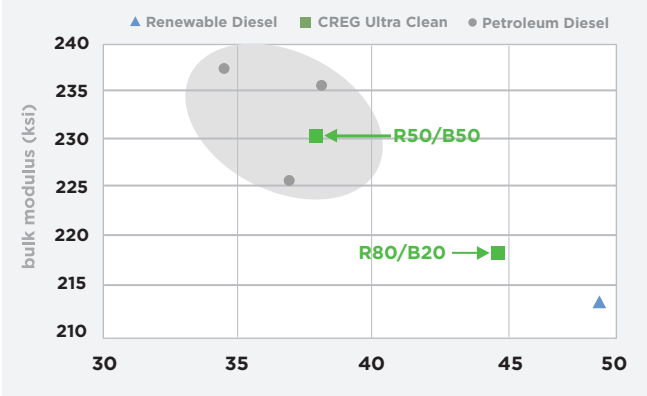
Biodiesel is one of the best diesel fuel lubricants, and adding it to fuels with poor lubricity—such as renewable diesel—can help limit engine part wear. As this graph shows, as little as 2% biodiesel will allow renewable diesel to meet the ASTM lubricity baseline and including additional biodiesel may help reduce wear scar diameter even further. Increasing the lubricity of a diesel fuel can help an engine run smoother and cooler and may avoid excessive wear on the engine—potentially leading to less downtime and maintenance.

It is fairly common knowledge that biodiesel can swell elastomeric parts (seals and gaskets) made from nitrile rubber and similar materials more than petroleum diesel does. It is less commonly known that renewable diesel can do the opposite and can cause some seals and gaskets to shrink, potentially leading to fuel leaks and reduced engine performance. This elastomer shrinkage is a result of the lack of aromatic content in renewable diesel, which is a significant difference from petroleum diesel. Blending biodiesel and renewable diesel can provide a finished fuel with elastomer interactions similar to conventional fuel.

Chart sources: Chevron Renewable Energy Group compiled from various third-party lab reports*

BD/RD blends behave more like petroleum diesel than neat RD

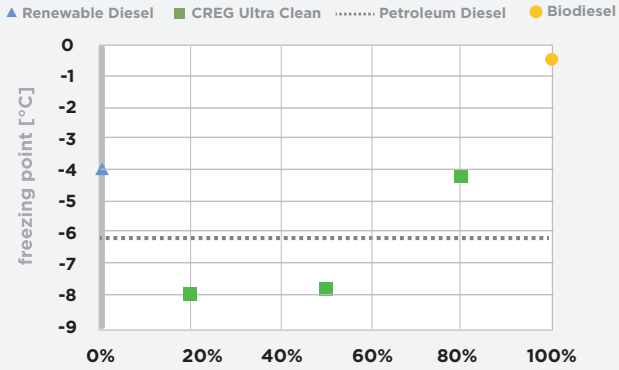
API Gravity Graph:



API Gravity

BD/RD blends can have lower freezing point test results than RD or even ULSD

Freezing Point Graph:



Volume % BD in RD

The density of renewable diesel (RD) is lower than conventional diesel. While this does not have much impact on the quality and combustion of the fuel, it is another example of a physical property of RD that is different than petroleum diesel. Blending biodiesel into renewable diesel creates a finished fuel with physical properties more similar to petroleum diesel, resulting in less impact to your engine when switching from petroleum fuel to renewable fuels.

While renewable diesel falls under the same ASTM specification as petroleum diesel, there is common confusion that this means it performs the same as petroleum diesel in cold weather. Renewable diesel can freeze solid when stored near its Cloud Point, which is significantly different than conventional diesel. One strategy to avoid this problem is to use the Freezing Point test to determine appropriate temperature limits for storing and handling renewable fuels. Our research has found that the Freezing Point of RD can be reduced by including high quality, low Cloud Point biodiesel. This creates a 100% renewable fuel that can be stored, handled, and used successfully at lower temperatures than RD alone. If temperatures continue to drop, adding petroleum diesel content in the finished fuel to further reduce the possibility of gelling issues and to ensure good cold temperature performance may be necessary. In locations with daytime high temperatures below freezing, we recommend including petroleum diesel in your renewable fuel blend.

Chart sources: Chevron Renewable Energy Group compiled from various third-party lab reports*

UltraClean Blend®

Better across the board. It's performance, quality, price and cold weather optics help make it more convenient to lower carbon emissions with a completely renewable fuel. Reach out to your sales expert at Chevron Renewable Energy Group for more information and any questions you may have.

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