

## Recommendations

- ◆ If using biodiesel, follow the engine manufacturers recommended maximum biodiesel content (B5, B10, B20, etc)
- ◆ To protect sensitive (and expensive) fuel system components from premature fuel related wear, add Stanadyne Performance Formula® diesel fuel additive every time you refuel at a ratio of 4 ounces per 15 gallons of fuel.

**STANADYNE DIESEL FUEL ADDITIVES COMPLY WITH FEDERAL LOW SULFUR CONTENT REQUIREMENTS FOR USE IN DIESEL MOTOR VEHICLES AND NONROAD ENGINES.**



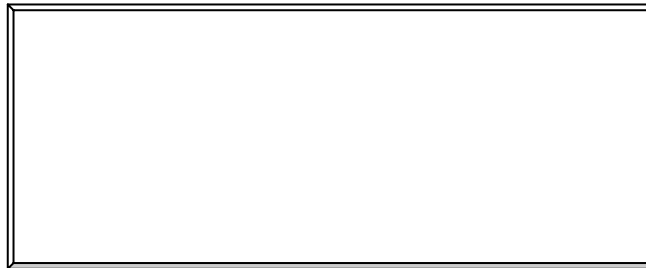
**NOTE:** additional information about diesel fuels and the complete line of Stanadyne Diesel Fuel Additives can be found on our website at [www.stanadyne.com](http://www.stanadyne.com) or by calling Customer Support at 800-842-2496

## Remember...

Stanadyne Fuel Additives are the only ones that:

- ◆ Are made by a diesel fuel injection equipment company and;
- ◆ Are approved by major diesel engine manufacturers including GM, Ford, VW, John Deere, Navistar, Caterpillar & AM General and;
- ◆ Have been proven to perform the best in independent tests.

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Contact your Local Stanadyne Authorized Dealer:



# **STANADYNE®**

*"Your Global Partner in Precision Products"*

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# **Diesel Fuel Update**

from

## **STANADYNE®**



Diesel Fuels continue to change and as a diesel engine owner or operator you want to know how you might be affected by these changes. By now you have heard of Ultra Low Sulfur Diesel. ULSD (also referred to as S15) has been in use in on-highway applications throughout North America since October 2006.

Starting Dec. 1, 2010 only ULSD will be available for all on- and off-highway applications. It's use is also spreading to many other parts of the world. You may also have heard of biodiesel. This fact sheet will inform you of some of the advantages and disadvantages of these fuels and how Stanadyne's products and services can help.

## Ultra Low Sulfur Diesel

Beginning in 2006 diesel fuel for North American on-highway application use could have no more than 15 parts per million sulfur. This was a 97% reduction from the previous limit of 500 ppm. Lowering the sulfur content preserves the proper function of the newest emissions reducing systems, such as particulate traps. Sulfur is removed from diesel fuel at the refinery by a process called hydro-treating which also affects the fuel in other ways. The American Society for Testing and Materials (ASTM) publishes the standard for diesel fuel including ULSD - ASTM D975 - which the refineries comply with.

### Advantages of ULSD

- + Reduced exhaust emissions
- + Improved cold startability and reduced white smoke at cold startup.

### Disadvantages of ULSD

- Higher Cost
- Slightly lower energy content. Less BTU's per gallon can result in reduced power and fuel economy
- Possible premature fuel system wear. The process of removing sulfur can also reduce the natural lubricity of the fuel. However, there is now a lubricity specification in the D975 standard but it is not as high as what the fuel system manufacturers recommended.
- Compromised fuel stability. ULSD tends to be less stable and will deteriorate sooner than the previous low sulfur diesels.
- Fuel System leaks. Reducing sulfur also reduces aromatics. This can result in natural rubber seals and hoses used in some fuel system components shrinking and resulting in fuel leaks. *NOTE: Stanadyne fuel systems do not use natural rubber seals but use Viton® seals instead which aren't affected by the aromatic reduction.*

## Biodiesel

In addition to mineral diesel, diesel fuel can also be made from various vegetable oils including Canola and Soybeans. The ASTM has released a standard, D-6751, for these biodiesel (biomass based) fuels. Stanadyne, as well as the other major fuel injection equipment manufacturers, have determined that a blend of 5% biodiesel that meets the ASTM D-6751 standard and 95% mineral diesel that meets the ASTM D-975 standard is acceptable for use with their fuel system components. This blend is referred to as B5 (see note below regarding additive recommendation). As with ULSD, biodiesel fuel also has various advantages and disadvantages including:

### Advantages of biodiesel

- + Made from a renewable resource
- + Almost no sulfur (in the biodiesel itself)
- + Higher cetane value (51 min vs 40 min for mineral diesel)
- + Excellent lubricity

### Disadvantages of biodiesel

- Could harm certain elastomers (seals)
- Has poor resistance to oxidation especially when blended with ULSD. This results in spoilage and the formation of acids and varnishes leading to corrosion issues.
- Biodiesel can absorb much more water than mineral diesel leading to water contamination issues.
- Has slightly lower energy content.



## What Can Help?

As a major manufacturer of diesel fuel injection equipment for over 50 years, Stanadyne is familiar with fuel related problems such as water in fuel, low lubricity, and the ongoing problem of low cetane values in North American diesel fuels. Fortunately Stanadyne makes a diesel fuel additive that is designed to address these and other issues - **Stanadyne Performance Formula® All Season Diesel Fuel Additive**:



- ✓ Lubricates fuel system components to help prevent wear caused by low lubricity fuels.
- ✓ Increases cetane value to help starting, reduce smoke, increase power, and increase fuel economy.
- ✓ Provides cold weather protection by reducing the fuel pour point by up to 40° F (22 °C).
- ✓ Helps demulsify water so that the water separator can work more effectively. Stanadyne additives do not contain alcohol which can emulsify water into the fuel where it then comes out of suspension when the engine cools down and corrodes expensive fuel system components.
- ✓ Suitable for use with all fuel system types including common rail.

***Protect Your Investment - Use Stanadyne Performance Formula® Diesel Fuel Additive at every fill-up!***

***Note: Stanadyne Performance Formula will provide water separation benefits with biodiesel blends up to B20.***