

# Diesel Fuel: Using the New Low Sulfur Diesel

Category: Fuel Additive

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## Introduction:

Many customers have expressed a desire for information and recommendations regarding the use of EPA mandated low sulfur diesel fuel and the possible effect it may have on their engines and/or fuel injection systems. The fuel is documented to produce fewer particulate, sulfur dioxide and NOx emissions.

## Background:

Low sulfur diesel fuel may be produced in a number of ways. Some of these methods, such as using base stocks naturally low in sulfur content, yield a fuel with operating properties undistinguishable from earlier diesel fuel. One of the most cost effective processes to produce compliant fuel from high sulfur base stocks is called "hydrotreating". This process involves the introduction of hydrogen in the refining process to remove sulfur and reduce aromatic hydrocarbons to their aliphatic (saturated) forms, also positively influencing cetane index.

Hydro processed low sulfur diesel fuel has been demonstrated to possess poorer lubricity properties than earlier diesel fuels. This loss of lubricity has resulted in high rates of fuel system component wear in tests run by some fuel injection equipment (FIE) manufacturers. Experience in European countries running hydro processed low sulfur diesel confirms the potential premature failure of FIE components but also proves the value of advanced lubricity additives in restoring normal operating life when properly blended in the low lubricity fuel. Investigations conducted by American and International industry groups have documented the existence of the phenomenon and have put forth two proposed test methods for evaluating lubricity: the modified Ball On Cylinder Lubricity Evaluation (BOCLE) as developed by Or. Paul Lacey of Southwest Research in San Antonio, Texas, and the High Frequency Resonating Rig (HFRR) developed by the 180 in Great Britain. Both tests have been substantiated to provide excellent correlation to actual pump wear data.

## Facts:

Many of the failures on class 8 type engines are now thought to have been related to the negative response of seal materials when exposed to the new fuels after having been exposed for long periods of time to traditional fuels. These problems appear to be past and reports of recurrences once seals are replaced are exceedingly rare. This type of failure is not a lubricity issue. Some fuel pump manufacturers have reiterated long standing warranty policies of declining coverage on components which have worn out, regardless of age, if no defect in materials or workmanship is found. Premature failures of pumps running low sulfur fuel have been observed and are attributed to poor lubricity. The majority of failures involve distributor type fuel pumps found on small and mid-size diesels typically rated below 250 horsepower. At least one major diesel engine OEM has recommended the use of lubricity enhancing fuel additives.

## PENRAY'S Recommendation:

Since the character of the fuel being used is unknown to the consumer, he can not predict the effect on his system. Most major heavy-duty engine manufacturers report no increase in FIE problems. It is the position of Penray that consumers should educate themselves and discuss this issue with their engine manufacturer. If, after such discussion, the customer wishes to take preventative action to insure the normal operating life of their injection pumps and injectors, we recommend the use of a well documented lubricity enhancing fuel additive such as Fuel Prep 1000 (at 1:350) or Fuel Prep 2012 (at 1:7,000).