

INNOVATIONS

BY GROWMARK ENERGY DIVISION

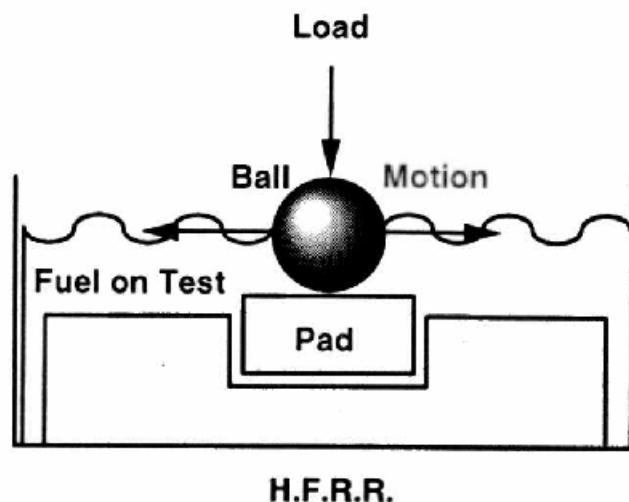
ASTM Diesel Fuel Lubricity Standard

The ASTM (American Society for Testing and Materials) has recently adopted a new specification regarding lubricity in diesel fuel effective January 1, 2005. The lubricity specification comes under the ASTM D-975 Standard Specification for Diesel Fuel Oils.

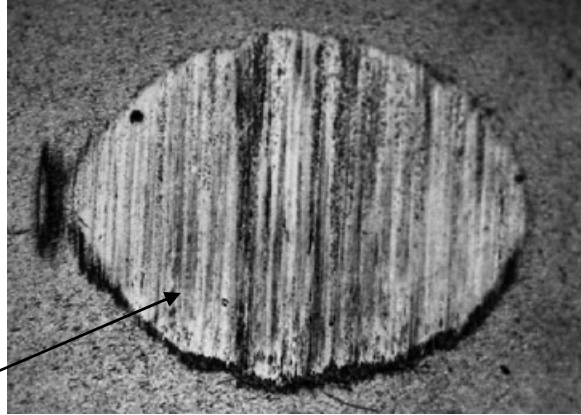
Since the introduction of low sulfur fuel in 1993, low sulfur diesel fuel has caused concerns on the lubricity quality. A lubricious fuel provides protection to the fuel system by extending pump and injector life, reducing repair costs and reducing downtime for the user. Some fuel pump systems are more susceptible to damage from a low lubricious fuel than others. As an example, the rotary type fuel pump looks to the fuel for the lubricity protection, where some other pump types use lubricating oil for a portion of the lubricity protection. This is not to say that one pump design is better than another, it is to point out that lubricity properties are very important to engine performance and even more so in certain types of fuel pumps.

Until now there has been no specification for fuel lubricity, only recommendations from groups such as the EMA (Engine Manufacturers Association). The new ASTM specification requires the fuel to possess a maximum 520 micron scar diameter through the HFRR (High Frequency Reciprocating Rig) test method. The new specification is primarily the result of the poor lubricity characteristics of ULSD (Ultra Low Sulfur Diesel) that will officially be introduced in June 2006, although industry experts would say that 50% of #2 diesel fuel today would not meet the 520 threshold.

The HFRR lubricity test uses a hardened steel ball vibrating in loaded contact with a hardened steel plate immersed in the test fuel. Results from the HFRR lubricity test is based on comparison of the wear scar diameter with that of a reference fuel. **The smaller the scar diameter the better the results.**



wear scar
(magnified)



Although the 520 micron minimum wear scar diameter will provide a baseline for lubricity, it is well below what the EMA would prefer. The EMA has recommended a minimum 460 micron wear scar diameter through the HFRR test method as a standard for adequate fuel lubricity. The 520 micron scar diameter was a compromise within the various industry participants (engine manufacturers, fuel manufacturers, etc.). When measuring engine and fuel system performance, the 460 micron wear scar diameter measurement would have been a much more desirable lubricity standard to work from due to both the importance of lubricity in the fuel pumps and injectors of the heavy duty engines we provide fuel for and also from the standpoint of the blending of #1 diesel fuel for cold temperature operability.

Fuel terminal operators didn't expect to have to deal with this issue until mid 2005, believing that diesel fuel with a lubricity additive to meet the new ASTM specification would originate at the refinery gate and be shipped through the pipeline system to terminals meeting the January 1, 2005 timeline. This issue took a pivotal turn during October when pipeline operators said they would not allow diesel fuel with lubricity additive to be shipped through its' pipeline system, even on a temporary basis. Testing revealed that the lubricity additive had the potential to contaminate batches of jet fuel that interfaces or pick up residue off pipeline walls with the additized diesel fuel during shipment.

Lubricity additive injection appears now to fall at the terminal operator level. In most cases, this means installing injection equipment at the terminal. With the impending target date, terminals as a whole will not meet the January 1, 2005 deadline.

Adoption of ASTM standards takes place on a state by state basis. The states that have adopted the ASTM lubricity standard at the time of this communication are: Arkansas, California, Connecticut, Delaware, Idaho, Illinois, Iowa, Kansas, Louisiana, Michigan, Montana, New Hampshire, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Washington, West Virginia and Wyoming.

It does not appear that any of the states in our marketing geography will either adopt or enforce the ASTM lubricity standard with the effective date of January 1, 2005. Adoption and/or enforcement will most probable occur later in the 2005 calendar year or January 1, 2006 giving additional time for infrastructure to be put into place. Also, ASTM members are voting in December to postpone this lubricity change in D-975 one year (January 1, 2006).

Regardless of the vote or implementation schedule, this issue highlights the importance of a good lubricity quality in diesel fuel or the lack of. Our organization has understood and addressed this issue for many years.

Dieselex Gold has contained additional lubricity from inception and was further enhanced with lubricity to meet the needs of the 1993 low sulfur fuel requirements. Lubricity (friction modifiers) has always been an important part of the Dieselex Gold package. Current lubricity test results with the Dieselex Gold product indicates a wear scar diameter using the HFRR test method consistently and constantly well below the 460 micron EMA maximum target. It appears that Dieselex Gold will exceed lubricity requirements ULSD will need. But “appears” is not good for us—as we will continue to test the Dieselex Gold product as ULSD arrives in the marketplace.

Each of us knows that biodiesel has excellent lubricity qualities and can be a remedy, but we also know that not every gallon of diesel fuel will use a biodiesel blend. I know of no better solution to the lubricity issue than a blend of Dieselex Gold with soy biodiesel.

Lubricity in the engine and fuel system is important to performance and equipment longevity. Why should our customers and prospects use anything less than optimal products (compromise of the 460 vs. 520 micron wear scar diameter; delayed implementation: January 1, 2005 vs. January 1, 2006; etc.). Your role as a solution provider and energy information source allows you to reinforce with customers that they have been using a diesel fuel product (Dieselex Gold) that has been supplying their lubricity requirements. This also provides an avenue with prospects to educate them with facts regarding lubricity and a proven product to meet the lubricity needs of their diesel engines.

Dieselex Gold continues to be the absolute best fuel to power and protect diesel engines!

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