

Reduced Lubricity Increases Fuel Pump, Injector Wear

Diesel fuel now undergoes additional steps in the refining process to meet the EPA's new ultra low sulfur requirement of <15 ppm. It's these additional steps that reduce a fuel's lubricity. Because fuel pumps and injectors rely on diesel fuel for lubrication, less lubricity means increased pump and inject wear and possibly failure.

The standard test method for evaluating the lubricity of diesel fuels is ASTM D6079. A 2mL fuel sample is placed in the test reservoir of a high frequency reciprocating rig (HFRR) and adjusted to either of the standard temperatures of 25 or 60°C. The preferred test temperature is 60°C, except where there may be concerns about loss of fuel because of its volatility or degradation at this temperature.

When the fuel's temperature has stabilized, a vibrator arm holding a non-rotating steel ball and loaded with a 200g mass is lowered until it contacts a test disk completely submerged in the fuel. The ball is caused to rub against the disk with a 1mm stroke at a frequency of 50 Hz for 75 min. The ball is then removed from the vibrator arm and cleaned. The dimensions of the major and minor axes of the wear scar are then measured under 100X magnification and recorded. If the wear scar is >520µ (microns), the fuel doesn't have sufficient lubricity to properly lubricate the fuel pump and injectors.

Fuels that fail lubricity testing may be treated with lubricity agents. Always consult your fuel supplier for details before doing so.