

# Maximum Viscosity Protection

Hard-working diesel engines present a serious challenge to the lubricants that protect them. Tight clearances and intense pressures can generate enough force to tear apart the molecular structure of the oil, causing permanent viscosity loss. Permanent viscosity loss is termed “shear” and leads to accelerated equipment wear, oil consumption and deposit formation.

Shear stability measures a lubricant’s ability to withstand shearing forces without degrading to a lower viscosity. To meet CJ-4 requirements for shear stability, the American Petroleum Institute (API) requires diesel oils to pass the Kurt Orbahn 90-Cycle Shear Stability Test.

Resisting shear and maintaining protective viscosity in the harsh operating conditions of diesel engines is challenge enough for many diesel oils, but maintaining viscosity in the face of fuel dilution is another challenge altogether. Factors such as frequent starts, excessive engine idling, short trips and cold weather have contributed to moderate levels of fuel dilution in diesel applications for years, while recent issues with emission systems have brought the fuel dilution problem to a whole new level.

For example, AMSOIL has documented increasing fuel dilution levels in 2007-2009 Caterpillar C13 and C15 on-highway engines. There are many possible causes, including problems with a unit injector or leaking seals. Another cause of fuel dilution is new emission systems using in-cylinder post-fuel injection, a process most 2007-2010 light-duty GM, Ford and Dodge diesel pickups use to regenerate the diesel particulate filter.

Because diesel fuel is a natural solvent, it causes a multitude of problems when it contaminates the oil, including reduced oil viscosity, reduced oil film strength, increased engine wear (particularly in the cylinder/ring area), increased volatility, weakened lubricant detergency, accelerated lubricant oxidation, varnish formation, acid formation/corrosion and low oil pressure.

The most notable problem associated with increased fuel contamination is reduced viscosity and the corresponding effect it has on oil performance. When combined with shearing conditions, as little as 4 percent fuel dilution is generally enough to reduce an oil’s viscosity to less than the specified viscosity grade.

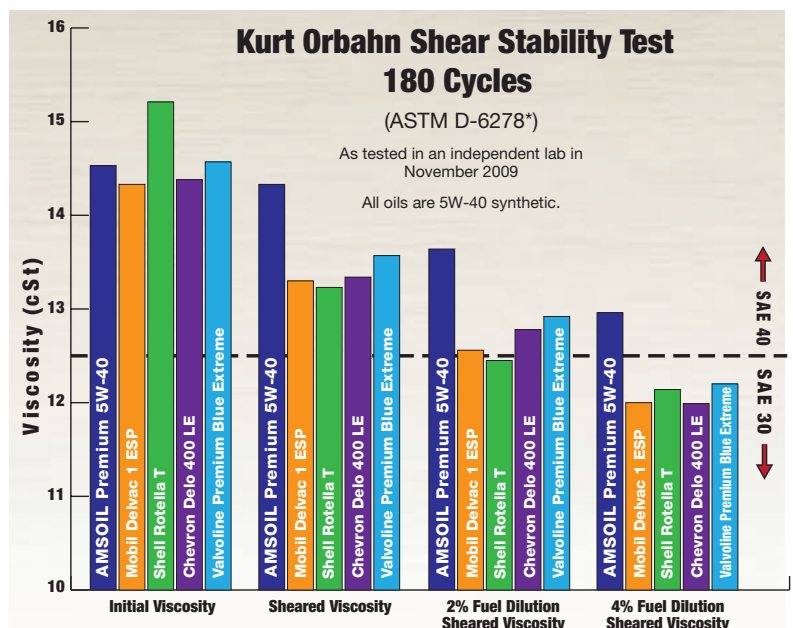
AMSOIL sent five competitive synthetic CJ-4 5W-40 diesel oils to an independent laboratory for shear stability testing. Knowing the tough environment that diesels present to lubricating oils, AMSOIL doubled the standard Kurt Orbahn 90-cycle test and had the oils tested for 180 cycles. Samples were then contaminated with 2 and 4 percent ultra low sulfur diesel (ULSD) fuel. As the graph shows, even after being shear tested for twice the industry standard and con-

taminated with 4 percent fuel dilution, AMSOIL maintained viscosity and was the only oil to stay within an SAE 40 viscosity rating. As other oils lost viscosity due to shearing forces and fuel dilution, their ability to protect against wear was jeopardized.

“The superior shear stability of AMSOIL Premium API CJ-4 Synthetic Diesel Oils, even in the face of fuel dilution, is a significant selling point for AMSOIL Dealers,” said Executive Vice President Alan Amatuzio. “Although some emission system hardware has forced AMSOIL to scale back its drain recommendations in the corresponding applications, shear stability test results show AMSOIL is the best choice for keeping diesel engines protected and running at peak performance.”

AMSOIL Premium Diesel Oils are formulated with an ultra shear stable polymer system that maintains viscosity better than inferior products. Testing proves that AMSOIL provides unsurpassed shear stability, offering better viscosity control than competitive oils.

Even though recent fuel dilution issues forced AMSOIL to adjust its Premium API CJ-4 Synthetic Diesel Oil drain interval recommendations in 2007-2010 Dodge 6.7L, Ford 6.4L and GM 6.6L light-duty turbo-diesel pickups and 2007-2009 on-highway Caterpillar C13 and C15 engines to the manufacturer-recommended drain intervals, AMSOIL Premium Diesel Oils remain the premium choice for diesel applications. AMSOIL Premium Diesel Oils resist viscosity loss from both shearing forces and fuel dilution to maintain their protective film strengths, providing superior protection to all diesel engines.



\*ASTM D-6278 specifies 90 cycles. AMSOIL requested a double-length test.