Service Line
NEWS AND IDEAS FROM AMSOIL

AMSOIL Severe Gear Provides Unsurpassed Shear Stability

Model-year 2007 turbo diesel pickup trucks, V-10 gasoline pickups and sport utility vehicles (SUVs), and high-horsepower V-8 trucks have more towing and payload capacities than in previous years, yet their differentials have not changed. There has been a 34% increase in engine horsepower over the last decade, while axle gear sizes have remained constant, sump capacities have been lowered and drain intervals extended. In the light truck segment there has been a 93% horsepower increase since 1981. In vehicles such as a fifth-wheel equipped Ford F-350 Super Duty, towing capacities have reached a high of 19,200 lbs. And testing shows that in new axle applications simulating trailer towing at 88 km/h (55 mph) at a 3.5% grade temperatures can reach as high as 188°C (370°F). Stress on differentials has also increased in limousines, conversion vans, and trucks and cars with modified, high-performance engines. More power, more towing capacity and higher hauling limits greatly increase the stress that causes heat and wear.

Most vehicles operate under severe service as defined by vehicle manufacturers, but the majority of vehicle owners are unaware of this. Severe service applications include towing, hauling, plowing, off-road use, frequent stop-and-go driving, steep-hill driving and temperature extremes. Severe service applications are on the rise. For example, more than 90 percent of Ford Super Duty pickups are used for towing. Severe service increases the need for better gear lubrication.

AMSOIL Severe Gear Gear Lubes provide superior performance and protection. Their well-balanced synthetic formulation reduces friction and wear and improves efficiency. In fact, AMSOIL recently completed a white paper entitled A Study of Automotive Gear Lubricants (G2457) that proves AMSOIL Severe Gear Synthetic 75W-90 Gear Lube's superiority. This issue of Service Line examines the results of one of the tests from the white paper, the KRL 20-Hour Shear Stability Test.

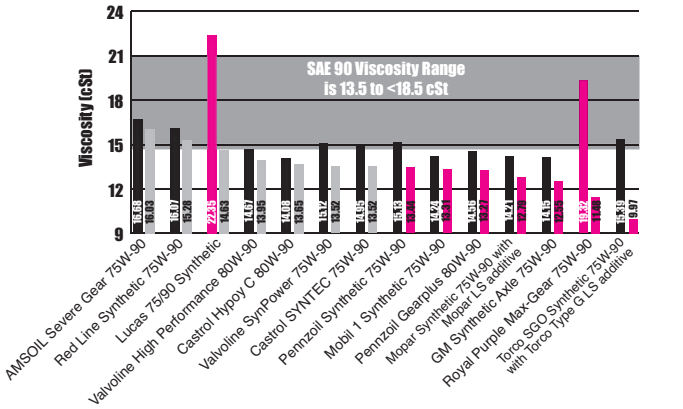
KRL Shear Stability Test

Similar to 5W-30 automotive engine oils, 75W-90 gear lubricants are defined as multi-viscosity. This means the gear lubricant has enough viscosity to protect against wear at high temperatures, as well as good flow properties at cold temperatures. Many gear lubes cannot fulfill both requirements without the use of VI improver additives. VI additives keep lubricants from becoming too thick to flow in cold temperatures and too thin to protect in high temperatures. VI additives have many uses. If used improperly in gear lubricants, however, they can break down and lose viscosity through a process called shearing. Because of this, the SAE incorporated the CEC L-45-A-99 (KRL) 20-Hour Shear Test as a requirement for all automotive gear lubes. This specification requires that gear lubes not shear down and fall below the minimum viscosity for that grade. Testing showed that Lucas 75/90 Synthetic, at 22.35 centistokes (cSt), and Royal Purple Max-Gear 75W-90, at 19.32 cSt, both exceed the maximum 18.49 cSt initial viscosity, failing the SAE J306 requirements for SAE 90 gear lubes. All other gear lubricants were within the required high-temperature viscosity range prior to the KRL Shear Stability Test.

Viscosity measurements following the KRL test revealed that seven gear lubes sheared down below minimum viscosity requirements, failing the shear stability requirements of the SAE J306. The two gear lubes with the largest viscosity loss, as reflected in the following graph, were Royal Purple, losing 40.6% of its viscosity, and Torco SGO Synthetic, losing 35.2% of its viscosity. Royal Purple was the only gear lube to fail both the initial viscosity requirements and the shear stability requirements. It started out too thick and ended up too thin. Torco SGO Synthetic finished the shear stability test as the thinnest of all the oils at 9.97 cSt, far below the minimum 13.5 cSt requirement. Lucas 75/90 Synthetic, with an initial viscosity that exceeded the maximum requirements by 20.8%, passed the shear stability test, but lost 34.5% of its viscosity, the third largest loss of viscosity. Both OEM gear lubes, GM and Mopar, failed the minimum viscosity requirements after the shear test. Of all the gear lubes tested, half did not meet the SAE J306 shear stability requirements.

AMSOIL Severe Gear 75W-90 was in the proper initial viscosity range and retained the highest viscosity after the shear test with a viscosity of 16.03 cSt – the mid-point of the SAE 90 viscosity grade.

Viscosity Before and After KRL 20-Hour Shear Stability Test



Lakeland Fire Department Trusts AMSOIL

Volunteer fire departments routinely subject equipment to some of the most harsh conditions possible. Sometimes a vehicle will sit for two weeks without being started, other times they are started fast and driven hard to the scene of a fire, only to idle for hours on end.

"That is exactly why the Lakeland Fire Department chose AMSOIL," said Assistant Fire Chief Gary Stanaway. "We are located in northern Minnesota and our temperatures range from -50°F to 95°F. To have one product cover a range like that is impressive."

The LFD has converted all drivetrain fluids in every vehicle to AMSOIL lubricants as well.

Stanaway noted that when a call goes out, there is no time to warm-up any of the department's vehicles. Once the trucks are fired up, they don't shut off until the call is complete and they're back in the fire all, up to 18 hours on some calls.

In addition to structure protection, the 18-member department works in cooperation with the U.S. Forest Service and the Minnesota Department of Natural Resources (DNR) on wildland fire suppression. Lakeland F.D. has two tracked vehicles that can go virtually anywhere the fire is burning.

"The off-road vehicles are incredible in their capabilities while working on wildland fire suppression," said firefighter Jeremy Nissila.

In addition to the performance aspect, AMSOIL also benefits the department financially. "With the extended drain intervals, this has become a cost savings for us as well," said firefighter/fleet manager Shaun Kilpela. "It is a fair amount of work to service one of our vehicles, and the extended use of AMSOIL requires far less time spent on oil changes."

The Lakeland Township Fire Department displays their faith in AMSOIL on every vehicle.

The Lakeland Fire Department takes great pride in everything they do. In addition to treating their fleet to AMSOIL synthetic lubricants, the vehicles are always looking great and display AMSOIL decals in many parades and other special events during the summer months.

The AMSOIL *Service Line* sent courtesy of your Servicing AMSOIL Dealer.

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