



SERVICE LINE

NEWS AND IDEAS FROM AMSOIL

AMSOIL Raises the Bar for Grease Technology

New AMSOIL Synthetic Polymeric Off-Road Grease Brings New Technology to Market

NOTES

Toyota to Begin Requiring OW-20 Synthetic Motor Oil in New Vehicles

Driven by increasingly stringent emission and fuel economy standards, Toyota has informed its dealers that the company will begin requiring SAE OW-20 synthetic motor oils in new Toyota, Scion and Lexus vehicles over the next several years. Other OEMs are expected to follow suit by 2011.

Among the benefits cited by Toyota are enhanced protection at high and low temperatures, improved fuel economy and reduced engine deposits. In addition, Toyota is reportedly studying increasing oil drain interval recommendations to 10,000 miles.

AMSOIL OW-20 Synthetic Motor Oil (ASM) is the superior choice among OW-20 motor oils on the market, offering maximum power, performance and fuel economy and extended drain intervals of 25,000 miles or one year, whichever comes first.

AMSOIL has developed a new line of heavy-duty greases designed to excel in the extreme environments faced in heavy-duty off-road equipment. New AMSOIL Synthetic Polymeric Off-Road Grease (GPOR1, GPOR2) combines an over-based calcium-sulfonate complex thickener and a proprietary synthetic polymeric system to provide outstanding performance in heavy-duty off-road applications.

Unique Polymeric Chemistry

AMSOIL developed an exclusive synthetic polymeric system custom-built to provide performance benefits specific to off-road equipment. This synthetic technology helps give AMSOIL Synthetic Off-Road Grease tenacious cling ability and maximum pound-out resistance over extended service intervals, even in wet environments.

Extreme Impact Resistance

Greased components in heavy equipment are subjected to serious abuse. For example, when the operator of a front-end loader slams the machine's bucket up and down to shake free any remaining debris, all the strain of that action is placed on the grease. Virtually all heavy-duty off-road equipment operates under similar heavy-load conditions. The extreme impact created in this environment forces all of that heavy load (pressure) onto places where the equipment pivots, relying on the grease to prevent metal-to-metal contact. Lesser-quality greases cannot

withstand the load and are pounded out of the impact area. When pound-out occurs, heavily-loaded components are left unlubricated, which can result in metal-to-metal contact and extreme amounts of wear. In addition, one of a grease's main functions is to act as a seal around the perimeter of the greased component, preventing water, dirt and other contaminants from entering the component and increasing wear. Pound-out leaves equipment vulnerable to potentially devastating amounts of contaminants.

AMSOIL Off-Road Grease's exclusive synthetic polymeric technology provides exceptional adhesion (ability to cling to components) and cohesion (ability to cling to itself) properties. It is engineered to resist pound-out better than other greases in heavy-load-bearing, extreme pressure applications and stay in place longer, providing outstanding lubrication over extended service intervals and reducing the detrimental effects of missed grease points.

Calcium-Sulfonate Complex Thickener

AMSOIL Synthetic Polymeric Off-Road Grease features a calcium-sulfonate complex thickener for enhanced extreme-pressure performance. Its inherent extreme-pressure benefits deliver excellent impact resistance.



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Moly-Fortified, Meets CAT Requirements

AMSOIL Synthetic Polymeric Off-Road Grease is 5 percent moly-fortified and meets Caterpillar's requirement for pin and bushing applications. Its high Timken OK load and excellent four-ball wear and four-ball weld test results are proof of its exceptional load-bearing capacity (see chart below).

	AMSOIL Synthetic Polymeric Off-Road	Caterpillar Ultra 5 Moly
NLGI Grade	2	2
Timken OK Load	75+	60
Four-Ball Weld, kgf	620+	620
Four-Ball Wear, scar mm	<0.45	0.5
Dropping Point, °F	650	550
Ambient Temperature Range, °F	-10 to 130	-22 to 122
Thickener	Calcium-Sulfonate Complex	Calcium-Sulfonate Complex
Moly Content, %	5	5

Excellent Water Washout Resistance

Greased components on heavy equipment are frequently exposed to wet conditions. AMSOIL Synthetic Polymeric Off-Road Grease resists water washout to maintain the external seal on greased components and help prevent water and other contaminants from entering wear-prone areas.

Extended Service Life

AMSOIL Synthetic Polymeric Off-Road Grease provides serious severe-duty performance over extended service intervals. Field testing has shown that AMSOIL Off-Road Grease can extend lubrication intervals by 50 percent over competitive products, reducing re-greasing frequency and associated labor costs. AMSOIL Off-Road Grease maximizes equipment uptime and reduces total grease usage.

Outstanding Value

AMSOIL Synthetic Polymeric Off-Road Grease resists pound-out and significantly reduces the amount of grease ejected during repetitive pounding action. In fact, AMSOIL



Off-Road Grease reduced consumption by as much as 50 percent over competitive greases tested. Its superior pound-out resistance combined with extended service intervals and superior protection result in reduced lubricant, labor and equipment-replacement costs.

A typical off-road application will consume one cartridge of grease per greasing. When compared to Caterpillar Ultra 5 Moly Grease, AMSOIL Synthetic Polymeric Off-Road Grease provides an annual savings of \$671 per machine. Based on price and service life, use of AMSOIL Off-Road Grease can save a business operating a fleet of five pieces of equipment \$3,355 annually; a fleet of 25 saves \$16,775 annually. Additional savings are realized through longer equipment life and reduced maintenance costs. Off-road bearings, bushings, pins and other components can have a total replacement cost of as much as \$24,000. Maximizing the life of equipment components is high-priority for maintenance managers and equipment owners.

Applications

AMSOIL Synthetic Polymeric Off-Road Grease is ideal for heavy-duty, heavy-load-bearing applications operating in adverse conditions, including power shovels, drag lines, wheel and track loaders, excavators, bulldozers, skid steers and other heavy-duty equipment. It excels at protecting heavily-loaded points such as pivot pins, king pins, bucket pins and bushings.

Compatibility

AMSOIL Off-Road Grease is compatible or borderline compatible with most other greases on the market. It is not compatible with greases formulated with calcium complex, conventional polyurea and clay (non-soap) thickeners.



AMSOIL Saber Professional Delivers Dependable Protection

Field study with logging company proves Saber superiority under extreme conditions.

AMSOIL Saber Professional Pre-Mix 2-Cycle Oil is formulated with exclusive AMSOIL synthetic base oils and premium additives. Designed for lean mix ratios in two-cycle motors, Saber Professional has excellent lubricity and cleanliness properties to control friction and help prevent wear, plug fouling and ring sticking.

Many Applications, One Mix Ratio

Saber Professional has a recommended mix ratio of 100:1, even when the application calls for a ratio of 50:1 gas-to-oil. Its high-quality base oils resist consumption and evaporation better than conventional two-cycle oils. The combination of premium base oil chemistry and superior additive technology allows Saber Professional to deliver maximum performance and protection in small engine applications; even at 100:1.



A logger puts Saber Professional to the test in the field.



Logging Outfit Puts Saber To The Test

AMSOIL Synthetic 100:1 2-Cycle Oils have been providing improved performance and protection in two-cycle motors since 1973. However, there are still consumers who struggle with the notion that Saber provides optimum protection at 100:1 when the equipment manufacturer has specified a 50:1 mix ratio. In order to once again demonstrate the superiority of AMSOIL Synthetic 2-Cycle Oils, AMSOIL provided a logging company with six Stihl MS 440 chainsaws. Three of the saws were operated using the manufacturer-recommended two-cycle oil at the recommended mix ratio (50:1). The other three saws had AMSOIL Saber Professional installed at a mix ratio of 100:1. The loggers used all six saws as they normally would for 200 hours.

200 Hours of Abuse

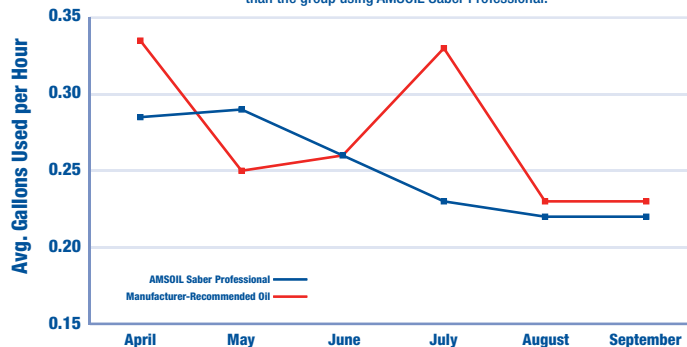
It is important to remember that normal use of chainsaws by a commercial logging outfit easily qualifies as extreme severe service. At the end of the 200-hour test period, the saws were returned with missing paint, cracked handles and an overall appearance of abuse.

Saber Professional Withstands Severe Service

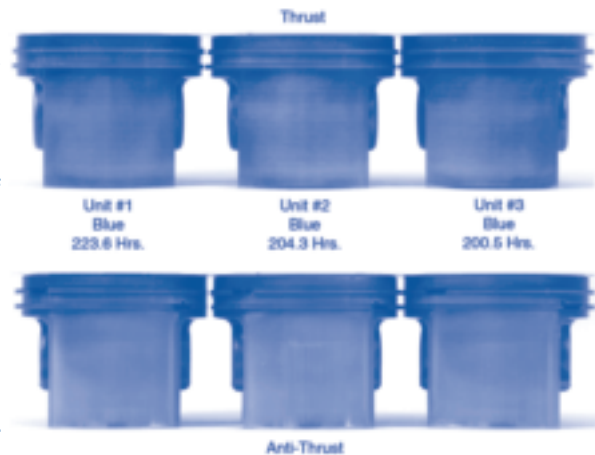
After the test period the saws were subjected to a detailed engine teardown to determine how well Saber performed. As expected, the teardown revealed that the chainsaws using AMSOIL Saber Professional at a mix ratio of 100:1 had fewer deposits, less wear and were generally cleaner than the saws that operated using the manufacturer-recommended two-cycle oil mixed at 50:1. In addition, the chainsaws with Saber installed used an average of 8% less fuel than the saws running conventional oil at 50:1.

Average Fuel Consumption

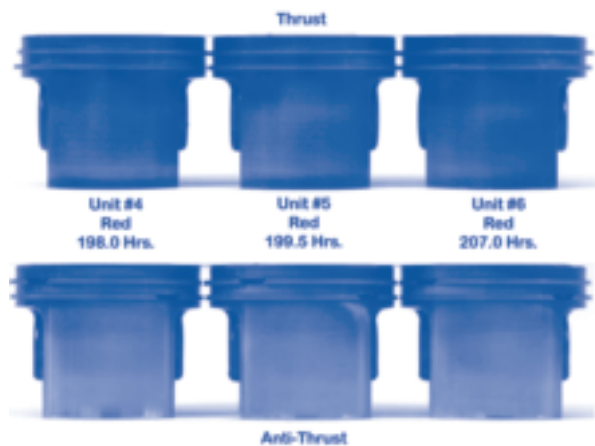
The group using the manufacturer-recommended motor oil consumed 8% more fuel than the group using AMSOIL Saber Professional.



With AMSOIL Saber Professional at 100:1



With Manufacturer-Recommended Oil at 50:1



The chainsaws using the manufacturer-recommended two-cycle oil featured heavier deposits than the chainsaws using Saber Professional.