



AMSOIL synthetic motor oil is the Official Oil of some of the most prominent hot-rod events and engine-building competitions in North America. AMSOIL synthetic lubricants are recognized as the best by engine builders, enthusiasts and professionals from coast to coast.



Contact your local full-service AMSOIL Dealer for more information on AMSOIL products or to place an order. You may also order direct by calling AMSOIL INC. at 1-800-956-5695 and providing the referral number listed here.

Referral # **779**

Classic Cars



The First in Synthetics®



A well-built classic car or hot rod isn't just a vehicle, it's a source of pride. You spend every spare hour and dollar crafting its appearance and tuning its engine for the perfect look and the best performance. A car that's built well should also be maintained well. AMSOIL synthetic lubricants deliver long-lasting protection and maximum performance. Using AMSOIL products to take care of your classic car or hot rod helps ensure it'll continue turning heads for years to come.

AMSOIL Z-ROD® Synthetic Motor Oil

Engines modified to produce increased power and torque can rupture the oil film, leading to accelerated wear, particularly on flat-tappet cams. Plus, long-term storage invites harmful corrosion that can negatively affect engine performance. AMSOIL Z-ROD Synthetic Motor Oil contains high levels of zinc and phosphorus (ZDDP) to protect cams, lifters, rockers and other critical parts against wear. It's also formulated with a unique blend of corrosion inhibitors to ensure protection during storage.

- **High** levels of ZDDP to guard against wear
- **Performs** on the street and protects during storage
- **Withstands** extreme heat



Synthetic Transmission Fluid

Few things connect driver and vehicle like a smooth-shifting manual gearbox. Synthetic Manual Transmission & Transaxle Gear Lube's friction-modified formula and excellent cold-flow properties promote smooth, fast engagement of synchronizers and gears. It protects against wear caused by the high-horsepower, large-displacement engines common to hot rods and muscle cars.



- **Promotes** smooth, fast shifts
- **Resists** wear
- **Helps** prevent leaky seals

Oil & Air Filters

Maximum airflow allows your engine to produce maximum power. Ea Racing Air Filters are specifically designed for carbureted engines, providing lower pressure drop and greater airflow. AMSOIL Oil Filters are among the most efficient available, keeping contaminants in the filter and out of your engine.



Synthetic Gear Lube

Performance driving and sudden throttle bursts focus intense pressure on the ring-and-pinion gears, inviting wear, while intense heat causes gear lube to thin, reducing viscosity and further increasing heat in a cycle known as *thermal runaway*. Left unchecked, thermal runaway can shorten component life and lead to catastrophic failure. Severe Gear® Synthetic Gear Lube delivers high film strength to protect against wear and outstanding heat resistance to guard against thermal runaway.



- **Reduces** gear and bearing wear
- **Guards** against thermal runaway
- **Maximizes** power

DOMINATOR® Synthetic Racing Grease

DOMINATOR Synthetic Racing Grease helps protect wheel bearings and chassis components from the damaging effects of intense heat and extreme torque. It helps improve operating efficiency for maximum output.



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AMSOIL Accessory Products



AMSOIL spray protectants, engine coolant and accessory products provide your vintage ride all the protection it needs for miles of trouble-free enjoyment.

Fuel Additives

AMSOIL fuel additives clean harmful deposits and help increase power and fuel efficiency. DOMINATOR® Octane Boost is excellent as a lead substitute in classic cars.



Products for Storage

AMSOIL products for storage guard against the problems associated with deteriorated fuel and corrosion, helping engines start each spring and run properly.



AMSOIL Engine Builder's Package

From installing the first bearing to driving the final mile of the day, the AMSOIL Engine Builder's Package helps minimize harmful friction and wear while maximizing torque and horsepower.



STEP ONE: Build it. AMSOIL Engine Assembly Lube

- **Exceptional** wear protection
- **Designed** to dissolve in oil
- **Clings** well to engine parts



STEP TWO: Break it in. AMSOIL Break-In Oil

- **No friction** modifiers for quick, efficient ring seating
- **Zinc & phosphorus** provide excellent wear protection
- **Designed** to maximize compression, horsepower and torque



STEP THREE: Cruise it. AMSOIL Z-ROD® Synthetic Motor Oil

- **High** levels of ZDDP to guard against wear
- **Performs** on the street and protects during storage
- **Withstands** extreme heat





Z-ROD® Synthetic Motor Oil

Modern Technology for Classic Cars

AMSOIL Z-ROD Synthetic Motor Oil is specially engineered for classic and high-performance vehicles. It features a high-zinc formulation to prevent wear on flat-tappet camshafts and other critical engine components, along with a proprietary blend of rust and corrosion inhibitors for added protection during long-term storage. Z-ROD Synthetic Motor Oil is designed to perform on the street and protect during storage.

Protects Flat-Tappet Cams

The lifters and cam lobes on flat-tappet camshafts common to classic and high-performance vehicles slide rapidly against one another, producing high friction and heat. The friction between the two components can eventually wear down the cam and affect valve operation, ultimately resulting in lost engine power and reduced efficiency. In addition, these areas are splash-lubricated rather than pressure-lubricated like other areas of the engine, which adds extra strain on anti-wear additives such as the zinc and phosphorus in zinc dialkyldithiophosphate (ZDDP).

AMSOIL Z-ROD Synthetic Motor Oil is formulated with high levels of ZDDP to protect flat-tappet cams, lifters, rockers and other areas susceptible to wear. Its high-zinc, high-phosphorus formulation provides the extra wear protection these critical splash-lubricated components require.

Provides Long-Term Protection from Rust & Corrosion

Z-ROD Synthetic Motor Oil is formulated with a unique blend of rust and corrosion inhibitors to ensure maximum protection during long-term storage. To prove its effectiveness, AMSOIL submitted Z-ROD Synthetic Motor Oil to the Standard Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet (ASTM D1748-10). This test evaluates the rust-preventive properties of oil under high-humidity conditions, similar to those faced by a covered hot rod in a damp garage. The metal coupon treated with AMSOIL Z-ROD Synthetic Motor Oil showed no signs of rust.

AMSOIL Delivers Superior Rust Protection

In industry-standard testing, AMSOIL Z-ROD® completely prevented rust formation while a leading competitor did not.¹



¹Based upon in-house testing of AMSOIL Z-ROD 10W-40 and a leading competitor obtained on 7/25/2019 in ASTM D1748-10.

*All trademarked names are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.



- **Engineered** for classic vehicles
- **High-zinc** formula
- **Protects** against rust during storage

TYPICAL TECHNICAL PROPERTIES

AMSOIL Z-ROD® Synthetic Motor Oil

	10W-30 (ZRT)	10W-40 (ZRD)	20W-50 (ZRF)
Viscosity @ 100 °C, cSt (ASTM D445)	11.8	14.9	19.3
Viscosity @ 40 °C, cSt (ASTM D445)	74.9	97.5	140.3
Viscosity Index (ASTM D2270)	152	159	157
Flash Point, °C (°F) (ASTM D92)	236 (457)	242 (468)	254 (490)
Fire Point, °C (°F) (ASTM D92)	268 (514)	260 (500)	270 (518)
Pour Point, °C (°F) (ASTM D97)	-46 (-51)	-39 (-38)	-40 (-40)
NOACK Volatility, % weight loss (g/100g) (ASTM D5800)	.5.5	3.1	4.0
High-Temperature/High-Shear Viscosity @150°C, 1.0 X 10 ⁶ s ⁻¹ , cP (ASTM D5481)	3.6	4.3	5.2
Four-Ball Wear @ 40 kgf, 75°C, 1200 rpm, 1 hr, scar diameter, mm (ASTM D4172)	0.35	0.33	0.34
Total Base Number (ASTM D2896)	.9.1	9.0	9.1

APPLICATIONS

Use Z-ROD Synthetic Motor Oil in engines requiring either 10W-30, 10W-40 or 20W-50 motor oil. Z-ROD Synthetic Motor Oil meets API SL and earlier specifications, allowing for increased levels of anti-wear additives. ZDDP levels in Z-ROD Synthetic Motor Oil exceed the limits of API SM and newer specifications.

COMPATIBILITY

AMSOIL Z-ROD Synthetic Motor Oil is compatible with conventional and other synthetic motor oils. Mixing AMSOIL Z-ROD Synthetic Motor Oil with other oils, however, will shorten the oil's life expectancy and reduce its performance benefits.

Z-ROD Synthetic Motor Oil is safe for automotive seals. After-market oil additives are not recommended for use with Z-ROD.

SERVICE LIFE

Because engines in classic cars, hot rods and other performance vehicles are generally modified, a universal oil drain interval recommendation for these applications cannot be given. Responsibility for determining the drain interval duration rests with the owner. As a general service guideline, the maximum drain interval for Z-ROD Synthetic Motor Oil should not exceed 5,000 miles or two years, whichever comes first.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH AND SAFETY

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available online at www.amsoil.com or upon request at (715) 392-7101.

Keep Out of Reach of Children. Recycle used oil and bottle.



AMSOIL products and Dealership information are available from your local full-service AMSOIL Dealer.

Referral # **779**

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AMSOIL[®]

► DEALER EDITION

MAGAZINE

JUNE 2020



New Z-ROD[®] 10W-40 Synthetic Motor Oil Expands Market Coverage | PAGE 8



Tap into the Diesel Enthusiast Market | PAGE 12

NEW Z-ROD® 10W-40 SYNTHETIC MOTOR OIL EXPANDS MARKET COVERAGE

Available June 2, new Z-ROD 10W-40 Synthetic Motor Oil (ZRD) provides the rock-solid wear protection for flat-tappet cams and proven protection against rust during storage that Z-ROD is known for to applications that require a 10W-40 viscosity. Z-ROD 10W-30 and 20W-50 Synthetic Motor Oil feature updated labels that you'll begin to see soon as current inventory is depleted. Formulations and pricing remain unchanged.

Updated labels and packaging? Yes
Formulation change? No
New stock numbers? No. The 10W-30 (ZRT) and 20W-50 (ZRF) viscosities maintain their current product codes; the new 10W-40 viscosity is indicated by code ZRD.

The Classics Have Different Needs

Oil formulations have evolved over the years in lockstep with the evolution of engine design. Use of modern emissions-regulation devices has resulted in reduced zinc dialkyldithiophosphate (ZDDP) content in motor oil. High amounts of phosphorus in ZDDP additives can negatively affect a vehicle's catalytic converter and reduce its effectiveness. However, ZDDP additives are proven anti-wear agents that are especially important in modified, classic and performance vehicles that feature flat-tappet camshafts and custom lifters and rocker arms for increased performance. The limitation of these additives in modern oils reduces their effectiveness in classic and performance cars.

Protecting Flat-Tappet Cams

Two main types of camshafts are used in automotive applications: flat-tappet and roller. The tappet, or lifter, on the

flat-tappet camshaft is flat and requires an oil film to keep its surface separated from the cam lobe. Flat-tappet camshafts produce high friction (high heat) because the surfaces slide rapidly against each other. The oil film is the only barrier that prevents the lifter and cam lobe from welding together.

The friction between the two components can eventually wear down the flat-tappet cam and affect valve operation. Engine power and efficiency decline if the flat-tappet cams can't lift the valves enough to adequately charge the chamber for ignition or adequately release exhaust fumes. In addition, these areas are splash-lubricated rather than pressure-lubricated like other areas of the engine, placing extra strain on anti-wear additives.

Roller cams, on the other hand, are differentiated by rolling contact rather than sliding contact. Although more expensive, roller cams are common in most modern vehicles and can be retrofitted into classic-car and hot-rod engines.



Flat-tappet lifter

Roller lifter

Z-ROD is Packed with ZDDP

AMSOIL Z-ROD Synthetic Motor Oil is formulated with high levels of ZDDP to protect flat-tappet cams, lifters, rockers and other areas susceptible to wear. Its high-zinc, high-phosphorus formulation provides the extra wear protection these critical splash-lubricated components require.

Long-Term Protection from Rust & Corrosion

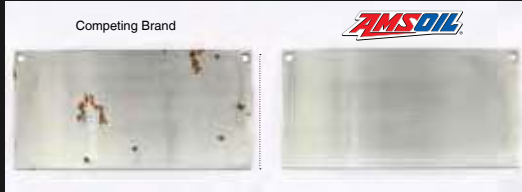
Rust and corrosion are the classic-car owner's nemesis. Classic cars spend most of their existence in storage and only hit the road in the summer months.

Why "Z-ROD"?

"Z" stands for zinc and "ROD" refers to the hot rods and other classics for which it's designed. **Lack of zinc in modern oils** is a hot topic among classic-car owners, and many seek out high-zinc oils to protect their engines. **Z-ROD is packed with zinc** and phosphorus anti-wear additives to protect the classics.

AMSOIL Delivers Superior Rust Protection

In industry-standard testing, AMSOIL Z-ROD® completely prevented rust formation while a leading competitor did not.^{JJ}



^{JJ}Based upon in-house testing of AMSOIL Z-ROD 10W-40 and a leading competitor obtained on 7/25/2019 in ASTM D1748-10.

The rarity of these vehicles and their often treasured place in the hearts of their owners place extra importance on protection during extended periods of storage.

AMSOIL Z-ROD Synthetic Motor Oil is formulated with a unique blend of rust and corrosion inhibitors to ensure maximum protection during long-term storage. To prove its effectiveness, we submitted Z-ROD to the Standard Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet (ASTM D1748-10). This test evaluates the rust-preventative properties of oil under high-humidity conditions, similar to those faced by a covered hot rod in a damp garage. The metal coupon treated with Z-ROD showed no signs of rust.

Applications

Use AMSOIL Z-ROD Synthetic Motor Oil in engines requiring 10W-30, 10W-40 or 20W-50 motor oil. Z-ROD Synthetic Motor Oil meets API SL and earlier specifications, allowing for increased levels of anti-wear additives. ZDDP levels in Z-ROD Synthetic Motor Oil exceed the limits of API SM and newer specifications.

Service Life

Because engines in classic cars, hot rods and other performance vehicles are generally modified, a universal oil drain interval recommendation for these applications cannot be provided. Responsibility for determining the drain interval duration rests with the owner. As a general service guideline, the maximum drain interval for Z-ROD Synthetic Motor Oil should not exceed 5,000 miles or two years, whichever comes first.

DATA BULLETIN

The Z-ROD Synthetic Motor Oil Data Bulletin (G2883) has been updated to include the new 10W-40 viscosity.

Stock #	Qty.	U.S.	Can.
G2883	25	4.10	5.60

- **Engineered** for classic vehicles
- **High-zinc** formula
- **Protects** against rust during storage



Z-ROD Synthetic Motor Oil

U.S. PRICING			Comm. Credits	U.S. Wholesale	U.S. P.C.	U.S. MSRP	U.S. Catalog
Stock #	Units	Pkg./Size					
ZRTQT	EA	1 Quart	5.61	8.55	9.00	11.10	12.05
ZRTQT	CA	12 Quarts	67.38	97.65	102.55	131.85	143.00
ZRDQT	EA	1 Quart	5.61	8.55	9.00	11.10	12.05
ZRDQT	CA	12 Quarts	67.38	97.65	102.55	131.85	143.00
ZRFQT	EA	1 Quart	5.84	8.90	9.35	11.55	12.50
ZRFQT	EA	12 Quarts	70.07	101.55	106.65	137.10	148.35
CANADA PRICING			Comm. Credits	Can. Wholesale	Can. P.C.	Can. MSRP	
Stock #	Units	Pkg./Size					
ZRTQTC	EA	(1) 946-ml Bottle	5.61	10.95	11.50	14.15	
ZRTQTC	CA	(12) 946-ml Bottles	67.38	124.80	131.05	168.60	
ZRDQT	EA	(1) 946-ml Bottle	5.61	10.95	11.50	14.15	
ZRDQT	CA	(12) 946-ml Bottles	67.38	124.80	131.05	168.60	
ZRFQTC	EA	(1) 946-ml Bottle	5.84	11.35	11.95	14.70	
ZRFQTC	CA	(12) 946-ml Bottles	70.07	129.60	136.10	175.20	

Z-ROD[®] SOLVES THE PROBLEM

Catalytic converters make the harmful byproducts of combustion less harmful by transforming them into carbon dioxide and water before they leave the exhaust system. Unfortunately, the zinc and phosphorus anti-wear additives in motor oil have been shown to reduce the efficiency of catalytic converters.

In 2004 a decision was made to reduce zinc and phosphorus levels in motor oil to accommodate these emissions-reduction devices. Shortly after, there followed a huge

outbreak of flat-tappet camshaft failure. The culprit turned out to be the lack of zinc and phosphorus in motor oil.

The solution became quickly apparent: the oil in muscle cars and vintage cars must provide beefier levels of zinc and phosphorus. In order to effectively address this issue head on, AMSOIL Z-ROD[®] Synthetic Motor Oil is formulated with extra levels of zinc and phosphorus. Be sure your customers who own classic cars are aware of this AMSOIL solution.



The Debate Over Reduced ZDDP and Wear Protection

Do modern motor oils formulated with reduced zinc and phosphorus anti-wear additives provide adequate engine protection? It's a question some industry insiders, auto enthusiasts and motorists have been asking for years. And as engine builders and classic-car owners continue to experience engine failures they attribute to reduced zinc and phosphorus motor oils, the debate seems to intensify. *Lubes 'n Greases* recently published a feature story on the topic, and it continues to be a hot-button issue on Internet forums and in trade magazines. Arriving at an answer, however, first requires some background information.

What is ZDDP?

Zinc dialkyldithiophosphate (ZDDP) is the most commonly used anti-wear additive in motor oils. It contains both zinc and phosphorus components that work together to provide anti-wear protection and minimize lubricant breakdown. ZDDP also exhibits mild extreme-pressure protection.

Some motorists think that increased zinc content equals increased wear protection. Although somewhat true, the statement can be misleading. First, the mere presence of zinc doesn't mean it is in the form of ZDDP. In other forms, zinc offers additional oxidation protection but little wear protection. Second, other factors influence the oil's ability to control wear, such as its viscometrics and base stocks. While zinc is important in protecting against wear, the greatest concern should be in using a well-balanced oil that is designed for its intended application.

How ZDDP Works

As temperatures rise and surfaces come closer together, ZDDP decomposes, and the resulting chemistry protects critical metal surfaces. When parts move during operation, any sliding or rolling motion takes place on top of or within the ZDDP anti-wear film, which reduces metal-to-metal contact. This is especially important in modified engines with flat-tappet camshafts because the engine is creating more horsepower than it was designed for, which puts more stress on the engine. High-tension valve springs, often used in racing applications, also increase the potential for cam wear and require additional ZDDP.

Negative Effects of ZDDP

Since all engines benefit from oils with superior anti-wear properties, it seems obvious to formulate all motor oils with high levels of ZDDP. Generally, high levels of ZDDP result in volatile phosphorus being transferred from the combustion chamber to the catalytic converter. Phosphorus can blind over the catalytic reaction sites in the converter, making it less efficient in turning carbon monoxide (CO) into carbon dioxide (CO₂). The EPA mandates that catalytic converters operate as designed for more than 100,000 miles. As a result, phosphorus is limited for newer motor oil specifications.

When the American Petroleum Institute (API) and the International Lubricants Standardization and Approval Committee (ILSAC) established phosphorus limits at 0.10 percent weight in 1996, motorists and enthusiasts wondered if it would negatively affect wear protection. The move to reduce phosphorus may not have taken into consideration high-performance and modified engines or engines that had yet to be broken in. The debate intensified in 2004 when the API and ILSAC further limited phosphorus to 0.08 percent, where it remains today.


Despite the reduction, there is no evidence to suggest modern engines using today's lower-ZDDP oils are suffering widespread wear. A properly formulated oil that meets API SN and ILSAC GF-5 is capable of delivering reliable wear protection in stock engines. In fact, testing shows that AMSOIL Signature Series 5W-30 Synthetic Motor Oil (ASL) offers outstanding wear protection in the Four-Ball Wear Test (ASTM D4172 Mod.).

When it comes to older engines – particularly those equipped with flat-tappet cams – and engines modified for increased performance, the challenges to delivering adequate wear protection become more pronounced.

Flat-Tappet Cams

The design of flat-tappet cams makes them especially vulnerable to wear. As the name indicates, the tappet – or lifter – is flat. During operation the surface of the cam lobe slides rapidly over the surface of the tappet, producing high friction and temperatures. The camshaft and lifters are responsible for triggering the precisely tuned movements of the valvetrain.





Without the protective film barrier provided by ZDDP, the cams and lifters wear from the force of operation, negatively affecting cam and valve operation. Because most V-8 engines of the muscle car era came standard with flat-tappet cams, the problem is especially prevalent to classic-car and hot-rod owners.

In these applications, modern oils, such as AMSOIL synthetic motor oils, are capable of providing adequate wear protection after the engine has been broken in. But due to variables like severity of service and level of modification, AMSOIL primarily recommends high-ZDDP oils in these applications, such as Z-ROD® Synthetic Motor Oil (ZRF, ZRT) or DOMINATOR® Synthetic Racing Oil (RD20, RD30, RD50, RD60). When breaking in a rebuilt or high-performance engine, AMSOIL recommends AMSOIL Break-In Oil (BRK), which contains high levels of ZDDP for added wear protection.

Demand for High-ZDDP Oils

As the debate over ZDDP levels and engine wear continues, many enthusiasts and engine builders will continue to seek out high-ZDDP speciality oils. ■

- ▶ **AMSOIL Z-ROD® Synthetic Motor Oil (ZRT, ZRF)** is the primary recommendation for older and modified engine designs, such as those with flat-tappet camshafts. It is also designed specifically to resist rust and corrosion that attacks engines during periods of inactivity and storage.

- ▶ **AMSOIL Premium Protection Synthetic Motor Oil (AMO, ARO)** is the secondary recommendation for older and modified engines that require the protection of added ZDDP.

- ▶ **AMSOIL Break-In Oil (BRK)** is designed to work quickly in new and rebuilt high-performance and racing engines. This SAE 30 viscosity-grade oil features a no-friction-modifier formula that helps induce controlled wear in rings to help mate and seat piston rings. It also has very high levels of ZDDP.

- ▶ **AMSOIL DOMINATOR® Synthetic Racing Oil (RD20, RD30, RD50, RD60)** is formulated similarly, but more for true racing applications. It can be used in muscle cars, street rods and other high-performance vehicles with flat-tappet camshafts.





Signature Series 100% Synthetic Motor Oil

A New Level of Motor Oil Technology

AMSOIL was founded on innovation, beginning with our introduction of the world's first API-qualified synthetic motor oil. By ignoring conventionally accepted limitations and refusing to stop short of success, we set a new benchmark for lubricant performance. These same principles guide our product development today, resulting in Signature Series Synthetic Motor Oil. Signature Series is not only the best oil we have ever made, it's also better than any competitive oil we have tested. Some may claim that Signature Series is over-engineered. Perfect. It is not for everyone. It is for those who want the absolute best engine protection, and it delivers.



Protects Against Engine Wear

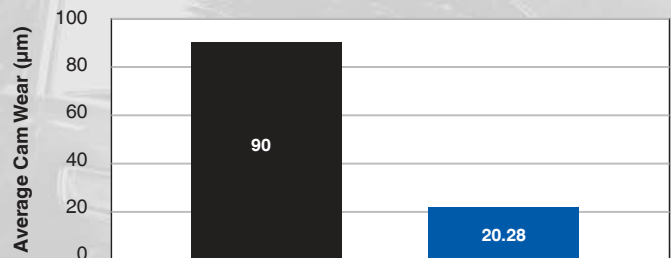
Signature Series Synthetic Motor Oil develops a strong fluid film that keeps metal surfaces separated while its robust anti-wear additives further reduce wear in metal-to-metal contact regions for maximum engine life. The Sequence IVA Engine Test, which must be passed to meet the API SN PLUS specification, simulates extended periods of stop-and-go driving. For 100 hours, the test engine cycles between 50 minutes of idling and 10 minutes of elevated rpm – conditions that encourage engine wear. The camshaft is then measured for wear in 84 locations and an average score is determined. We used Signature Series 0W-20, the lightest viscosity in the line, to further increase the severity of the test. AMSOIL Signature Series Synthetic Motor Oil provided **75 percent more engine protection against horsepower loss and wear¹** than required by the industry standard, extending the life of vital components like pistons and cams.



After rigorous third-party testing, the cam lobes show little-to-no wear.

SEQUENCE IVA ENGINE TEST

Lower number = less wear



¹Based on independent testing of AMSOIL Signature Series 0W-20, in ASTM D6891 as required by the API SN PLUS specification.

Protects Pistons from Low-Speed Pre-Ignition

We armed Signature Series with an advanced detergent system that protects against harmful deposits and low-speed pre-ignition (LSPI). Most new engines feature gasoline direct injection (GDI), often combined with a turbocharger to boost power and improve fuel economy. These new technologies, when combined with a poorly formulated motor oil, promote LSPI and threaten engine operation. LSPI is the spontaneous ignition of the fuel/air mixture prior to spark-triggered ignition. It occurs in today's advanced engines and is much more destructive than typical pre-ignition. A properly formulated motor oil is critical for protecting your engine.

Original equipment manufacturers (OEMs) like GM* have addressed the issue by designing tests to determine a motor oil's ability to prevent LSPI. Signature Series Synthetic Motor Oil achieved **100 percent protection against LSPI¹** in the engine test required by the GM dexos1* Gen 2 specification – zero occurrences were recorded throughout five consecutive tests.



Example of piston damage due to an LSPI event observed during the testing of a competitor's motor oil. The red arrows indicate sections of the ring land that broke away from the piston.

Protects Turbochargers

Our unique synthetic formulation is inherently stable to resist oxidation and neutralize acids. Signature Series Motor Oil provides outstanding protection against deposits common to high-temperature engine environments. The tremendous heat and stress turbos create can cause some oils to break down and form harmful bearing deposits through a process known as turbo coking. Over time, turbos can suffer reduced performance or fail altogether.

We challenged Signature Series to the GM Turbo Coking Test, which consists of 2,000 cycles of extreme heat soaks. An oil must limit the temperature change within the turbocharger to 13 percent or less to pass the test. Signature Series limited the temperature increase to only 3.6 percent, **protecting the turbocharger 72 percent better than required²** by the GM dexos1 Gen 2 specification.



Signature Series controlled heat and minimized performance-robbing deposits on the turbo-bearing and shaft surfaces.



Maximum Cleaning Power to Battle Sludge

AMSOIL Signature Series Synthetic Motor Oil has **50 percent more detergents³** to help keep oil passages clean and promote oil circulation.

Engine failures due to sludge are often caused by a plugged oil pick-up tube screen – the motor is effectively starved of oil. The Sequence VG Engine Test measures an oil's ability to prevent sludge. During the test, a Ford* 4.6L engine is subjected to sludge-inducing conditions for 216 hours. The industry standard allows for 10 percent blockage before the motor oil fails the test.

Signature Series produced a screen virtually free from sludge (see image). Its detergent and dispersant additives are so effective, Signature Series provides **90 percent better protection against sludge.⁴**



Trusted by Professional Engine Builders

Dedicated engine builders and mechanics put in long hours honing their craft. These architects of powerful, high-performance engines turn to Signature Series to protect their passion.

"When we use AMSOIL, I don't worry about a film breakdown or an oil breakdown – and the oil pressure is always consistent. We've tested oils back-to-back on the dyno in our shop and we're always able to make more power with AMSOIL."

Brett Bowers, Professional Engine Builder



Extends Drains: Protection Guaranteed

AMSOIL Signature Series Synthetic Motor Oil provides reserve protection, allowing you to go longer between oil changes if you choose – up to 25,000 miles (40,200 km), 700 hours of operation or one year, whichever comes first (see back page for details).

Our unique synthetic formulation and long-drain additive system are inherently stable to resist oxidation and neutralize acids over longer periods.

Signature Series is designed to deliver outstanding engine protection, cleanliness and performance over extended drain intervals – guaranteed. It provides peace of mind so you can fit oil changes into your schedule.

¹ Based on independent testing of AMSOIL Signature Series 5W-30 motor oil, in the LSPI engine test as required for the GM dexos1 Gen 2 specification.

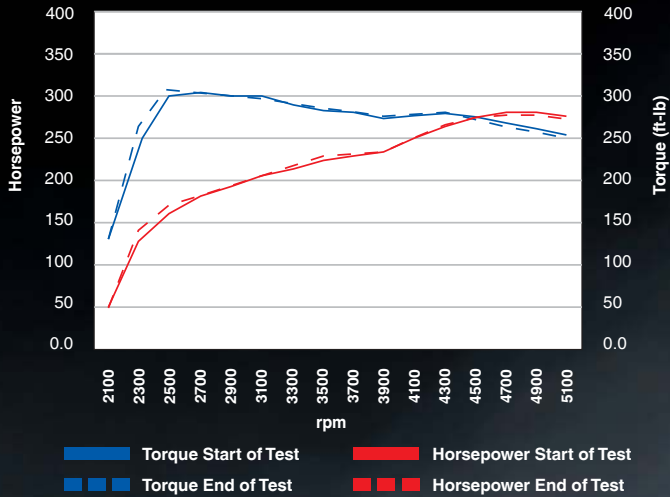
² Based on independent testing of AMSOIL Signature Series 5W-30 in the GM turbo coking test, vs. AMSOIL OE Motor Oil

³ Based on independent testing of AMSOIL Signature Series 5W-30 in the ASTM D6593 engine test for oil screen plugging as required by the API SN PLUS specification.

⁴ All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.

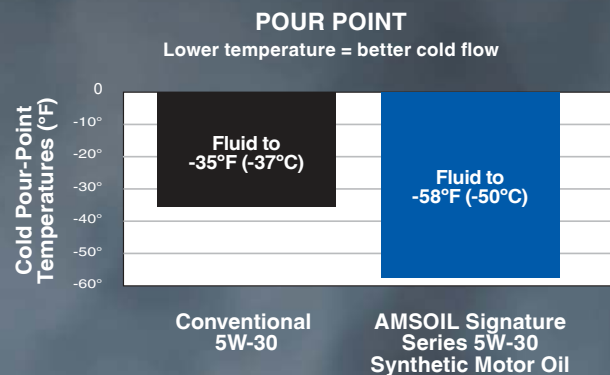
Preserves Horsepower

The extreme durability of Signature Series Motor Oil helps your engine run stronger, for longer. We installed Signature Series 5W-30 Synthetic Motor Oil in a Ford* F-150* with a new 3.5L EcoBoost* engine to test its ability to protect turbocharged direct-injection (TDGI) engines from torque and horsepower loss during extended drain intervals up to 25,000 miles (40,200 km). Power sweeps were done at the beginning and end of the test to evaluate horsepower and torque retention. As the graph shows, Signature Series helped maintain engine performance throughout the 100,000-mile (160,934 km) test.



Easier Cold-Starts

Signature Series Synthetic Motor Oil does not contain paraffins (wax) and stays fluid in temperatures of -58°F (-50°C) and lower. Extreme cold causes other motor oils to thicken, starving vital moving parts of lubrication, accelerating wear and even preventing vehicles from starting. Signature Series **provides 66 percent better cold-temperature performance** for easier starting, better fuel economy, improved oil flow (as seen below) and reduced wear.



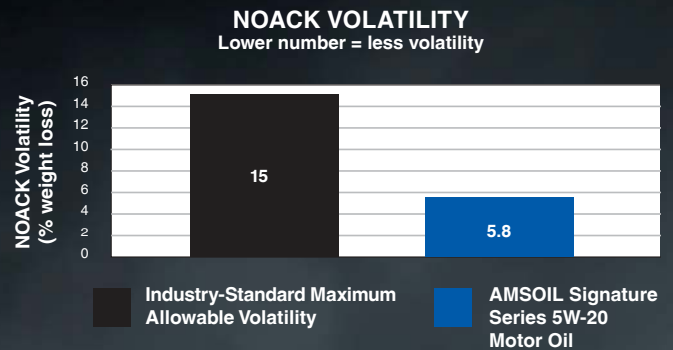
Conventional 5W-30 (-40°)



AMSOIL Signature Series 5W-30 Synthetic Motor Oil (-40°)

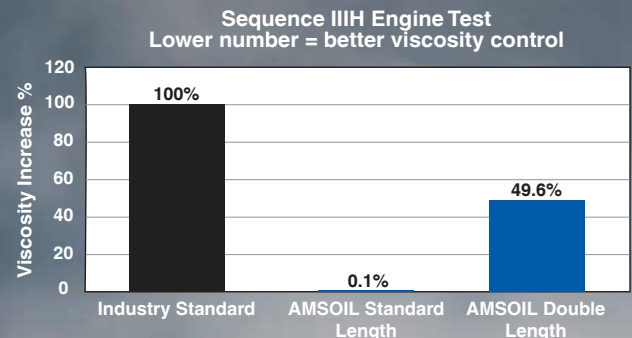
Limits Oil Consumption

Signature Series has a uniform molecular structure that limits evaporation and keeps it where it's needed most – protecting your engine. Volatility (burn-off) occurs when oil gets hot, causing lighter molecules to burn off or evaporate. This leads to oil thickening, additive imbalance, higher emissions and oil consumption. The NOACK Volatility test is the industry standard for evaluating motor oil high-temperature evaporation. It measures the percentage of burn-off after a motor oil is placed under constant airflow at 482°F (250°C) for 1 hour. A lower number indicates a better resistance to evaporation. Signature Series falls far below the API limit for volatility, reducing the need for frequent oil top-offs and limiting vehicle emissions.



Keeps Pistons Cleaner

We formulated Signature Series with superior thermal durability that resists breakdown and keeps pistons clean. The Sequence IIIH Test uses the Chrysler* 3.6L Pentastar* engine to evaluate a motor oil's ability to resist heat and keep pistons clean. The test is conducted with oil temperatures of 304°F (151°C), much hotter than normal operation, to accelerate oil thickening and deposits. A single-length 90-hour test didn't even challenge Signature Series. Its viscosity was like that of new oil, and the pistons were still nearly spotless. To really test the oil, we told the lab to reassemble the engine and run the test again using the same oil. Even after **doubling the length of the industry-standard test**, the oil limited oil thickening to well under the allowable threshold while delivering 40 percent cleaner pistons than required by the standard.¹



Even after doubling the length of the standard test, Signature Series maintained viscosity and minimized performance-robbing piston deposits for a clean, long-lasting engine.

Based on independent testing of AMSOIL Signature Series 5W-30 in the Sequence IIIH Engine Test (ASTM D8111), required by the ILSAC GF-6 and API SP specifications.

*All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.

TYPICAL TECHNICAL PROPERTIES

AMSOIL Signature Series Synthetic Motor Oil

	0W-20 (ASM)	5W-20 (ALM)	0W-30 (AZO)	5W-30 (ASL)	10W-30 (ATM)	0W-40 (AZF)	5W-50 (AMR)
Kinematic Viscosity @ 100°C, cSt (ASTM D445)	8.8	8.8	10.4	10.3	10.0	14.8	19.4
Kinematic Viscosity @ 40°C, cSt (ASTM D445)	47.1	50.6	57.1	59.7	62.3	84.6	119.5
Viscosity Index (ASTM D2270)	169	153	173	162	147	184	185
CCS Viscosity, cP @ (°C) (ASTM D5293)	5122 (-35)	4385 (-30)	5372 (-35)	3968 (-30)	4278 (-25)	6062 (-35)	5108 (-30)
Flash Point °C (°F) (ASTM D92)	220 (428)	220 (428)	220 (428)	220 (428)	230 (446)	222 (431)	224 (435)
Fire Point °C (°F) (ASTM D92)	244 (471)	244 (471)	238 (460)	244 (471)	256 (492)	238 (460)	244 (471)
Pour Point °C (°F) (ASTM D97)	-53 (-63)	-50 (-58)	-50 (-58)	-50 (-58)	-47 (-52)	-50 (-58)	-48 (-54)
NOACK Volatility, % weight loss (g/100g) (ASTM D5800)	8.5	5.8	8.8	6.7	4.1	7.7	6.1
High-Temperature/High-Shear Viscosity @ 150°C, 1.0 X 10 ⁶ s ⁻¹ , cP (ASTM D5481)	2.67	2.67	3.07	3.11	3.11	3.76	4.45
Total Base Number (ASTM D2896)	12.5	12.5	12.5	12.5	12.5	12.5	12.5

APPLICATIONS

Use AMSOIL Signature Series Synthetic Motor Oil in applications that require any of the following specifications:

0W-20 (ASM): API SP (Resource Conserving), SN PLUS, SN...; GM dexos1 Gen 2 (supersedes 6094M); ACEA A1/B1; Ford WSS-M2C947-B1, WSS-M2C947-A; Chrysler MS-6395; ILSAC GF-6A, GF-5, GF-4

5W-20 (ALM): API SP (Resource Conserving), SN PLUS, SN...; GM dexos1 Gen 2 (supersedes 6094M); ACEA A1/B1; Ford WSS-M2C945-B1, WSS-M2C945-A, WSS-M2C930-A; Chrysler MS-6395; ILSAC GF-6A, GF-5, GF-4

0W-30 (AZO): API SP (Resource Conserving), SN PLUS, SN...; GM dexos1 Gen 2 (supersedes LL-A-025, 6094M and 4718M); ACEA A5/B5, A1/B1; Chrysler MS-6395; ILSAC GF-6A, GF-5, GF-4

5W-30 (ASL): API SP (Resource Conserving), SN PLUS, SN...; GM dexos1 Gen 2 (supersedes LL-A-025, 6094M and 4718M); ACEA A5/B5, A1/B1; Honda HTO-06; Ford WSS-M2C946-B1, WSS-M2C946-A, WSS-M2C929-A; Chrysler MS-6395; ILSAC GF-6A, GF-5, GF-4

10W-30 (ATM): API SP (Resource Conserving), SN PLUS, SN...; ACEA A5/B5, A1/B1; Ford WSS-M2C205-A; Chrysler MS-6395; GM LL-A-025, 6094M, 4718M; ILSAC GF-6A, GF-5, GF-4...

0W-40 (AZF): API SP, SN PLUS, SN...; Chrysler MS-12633, MS-10725, MS-10850; Nissan GT-R

5W-50 (AMR): API SP, SN PLUS, SN...; Ford WSS-M2C931-C (Mustang)

COMPATIBILITY

AMSOIL Signature Series Synthetic Motor Oil is compatible with other conventional and synthetic motor oils. Mixing other oils with AMSOIL motor oils, however, will shorten the oil's life expectancy and reduce its performance benefits. AMSOIL does not support extended drain intervals where oils have been mixed.

Aftermarket oil additives are **not recommended** for use with AMSOIL synthetic motor oils.

TECHNICAL SERVICES

For immediate answers to your technical questions call (715) 399-TECH (8324) between 8 a.m. and 5 p.m. Central time or email tech@amsoil.com.

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SERVICE LIFE

Normal Service – Up to 25,000 miles (40,200 km), 700 hours of operation or one year, whichever comes first, in personal vehicles not operating under severe service.

Severe Service – Up to 15,000 miles (24,140 km), 700 hours of operation or one year, whichever comes first. Severe service conditions include commercial or fleet vehicles; excessive idling; or frequent towing, hauling, plowing or driving in dusty conditions.

- Modified engines (non-stock), racing vehicles and vehicles using alternative fuels (E85, CNG, propane, etc.) are excluded from extended drain interval recommendations.
- Change at the vehicle manufacturer's recommended drain interval outside U.S. and Canada.
- AMSOIL Oil Filters are designed for extended drain intervals. Do not exceed 12,000 miles (19,312 km) or one year with other brand filters unless longer intervals are recommended by the vehicle manufacturer. Always change filter when changing oil.
- Check oil regularly to maintain proper fill levels.

AMSOIL Oil Filters stop smaller particles, flow more oil and last longer than regular filters. For best performance, use AMSOIL Oil Filters.

AMSOIL PRODUCT WARRANTY

Using AMSOIL synthetic lubricants or practicing extended drain intervals does not void your new vehicle or equipment manufacturer's warranty. All AMSOIL lubricants and filters are covered by the AMSOIL Limited Warranty. For complete information visit AMSOIL.com/warranty.aspx.



HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended application and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available at AMSOIL.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Don't pollute. Return used oil to collection centers.

AMSOIL products and Dealership information are available from your local full-service AMSOIL Dealer.

Referral # **779**

Vaughn Enterprises, Inc.

Call Greg Vaughn at **1-800-581-5823**

3508 W. Pine Street,

Appleton, Wisconsin, 54914, USA

Fax: 920-734-5823

greg@vaughninc.com

<https://www.Vaughninc.com/>



100% Synthetic European Motor Oil

Specially Formulated for European Gasoline and Diesel Engines

European performance and styling define a culture of exceptional engineering. AMSOIL matches that devotion to precision with lubricants specially designed for the unique demands of gasoline, diesel and hybrid European vehicles.

Our exclusive European formula features a precise blend of advanced synthetic base oils and premium additives that delivers exceptional engine protection without harming emissions systems.

Complete Coverage

AMSOIL European Motor Oil meets and often exceeds strict European manufacturer specifications. Its shear-stable synthetic base oils and high-quality anti-wear additives provide outstanding protection in high-temperature conditions and deliver dependable performance throughout the long drain intervals recommended by European manufacturers.

Emissions System Protection

AMSOIL European Motor Oil features precisely balanced formulations that consider the needs of modern exhaust treatment devices. Protecting sensitive emissions systems depends on using the optimal blend of SAPS (sulfated ash, phosphorus and sulfur). AMSOIL European Motor Oil is carefully crafted in six varieties to ensure proper emissions system function.

Superior Engine Cleanliness

The excellent oxidation stability, heat resistance and detergency properties of AMSOIL European Motor Oil help keep engines clean. It is specifically designed to prevent sludge and varnish deposits, reduce oil consumption, extend engine life and provide maximum performance.

Excellent For Turbochargers

AMSOIL European Motor Oil has a robust composition that shields engines from the high temperatures produced by turbochargers. Its thermally stable oil formulation resists deposit formation and cools turbochargers. Its low pour point protects turbochargers against oil starvation in subzero temperatures and ensures a rapid return to appropriate oil pressure at startup.



- **Engineered** to meet European manufacturers' specifications
- **Excellent** protection for gasoline, diesel and hybrid engines
- **Fights** sludge for superior engine cleanliness

TYPICAL TECHNICAL PROPERTIES

AMSOIL 100% Synthetic European Motor Oil

	EFO	EFM	AEL	AFL	AFE	EZT
Kinematic Viscosity @ 100°C, cSt (ASTM D445)	13.3	13.6	11.6	14.3	8.1	8.2
Kinematic Viscosity @ 40°C, cSt (ASTM D445)	74.7	83.3	68.4	88.5	43	42.2
Viscosity Index (ASTM D2270)	182	168	165	168	163	174
CCS Viscosity cP (ASTM D5293)	5888 (-35)	5433 (-30)	5946 (-30)	5855 (-30)	6081 (-35)	5501 (-35)
Pour Point °C (°F) (ASTM D97)	-51 (-59.8)	-39 (-38.2)	-51 (-59.8)	-40 (-40)	-46 (-50.8)	-44 (-47.2)
Flash Point °C (°F) (ASTM D92)	232 (449.6)	220 (428)	228 (442.4)	224 (435.2)	226 (438.8)	236 (456.8)
Fire Point °C (°F) (ASTM D92)	240 (464)	238 (460.4)	250 (482)	240 (464)	240 (464)	246 (474.8)
Noack Volatility, % weight loss (ASTM D5800)	9.9%	8.7%	7.1%	10%	11%	8.9%
High-Temperature/High-Shear Viscosity cP (ASTM D5481)	3.7	3.7	3.6	3.8	2.7	2.7
Total Base Number	10.1	10.1	8.8	8	7.9	8.8

APPLICATIONS

Use in gasoline or diesel vehicles that require any of the following specifications:

0W-40 (EFO): API SN, SM...; ACEA A3/B3, A3/B4; BMW LL-01; MB 229.1, 229.3, 229.5; Porsche A40; Renault 0700, 0710; VW 502.00, 505.00

5W-40 (EFM): API SN, SM...; ACEA A3/B3, A3/B4; BMW LL-01; GM LL-B-025; Renault 0700, 0710

Manufacturer Approvals:* MB-Approval 229.5; Porsche A40; VW 502.00, 505.00

5W-30 (AEL): API SN; SM...; ACEA C3; BMW LL-04; Porsche C30; GM dexos 2⁺; Chrysler MS-11106; MB 229.51

Manufacturer Approvals:* VW 504.00; 507.00

5W-40 (AFL): API SN, SM, CF...; ACEA C3; Chrysler MS-10850; GM dexos 2⁺; VW 502.00, 505.01; Ford WSS-M2C917-A; Renault 0700, 0710; BMW Longlife-04

Manufacturer Approvals:* MB 229.51; Porsche A40

0W-20 (AFE): API SN-PLUS (Resource Conserving); SN, SM...; ILSAC GF-5; ACEA C5; A1/B1; BMW LL-17FE+; MB 229.71; Ford WSS-M2C947-B1; Opel/Vauxhall OV0401547; Fiat 9.55535-GSX; Chrysler MS-12145; Volvo VCC RBS0-2AE

0W-20 (EZT): API SN-PLUS, SN...; ACEA C5; VW 508.00/509.00

SERVICE LIFE

Recommended for the extended drain intervals established by the vehicle manufacturer. Change oil filter at time of oil change.

COMPATIBILITY

AMSOIL 100% Synthetic European Motor Oil is compatible with other synthetic and conventional motor oils. Mixing AMSOIL motor oil with other oils, however, will shorten the oil's life expectancy and reduce its performance benefits. AMSOIL does not support extended drain intervals where oils have been mixed.

Aftermarket oil additives are **not recommended** for use with AMSOIL synthetic motor oils.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available via the Internet at www.amsoil.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Recycle used oil and bottle.

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AMSOIL Signature Series Synthetic Motor Oil protects against harmful deposits on turbochargers **4X better than Mobil 1® Extended Performance** and **3.6X better than Royal Purple®** in industry-standard testing*.

LEADING THE FIELD IN DEPOSIT PROTECTION

Testing proves AMSOIL Signature Series 5W-30 Synthetic Motor Oil provides more complete protection against damaging deposits than its competitors.

The push toward smaller, fuel-efficient, yet powerful engines has driven the development of several key technologies. Gasoline direct injection (GDI) and turbochargers are now common features of passenger cars and light trucks. By 2020, industry experts predict that nearly every new vehicle will feature GDI technology, and the vast majority will be turbocharged. While these advanced technologies enhance performance, they also present serious challenges to motor oil.



THE TURBOCHARGER TRADE-OFF

Turbochargers push more air into the engine's combustion chamber, providing better fuel economy and performance but also creating intense engine temperatures. They often operate above 150,000 rpm on exhaust gases exceeding 1,000°F. These extreme conditions cause some motor oils to break down and solidify into harmful deposits.

Vehicle manufacturers have long recommended different service intervals based on "normal" or "severe" driving conditions. Turbocharged vehicles are automatically included in the severe service category due to the extreme heat they generate. Motor oil with unique properties is required to combat the effects of intense temperatures.

PROOF OF PROTECTION

AMSOIL Signature Series 5W-30 Synthetic Motor Oil was tested against two competing brands to determine its level of protection against deposit formation in high-heat applications.

The TEOST 33C test (ASTM D6335) is an industry-standard bench test that simulates turbocharger operating conditions. According to the American

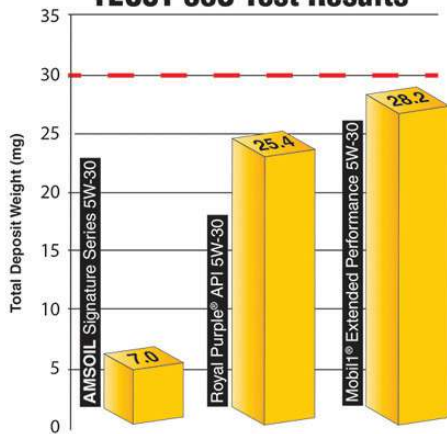
SIGNATURE SERIES 5W-30 SYNTHETIC MOTOR OIL

Protects against harmful deposits on turbochargers **4X better than Mobil 1 Extended Performance** and **3.6X better than Royal Purple**, and provides **75 percent more protection** against horsepower loss and wear than required by a leading industry standard**.

Society for Testing and Materials (ASTM), it is "designed to predict the high temperature deposit forming tendencies of an engine oil." To meet the API SN Resource Conserving and ILSAC GF-5 motor oil specifications that are often recommended by vehicle manufacturers, a 5W-30 motor oil must limit total deposit formation to 30 mg or less.

AMSOIL Signature Series 5W-30 Synthetic Motor Oil held the total weight of deposits to 7 mg, well under the 30 mg limit required by the API and ILSAC, while Royal Purple® API 5W-30 and Mobil 1® Extended Performance 5W-30 came in just under the limit at 25.4 mg and 28.2 mg respectively. Signature Series 5W-30 Synthetic Motor Oil protects against harmful deposits on turbochargers **4X better than Mobil 1® Extended Performance** and **3.6X better than Royal Purple®** in industry-standard testing*.

TEOST 33C Test Results



The independent, third-party lab results show AMSOIL Signature Series 5W-30 held deposits to well under the 30 mg limit recommended by vehicle manufacturers.

*Based on independent, third-party testing of AMSOIL® Signature Series 5W-30, Mobil 1® Extended Performance 5W-30 and Royal Purple® API 5W-30 in the ASTM D6335 bench test required by the API SN Resource Conserving specification. For full test details visit www.amsoil.com/depositprotection.

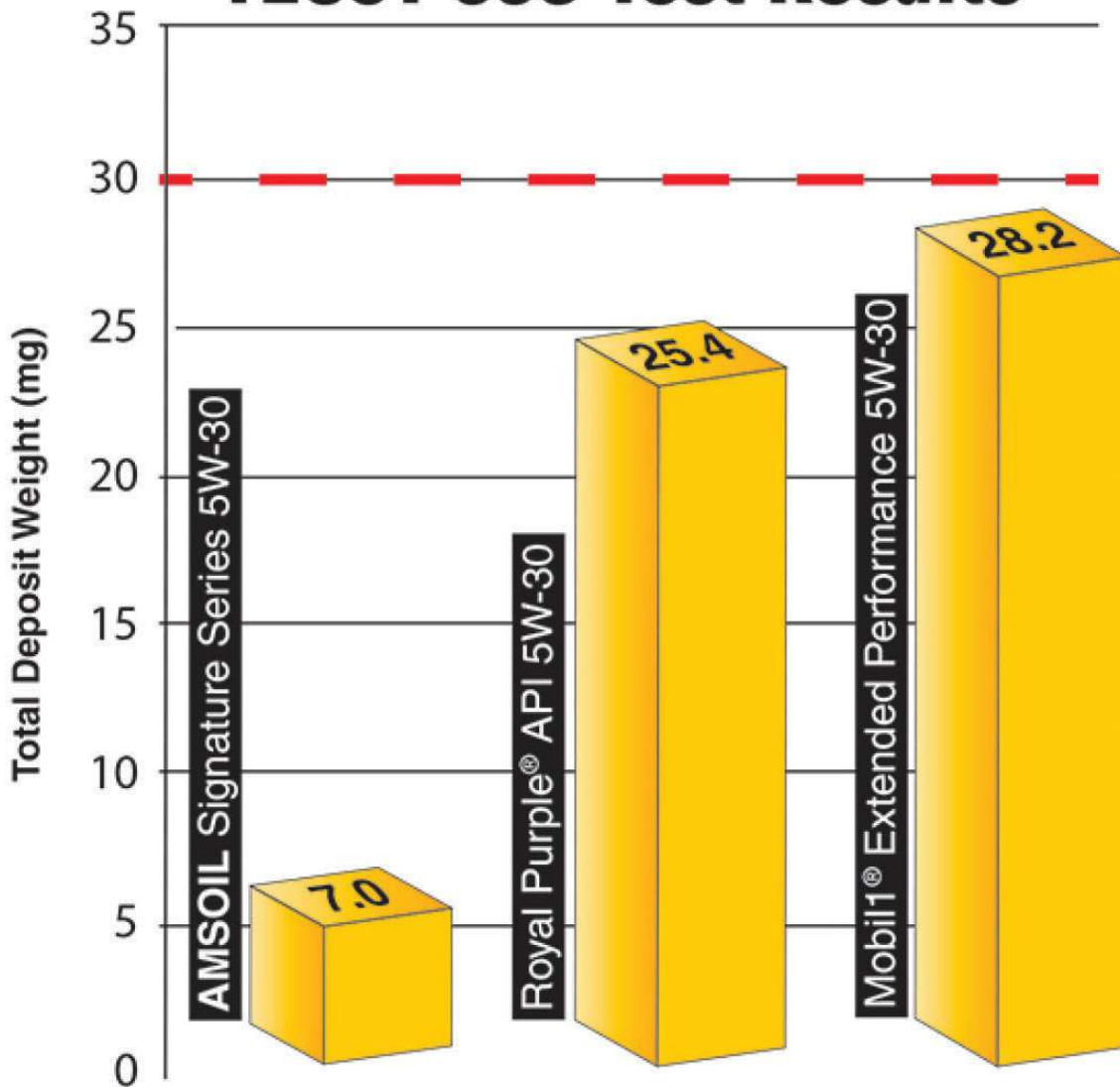
**Based on independent testing of AMSOIL Signature Series 5W-30, in ASTM D7320 as required by API SN specification.

THE TEST

The TEOST 33C test (ASTM D6335) is an industry standard bench test that simulates turbocharger operating conditions. According to the American Society for Testing and Materials (ASTM), it is “designed to predict the high temperature deposit forming tendencies of engine oil.” To meet the API SN Resource Conserving and ILSAC GF-5 motor oil specifications that are often recommended by vehicle manufacturers, a 5W-30 motor oil must limit total deposit formation to 30 mg or less.



TEOST 33C Test Results



For full test details visit www.amsoil.com/depositprotection



PERFORMANCE AND PROTECTION THAT ARE MILES AHEAD OF THE REST.

Signature Series Synthetic Motor Oil (ASM, ALM, AZO, ASL, ATM, AZF, AMR)

Signature Series blows the doors off the latest industry standards. Say hello to the best motor oil we've ever made.

- **75 percent** more wear protection¹
- **Guaranteed** protection for up to 25,000 miles or 1 year, whichever comes first
- Achieved **100 percent protection** against LSPI²

XL Synthetic Motor Oil (XLZ, XLM, XLF, XLT, XLO)

XL's boosted formulation delivers more cleaning power and promotes longer engine life.

- Extra protection that lasts up to **12,000 miles or 1 year**, whichever comes first
- Achieved **100 percent protection** against LSPI²

OE Synthetic Motor Oil (OEZ, OEM, OEF, OET)

100 percent synthetic engine protection for advanced automotive technology, including turbochargers and direct injection.

- **Protects** against wear
- **Fights** sludge and deposits
- Achieved **100 percent protection** against LSPI²

Online Store: [Click Here](#) | Telephone: 1-800-581-5823

¹Based on independent testing in the ASTM D6891 test using 0W-20 as worst-case representation.

²Based on zero LSPI events in five consecutive tests of AMSOIL Signature Series, XL & OE 5W-30 motor oil in the LSPI engine test as required for the GM dexos1[®] Gen 2 specification.



Matt Erickson | TECHNICAL MANAGER – PCLT PRODUCTS AND MECHANICAL R&D

Anyone can claim to stand apart from the crowd

But few can prove it.

How do you make the world's best motor oil even better? With more than two years of calculated and persistent research and development validated by several rounds of bench, dyno and field tests, that's how.

The previous version of Signature Series Synthetic Motor Oil was the best motor oil we'd ever made. It delivered on all fronts, and it did so while providing enthusiasts maximum engine protection and performance while providing the ability to extend drain intervals if they wanted.

When we planned how to improve Signature Series in anticipation of the forthcoming GM* and ILSAC/API specification changes, we knew we had a challenge on our hands. We had to raise the bar even higher and push the limits of technology to ensure we continued to offer the best performance and meet the new challenges of modern engines that run hotter, produce more contaminants and present tougher conditions to motor oil. The oil would need to fight low-speed pre-ignition (LSPI), a damaging side effect surfacing in modern turbocharged, gasoline-direct-injected (T-GDI) engines; protect turbos despite intense heat and stress; fight engine wear; maintain its viscosity despite high heat and shearing force and continue to provide reserve protection for extended drain intervals.

We went to work formulating, testing, reformulating and testing again. And again. The test results exceeded our expectations, and after more than two years, we arrived at the Signature Series product now available to you.

You've likely noticed several performance claims surrounding the new product. These claims continue our tradition of setting our products apart from our competitors and showing customers how they benefit from using AMSOIL synthetic lubricants. Let me illustrate.

- **75% more protection against horsepower loss and wear¹**

I hope you've seen this claim by now. It's front-and-center on the product label and in our ads since research tells us enthusiasts value wear protection above all other motor oil benefits. We validated the claim based on the industry-standard API Sequence IV-A Engine Wear Test, the gold standard for testing engine wear. The test uses a 2.4L four-cylinder engine that runs 100 hours under extreme conditions designed to encourage wear. Signature Series crushed this test, delivering 75 percent more wear protection than required to pass.

- **Handles heat so well that it protects turbochargers 72% better than required by GM's dexos1® Gen 2 specification²**

Here's another important claim given the prevalence of turbos today. In fact, turbos were installed in a record 27.6 percent of vehicles built through March 2017, according to *WardsAuto*. The claim is based on the turbo coking test General Motors uses for its dexos1 Gen 2 specification. The oil is run in a 1.4L engine subject to extreme heat soaks. This means test administrators get the turbo extremely hot, then shut down the engine, allowing the intense heat to bake the oil. That's exactly what you

shouldn't do to a turbocharged engine if you want it to last. However, this is an extreme test to differentiate between good and bad oils, so the process is repeated 2,000 times.

Signature Series handled it with ease, providing 72 percent more protection than required. You can rest assured that your turbocharger is protected despite intense heat and stress.

- **Achieved 100% protection against LSPI³**

LSPI is the biggest new challenge for the automotive industry, and it is driving significant changes to motor oils. LSPI is a more destructive form of traditional engine knock that occurs in T-GDI vehicles. Motor oil can help prevent LSPI, which is why the industry has been working hard to upgrade specifications to include tests for LSPI.

We subjected Signature Series to the LSPI engine test required for the GM dexos1 Gen 2 specification. The test uses a GM 2.0L EcoTec* engine run five consecutive times to test for LSPI. Signature Series – in addition to XL and OE – aced the test, allowing zero LSPI events.

As you can see, we back up the claims surrounding Signature Series with data from legitimate industry-standard tests. We do it not only to stand out from competitors, but to help you stand out as the go-to resource to solve the problems modern vehicles present to your customers.

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¹Based on independent testing of AMSOIL Signature Series 0W-20, in ASTM D6891 as required by the API SN specification.

²Based on independent testing of AMSOIL Signature Series 5W-30 in the GM TurboCoking test.

³Based on zero LSPI events in five consecutive tests of AMSOIL Signature Series 5W-30 Motor Oil in the LSPI engine test required by the GM dexos1® Gen 2 specification.

PRODUCT SPOTLIGHT:

AMSOIL ENGINE AND TRANSMISSION FLUSH

We cover a range of topics on the AMSOIL blog at blog.AMSOIL.com, but our most widely read and commented-on post is the one about engine-flush products. People have several questions about the effectiveness and suitability of AMSOIL Engine and Transmission Flush (FLSH) for their vehicles. To prepare you to answer these questions and help improve your success when selling this great add-on product, we address the top questions here.

What is Engine and Transmission Flush?

It's a detergent-based additive designed to clean deposits and sludge from your engine. While motor oils contain detergents that help keep the engine clean, the formulation must also contain anti-wear, oxidation-inhibitor and other additives, limiting room for detergents. Engine and Transmission Flush, however, is designed solely to clean, and therefore packs a more potent cleaning punch.

What are its benefits?

1. Prepares your engine for new oil: Engine and Transmission Flush helps loosen sticky valves or piston rings and remove harmful sludge and other contaminants. Cleaning the engine prior to installing fresh oil ensures the new oil functions as intended and delivers maximum protection. The oil won't last as long or protect as well if it must contend with sludge and deposits from the previous oil.
2. Helps increase fuel efficiency: Contaminants circulating throughout the engine can lead to oil breakdown and increased viscosity – and higher-viscosity oil requires more energy to circulate throughout the engine. Sludge and deposits on engine parts can also increase resistance, which wastes fuel. Cleaning the engine helps ensure parts move efficiently, maximizing fuel economy.
3. Helps reduce oil consumption: If deposits in the piston-ring lands cause the rings to stick, oil can migrate into the combustion chamber, where it burns. This not only leads to harmful deposits, it also increases exhaust emissions as the burned oil exits the tailpipe. Engine and Transmission Flush helps free stuck rings and reduce oil consumption, in turn reducing emissions.

4. Helps reduce heat: Extreme heat reduces engine efficiency while increasing the rate at which the oil oxidizes (chemically breaks down). Sludge and deposits act as insulators that prevent the engine from dissipating heat as designed. Flushing your engine helps ensure it manages heat properly for optimum efficiency and oil life.

5. Convenience: You can safely use AMSOIL Engine and Transmission Flush in gas or diesel engines and automatic transmissions. And, while some solvent-based flush products require a cumbersome disposal process, Engine and Transmission Flush uses a detergent-based formulation allowing easy disposal with waste oil.

Can flushing an engine or transmission create leaks?

This is a common question. There's a good deal of misinformation surrounding engine-flush products, which likely explains its origin.

In old, poorly maintained engines, time and neglect can cause seals to wear out, dry and crack. If using a low-quality oil, sludge and deposits can form that cover the seals, like Spackle* covering cracked plaster. This veneer of deposits papers over the worn seals and helps prevent them from leaking.

Signature Series Cleans

AMSOIL Signature Series Synthetic Motor Oil has **50% more** detergents^D to help keep oil passages clean and promote oil circulation. It provides **90% better protection** against sludge.^{DD}



The oil pick-up tube screen is virtually free of sludge.

^Dvs. AMSOIL OE Motor Oil
^{DD}Based on independent testing of AMSOIL Signature Series 5W-30 in the ASTM D6593 engine test for oil screen plugging as required by the API SN specification.

Flushing the engine dissolves the deposits and reveals the true nature of the seals, which can create a leak. The motorist then associates the engine flush with a fluid leak. In reality, the seals were already bad; the flush simply revealed their true condition.

If you suspect a customer's vehicle falls into this camp, it's best to leave well enough alone and skip the engine flush. While Engine and Transmission Fluid won't cause leaks, the customer must choose between sludge and deposits robbing engine performance or the seals showing their true condition.

Is flushing the engine necessary?

It depends on vehicle condition and maintenance practices. For customers who have used AMSOIL synthetic motor oil exclusively, flushing the engine prior to an oil change won't provide as noticeable a benefit as if they had been using a low-quality oil. However, flushing

the engine before each oil change ensures they derive the greatest benefits from the new oil. AMSOIL synthetic motor oil contains potent detergent additives that help keep engines clean.

If your customer wants to flush his or her engine regardless, Engine and Transmission Flush is perfectly safe to use in this scenario.

In vehicles with a suspect maintenance history switching to AMSOIL products for the first time, it's a good idea to give the engine a fresh start prior to installing new oil. However, it's not required. Doing so helps ensure your customer gets maximum benefit from the oil.

Is Engine and Transmission Flush safe?

Some motorists fear that flushing their engines or transmissions may loosen large chunks of debris that end up clogging narrow passages or the filter. Engine and Transmission Flush cleans at the molecular level, ensuring deposits dissolve and properly exit the engine or transmission with the oil when it's drained. It's perfectly safe to use.

How do I use Engine and Transmission Flush?

To flush the engine, add the entire bottle to the fill port and idle the engine for 10-15 minutes. Immediately drain the oil. Replace the oil filter and refill with new oil.

To flush an automatic transmission, add the entire bottle to the fill port and idle the engine for 10-15 minutes, shifting through drive and reverse. Do not place the vehicle under heavy load. Drain all the fluid, including from the torque converter, replace the filter and add new fluid. We don't recommend flushing a transmission without a removable pan or filter access.

For video instructions on flushing an engine, head to [youtube.com/user/AMSOILinc](https://www.youtube.com/user/AMSOILinc) and search "flush."

How well does Engine and Transmission Flush work?

To see the product in action, check out the before/after images here. They're also available on the product page at [AMSOIL.com](https://www.AMSOIL.com) and [AMSOIL.ca](https://www.AMSOIL.ca), as well as on the Engine and Transmission Flush product data bulletin (G2763).



Before Cleanup



Cylinder head pre-cleanup. Note the sludge deposits on and around the valve springs and push rod openings.

After Cleanup



Cylinder head after cleanup with AMSOIL Engine and Transmission Flush. The valve springs and push rod openings are noticeably cleaner, with fewer sludge deposits. The manufacturer's stamping is more easily seen.

Before Cleanup



Automatic transmission clutch plates pre-cleanup. Varnish and glazing is heavy on some of the plates.

After Cleanup



Automatic transmission clutch plates after cleanup with AMSOIL Engine and Transmission Flush reveal lighter glazing and varnish.

Break-In Oil (SAE 30)

Designed for High-Performance and Racing Engines

AMSOIL Break-In Oil is an SAE 30 oil formulated without friction modifiers to allow for quick and efficient piston ring seating in new and rebuilt high-performance and racing engines. It contains zinc and phosphorus anti-wear additives to protect cam lobes, lifters and rockers during the critical break-in period when wear rates are highest, while its increased film strength protects rod and main bearings from damage. AMSOIL Break-In Oil is designed to increase compression, horsepower and torque for maximum engine performance.



Quickly Seats Rings

The primary goal during engine break-in is to seat the rings against the cylinder wall. Properly seated rings increase compression, resulting in maximum horsepower; they reduce oil consumption and prevent hot combustion gases from entering the crankcase. To achieve this, however, the oil must allow the correct level of “controlled wear” to occur between the cylinder wall/ring interface while maintaining wear protection on other critical engine parts. Insufficient break-in leaves behind peaks on the cylinder wall that prevent the rings from seating. The deeper valleys, meanwhile, allow excess oil to collect and burn during combustion, increasing oil consumption. Too much wear results in cylinder glazing due to peaks “rolling over” into the valleys and preventing oil from collecting and adequately lubricating the cylinder wall.

AMSOIL Break-In Oil's friction-modifier-free formula allows the sharp peaks on newly honed cylinder walls (fig. 1) to partially flatten. The result produces more surface area for rings to seat against, allowing formation of a dynamic seal that increases compression, horsepower and torque (fig. 2).

- **Quickly** seats piston rings
- **Increased** zinc and phosphorus protect against wear
- **Maximizes** compression and power

Fig. 1: New Cylinder

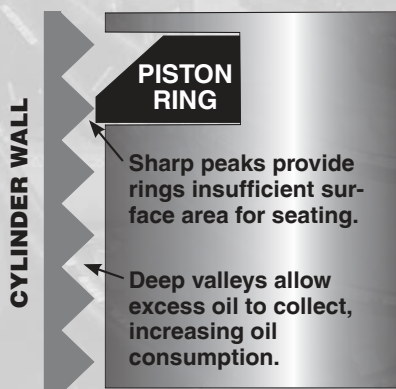
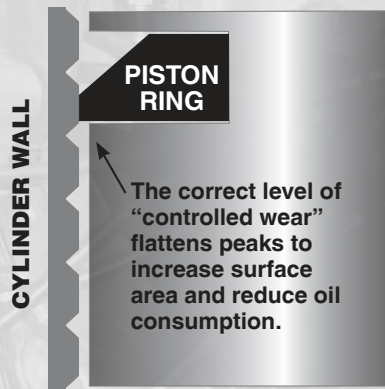


Fig. 2: Broken-In Cylinder



TYPICAL TECHNICAL PROPERTIES

Break-In Oil (BRK)

Kinematic Viscosity @ 100°C, cSt (ASTM D-445)	11.4
Kinematic Viscosity @ 40°C, cSt (ASTM D-445)	94.5
Viscosity Index (ASTM D-2270)	107
Flash Point °C (°F) (ASTM D-92)	234 (453)
Fire Point °C (°F) (ASTM D-92)	250 (482)
Pour Point °C (°F) (ASTM D-97)	-34 (-29)
Four-Ball Wear (ASTM D-4172)	
Para 1 (40 kg, 75°C, 1200 rpm, 1 hr), Scar, mm	0.45
Total Base Number	6.6
High-Temperature/High-Shear Viscosity (ASTM D-5481 @ 150°C, 1.0 x 10 ⁶ S ⁻¹), cP	3.5

Protects Critical Parts from Wear

New flat-tappet camshafts and lifters are not seasoned or broken in and must be heat-cycled to achieve proper hardness. During the break-in period, these components are susceptible to accelerated wear because they are splash-lubricated, unlike other areas of the engine that are pressure lubricated. AMSOIL Break-In Oil contains high levels of zinc and phosphorus (ZDDP) additives designed to provide the anti-wear protection required during this critical period.

Increased Film Strength

High-performance and racing engines often use aftermarket parts designed to increase torque and horsepower. The added stress can rupture the oil film responsible for preventing harmful metal-to-metal contact on rod and main bearings. The base oils in AMSOIL Break-In Oil provide increased film strength to protect bearings from wear.

APPLICATIONS

AMSOIL Break-In Oil is designed to effectively break in high-performance and racing engines requiring SAE 30 oil, helping maximize compression, horsepower and torque.

RECOMMENDATIONS

The engine builder's or manufacturer's break-in recommendations should be followed if available. Break-in period should not exceed 1,000 miles. When the engine is new, the exhaust ports will have a large area of oil residue (Fig. 3). As the rings begin to seat, less oil is passed and the oil residue area begins to shrink (Fig. 4). When the rings are fully seated and have formed a tight seal against the cylinder walls, no oil residue will be evident. Other common methods to determine if rings have seated

include performing a leak-down test or horsepower measurements over time. Break-in duration will vary between engines. Afterward, drain and fill the engine with an AMSOIL high-performance synthetic oil that meets builder or manufacturer specifications.

Fig. 3



Fig. 4



HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended application and according to the recommendations in the Material Safety Data Sheet (MSDS). An MSDS is available via the Internet at www.amsoil.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Don't pollute. Return used oil to collection centers.

For warranty information, visit www.amsoil.com/warranty.aspx.



AMSOIL products and Dealership information are available from your local AMSOIL Dealer.

Referral # **779**

Vaughn Enterprises, Inc.

Call Greg Vaughn at **1-800-581-5823**

3508 W. Pine Street,

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<https://www.Vaughninc.com/>



The First in Synthetics®

Engine Assembly Lube

High-Quality Assembly Lube for Racing, Performance and Other Four-Stroke Engines.

AMSOIL Engine Assembly Lube (EAL) is formulated to cling to engine parts and provide exceptional wear protection, while inhibiting rust and corrosion in newly built or rebuilt four-stroke engines. It is designed to dissolve in oil, helping eliminate oil port clogging and deposit formation.

Clings Tenaciously to Parts

Because building an engine can take from a few days to many months, using an engine assembly lube that clings well to parts for extended periods is critical. AMSOIL Engine Assembly Lube is formulated with a high-viscosity base oil and a unique tackifier for long-lasting, tenacious cling.

Exceptional Wear Protection

During initial startup, engines operate momentarily with little-to-no oil pressure, placing camshaft lobes, lifters, rocker arms, bearings and other critical parts at high risk of wear and failure. In addition to inhibiting wear by clinging to parts, AMSOIL Engine Assembly Lube contains high levels of anti-wear additives for further protection.

Inhibits Rust and Corrosion

An engine can sit in a garage partially assembled for long periods, allowing moisture and oxygen to form rust on exposed metal surfaces. AMSOIL Assembly Lube contains rust and corrosion inhibitors that protect engine components during inactivity.

Dissolves in Oil

Grease-based assembly lubes can increase the risk of oil port clogging if the grease is not fully consumed at initial startup, potentially causing engine failure. AMSOIL Engine Assembly Lube is designed to dissolve in oil, helping oil ports remain clean, and helping to eliminate deposit formation under the valve covers and in the oil pan.

Easy and Precise Application

AMSOIL Assembly Lube is packaged in convenient 4-oz. tubes, allowing for cleaner, more precise application compared to other products.

APPLICATIONS

AMSOIL Engine Assembly Lube is recommended for any new or rebuilt four-stroke engine, including racing and performance engines, and should be applied to all areas of the engine susceptible to initial startup wear.



- Tenaciously clings to parts
- High in anti-wear additives
- Dissolves in oil
- Provides rust & corrosion protection
- Recommended for all four-stroke engines, including high-performance and racing engines



The First in Synthetics®

AMSOIL products and Dealership information are available from your local full-service AMSOIL Dealer.

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The First in Synthetics®

AMSOIL Oil Filters Superior Oil Filtration for Cars and Light Trucks

AMSOIL Oil Filters feature advanced full-synthetic media that traps and holds a greater amount of small, wear-causing contaminants compared to conventional filters. They provide extended service intervals for increased convenience while helping reduce engine wear.



High Efficiency

Efficiency is a filter's ability to capture contaminants. The more efficient a filter is, the more contaminants it will remove from oil. AMSOIL Oil Filters provide a filtering efficiency in accordance with industry standard ISO 4548-12 of **99 percent at 20 microns** – one of the best ratings on the market. Some competitors also claim 99 percent efficiency, but at larger particle sizes of 30 to 40 microns.

Less Restriction

Proper oil flow is essential to keep engine parts lubricated at all times. AMSOIL Oil Filters' synthetic fibers are smaller than the fibers used in traditional filters, allowing for lower restriction which decreases engine wear. Our filters allow oil to flow through more easily than a typical cellulose filter does during cold-temperature warm-ups.

Contaminant Retention

A filter's capacity refers to the amount of contaminants it can hold and still remain effective. AMSOIL Oil Filters have a greater capacity for small, wear-causing contaminants than competing filter lines. They last longer and ensure the oil is properly filtered.

Superior Construction

AMSOIL Oil Filters are made with premium-grade full-synthetic media. The strictly controlled processing of this media ensures accurate filter construction and delivers higher capacity and efficiency along with better durability.

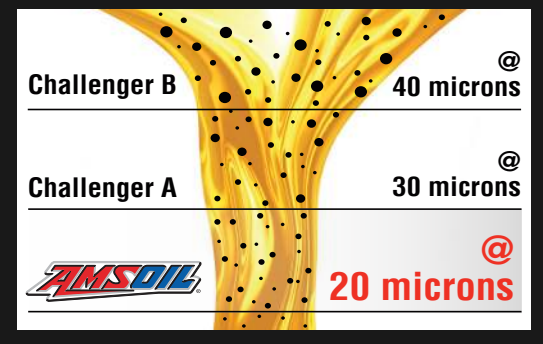
Our full-synthetic media technology is resin-free to resist degradation from hot oil. It features a rigid mesh material that is pleated with the media for superior strength.

AMSOIL Oil Filters are constructed with nitrile gaskets that remain flexible and have been tested to extreme distances in severe environments. They feature fully tucked seams, a molded element seal, roll-formed threads and a long-lasting, premium-grade silicone anti-drainback valve.

Easy-Grip Coating

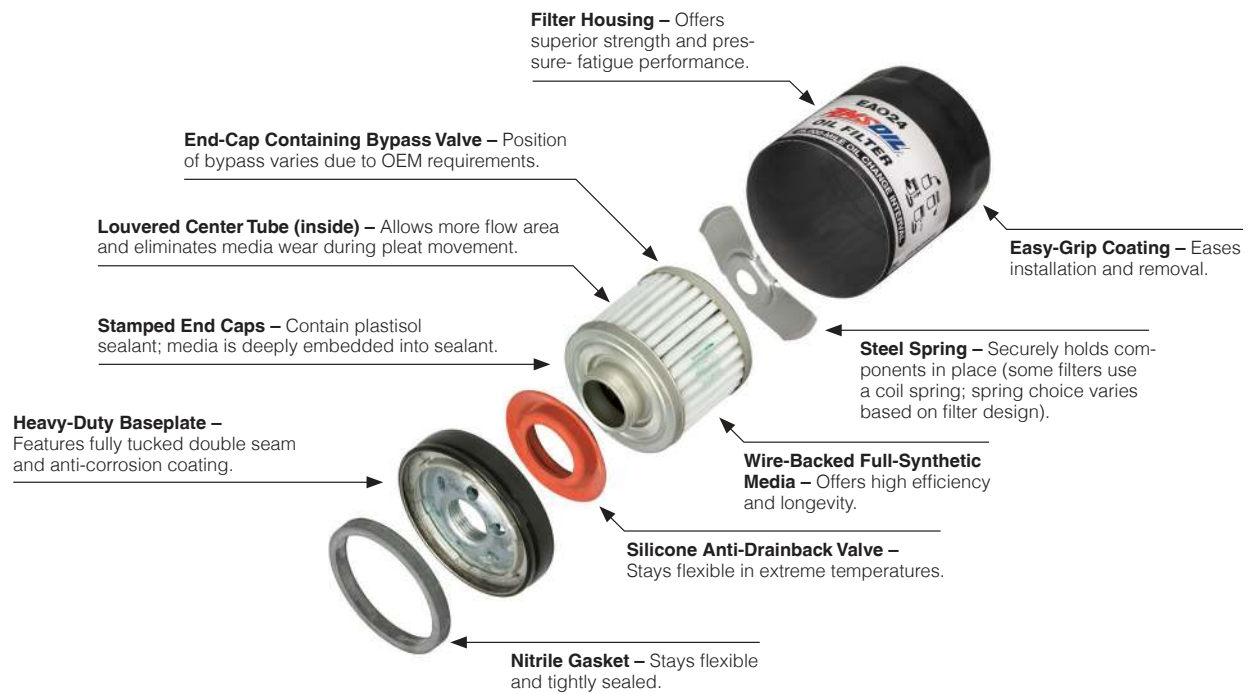
AMSOIL Oil Filters feature a textured coating to ease installation and removal.

99% Efficiency at 20 Microns^{AA}
Filtering particles >20 microns fights engine wear.



▲ AMSOIL Oil Filters feature a reference arrow to aid in proper installation. Once the filter is finger tight, it is easy to gauge the additional three-fourths to 1.25 turns required to ensure a good fit. Over-tightening can lead to leakage.

^{AA}In accordance with industry-standard ISO SO 4548-12. *All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.



RECOMMENDED ACCESSORIES

Filter wrenches with a 3/8" square drive offered by AMSOIL are designed to install and remove AMSOIL Oil Filters and Motorcycle Oil Filters in hard-to-reach locations.

Filter Wrench (64 mm) (GA265) Recommended for EA15K09, EA15K10, EA15K12, EA15K13, EAO14, EAOM103, EAOM103C, EAOM109.

Filter Wrench (74 mm) (GA258) Recommended for EAOM132, EAOM132C, EAOM133, EAOM133C, EAOM137C.

Filter Wrench (76 mm) (GA251) Recommended for EAO17, EAO18, EAO23, EA15K20, EA15K29, EA15K32, EAO34, EAO37, EAO38, EA15K50, EA15K51, EA15K53, EAO55, EAO64, EAOM122, EAOM122C, EAOM134, EAOM134C, EAOM135, EAOM135C, EAOM136C, EAOM138.

Filter Wrench (93 mm) (GA252) Recommended for EAO11, EAO15, EAO21, EAO24, EAO26, EAO27, EAO31, EAO40, EAO42, EAO52, EAO59, EAO98.

Filter Wrench (76 mm) (GA264) Recommended for EA15K20 built prior to 2018 or 2020 and newer. Any filter built in 2018 or 2019 will use the GA251.

Filter Wrench (64 mm) (GA248) Recommended for EA15K01, EA15K02, EA15K04 and EA15K49

SERVICE LIFE

When used in conjunction with AMSOIL synthetic motor oils, AMSOIL Oil Filters are guaranteed for extended service life:

- Filters designated with product code EA15K are recommended for 15,000 miles (24,000 km) or one year, whichever comes first, in normal or severe service.
- Filters designated with product code EAO are recommended for 25,000 miles (40,000 km) or one year, whichever comes first, in normal service or 15,000 miles (24,000 km) or one year, whichever comes first, in severe service.
- NOTE: Change oil filter at every oil change.

Consult the AMSOIL Product Guide, AMSOIL Online Filter Cross-Reference or MyAMSOILGarage™ at www.amsoil.com to determine the appropriate filter for each application. When AMSOIL Oil Filters are used with a motor oil other than AMSOIL synthetic motor oil, the filter should be changed according to the vehicle manufacturer's recommendation.

TECHNICAL SERVICES

For immediate answers to your technical questions call (715) 399-TECH (8324) between 8 a.m. and 5 p.m. Central time or email tech@amsoil.com.

PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.





Signature Series Synthetic Automatic Transmission Fluid

Transmissions in commercial vehicles, SUVs, trucks and vans – particularly those used for hauling or towing – are subjected to severe-service operation and increased heat. Elevated temperatures cause fluids to break down, allowing damaging metal-to-metal contact and the formation of sludge and deposits. The problem is worse in modern transmissions with more gears, clutch packs and narrow oil passages that require clean, high-quality fluid to achieve maximum performance and life.

AMSOIL Signature Series Synthetic Automatic Transmission Fluid is specifically formulated to withstand the rigors of heavy towing, elevated temperatures and challenging terrain. It remains fluid in sub-zero temperatures and provides reserve protection during heavy use and abuse.

Proven in 180,000-mile, Severe-Service Taxi Fleet Field Trial

To demonstrate its effectiveness in severe service, Signature Series Multi-Vehicle Synthetic ATF was installed in Las Vegas taxi cabs. The vehicles routinely encountered demanding stop-and-go driving loaded with passengers and cargo, while the desert environment presented extremely hot ambient temperatures, placing enormous strain on the fluid. Following 180,000 miles, a transmission was selected for analysis. The Aluminum Beaker Oxidation Test (ABOT) is an industry standardized test used to determine a transmission fluid's oxidation resistance, which is a good indicator of its service life. Testing by an independent, third-party lab revealed that after 180,000 miles in severe service, Signature Series Multi-Vehicle Synthetic ATF resisted oxidation longer than required for new fluid to meet the Chrysler ATF+4 specification (see graph). Internal components, including the valve body and clutch plates (pictured), were virtually free of damaging sludge, deposits and wear, confirming the lubricant's high level of protection for severe-service applications.

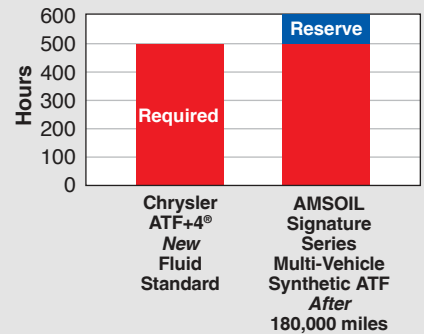
Protects Against Thermal Breakdown

Signature Series Synthetic ATF is formulated with high concentrations of antioxidants, making it naturally heat resistant. It provides outstanding protection against sludge and varnish deposits that clog narrow oil passages and contribute to clutch glazing. After 180,000 miles in severe service, fluid analysis revealed Signature Series Multi-Vehicle Synthetic ATF contained 83 percent of its original oxidation inhibitors, proving its long-lasting resistance to thermal breakdown.



Reserve Protection Against Heat After 180,000 Miles

ABOT Test Performed by Independent Lab
Based on Total Acid Number (TAN)



The transmission's valve body is clean and virtually sludge-free following 180,000 severe-service miles. The clutch plates demonstrated only trace discoloration and earned a rating of "good," the highest possible, for deterioration/wear.

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TYPICAL TECHNICAL PROPERTIES

AMSOIL Signature Series Multi-Vehicle Synthetic Automatic Transmission Fluid (ATF)

AMSOIL Signature Series Fuel-Efficient Synthetic Automatic Transmission Fluid (ATL)

	ATF	ATL
Kinematic Viscosity @ 100°C, cSt (ASTM D445)	7.5	6.3
Kinematic Viscosity @ 40°C, cSt (ASTM D445)	38.5	30.8
Viscosity Index (ASTM D2270)	165	159
Pour Point °C (°F) (ASTM D97)	-53 (-63)	-65 (-85)
Flash Point °C (°F) (ASTM D92)	234 (453)	224 (435)
Four-Ball Wear Test (ASTM D4172 @ 40 kg, 75°C, 1200 rpm, 1hr), Scar, mm	0.39	0.41
Brookfield Viscosity @ -40°C, cP (ASTM D2983)	9755	7676

Outstanding Wear Protection

Varying speeds and loads causes torque multiplication and extreme stress on gears and bearings. AMSOIL formulated Signature Series Synthetic ATF with high film strength and premium anti-wear/extreme-pressure additives to help prevent wear during severe service. In the industry-standard FZG Gear Wear Test, Signature Series Multi-Vehicle Synthetic ATF that had been used for 180,000 severe-service miles achieved a "Pass" at stage 12 – the highest stage. The results exceeded the Ford MERCON V and Chrysler ATF+4 specifications for new fluid, demonstrating the lubricant's long-lasting wear protection.

Cold-Temperature Fluidity

Cold, thick automatic transmission fluid lengthens shift times and reduces fuel economy. Signature Series Synthetic ATF is wax-free and delivers extraordinary cold-flow properties. It helps improve shift response, energy efficiency and warm-up times.

Friction Durability

Today's transmissions are smaller and must withstand higher horsepower and torque while delivering smoother shifts, all with longer fluid life recommendations. AMSOIL Signature Series Synthetic ATF is formulated with friction modifier additives that deliver outstanding clutch-holding capacity (static friction), torque-transfer ability (dynamic friction) and anti-shudder properties (slipping torque-converter clutches). Analysis reveals that after 180,000 miles in severe service, Signature Series Multi-Vehicle Synthetic ATF provides nearly identical friction properties as new fluid for smooth, reliable shifts.

APPLICATIONS

AMSOIL Signature Series Multi-Vehicle Synthetic ATF is recommended for transmissions, hydraulics, power steering systems and other applications that require any of the following specifications:

Allison C-4, TES-389; **BMW** 7045E, 8072B, LA 2634, LT 71141; **Chrysler** ATF+4*, MOPAR* ASRC, 68089195AA, 68049954AA; **Ford** MERCON*, MERCON* V, ESP-M2C166-H, FNR5, M2C924-A, XL-12; **GM** DEXRON* II, DEXRON* III, AutoTrak II; **Honda/Acura** ATF-Z1; **Hyundai/Kia** SP-II, SP-III, Red-1; **IDEMITSU** K17; **JASO** 1A; **JWS** 3309, 3314, 3317; **MAN** 339 Type V-1, 339 Type V-2, 339 Type Z-1, 339 Type Z-2, 339 Type Z-3, 339F; **Mazda** ATF-M III, ATF-MV, F-1; **Mercedes Benz** 236.1, 236.2, 236.3, 236.5, 236.6, 236.7, 236.9, 236.10, 236.11, 236.81, 236.91; **Mitsubishi** SP-II, SP-III, ATF-J2; Nissan Matic-D, Matic-J, Matic-K,

402; **SAAB** 3309; **Shell** 3403, LA 2634; **Subaru** ATF, ATF-HP; **Suzuki** 3314, 3317; **Texaco** ETL-7045E, ETL-8072B, N402; **Toyota** Type T, T-II, T-III, T-IV; **Voith** 55.6335, 55.6336; **Volvo** 97340, 97341; **VW/Audi** G 052 162, G 052 990, G 055 025; **ZF** TE-ML 03D, 04D, 05L, 09, 11A, 11B, 14A, 14B, 14C, 16L, 16M, 17C, 20B, 20C, 21L.

AMSOIL Signature Series Fuel-Efficient Synthetic ATF is recommended for transmissions and other applications that require any of the following specifications:

Aisin-Warner AW-1; **BMW** 83 22 0 142 516, 83 22 2 152 426; **Chrysler** MOPAR* 68157995AA, SP-IV, 68218925AB; **DSIH** 6p805; **Ford** MERCON* LV, SP, ULV; **GM** DEXRON* HP, DEXRON* VI, ULV; **Honda/Acura** DW-1*, Type 3.0; **Hyundai/Kia** SP-IV, SPH-IV, SP-IV-RR, NWS-9638, SP4-M; **JASO** 1A-LV; **JWS** 3324; **Mercedes Benz** 236.12, 236.14, 236.15, 236.41; **Mitsubishi** SP-IV, ATF J3, ATF-PA, ATF-MA1; **Nissan** Matic-S, Matic-W; **Saab** 93 165 147; **Shell** M-1375.4, M-1375.5, M-1375.6, M-L 12108; **Toyota** WS; **Volvo** 31256774; **VW/Audi** G 055 005, G 055 162, G 060 162; **ZF** S671 090 255.

AMSOIL Signature Series Fuel-Efficient Synthetic ATF is backward compatible and replaces DEXRON III fluids in older GM automatic transmissions. (DEXRON VI specification supersedes the obsolete DEXRON III in GM vehicles.)

SERVICE LIFE

Normal Service: Follow the vehicle manufacturer's normal-service drain interval.

Severe Service: Double the vehicle manufacturer's severe-service drain interval in passenger cars and light trucks.

Change at the vehicle manufacturer's recommended drain interval outside U.S. and Canada.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended application and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available online at www.AMSOIL.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.**

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.AMSOIL.com/warranty.aspx.

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Synthetic Manual Transmission & Transaxle Gear Lube

Formulated specifically for demanding manual transmission and transaxle applications

Towing, heavy hauling and performance driving create shock-loading conditions and elevated heat that threaten the performance and life of manual transmissions and transaxles. Making matters worse, horsepower, torque and towing capacities seem to increase with each new vehicle model year, increasing severity. AMSOIL Synthetic Manual Transmission & Transaxle Gear Lube is specifically formulated to reduce friction and maintain viscosity for long component and fluid life. It is designed to excel in severe-service conditions that exceed the limitations of conventional fluids.

Protects Against Wear & Heat in Severe Applications

Synthetic Manual Transmission & Transaxle Gear Lube is shear-stable and maintains its viscosity despite rigorous mechanical action. It provides a thick lubricating film and contains extreme-pressure additives to protect against wear in severe-service and shock-loading conditions common when towing or hauling. It resists thermal degradation and oxidation for excellent performance in high-temperature applications, such as the New Venture* NV-4500 transmission, which retains heat due to its cast-iron housing and is often subject to increased torque from turbodiesel engines.

Quick Shifts & Excellent Protection in Hot Rods and Muscle Cars

Synthetic Manual Transmission Gear Lube's friction-modified formula and excellent cold-flow properties promote smooth, fast engagement of synchronizers and gears. It protects against wear caused by the high-horsepower, large-displacement engines common to hot rods and muscle cars. It is formulated with seal conditioners to reduce leaks.

Promotes Longevity in Front-Wheel-Drive Transaxles

Synthetic Manual Transmission Gear Lube meets 75W/80W-90 viscosity requirements and exceeds API GL-4 performance requirements for many front-wheel-drive vehicles. Its excellent gear protection, extreme-temperature performance and durability promote maximum longevity and reduced maintenance costs.



- **Protects** against increased heat and pressure
- **Outstanding** cold-flow properties
- **Protects** brass synchronizers
- **Friction-modified**
- **Excellent** seal compatibility
- **Inhibits** rust and corrosion
- **Long** service life

TYPICAL TECHNICAL PROPERTIES

Synthetic Manual Transmission & Transaxle Gear Lube (MTG)

Kinematic Viscosity @ 100°C, cSt (ASTM D445)	14.0
Kinematic Viscosity @ 40°C, cSt (ASTM D445)	80.3
Viscosity Index (ASTM D2270)	181
Flash Point °C (°F) (ASTM D92)	226 (439)
Pour Point °C (°F) (ASTM D97)	-56 (-69)
Four-Ball Wear Test (ASTM D4172B @ 40 kg, 75°C, 1200 rpm, 1hr), Scar, mm	0.40
Brookfield Viscosity @ -40°C, cP (ASTM D2983)	28,425
Foam Stability (ASTM D892)	0/0, 0/0, 0/0
Copper Corrosion 3 hr, 121°C (ASTM D130)	1B

APPLICATIONS

Use in applications requiring a 75W-85, 75W-90 or 80W-90 viscosity gear oil with any of the listed specifications:

- API GL-4
- Chrysler* MS-9070
- ZF* TE-ML 02b, 17a
- MAN* 341-Z2 (formerly MAN 341 ML)
- MB 235.5

Replaces GM* part #12346190 and Chrysler* part #4874459.

Examples of transmissions and transaxles requiring a 75W-90, API GL-4 lubricant include certain models of Hyundai*, Infiniti*, Kia*, Lexus*, Mazda*, Mitsubishi*, Nissan*, Suzuki*, Toyota*, Volkswagen* and Hino*.

Examples of street rod and muscle car transmissions include Muncie*, Borg Warner*, Saginaw*, Ford* Toploader*, Dearborn* and New Process*.

SERVICE LIFE

Under normal operating conditions, AMSOIL Synthetic Manual Transmission & Transaxle Gear Lube lasts two times longer than conventional petroleum GL-4 gear oils. Where the original equipment manufacturer (OEM) recommends synthetic oils, follow the OEM drain interval (such as NV-4500).

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available via the Internet at www.amsoil.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Recycle used oil and bottle.

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Vaughn Enterprises, Inc.

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3508 W. Pine Street,

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The First in Synthetics®

SEVERE GEAR® 100% Synthetic Extreme Pressure (EP) Gear Lube

Formulated for the severe operating conditions of today's pick-up trucks, SUVs, heavy equipment and other hard-working vehicles.

AMSOIL SEVERE GEAR® 100% Synthetic Extreme Pressure (EP) Gear Lube is a premium-grade gear oil specifically engineered for maximum performance in severe-duty applications. It maintains its viscosity for long-lasting protection against metal-to-metal contact. The proprietary AMSOIL additives form an iron-sulfide barrier coating on gear surfaces, providing the ultimate line of defense against wear, pitting and scoring. AMSOIL SEVERE GEAR helps prevent "thermal runaway" – a phenomenon caused by a lubricant's inability to control friction and increased heat under high-stress conditions. By controlling thermal runaway, AMSOIL SEVERE GEAR 100% Synthetic EP Gear Lube inhibits rapid lubricant degradation and component damage – helping equipment run better and last longer.



Performance

AMSOIL SEVERE GEAR provides performance far beyond what is possible with conventional gear oil. AMSOIL engineered its gear lubes to provide superior gear and bearing protection, better friction and heat reduction, increased efficiency and extended service life.

Temperature Extremes

AMSOIL SEVERE GEAR 100% Synthetic EP Gear Lube excels in hot and cold temperature extremes. By design, it resists breakdown from high heat, preventing acids and carbon/varnish formation. Its wax-free construction also improves cold-flow properties, improving fuel economy and cold-weather shifting. As the graph shows, SEVERE GEAR delivers 20 percent more cold-temperature protection than required by the industry standard.

Applications

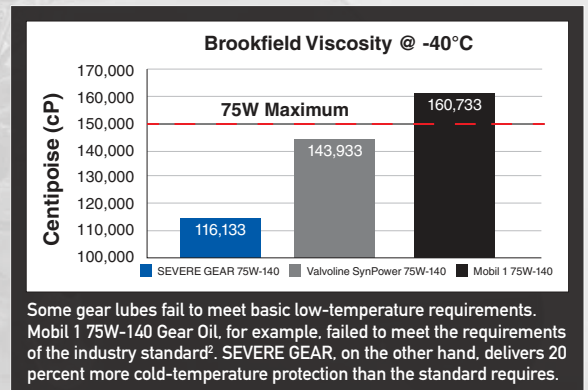
AMSOIL SEVERE GEAR 100% Synthetic EP Gear Lube is excellent for severe applications, such as towing, hauling, steep-hill driving, commercial use, plowing, racing, off-road use, rapid acceleration, frequent stop-and-go operation and high ambient temperatures. Higher horsepower, towing and hauling capabilities of modern vehicles make pick-ups, SUVs, vans and delivery/utility vehicles especially prone to severe service. Other severe-duty vehicles include light-, medium-, and heavy-duty trucks, buses, heavy equipment, 4X4s, tow trucks, race cars, tractors and motor homes.

- **Advanced protection** against wear, even with up to 15 percent water contamination¹
- **Controls** thermal runaway
- **Protects** against rust and corrosion
- **Helps reduce** operating temperatures
- **Maximum** efficiency
- **Long** oil, seal & equipment life
- **Flexible** easy-pack for clean, fast installation

¹Based upon AMSOIL testing of AMSOIL Synthetic SEVERE GEAR® 75W-90 and Long-Life 75W-90 Synthetic Gear Lube in ASTM 3233 and ASTM D892.

²Based upon results of samples of Mobil 1 75W-140 and Valvoline SynPower 75W-140 purchased in 2018 and tested in ASTM D2983 by an independent testing facility in May 2018. Samples sent blind to eliminate bias.

³All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.



TYPICAL TECHNICAL PROPERTIES

AMSOIL SEVERE GEAR® Synthetic Extreme Pressure (EP) Gear Lube

	SAE 75W-90 (SVG)	SAE 75W-110 (SVT)	SAE 75W-140 (SVO)	SAE 80W-90 (AGL)
Kinematic Viscosity @ 100°C, cSt (ASTM D445)	15.9	20.9	26.1	15.5
Kinematic Viscosity @ 40°C, cSt (ASTM D445)	102.4	139.9	177.7	120.2
Viscosity Index (ASTM D2270)	166	174	181	135
Brookfield Viscosity, cP @ (°C) (ASTM D2983)	78,400 (-40)	102,100 (-40)	109,400 (-40)	46,200 (-26)
Flash Point, °C (°F) (ASTM D92)	208 (406)	216 (421)	210 (410)	208 (406)
Pour Point, °C (°F) (ASTM D97)	-43 (-45)	-44 (-47)	-43 (-45)	-42 (-44)
Copper Corrosion (ASTM D130) @ 121 °C (250°F) / 3hr	1b	1b	1b	1b
Foam Stability (ASTM D892)	0/0, 10/0, 0/0	0/0, 20/0, 0/0	0/0, 20/0, 0/0	0/0, 0/0, 0/0

For product service life in differentials, consult your owner's manual or the Original Equipment Manufacturer (OEM) to establish the application, NORMAL or SEVERE.

	Normal Service	Severe Service
Cars, SUVs, Light Trucks	Drain at 100,000 miles of service or according to the owner's manual, whichever is longer	Drain at 50,000 miles of service or according to the owner's manual, whichever is longer
Heavy-Duty Class 8 Line Haul	Follow the OEM drain interval (miles or hours) for synthetic oil up to 250,000 miles or three years, whichever comes first.	
Vocational/Delivery	Follow the OEM drain interval (miles or hours) for synthetic oil up to 120,000 miles or three years, whichever comes first.	
Heavy-Duty Off-Road	Follow the OEM drain interval (miles or hours) for synthetic oil up to 100,000 miles or two years, whichever comes first.	

For product service life in non-differential applications, consult owner's manual or the OEM for either normal or severe synthetic oil service intervals. Where service intervals are unavailable, drain at twice the interval for conventional oil.

Gear oils should be changed more frequently when operating vehicles or equipment in dusty or dirty conditions, unless the gear system is properly sealed and equipped with membrane-type breathers.

Note: AMSOIL does not support extended drain intervals where water contamination occurs. Check and service the gear oil frequently when water contamination is possible.

Recommended for use in differentials, manual transmissions and other gear applications requiring any of the following specifications: API GL-5, MT-1, MIL-PRF-2105E, Dana SHAES 234 (Formerly Eaton PS-037), Mack GO-J, or other GL-5 based specifications from vehicle manufacturers, including Ford*, GM* and Chrysler*. Can also be used in axles where an API GL-4 lubricant is recommended.

AMSOIL SEVERE GEAR (75W-90) provides superior performance and replaces competitors' 75W-90 and 80W-90 gear oils. It delivers the best fuel efficiency and cold-temperature performance of the Severe Gear oils.

AMSOIL SEVERE GEAR (75W-110) provides superior performance and replaces competitors' 75W-110, 75W-90 and 80W-90 gear oils. It delivers better viscosity protection than Severe Gear 75W-90.

AMSOIL SEVERE GEAR (75W-140) provides superior performance and replaces competitors' 75W-140, 80W-140 and 85W-140 gear oils. Use where these viscosities are required by OEMs and where maximum viscosity protection is needed for extreme severe-duty applications.

AMSOIL SEVERE GEAR (80W-90) provides superior performance and replaces competitors' 80W-90 gear oils. It is formulated to exceed the requirements of front and rear differentials, transfer cases, transaxles, manual transmissions, oil-lubricated wheel bearings and steering gear boxes.

AMSOIL SEVERE GEAR is compatible with conventional and synthetic gear oils. Mixing AMSOIL gear oil with other oils, however, will shorten the oil life expectancy and reduce the performance benefits. AMSOIL does not support extended drain intervals where oils have been mixed.

Aftermarket oil additives, other than those specified by AMSOIL, are **not recommended** for use with AMSOIL gear oil.

AMSOIL SEVERE GEAR is compatible with most limited-slip differentials. For applications that require additional limited-slip friction modifier, add AMSOIL Slip Lock®.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended application and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available via the Internet at www.amsoil.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Don't pollute. Return used oil to collection centers.

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DOMINATOR® Synthetic Racing Grease

Exceptional High-Speed/High-Temperature Performance

AMSOIL DOMINATOR® Synthetic Racing Grease is engineered to protect high-performance bearings and chassis components in racing applications operated on snow, dirt, water or track. It provides superior protection for bearings operating under high-speed, high-heat and heavy-load conditions.

Anti-Wear Performance

DOMINATOR Racing Grease is engineered with extreme-pressure additives to deliver excellent wear protection in heavily loaded, high-speed racing applications. Its high-performance anti-wear additive package helps ensure long component life.

Friction Reduction

Because it effectively reduces friction, DOMINATOR Racing Grease not only inhibits wear, it also maximizes power through-put and fuel efficiency. Its superior friction-reduction properties help ensure race vehicles operate at peak performance.

Load Capacity

Although DOMINATOR Racing Grease is specially formulated for high-temperature/high-speed applications, it also delivers superior protection for low-speed bearings, providing racing components with the exceptional load-bearing capacity of a heavy-duty grease.

All-Temperature Protection

DOMINATOR Racing Grease pairs a high-viscosity-index synthetic base oil with a top-quality calcium sulfonate thickener known for its exceptional mechanical stability, high dropping point, high load-carrying performance, reduced wear and excellent resistance to water washout and corrosion. It offers excellent low-temperature pumpability and high-temperature consistency for dependable protection in all temperatures.

Resists Oxidation, Corrosion & Water Washout

DOMINATOR Racing Grease contains a robust package of oxidation inhibitors, helping prevent grease breakdown and component surface damage. Its excellent adhesion and cohesion properties allow it to resist water washout during operation in wet conditions. A premium blend of corrosion inhibitors further protects against corrosion formation.



NLGI #2
GC-LB

TYPICAL TECHNICAL PROPERTIES
DOMINATOR® Synthetic Racing Grease (GRG)

	DOMINATOR Synthetic Racing Grease	NLGI GC-LB
Thickener	Calcium Sulfonate Complex	NR*
NLGI Consistency Grade	2	NR*
NLGI Performance Grade.	GC-LB	NR*
Operating Range °C (°F)	-40 to 177 (-40 to 350)	NR*
Penetration (ASTM D217) Worked 60 Strokes	265-295	220-340 range
Dropping Point (ASTM D566) °C (°F)	318 (605)	220 (428) min
High-Temperature Life (ASTM D3527) hours	220	80 min
Water Washout (ASTM D1264) 79°C (175°F) % loss	0.5	15 max
Rust and Corrosion (ASTM D1743)	Pass	Pass
Oil Separation (ASTM D1742)	0.2	6 max
Leakage (ASTM D4290), g	4.0	10 max
Four-Ball Wear Test , mm scar (ASTM D2266)	0.42	0.6 max
Four-Ball EP, kgf (ASTM D2596)		
Weld Point	500	200 min
Load Wear Index62	30 min
Timken OK Load Test (ASTM D2509), lbs.60	NR*
Low-Temperature Torque (ASTM D4693) (-40°F)	2.5	15.5 max

*NR: Not Required for NLGI GC or LB labeling.

APPLICATION MAINTENANCE

Maintaining a clean work environment is important when equipment greasing is performed. Wipe grease fittings clean prior to injecting grease to prevent contaminant ingestion. Maintain bearing housings one-third to one-half full of grease. Do not over-grease, as excessive heat buildup can result. Supplement standard grease maintenance by periodically cleaning and packing housings with fresh grease on an established maintenance schedule.

COMPATIBILITY

DOMINATOR Synthetic Racing Grease is compatible with many other types of greases. However, it is recommended that when changing greases, the equipment be cleaned of the old grease when possible or flushed with a liberal amount of DOMINATOR Synthetic Racing Grease while the mechanism is in operation. Closely monitor the system for any inconsistencies. Grease compatibility questions should be referred to your AMSOIL representative or AMSOIL INC.

AMSOIL PRODUCT AVAILABILITY

DOMINATOR Synthetic Racing Grease is available in 14-oz. cartridges.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.



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The First in Synthetics®

DOMINATOR® Octane Boost

Improves Performance in all Two- and Four-Stroke Gasoline-Fueled Engines

AMSOIL DOMINATOR® Octane Boost (AOB) significantly increases engine response and power in all two- and four-stroke gasoline-fueled engines by increasing octane up to four numbers. Just one treatment reduces engine knock, improves ignition and helps fuel burn cleaner. DOMINATOR Octane Boost is the recommended octane boost for all high-performance off-road and racing applications. Most users find one 12-ounce bottle of DOMINATOR Octane Boost for 15 gallons of gasoline provides the ideal performance increase. DOMINATOR Octane Boost is also excellent as a lead substitute at the same treat rates in collector automobiles, older off-road equipment and pleasure vehicles.

What is “engine knock” and why does it matter?

“Knock” is an uncontrolled and explosive ignition of a hydrocarbon fuel, such as gasoline, in the combustion chamber. It causes a knocking or pinging sound, robs the engine of power and, left unchecked, causes serious engine damage. Fuel’s tendency to knock is measured by its octane number. Lower numbers denote greater knock tendency; higher numbers denote greater knock control. Knock may be eliminated with the appropriate octane number.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY STATEMENT

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available online at www.amsoil.com or upon request at (715) 392-7101.

Keep Out of Reach of Children. Recycle used oil and bottle.



- Improves performance
- Removes carbon deposits
- Maximizes power
- Reduces engine knock
- Improves ignition
- Improves responsiveness
- Helps fuel burn cleaner



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The First in Synthetics®

P.i. Performance Improver Gasoline Additive

AMSOIL P.i. is a potent, deep-cleaning gasoline performance improver featuring concentrated detergents that aggressively clean stubborn, power-robbing deposits from injectors, valves and combustion chambers. It reduces emissions and increases fuel economy up to 5.7 percent.¹ P.i. cleans your entire fuel system and restores your engine's power and performance in one tank of gasoline. The P.i. bottle is fully compatible with the capless fuel systems of modern vehicles for easy application.

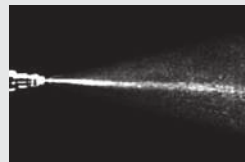


Maximum Deposit Clean-up

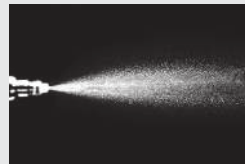
AMSOIL P.i. features aggressive additives that attack the most common forms of engine deposits and limit their effects.

Removes Fuel Injector Deposits

Most new engines feature gasoline direct-injection (GDI) to boost power and improve fuel economy. These injectors are located inside the intense heat and pressure environment of the combustion chamber, making them particularly vulnerable to deposits. Extreme pressure combined with incomplete fuel combustion can lead to dramatically increased soot (particulate matter) levels. Direct injection typically creates 30 to 40 times more soot than port fuel injectors (PFI). Even a minimal amount of injector fouling can lead to increased pollution and wear and decreased power and fuel economy.



Port injector spray pattern before P.i. treatment.



Port injector spray pattern after P.i. treatment.

- Restores power and performance
- Reduces need for costly higher-octane fuel
- Reduces noise from carbon rap and pre-ignition
- Controls pre-ignition "knock"
- Improves fuel economy
- Capless compatible

Injector deposits:

- Decrease efficiency, power and fuel economy
- Increase exhaust emissions
- Contribute to poor starting and rough idle

P.i. removes stubborn deposits and keeps injectors functioning as they should. Testing shows P.i. restored GDI fuel injectors to a 100 percent flow rate after one tank of fuel.²

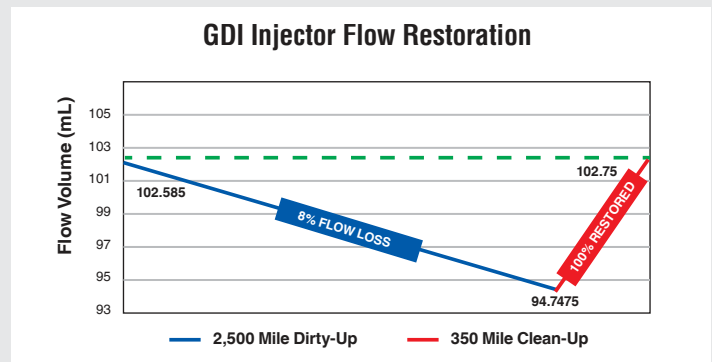
Fights Intake Valve Deposits

Valve deposits alter or restrict airflow patterns in the cylinder. They disrupt the balanced air/fuel ratio by momentarily absorbing and releasing fuel. The deposits can also cause valve sticking by getting in the way of the valve stem and guide.

Intake valve deposits:

- Decrease power and efficiency
- Increase exhaust emissions
- Lead to potential valve failure

P.i. helps keep valves clean and moving freely.



¹Based on independent testing using EPA tests: Federal Test Procedure 75 (FTP), Supplemental Federal Test Procedure (US06), and the Highway Fuel Economy Test (HFET). Average fuel mileage increase of 2.3 percent.
²ASTM D5598(M) – 2013 Buick Regal test vehicle

Cleans Combustion Chamber Deposits

Combustion chamber deposits increase compression and absorb heat during combustion. Later, they release that heat during the intake cycle. In some engines deposits can cause the piston to actually hit the cylinder head – a process known as “carbon rap.” The deposits can also flake off and become trapped between the valves and valve seat, resulting in compression loss.

Higher compression and stored heat increase the likelihood of pre-ignition “knock” when the fuel spontaneously combusts prior to spark ignition. This increases emissions and may cause engine damage. Most vehicles have sensors that adjust spark timing to prevent knock. Although audible “knock” is controlled, power is lost from retarded timing and engine efficiency suffers. Higher octane fuels can be used to help prevent the phenomenon. As a vehicle ages, more-expensive, higher-octane fuel is needed to keep it operating at peak performance.

Combustion chamber deposits:

- Increase the possibility of “carbon rap”
- Contribute to compression loss, difficult starting and rough idling
- Increase the possibility of pre-ignition “knock” or “pinging”

P.i. **fights combustion chamber deposits** which helps restore power, control knock, increase fuel economy and reduce the need for higher-octane fuels.

Maximum Fuel Economy & Reduced Emissions

AMSOIL P.i. maximizes fuel efficiency by dissolving and removing deposits and other contaminants for improved power and overall performance. It improves fuel mileage up to 5.7 percent.¹

P.i. works as an “emissions passer.” Running one tank of treated fuel through your engine helps pass emissions tests.

P.i. also reduces the following types of emissions:¹

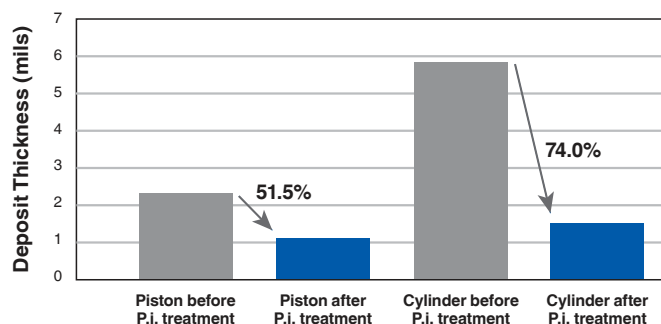
- Hydrocarbons (HC) up to 15%
- Carbon monoxide (CO) up to 26%
- Nitrous oxides (NOx) up to 17%

Capless-Compatible Packaging

Many new vehicles have replaced traditional fuel caps with capless systems. The threads on most bottles restrict them from opening the flap inside the fuel neck and also make removing the bottle difficult. The P.i. bottle is fully compatible with capless fuel systems.

¹Based on independent testing using EPA tests: Federal Test Procedure 75 (FTP), Supplemental Federal Test Procedure (US06), and the Highway Fuel Economy Test (HFET). Average fuel mileage increase of 2.3 percent. All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.

Motored Dyno D5500(M) Type Road Simulation Cycle 2013 Buick® Regal® Test Vehicle



RECOMMENDATIONS

- For use in gasoline powered cars and trucks.
- Treats up to 30 gallons. Add entire bottle to tank at fill-up.
- For best results, clean your fuel system with P.i. every 4,000 miles.
- For large gas tanks, treat with two bottles of P.i. Using more than two bottles per treatment is not recommended.
- Safe for use with catalytic converters, oxygen sensors, oxygenated gas and up to 15 percent ethanol blended gas.
- Do not use with diesel or E85 fuel or two-stroke engines.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

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The First in Synthetics®

Upper Cylinder Lubricant Gasoline Additive

Preserves Horsepower and Performance

Your engine's top-end is sparsely lubricated and prone to the development of performance-robbing deposits. It's also highly susceptible to corrosion, an issue compounded by the prevalence of ethanol in today's fuel. AMSOIL Upper Cylinder Lubricant is designed to solve those issues. Its AMSOIL-exclusive, powerful formulation helps maximize engine power and performance while increasing engine life. And unlike competing fuel additives, AMSOIL Upper Cylinder Lubricant works.

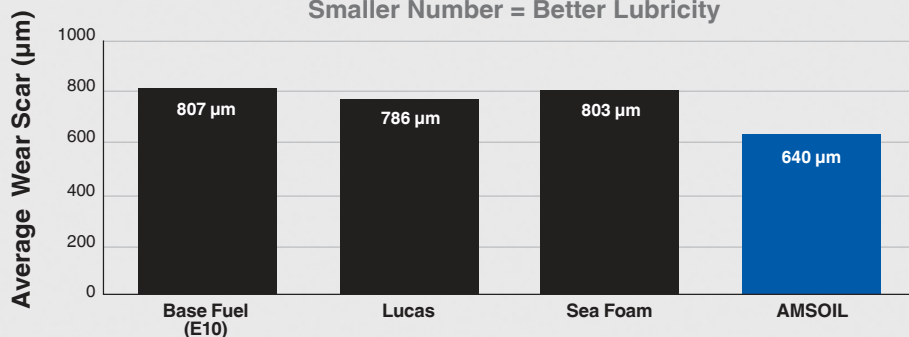
Lubricates Top-End Components

The intense heat of combustion and limitations of the oil-control piston ring result in a lack of oil at the top of each cylinder. AMSOIL Upper Cylinder Lubricant's unique additives provide that missing lubrication to fight piston-ring and cylinder wear, **maximizing engine compression and horsepower**. Its lubricity improves also aid in protecting fuel injectors and other fuel-system components from wear, helping ensure excellent performance and long-life. AMSOIL Upper Cylinder Lubricant delivers **18 percent more lubricity than Lucas*** and **20 percent more than Sea Foam*** for better retention of horsepower and fuel economy (see chart below).¹



Lubricity Performance

Measured by Wear Scar in Modified ASTM D6079
Smaller Number = Better Lubricity



- **Lubricates** fuel system and upper cylinders
- **Fights** ethanol-related corrosion
- **Helps** keep injectors clean
- **Compatible** with capless fuel systems

Inhibits Corrosion

Upper Cylinder Lubricant uses potent corrosion inhibitors to coat metal surfaces, block out moisture and stop deterioration before it starts. This is particularly important when using gasoline that contains ethanol due to its propensity to attract water and hasten corrosion. Inhibiting corrosion maximizes component life and reduces wear in the engine's top-end to guard against compression loss and maintain optimum power.

¹ Based on independent testing of AMSOIL Upper Cylinder Lubricant, Lucas Upper Cylinder Lubricant and Sea Foam Motor Treatment obtained on 02/13/2019 using the ASTM D6079 modified for use with gasoline. *All trademarked names and images are the property of their respective owners and may be registered marks in some countries. No affiliation or endorsement claim, express or implied, is made by their use. All products advertised here are developed by AMSOIL for use in the applications shown.

Keeps Injectors Clean

Upper Cylinder Lubricant contains detergent additives designed to maintain injector cleanliness. While AMSOIL P.i. Performance Improver is designed to attack and remove stubborn injector deposits that can reduce power and fuel economy, Upper Cylinder Lubricant helps preserve injector and combustion-chamber cleanliness. Using it with every tank of fuel helps retain fuel-economy and performance gains and maximizes component life.

Capless-Compatible Packaging

Many new vehicles have replaced traditional fuel caps with capless systems. The threads on most bottles restrict them from opening the flap inside the fuel neck and make removing the bottle difficult. The AMSOIL Upper Cylinder Lubricant bottle is fully compatible with capless fuel systems. It's easy to insert, pour and remove the bottle.

RECOMMENDATIONS

- For use with cars and trucks.
- For best results, use with every tank of fuel. Do not refill tank until almost empty.
- Treats up to 25 gallons. Add entire bottle to tank at fill-up.
- Treat large gas tanks with two bottles of Upper Cylinder Lubricant. Using more than two bottles is not recommended.
- Safe for use with catalytic converters, oxygenated gas and up to 15 percent ethanol-blended fuels. Do not use with E85 fuel.
- Do not use with two-stroke or diesel engines.

AMSOIL PRODUCT WARRANTY

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Gasoline Stabilizer

Formulated to Resist Gasoline Breakdown

For maximum convenience and cost-effectiveness, equipment and vehicles used seasonally, such as motorcycles, snowmobiles, personal watercraft, snowblowers, outboard motors and classic cars, need to start easily and run properly when removed from storage. Gasoline, however, is not formulated for long-term storage and can start to degrade in as little as 30 days. Degraded fuel leads to varnish and sludge that clog injectors, fuel lines and carburetors; stick floats; and cause poor engine performance, starting problems, increased maintenance expenses and decreased equipment life.

AMSOIL Gasoline Stabilizer inhibits the oxidation process that occurs when fuel is stored for extended periods, improving performance, extending equipment life and decreasing maintenance expenses.

Delivers Confidence

Treating fuel with AMSOIL Gasoline Stabilizer prior to storing equipment provides confidence. It offers peace of mind that equipment will not only start when it is needed, but will also perform properly.

Eliminates Need to Drain Fuel

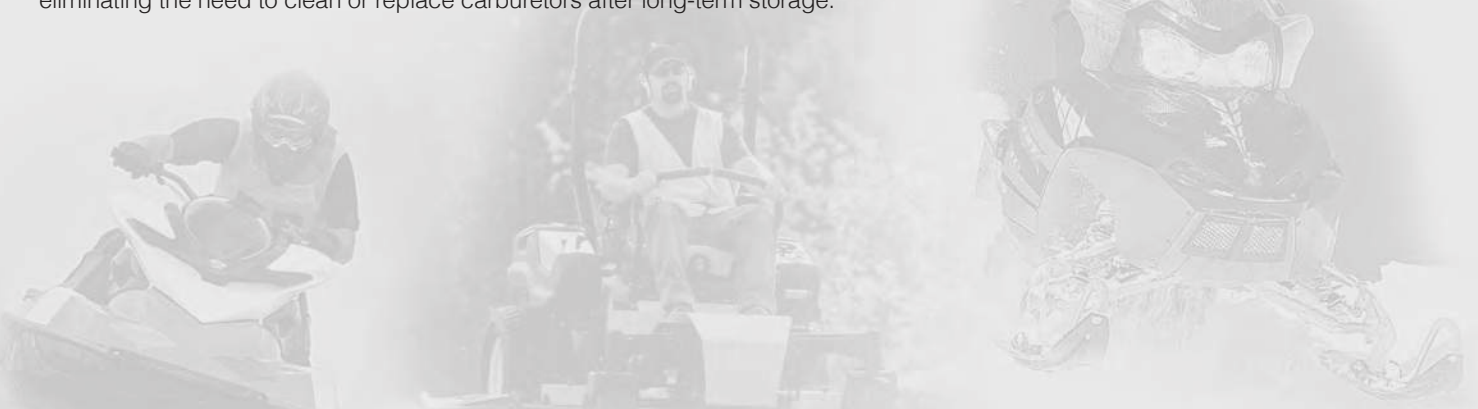
Draining fuel from equipment can not only be difficult, it invites corrosion on the bare metal in the tank and drying and cracking of gaskets and seals. Some fuels are pre-treated with oxidation inhibitors that allow them to be stored for short periods without forming excessive deposits, while other fuels have no inhibitors at all. AMSOIL Gasoline Stabilizer eliminates the need to drain fuel from equipment before long-term storage. It fights fuel deterioration, severely limiting the formation of damaging varnish and deposits to help extend equipment life.

Decreases Maintenance

Deposits, varnish and sludge that form from degraded fuel can cause important components in the fuel system to become clogged or stuck and require thorough cleaning or replacement. AMSOIL Gasoline Stabilizer helps reduce maintenance time and costs by preventing harmful deposits from forming in the tank and fuel system, eliminating the need to clean or replace carburetors after long-term storage.



- **Helps** keep fuel from deteriorating
- **Protects** against varnish and gum buildup
- **Fights** ethanol corrosion



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APPLICATIONS

Use AMSOIL Gasoline Stabilizer in motorcycles, snowmobiles, ATVs, UTVs, outboard motors, stern-drive and inboard marine engines, personal watercraft, lawn equipment, chainsaws, snowblowers, portable generators, handheld power equipment, motor scooters, powered farm equipment, powered construction equipment, cars and trucks.

DOSAGE RECOMMENDATION

One ounce of AMSOIL Gasoline Stabilizer treats 2.5 gallons of fuel, including fuel that contains up to 10 percent ethanol.

Before storing equipment, treat it with the appropriate dose of AMSOIL Gasoline Stabilizer. Let the engine run for five to 10 minutes to thoroughly circulate the additive through the fuel system. Stop the engine and store the equipment in a dry, covered location.

AMSOIL PRODUCT WARRANTY

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HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available via the Internet at [AMSOIL.com](https://www.amsoil.com) or upon request at (715) 392-7101. **Keep Out of Reach of Children.**



AMSOIL products and Dealership information are available from your local full-service AMSOIL Dealer.

Referral # **779**

Vaughn Enterprises, Inc.

Call Greg Vaughn at **1-800-581-5823**

3508 W. Pine Street,

Appleton, Wisconsin, 54914, USA

Fax: 920-734-5823

greg@vaughninc.com

<https://www.Vaughninc.com/>



The First in Synthetics®

Engine Fogging Oil

Protection for Stored Seasonal Equipment

Two- and four-stroke recreational vehicles, hand-held power equipment, small engines, construction equipment and farm equipment are commonly operated seasonally or infrequently, then stored for long periods of time. During these periods of inactivity, and as a result of fluctuations in ambient temperatures, water vapor can form condensate within the engine. When this condensate comes into direct contact with steel and iron components, it forms surface corrosion on cylinder liners, piston rings, anti-friction bearings and steel/iron contact surfaces on rotational seals. Long periods of storage can also dry out cylinders, often resulting in permanent damage when the equipment is taken out of storage and dry-started.

Most two- and four-stroke motor oils are formulated to have an affinity to engine component surfaces, acting as a barrier that keeps condensate from contacting engine components and forming corrosion. However, the effectiveness of motor oil in this area diminishes with time.

Engine Fogging Oil (FOG) offers superior film retention, providing long-term protection against corrosion and dry starts, extending engine life and reducing operating expenses. Its aerosol spray formulation offers easy and clean applications while reaching more components and offering complete distribution of the oil, something especially beneficial in applications with horizontal cylinder orientation, such as outboard motors. Consult equipment owners manual for application directions.

APPLICATIONS

Engine Fogging Oil applications include, but are not limited to, motorcycles, snow-mobiles, ATVs, outboard motors, stern drive and inboard marine engines, personal watercraft, lawn equipment, chainsaws, snowblowers, portable generators, hand-held power equipment, motor scooters, powered farm equipment, powered construction equipment, cars and trucks.

*All trademarked names and images are the property of their respective owners and may be registered marks in some countries. There is no affiliation or endorsement claim, express or implied, made by their use. AMSOIL products are formulated to meet or exceed the performance requirements set forth by the manufacturers of all applications shown/listed here.



AMSOIL PRODUCT AVAILABILITY

AMSOIL Engine Fogging Oil is available in 12-ounce spray cans.

AMSOIL PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

Disposal

Your area may have different disposal requirements for aerosols than other waste. Dispose of contents/container in accordance with all federal, state/provincial and local regulations.



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Metal Protector

High-Performance Spray-On Metal Surface Protectant

Metal Protector (AMP) is a high-performance, easy-to-use spray-on product that lubricates, displaces moisture, protects against corrosion and penetrates to free rusty parts.

Metal Protector effectively lubricates moving parts, silencing squeaks without gumming up mechanisms. It displaces moisture from freshwater or saltwater to help prevent corrosion, and it is the product of choice for drying and protecting electrical and ignition systems. Metal Protector penetrates deep through rust and corrosion to restore movement of rusty parts. Metal Protector contains no silicone, and is compatible with plastic, leather, fabric, fishing line and paint.

Recommendations

Shake well before use. Spray product on area to be treated. For best results, do not wipe off. Film carrier will evaporate, leaving Metal Protector protection in place. Disconnect power source to electrical equipment before spraying.

Product Availability

AMSOIL Metal Protector is available in 4-oz. and 8.75-oz. spray cans. The 8.75-oz. spray cans are available in Canada with stock code CMP.

Disposal

Aerosols may have different disposal requirements than other wastes in your area. Dispose of contents and container in accordance with all federal, state/provincial and local regulations.

Technical Services

For immediate answers to your technical questions call (715) 399-TECH (8324) between 8 a.m. and 5 p.m. Central time or email tech@amsoil.com.

PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended application and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available at www.amsoil.com or upon request at (715) 392-7101.

Keep Out of Reach of Children.



- **Cuts through** rust and frees frozen components
- **Helps protect** against rust and corrosion, even in salt water
- **Displaces** water
- **Stops** squeaks
- **Cleans**
- **Sprays into** hard-to-reach places
- **Protects** electrical equipment
- **Lubricates** moving parts



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AMSOIL Antifreeze & Coolant

Ethylene Glycol 50/50 Pre-Mix Formulations

AMSOIL Passenger Car/Light Truck Antifreeze & Coolant (ANTPC) and Heavy-Duty Antifreeze & Coolant (ANTHD) provide superior heat transfer and excellent protection against corrosion, cylinder-liner cavitation, freezing and boil-over. They provide maximum protection in extreme temperatures and operating conditions, and they provide superior protection for aluminum, steel, cast iron, copper, brass and solder alloys.

Help Prevent Metallic Corrosion and Erosion

Independent tests reveal AMSOIL antifreeze/coolants greatly surpass standards for metallic corrosion and erosion, achieving nearly perfect scores in ASTM corrosion and erosion testing on cast aluminum cylinder heads, steel, copper, solder, brass and cast iron and aluminum water pumps.

Anti-Scale

AMSOIL antifreeze/coolants are proprietary formulations that do not contain phosphate, nitrite, silicate, borate or amine found in conventional antifreeze/coolants. These materials are responsible for almost all scaling issues in cooling systems, and they can also precipitate to form scale if the antifreeze/coolant inhibitor system is at the wrong pH or mixed with incompatible products. AMSOIL antifreeze/coolants virtually eliminate scaling problems.

Cavitation/Pitting Protection

AMSOIL Heavy-Duty Antifreeze & Coolant effectively protects cylinder liners against cavitation erosion/corrosion pitting, without the problems associated with nitrite technology. Nitrites can cause aluminum corrosion, and they are being banned from coolants used by a growing number of manufacturers in both the heavy-duty and automotive markets. AMSOIL Heavy-Duty Antifreeze & Coolant features top-performing technology that performs extremely well in ASTM D7583 (John Deere Cavitation Test) testing.

Long-Life Formulations

AMSOIL antifreeze/coolants' proprietary formulations provide durable and long-lasting protection of cooling system components. AMSOIL Passenger Car/Light Truck Antifreeze & Coolant can be used for 150,000 miles or five years, whichever comes first, in passenger cars and light trucks. AMSOIL Heavy-Duty Antifreeze & Coolant can be used for 1,000,000 miles, 20,000 hours of operation or eight years, whichever comes first, in heavy-duty and off-road applications.

Compatible With Other Fluids

AMSOIL antifreeze/coolants are compatible with all ethylene and propylene antifreeze and coolant colors, as well as all plastics and elastomers (hoses, gaskets, etc.) found in cooling systems. Mixing propylene- and ethylene-glycol formulations, however, can make predicting freeze protection difficult. If mixing for top-off is unavoidable, we recommend flushing the cooling system at the next convenient opportunity.

¹Based on results of the ASTM D2570 corrosion test

²Based on results of the ASTM D7583 cavitation test

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In independent, industry-standard testing, cast-iron and copper plates protected by AMSOIL show virtually no signs of corrosion.¹



In independent, industry-standard testing, cylinder liners protected by AMSOIL show virtually no signs of cavitation.²

HEAVY-DUTY ANTIFREEZE & COOLANT (ANTHD)

- Pre-mixed 50/50 with high-purity water.
- Fully formulated – DOES NOT require the use of supplemental coolant additives (SCAs) or extenders.
- Proprietary hybrid organic acid (HOAT) formulation is further enhanced with anti-scalant, anti-fouling and water-pump lubrication additives.
- Phosphate-, nitrite-, silicate-, borate and amine-free.
- Boil-over protection up to 265°F with a 15 psi radiator cap.
- Freeze protection down to -34°F.

APPLICATIONS

Use in applications requiring any of the following specifications: ASTM D3306, D6210, D7583, D7820 • TMC RP329B, TMC RP338 • AS/NZS 2108.2004 Type A

Suitable for use with the following: Case New Holland • Cummins 14603 • Cummins 3666132 • DDC 7SE 298, 93K217 • Freightliner 48-22880 • GM Heavy Truck • International Truck and Engine / Navistar CEMS B-1 Type III-A • JIS K2234 • MAN 324 NF • MB DBL 7700 • MTU MTL 5048 • Kenworth RO26-170-97 • Mack 014GS17004, 014GS17009 • PACCAR CS0185 • DAF MAT 74002 • Peterbilt 8502.002 • Scania TB1451 • Volvo Heavy Truck

SERVICE LIFE

Protection up to 1,000,000 miles, 20,000 hours or 8 years, whichever comes first.

Heavy-Duty Antifreeze & Coolant is the best option for mixed fleets of both passenger-vehicle and heavy-duty applications that want to use one antifreeze/coolant. Heavy-Duty Antifreeze & Coolant can be used in non-heavy-duty applications, but with a drain interval of 150,000 miles or five years, whichever comes first.

Directions for Use

- Do not add water.
- Do not remove radiator cap when engine is hot.
- Antifreeze/coolant (new or used) is hazardous. Clean up and dispose of properly following local regulations.
- Check and maintain coolant level at every oil-change interval.
- Check owner's manual for additional maintenance and top-off guidelines.

PASSENGER CAR/LIGHT TRUCK ANTIFREEZE & COOLANT (ANTPC)

- Engineered to exceed original equipment manufacturer (OEM) requirements.
- Pre-mixed 50/50 with high-purity water.
- Unique poly-organic acid (OAT) formulation imparts multi-vehicle application.
- Phosphate-, nitrate-, nitrite-, silicate-, borate- and amine-free.
- Boil-over protection up to 265°F with a 15 psi radiator cap.
- Freeze protection down to -34°F.

APPLICATIONS

Formulated for use in ALL domestic and import passenger cars and light trucks.

Engineered to meet original equipment manufacturer (OEM) specifications GM 6277, JIS K2234, VW TL 774D, Ford WSS-M97B44-D and ASTM D3306 requirements.

SERVICE LIFE

Protection up to 150,000 miles or 5 years, whichever comes first, in passenger cars and light trucks.

Directions for Use

- Do not add water.
- Do not remove radiator cap when engine is hot.
- Antifreeze/coolant (new or used) is hazardous. Clean up and dispose of properly following local regulations.
- Check owner's manual for maintenance and top-off guidelines.

PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.AMSOIL.com/warranty.aspx.

HEALTH & SAFETY

This product is not expected to cause health concerns when used for the intended applications and according to the recommendations in the Safety Data Sheet (SDS). An SDS is available online at www.AMSOIL.com or upon request at (715) 392-7101. **Keep Out of Reach of Children.** Recycle used antifreeze/coolant and bottle.

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Miracle Wash® Waterless Wash & Wax

A Showroom Shine Without the Mess of Soap and Water

AMSOIL Miracle Wash® Waterless Wash & Wax (AMW) provides vehicles with a fantastic shine and super-tough protective finish in just two easy steps – spray and wipe. Specialized surfactants lift the dirt off the surface of the vehicle and hold it in suspension while the vehicle is wiped clean. Miracle Wash acts as a protective barrier between the dirt particles and the surface, protecting the finish from abrasion. Specialized anti-static agents repel dust and light dirt, maintaining the vehicle's brilliant shine long after washing is finished. Miracle Wash also protects against the damaging effects of the sun's ultraviolet rays.

Applications

Miracle Wash is highly effective on virtually all non-porous and painted surfaces:

- Cars • Trucks • RVs • Motorcycles •
- Boats • Countertops • Windows • Mirrors •
- Kitchen Appliances • Many More

Test in a small area before using on matte or other porous finishes.

Directions

1. Remove thick, coated dirt on surface.
2. Shake well.
3. Apply in dry, shaded location onto a 3 sq. ft. area.
4. Wipe immediately with a clean, lint-free cloth.

Disposal

Aerosols may have different disposal requirements than other wastes in your area. Dispose of contents and container in accordance with all federal, state/provincial and local regulations.

TECHNICAL SERVICES

For immediate answers to your technical questions call (715) 399-TECH (8324) between 8 a.m. and 5 p.m. Central time or email tech@amsoil.com.

PRODUCT AVAILABILITY

Miracle Wash is available in 13-ounce spray cans. Not available in Canada.

PRODUCT WARRANTY

AMSOIL products are backed by a Limited Liability Warranty. For complete information visit www.amsoil.com/warranty.aspx.

HEALTH & SAFETY

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