

# AMSOIL<sup>®</sup>

MAGAZINE

MAY 2020



## Claim Your Share of the Multi-Billion-Dollar Fishing Market

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A Closer Look at Differential Covers | PAGE 10



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MAY 2020

**STAFF**

**Editor**

Terry Johnsen

**Associate Editor**

Joel Youngman

**Staff Writers**

Kathy Anderson

John Baker

Dan McClelland

Jamie Trembath

Joel Youngman

**Graphic Design Manager**

Jeff Spry

**Senior Graphic Designer**

Luke Boynton

**Content Contribution**

Brett Granmo

Len Groom

Mark Nyholm

Alex Thompson

**Editorial Contribution**

Dan Gorski

Mark Nyholm

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**On the Web**

www.amsoil.com

**President & CEO**

Alan Amatzio

**Board Chair**

Dean Alexander

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**Letters to the Editor**

AMSOIL INC.

Communications Department

The AMSOIL Building

925 Tower Ave.

Superior, WI 54880

letters@amsoil.com

**THE COVER**

Professional angler Pete Maina is well-known as a guide, author, TV personality and one of the world's top muskie fishermen. Maina is also a professional photographer whose work has appeared on the covers of several outdoors publications.



**Claim Your Share of the Multi-Billion-Dollar Fishing Market | PAGE 8**



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# From the President



I am writing this under a state stay-at-home order due to the COVID-19 pandemic. If you would have told me two months ago that this would be happening,

I would not have believed it. This situation seemingly formed out of thin air, causing thousands of illnesses in North America and grinding our booming economy to a screeching halt. Sales in the U.S. and Canada dropped sharply, ending our march toward 8 percent growth for the fiscal year. The dramatic downturn highlighted the importance of diversification for the strength of the company. While consumer sales fell, our business in the wind and international markets was not hit as hard.

Our efforts through multiple areas of business are carrying us through, and it seems at this point sales have stabilized in consumer markets. Only time will tell. I am confident that business will return to normal and we will regain positive momentum; I just don't know when. I am also confident that we will continue pursuing viable paths of diversification to further strengthen the company.

Despite the obvious negative effects of the COVID crisis, there are several positive items to note. First, AMSOIL is a strong company. This situation highlighted the efficiencies in our systems and the strength of our leadership team. Just weeks ago, certain employees were incapable of working from home due to technical requirements of their jobs. When the pandemic struck, we acted quickly and developed solutions allowing most AMSOIL team members to work remotely. Our IT team's dogged

pursuit of solutions and extra effort to install remote workstations were outstanding.

Facilitating work-from-home capabilities was one of many precautionary measures taken to ensure the health and safety of our team. We also distributed hand sanitizer and disinfectant wipes throughout our facilities and instituted thrice-daily wipedowns of high-contact areas like doors and light switches.

Meanwhile, we cross-trained staff from a variety of areas to ensure crucial functions throughout the company were covered. Employees from the Mechanical Lab pitched in with Maintenance and the Chemical Lab. Many office personnel jumped into roles in Production and Distribution. Team members from Dealer Sales, Tech Services and Communications trained to take orders by phone if necessary. Everyone stepped up and pulled together to take care of the business, our Dealers and our customers. I am very proud of the AMSOIL team and the job everyone has done during this unprecedented event. While we did not predict this pandemic, it helped that we were strengthening our business-continuity plans prior to the crisis. There are other things we must be prepared to mitigate, like storms, fire, cybersecurity threats and active shooter situations. We have always been prepared and effectively managed through fire (Wichita DC), severe weather (hurricanes and bomb cyclones) and many other situations in the past, but we are now designing upgraded plans based on ISO 22301 and ISO 27001 standards for business continuity, disaster recovery and cybersecurity. These systems will further strengthen the company and our ability to serve you and our customers should anything like this occur again.

Our ability to maintain operations despite severe challenges is important for many reasons aside from the detrimental effects a shutdown would have on our business. AMSOIL is an essential supplier to critical manufacturing suppliers as defined by the Cybersecurity and Infrastructure Security Agency (CISA). Our products are relied upon by public and private utility companies, hospitals, fire departments, police departments and other vital businesses and industries. Our customers are depending on us to meet their lubricant needs during these challenging times, and we must deliver.

We are here for you and we are doing everything we can to stimulate business. We are in good shape to continue serving you and your customers for the foreseeable future.

Above all, I wish you and your families good health and safety during these uncertain times. Please ensure you've taken precautionary measures of your own to protect yourselves. We will emerge from this together and I expect AMSOIL will be stronger than ever.

**Alan Amatzio**  
President & CEO



## PRODUCT SPOTLIGHT:

### Synthetic Air Tool Oil (AIR)

#### WHAT IS IT?

- **Premium synthetic air tool oil** that effectively lubricates rotary and piston-type air tool bearings and motors, while managing moisture and conditioning rubber and plastic seals and O-rings

#### WHO IS IT FOR?

- **Professionals and do-it-yourselfers** who own and operate grinders, impact wrenches, ratchet wrenches, chisels, drills, sanders, hammers, nailers and other common air tools

#### WHAT DOES IT DO?

- **Helps prevent** corrosion and deposits, allowing air tools to run cleanly and reliably
- **Reduces** wear, extending tool life
- **Provides** easy dispensing



Online Store: [www.amsoil.com](http://www.amsoil.com) | Telephone: **1-800-777-7094** | EZ Online Order Form: [my.amsoil.com](http://my.amsoil.com)

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# LETTERS TO THE EDITOR

## SPONSORING

I recently had a customer that I introduced to AMSOIL products, and he had been buying his products directly from me. As he had several vehicles he bought products for, I explained the P.C. Program so he could save a few bucks over retail. Well, as I had not talked to him for a while, I stopped over to see him and found out he had become a Dealer online. He did not understand the referral part, so just signed up and was assigned to an AMSOIL-selected sponsor. As it had been several months since he signed up, AMSOIL told me over the phone that they could not switch him to me as his sponsor because 30 days had passed. So I am out a customer and a downline. Thanks AMSOIL, I appreciate how you look after your Dealers.

**Donald Keeslar**

**AMSOIL:** *We're sorry for the frustration you've experienced, Donald, but we have to look at these situations objectively and do what's best for everyone involved. When we assign a customer to a Dealer, we expect the Dealer to reach out to the customer and provide assistance. Within 30 days, that relationship is usually established and the Dealer could have spent considerable time working with the new customer. Changing Dealers more than 30 days later would frustrate and confuse customers, while Dealers would lose motivation to spend time and money working with assigned new customers. That's not what we want. This should be good news to you, too; we do our best to ensure any assigned new customers you receive stick with you.*

*We allow the 30-day flexibility in the event something like this happens, but after 30 days, the customer/Dealer relationship is established and commissions have been paid. This highlights the importance of controlling as many aspects of customer sales and registrations as possible. We have measures in place to help prevent these issues, but Dealers should do their best to leave nothing to chance. During the checkout process we ask new Dealers and customers to provide the Dealer number, name or any information they might have about any Dealer they've been working with. In the Dealer Zone, we provide reports for you to monitor new-customer activity and encourage all Dealers to monitor them daily. If you have been working with a customer and*

*encouraged him to create his own account and you don't see his name appear on your new-customer report, you'd know to contact him to provide assistance.*

## CUSTOMER LIST

Please give me a helping hand with the customer list that I cannot find. I have no idea who are my new or old customers because I cannot find the list of all of them. I know that I have several and would like to communicate with them with some sort of note, phone call or mail. I was wondering if AMSOIL could notify the listed Dealer when someone comes on board under his Dealer number. I know of two guys that applied online with my number, so how about some help on where to look on the dashboard page?

Thanks,

**F.M. Menou**

**AMSOIL:** *Thank you for reaching out, F.M. The Dealer Zone provides many reports to help manage your business, and we recommend regularly logging in to monitor customer activity. Navigate to Quick Links>Reports to reveal widgets that outline different reports and areas of interest. We recommend checking out these reports to get started:*

- *Active personal customers – shows all your current customers.*
- *Account expiration – shows accounts that have expired or are nearing expiration.*
- *Change of customer status – shows customers who have recently upgraded/downgraded or changed customer type.*

*You can also see your commission reports and other helpful information, and you can export reports to Excel and other programs to further filter/sort. See the article in the July 2019 AMSOIL Magazine for further information on using the reports in the Dealer Zone.*

## LICENSE PLATES

As I'm sure you're aware, Pennsylvania and many other states do not use front license plates on automobiles. Therefore, I am suggesting that AMSOIL offers license plates for the front of passenger car vehicles. I suggest two license plates – one with the AMSOIL logo and the other with the AMSOIL Racing logo.

I'd also like to see available a backing

piece for motorcycle license plates with the AMSOIL logos on it.

Anything to get a conversation started at the gas pump can be very helpful.

Thank you,

**Allen Pidcoo**

**AMSOIL:** *Thank you for your feedback, Allen. A customizable license plate is available in the AMSOIL Print Center (accessible in the Dealer Zone). While we don't currently have plans to introduce additional license plates, we'll certainly look into it should demand be deemed sufficient.*

## CATALOGS

I have been a Dealer for over two years and I have totally enjoyed selling the AMSOIL value story in my area. One thing that would help my business is tools that don't undermine my efforts by AMSOIL promoting direct pricing at discounts. I would like to see a catalog that Dealers can pass out with just list prices. I also don't understand why when you have a nice article in the AMSOIL Magazine you post three levels of costing within those stories. I could use those stories to promote AMSOIL business, but without pricing listed as part of the page.

Thanks,

**Geff Smith**

# LETTERS TO THE EDITOR

**AMSOIL:** *Good questions, Geff. Preferred Customer pricing was added to consumer catalogs because we want consumers to be aware of their options. They have the option to purchase at full price or at Preferred Customer pricing, and many people still choose the full-price option. It is a matter of good customer service and it builds loyalty when you're up-front about customers' potential choices; it lets them know that you have their best interest in mind rather than your own profits. It also helps overcome objections about pricing. You'll notice that we've implemented the same tactic at amsoil.com and the results thus far have been positive.*

*As to why we include all the pricing information in AMSOIL Magazine articles, well that's simply because it's a communication intended for Dealers only and not general consumers, and it's important that we provide Dealers all relevant information. The good news is, there's always a high likelihood we've published the same articles for consumers with information relevant only to their account type. You can typically find articles like this for use as you've described in the blog and the Newsstand at amsoil.com and amsoil.ca, and in the Preferred Customer edition of AMSOIL Magazine.*

## PRICING

While I have been a Dealer since 1983, I find it harder to make sales now with all the competition and pricing position of AMSOIL products. I live in Baton Rouge, La. and it is home to a large ExxonMobil\* refinery and there are a lot of other oil and gas industry people living here with loyalties to their employer. With many people's livelihood coming from the oil and gas industry, there is a lot of "family loyalty" also to other brands.

I just today got an email advertisement from Advance Auto Parts\* where they are selling Mobil 1\* Full Synthetic at prices considerably less than AMSOIL products.

I have problems justifying the difference

in prices when most of the existing and potential customers drive less than 15,000 miles a year. I am using my Ford\* truck requirements for both cost estimates. (My truck uses six quarts, but I just chose the more standard five quarts and the Mobil 1 comes in a five-quart container).

To buy five quarts of Mobil 1 5W-30 Extended Performance Full Synthetic Motor Oil and a Mobil 1 Extended Performance Oil Filter from Advance Auto Parts costs about \$35.99 plus sales taxes for a total of \$39.39.

To buy five quarts (one gallon and one quart) of AMSOIL Signature Series 5W-30 Synthetic Motor Oil and an oil filter (EAO17) from AMSOIL costs about \$83.30 plus taxes for a total of \$91.17 (from G100 catalog dated 9/19). This is better than 2X as much.

One question is why this big a difference since Advance Auto Parts is a third party making a profit too? Question two is what is the argument to convince people they should spend more than twice as much for AMSOIL?

I want to continue to use and sell AMSOIL lubricants, but it is very hard under these circumstances.

## M.M. Christensen

**AMSOIL:** *Thank you for your letter, M.M. Comparing the full catalog price of our top-tier Signature Series Synthetic Motor Oil to a sale price of Mobil 1's middle-tier Extended Performance Synthetic Motor Oil (Mobil 1 Annual Protection is Mobil 1's top-tier product) does not present an apples-to-apples comparison. Instead, AMSOIL XL Synthetic Motor Oil is a more appropriate comparison to Mobil 1 Extended Performance. A look at Advance Auto Parts' website pricing currently shows a five-quart container of 5W-30 Extended Performance motor oil and Mobil 1 Extended Performance Oil Filter sell for \$60.98. The full catalog price for five quarts (one gallon and one quart) of AMSOIL XL 5W-30 Synthetic Motor Oil and EAO17 oil filter is \$66.85, while the P.C. price is \$53.85. Be sure to present AMSOIL OE and promote our P.C. Program to cost-conscious customers. OE provides an excellent, lower-cost introduction to AMSOIL quality, while our P.C. Program presents everyday savings for the entire line of AMSOIL products.*

## ELECTRIC GEARBOX FLUIDS

I was just reading an article in *Lubes n Greases* about electric gearbox fluids, the move towards wet e-motors with the motor inside the gearbox of a wet transmission and all the needs with that and new specific needs of the fluids. It's an interesting article and I was just curious if AMSOIL was also thinking about looking into this subject.

Thank you for all everyone does at AMSOIL.

## Jeff Sonkowsky

**AMSOIL:** *Fluids for electrified applications are certainly on our radar, Jeff. You can be sure we'll be ready should the market move in this direction.*

## METRIC MEASUREMENTS

AMSOIL wants to portray itself as an international company, but it does not convey this message in its communication. I have many times brought this to the attention of several AMSOIL executives, but the lack of metric information continues. Most of the data bulletins lack metric equivalents. It is not very professional to have to add handwritten metric equivalents to AMSOIL materials.

I hope this communication helps get the message through.

Regards,

## Rein Lepik

**AMSOIL:** *Thank you for bringing this to our attention, Rein. We will continue to improve in this area.*

Email letters to:  
**letters@amsoil.com**

Or, mail them to:  
**AMSOIL INC.**  
**Communications Department**  
**Attn: Letters**  
**925 Tower Avenue**  
**Superior, WI 54880**

Letters are subject to editing for length and clarity; please include your name, address and phone number. Unsigned letters will not be published.

# CLAIM YOUR SHARE OF THE MULTI-BILLION-DOLLAR FISHING MARKET

Americans spend nearly \$50 billion annually on fishing gear and trips. In Canada, anglers contribute nearly \$8 billion annually to the economy. To carve out your share of the pie, make sure you know which anglers to target and how to talk to them. Here are three key tips

## #1) Target our Best Prospects

- Avid anglers
- Convenience stores near fishing hotspots
- Independent auto parts stores

**Avid anglers** are typically male do-it-yourselfers between the ages of 35-50 with disposable income. They spend an average of \$745 annually on fishing gear.

The avid angler chooses a high-performance boat/motor with sufficient horsepower to quickly take him and his

friends to their favorite fishing spot. Avid anglers are more likely to see the value of a premium product like AMSOIL than occasional weekend anglers or boaters.

**Convenience stores or independent parts stores** around fishing destinations aren't loyal to marine manufacturer-branded products, typically making them more receptive to carrying AMSOIL marine lubricants. They value quality products with high brand recognition that increase sales while satisfying their customers' need to protect their expensive marine engines.

## #2) Convert Avid Anglers to Customers

Avoid the temptation to begin conversations with prospects by launching into a technical presentation of product features. Most of what you say will go over the prospect's head and he will quickly lose interest. Instead, tailor your conversation depending on the phase of the sales process in which you find the prospect.

First, create curiosity in AMSOIL by asking the prospect about his or her boat

**CREATE CURIOSITY**



### Synthetic Marine Engine Oil

Sales of four-stroke engines have surpassed sales of two-stroke engines. Synthetic Marine Engine Oil helps anglers avoid downtime and stay on the water.

- Excellent high-stress, high-rpm endurance
- Increased rust and corrosion protection
- NMMA FC-W Catalyst Compatible



### HP Marine® Synthetic 2-Stroke Oil

The Evinrude® E-TEC® is the most popular two-stroke outboard manufactured today. HP Marine is proven to fight wear and deposits in E-TEC engines.

- Excellent for Evinrude E-TEC factory-lean setting (replaces Evinrude XD100® 2-Cycle Oil)
- Helps prevent deposits
- Protects against wear
- Low smoke



### Synthetic 2-Stroke Injector Oil

This oil is perfect for retailers who want to stock limited products. It's great in two-stroke outboards and snowmobiles, offering one oil for year-round use.

- Ideal for outboard motors and snowmobiles
- Protects against rust and wear
- Controls deposits



### Synthetic Marine Gear Lube

The AMSOIL easy-pack takes the hassle and mess out of changing lower-unit oil. Have a sample on hand so prospects can see its benefits.

- Excellent gear and bearing protection, even when contaminated with 15% water<sup>1</sup>
- Reduced friction and wear
- Protection against rust and corrosion

and talking about how you have helped other anglers. Ask questions that begin the conversation and help uncover the prospect's buying motivations.

- *How often do you fish?*
- *I've helped other anglers maximize power and reliability in their motors. Can I share a couple examples?*
- *A lot of anglers perform their own maintenance. Is that the case with you?*

Next, help the prospect discover

#### DISCOVER NEEDS

whether he or she has a need for AMSOIL products. Ask open-ended questions that

steer the conversation toward how AMSOIL marine products can solve problems the prospect is experiencing.

- *Other anglers sometimes experience power loss, starting difficulties or rust formation with their engines. Has that been the case with you?*
- *Have you ever had problems with the engine loading up when you troll?*

The prospect is assessing whether

#### ASSESSMENT

AMSOIL products are right for him or her. Consider all the information the

prospect has provided and link his or her problems to the proper solution AMSOIL marine lubricants provide.

Upon receiving an order, determine

#### ONGOING SERVICE

the level of ongoing service you will provide. Does your new customer require

a personal visit every so often to make sure everything is going well? Or just an occasional email? A concrete plan will help you meet their expectations and create happy and loyal customers.

### #3) Answer Challenges from Anglers and Retailers

Inevitably, anglers and retailers will challenge you to explain why they should use or sell AMSOIL products. Being prepared helps you remain patient and in control of the conversation.

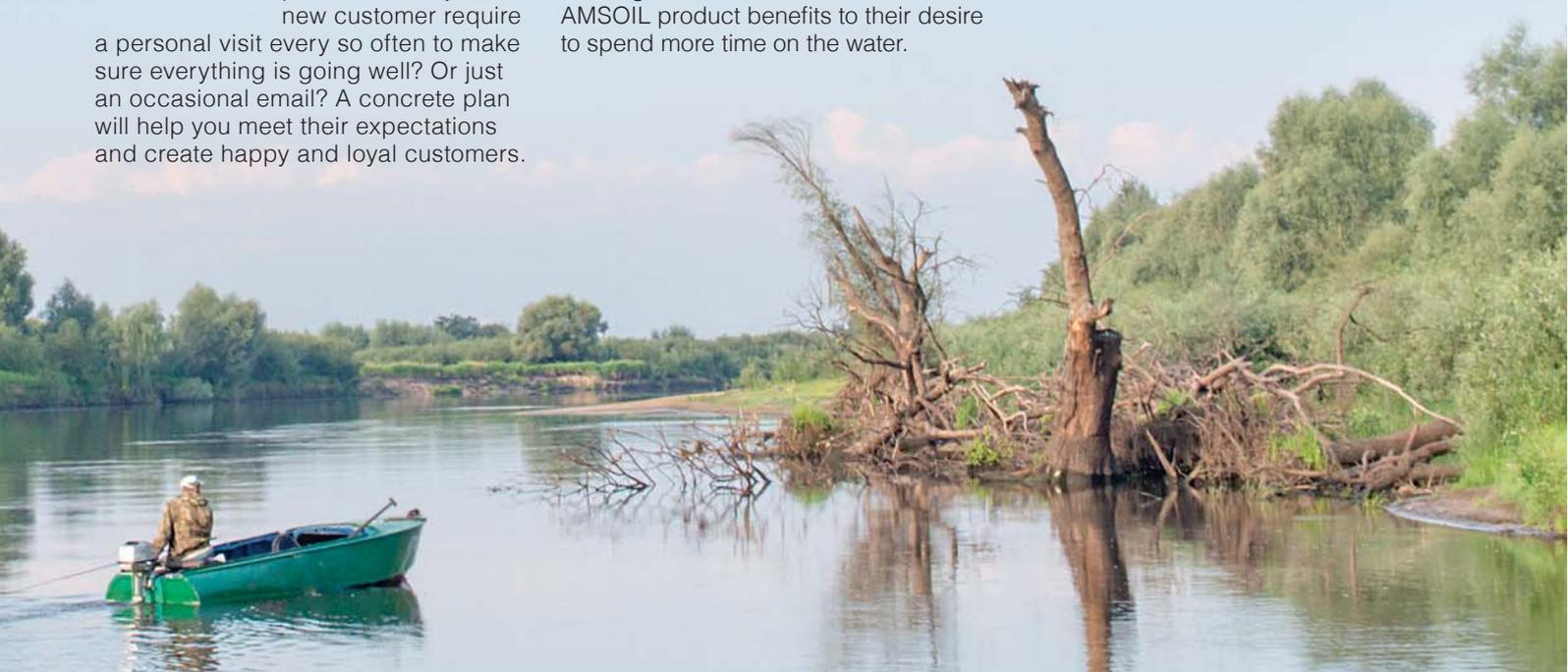
#### Why should I use AMSOIL products instead of the manufacturer's brand?

- *AMSOIL dedicates time and effort to crafting its lubricants. AMSOIL marine products are designed specifically for avid anglers and boaters who demand increased performance and protection in severe conditions.*

#### Why should my store carry AMSOIL marine products?

- *AMSOIL is a leader in the powersports market and boasts a loyal following, allowing you to tap into this market and grow sales. AMSOIL products aren't available everywhere, which allows you to separate your store from others in the area and attract new customers.*

To make this fishing season a success, target the right prospects with the right message and understand how to tie AMSOIL product benefits to their desire to spend more time on the water.



# A CLOSER LOOK AT DIFFERENTIAL COVERS

A new differential cover can help provide increased performance.

Although they're not always top-of-mind for enthusiasts, differential covers play an important role in the performance of pickup truck differentials. In addition to providing access for changing gear lube, differential covers help dissipate heat that can damage differentials, and they protect gears from contaminants like dirt and water, as well as rocks and other large obstacles encountered when off-roading.

Enthusiasts seeking a performance boost and improved cooling often look toward the aftermarket for upgrades over their stock differential covers.

## Better Cooling

Enthusiasts love to push their trucks to the limit, but adding power and hauling heavy equipment add heat and stress to the differential. Keeping gear lube temperatures down is key to extending differential life, and performance differential covers can make a significant difference. Features like cooling fins allow more surface area for oil cooling, while differential covers constructed of aluminum provide improved heat disbursement that keeps the differential and gear lube cool. In addition, lighter aluminum differential covers are advantageous for competitors looking to shed overall vehicle weight.

## Improved Strength

Differential covers constructed of thin steel can get dented, or they can bend and peel away from the differential when contacting rocks and other debris while off-roading, leading to gear lube leaking out and contaminants entering the differential and causing excess wear. Enthusiasts who put their pickups through the paces while off-roading often seek thicker, stronger differential covers constructed of heavy-duty iron.



## Easier Maintenance

Some performance differential covers include features designed to ease maintenance, including gear lube drain plugs and dipsticks. Some drain plugs and dipsticks include magnets, helping owners check for excessive wear without draining the gear lube.

## Enhanced Style

Upgrading a differential cover also offers the opportunity to add style to a pickup. Many differential covers are available with chrome-plating and polished aluminum for a beautiful finishing touch for customized trucks.

## Look to the Experts

With many different differential cover designs on the market, it is important for enthusiasts to find one that meets their specific needs. Experts like Banks Power specialize in this area and can provide professional guidance for enthusiasts seeking a performance upgrade.





## Protect Differentials with AMSOIL SEVERE GEAR®

Today's vehicles produce substantially more horsepower, torque and towing capacity than their predecessors, yet the design of differential gears and bearings remains largely unchanged. Many differentials even use less gear lube and lower viscosities than before in an effort to reduce drag and increase fuel economy. In essence, less gear lube is responsible for providing more protection.

### Fighting the Grind

Differential designs have inherent weaknesses. In a traditional automotive differential, the pinion gear concentrates intense pressure on the ring gear. As the gear teeth mesh, they slide against one another, separated only by a thin layer of lubricant. The repeated stress the lubricant film bears can shear gear lubes, causing permanent viscosity loss. Once sheared, the fluid film weakens, ruptures and allows metal-to-metal contact, eventually leading

to gear and bearing failure. The situation is amplified by severe-service applications like towing.

### Thermal Runaway

The extreme pressures and temperatures placed on gear lubricants can lead to a serious issue called thermal runaway. As temperatures in the differential climb, some gear lubes lose viscosity and load-carrying capacity. When extreme loads break the lubricant film, metal-to-metal contact occurs, increasing friction and heat. This increased friction and heat, in turn, results in further viscosity loss, which further increases friction and heat. As heat continues to spiral upward, viscosity continues to spiral downward. Thermal runaway is a vicious cycle that leads to irreparable equipment damage from extreme wear, and ultimately catastrophic gear and bearing failure.

### AMSOIL SEVERE GEAR Synthetic Gear Lube

SEVERE GEAR excels in protecting gears and bearings from the rigors of

severe-service operation. 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 performance.

- Superior film strength
- Controls thermal runaway
- Protects against rust and corrosion
- Helps reduce operating temperatures
- Maximum efficiency
- Long oil, seal and equipment life
- Flexible easy-pack for clean, fast installation



# NEW MOTOR OIL SPECIFICATIONS NOW IN EFFECT

The automotive industry's latest specifications, ILSAC GF-6 and API SP, are now effective. AMSOIL is ahead of the game.

Original equipment manufacturers (OEMs) are under pressure to improve fuel economy and reduce emissions. As a result, most new engines today use some combination of turbochargers, direct-fuel injection and variable valve timing to deliver better fuel economy and increase horsepower.

The trend of lighter engine oils to achieve these goals continues with 0W-16 viscosities emerging in the market and 0W-12 and 0W-8 expected to follow. The industry has responded to these advanced engine technologies and ultra-light oil viscosities with two new oil specifications: ILSAC GF-6 and API SP.

## **The Split: GF-6A and B**

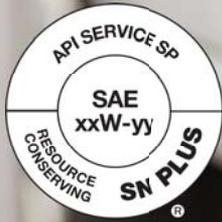
The International Lubricant Standardization and Approval Committee (ILSAC) has set a new precedent in

the passenger-car motor oil market by splitting its specification into two parts. One of the main differences between the two specifications is compatibility. See the chart on the next page.

Both versions focus on wear protection, prevention of low-speed pre-ignition (LSPI) and improved engine cleanliness. However, GF-6B features a more stringent fuel economy test. Engine oils can easily be identified as ILSAC GF-6A or 6B by the API emblem on the front label of the packaging. A shield represents the GF-6B specification, while the traditional starburst indicates a GF-6A product. Both ILSAC specifications meet the industry-standard API SP specification which is most commonly found in owners' manuals.

## **We Are Ready**

Our claims about using advanced technology aren't just talk, and this specification update proves it once again. AMSOIL synthetic motor oils already meet or exceed the new industry standards and require no change in formulation. This is not the first time we've been in this position. While the competition works on making major formulation adjustments, we are ready. Our product labels will soon feature the new specifications as inventories of current packaging are depleted.



	BACKWARD COMPATIBLE GF-6A	NOT BACKWARD COMPATIBLE GF-6B
--	---------------------------	-------------------------------

Added piston deposit prevention for fuel economy and horsepower retention	✓	✓
Improved turbocharger protection to prevent turbocoking and increase longevity	✓	✓
Increased wear protection for maintaining like-new performance	✓	✓
Increased sludge protection for cleaner engines	✓	✓
Viscosities XW-20, XW-30, XW-40, XW-50	✓	
Low HTHS viscosities for improved fuel economy XW-16 (XW-12, XW-8 possible future viscosities)		✓
Low-speed pre-ignition protection, preventing severe engine damage	✓	✓



# THE CHEMICAL PROPERTIES OF ADDITIVES

Additives enhance lubricant functioning by performing two critical functions: decreasing destructive processes and enhancing beneficial properties of the base oil.

Oil additives have had a significant effect on modern transportation and industrial processes. The use of sophisticated additives has allowed equipment to evolve into what it is today, enhancing performance capabilities by providing added efficiency and protection to internal systems.

Although there may be a variety of additives directed toward a specific function, such as imparting controlled frictional properties, the performance of each can differ significantly. The concentration at which an additive is used also has a major effect on how well a lubricant performs a given task. To achieve the proper mix of additive and base oil chemistries, an understanding of how different additives interact is necessary.

Additives can function to lessen the damage caused from oxidation, extreme pressure, wear, rust and corrosion. Additives can also enhance

a lubricant's ability to control foam, separate or combine with water and keep the engine clean.

## Resisting Oxidation

Oxidation and heat are the primary enemies of lubricant base oils, especially conventional petroleum base oils. Once oxidation and heat cause a lubricant to break down, it must be replaced or the resulting contamination and lack of lubrication will cause equipment damage.

Some of the chemicals in conventional lubricants break down at temperatures within the normal operating range of vehicle and equipment components. Some tend to break down and generate contaminants in relatively mild temperatures when exposed to oxygen, which is almost always present. These unstable contaminants do not help the lubrication process in any way, and chemical additives are necessary to keep the lubricant's performance in check under these oxidative conditions.

## What is Oxidation?

Oxidation is the breakdown of a lubricant's base oil or additive molecules as they chemically react with air in high-temperature environments. Oxidation increases exponentially as temperatures increase and is further accelerated by the presence of water and catalysts such as copper, aluminum and other substances present in the application. Excessive foam is another contributor to accelerated oxidation.

Foam is bad for several reasons, but its contribution to accelerated oxidation is due in part to more surface area of the oil being exposed to air. As oxidation progresses, the oil typically begins to thicken and its acid number rises. Both these trends can be identified by oil analysis and the oil condemned when it reaches limits established by the oil analysis lab or the equipment manufacturer. If unaddressed, the oil will degrade to the point of producing varnish and sludge which can easily cause damage.



Oxidation is a natural process that cannot be stopped, but the quality, quantity and types of raw materials used in a lubricant can have a dramatic impact on slowing its rate. Regardless of the lubricant quality, lowering heat, keeping water out and minimizing foam whenever possible can help extend its life.

### The Importance of Oxidation Resistance

Since oxidation produces acids, measuring the acid components in a lubricant is an indirect way of determining the occurrence of oxidation. This measure is known as the Total Acid Number (TAN). In non-engine lubricants, TAN can help measure the extent of oxidation, which in turn can help determine if the oil is suitable for continued use. TAN values can be determined through conventional oil analysis.

When a lubricant reaches the end of its service life, it reaches its condemning limit and must be replaced. Depending on the application, a TAN between 2 and 5 typically indicates the lubricant has reached its condemning limit; however, TAN and condemning limits vary between application and product types.

Although oxidation resistance varies between different base oils, most require the assistance of oxidation inhibitors to combat the negative results of oxidation and improve the life expectancy of a lubricant. A typical oxidation inhibitor is zinc dialkyldithiophosphate, more commonly referred to as ZDDP.

### AMSOIL Advantage

#### Saturated Molecular Structure

AMSOIL synthetic lubricants are formulated with base oils that have a saturated molecular structure, meaning oxygen is prevented from attaching. This provides inherent heat and oxidation stability over conventional oils that are unsaturated. Because AMSOIL synthetic oils do not contain contaminants like conventional mineral oils, their base composition does not accelerate oxidation.

AMSOIL synthetic lubricants contain oxidation inhibitors that are far better than conventional oils. Oxidation inhibitors are sacrificial in nature, meaning they deplete, or are used over time. Since AMSOIL base oils have better oxidation stability on their own, oxidation inhibitors in AMSOIL synthetic oils last longer because they are not depleted as rapidly. AMSOIL uses a combination of oxidation-inhibitor systems for different temperatures and application needs.

### Oxidation Testing

AMSOIL uses several tests to evaluate the oxidation characteristics of its lubricants:

- Turbine Oil Oxidation Stability Test (TOST) (ASTM D943)
- 1000-Hour Sludge Test (ASTM D4310)
- Panel Coker Test
- Rotary Bomb/Pressure Vessel Oxidation Test (RBOT/RPVOT) (ASTM D2272)
- Thin-Film Oxygen Uptake Test/TFOUT (ASTM D4742)

Each of these tests has its own procedures, but all evaluate oxidation. The Thin-Film Oxygen Uptake Test (TFOUT) evaluates a lubricant's ability to resist heat and oxygen breakdown when contaminated with oxidized or nitrated fuel, or water and soluble metals such as lead, copper, iron,

manganese and silicon. Designed to mimic the operating conditions of a gasoline engine, this test demonstrates the consistently superior oxidation stability of AMSOIL lubricants.

### Thin-Film Oxygen Uptake Test (ASTM D4742)

During the test, the oil is mixed with other typical chemistries that are found in gasoline engines. The test is conducted under high pressure at a high temperature of 320°F (160°C). The mixture is pressurized along with oxygen and other metal catalysts, fuel and water to simulate the operating conditions of the gasoline engine.

The breakdown of the oil's antioxidants is detected by a decrease in oxygen pressure, referred to as the induction time (break point) of the oil, which is recorded.



Mark Nyholm | TECHNICAL MANAGER, HEAVY DUTY AND MECHANICAL R&D

## Neglect causes most coolant-system problems

Using a good coolant on a routine schedule is a great prescription for protection.

Coolant-system issues account for about 40 percent of engine problems, likely due to most of us neglecting to maintain our coolant. It's easy to see why – coolant is a long-drain-interval product. With service intervals of five years or so (and longer in heavy-duty applications), it's not top-of-mind. Compare that to engine oil, which you change at least yearly and sometimes more often.

Coolant consists of a base (typically ethylene glycol or propylene glycol) mixed with additives and water. The base is primarily responsible for keeping your engine from turning into a block of ice in winter and Old Faithful in summer. The additives guard against corrosion, cavitation and scaling. And the water does a good job removing heat from the engine.

Neglect leads to all kinds of problems, particularly if using inexpensive conventional green coolants found at almost every retailer.

The additives in these coolants use **inorganic-acid technology (IAT)**, which relies exclusively on inorganic salts such as nitrites, phosphates and silicates for protection. Formulating exclusively with inorganic salts has drawbacks. They deplete rather quickly and can lead to scale buildup and sludge if maintenance is neglected.

One solution is to formulate the coolant using **organic-acid technology (OAT)**. These coolants don't contain phosphates, silicates and other inorganic salts, virtually eliminating problems associated with conventional green coolants. They also last longer, which makes everyone happier.

Finally, we have **hybrid organic acid technology (HOAT)**. These coolants rely heavily on organic acids, but strategically use some inorganic salts to take advantage of their protective properties. A properly formulated HOAT coolant delivers long service life and excellent protection. Think of it as a belt-and-suspenders approach to protection.

Whichever coolant you use, it's best to flush the system about every five years to maintain its health.

Some do-it-yourselfers simply place a drain pan under the radiator and open the petcock. While it's better than nothing, this quick-and-dirty coolant service only removes about half the fluid.

Heavy-duty diesel operators often use supplemental coolant additives (SCAs). They're designed to be added to the coolant about halfway through the service interval, replenishing the additives that have depleted.

That sounds like a decent solution, but SCAs have drawbacks. For starters, they're a hassle. The operator has to test the coolant using test strips and match the color of the strip to a chart. Hopefully he's had his eyes checked recently and can correctly match the colors. If not, he risks adding too much SCA, which can cause additive "dropout." This occurs when the additives separate from the coolant base and form sludge and slime that plug coolant passages. Too much SCA can also lead to scale buildup, which inhibits heat-transfer.

Fortunately, there's a better way. You can use a high-quality coolant that doesn't require the hassle of SCAs

and that does a better job fighting common problems like scale, sludge and slime.

At AMSOIL, we have such a coolant: Heavy-Duty Antifreeze & Coolant (ANTHD). It offers a recently improved HOAT formulation that delivers excellent protection against overheating and corrosion for up to 1 million miles (1,609,344 km), 20,000 hours or 8 years, whichever comes first. And it doesn't require the hassle of adding an SCA.

For passenger car/light truck owners, we have AMSOIL Passenger Car & Light Truck Antifreeze & Coolant (ANTPC). It features an improved OAT formulation that eliminates additive drop-out, scaling and other issues inherent to conventional coolants. It's pre-mixed 50/50 with high-quality water and is compatible with all ethylene and propylene coolant colors.

For those who want a low-toxicity, biodegradable coolant, we offer AMSOIL Low Toxicity Antifreeze & Engine Coolant (ANT). Its new HOAT formulation delivers excellent protection for up to 150,000 miles (241,000 km) or 5 years, whichever comes first, in passenger cars and light trucks. In heavy-duty applications, it lasts 1 million miles (1,609,344 km), 20,000 hours or 8 years, whichever comes first. It's compatible with all ethylene and propylene coolant colors.

This summer is a great time to flush your coolant system if it's been awhile and give your engine a fresh start with one of our reformulated coolants.

**May Close-Out**

The last day to process May orders in the U.S. and Canada is the close of business on Friday, May 29. Individual telephone and walk-in orders will be processed if initiated by the close of business. Internet and fax orders will be accepted until 3 p.m. Central Time on that day. All orders received after these times will be processed for the following month. Volume transfers for May business will be accepted until 3 p.m. Central Time on Friday, June 5. All transfers received after this time will be returned.

**Holiday Closings**

AMSOIL corporate headquarters and U.S. distribution centers will be closed Monday, May 25 for Memorial Day. The Edmonton and Toronto distribution centers will be closed Monday, May 18 for Victoria Day.

**New Z-ROD® 10W-40 Synthetic Motor Oil Available June 2**

Available June 2, new Z-ROD 10W-40 Synthetic Motor Oil (ZRD) will provide the benefits of Z-ROD to applications that require a 10W-40 viscosity, including rock-solid wear protection for flat-tappet cams and proven protection against rust during storage. Z-ROD 10W-30 and 20W-50 Synthetic Motor Oil (ZRT, ZRF) will be updated with new labels that you'll begin to see once current inventory is depleted. Formulations and pricing will remain unchanged. Watch the June *AMSOIL Magazine* for details.

**SEVERE GEAR® SAE 190 Synthetic Racing Gear Lube Discontinued**

Due to slow and declining sales, SEVERE GEAR SAE 190 Synthetic Racing Gear Lube (SRN) is discontinued and available while supplies last. We recommend SEVERE GEAR SAE 250 Synthetic Racing Gear Lube (SRT) or SEVERE GEAR 75W-140 Synthetic Gear Lube (SVO) as replacements, depending on application needs. Contact AMSOIL Technical Services (tech@amsoil.com; 715-399-TECH) with product-recommendation questions.

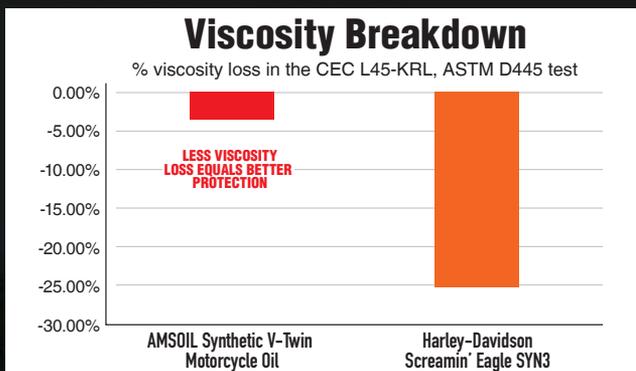


# EVERYTHING YOUR HARLEY NEEDS, INCLUDING BETTER PROTECTION

Dealers and customers asked for more V-twin oil-change kits, and we've delivered. Four kits are now available, including kits with an extra quart of oil for larger Milwaukee-Eight\* engines or a black oil filter instead of chrome. And, as always, Synthetic V-Twin Motorcycle Oil delivers **excellent protection against extreme heat** so you have **peace of mind your bike is protected**.

## AMSOIL Resists Viscosity Breakdown

AMSOIL resists viscosity breakdown **6X better** than Harley-Davidson\* SYN3\* for **improved protection** against compensator and transmission gear wear.<sup>BB</sup>



<sup>BB</sup>Based on testing of AMSOIL 20W-50 Synthetic V-Twin Motorcycle Oil purchased on 3/19/19 and Harley-Davidson Screamin' Eagle SYN3 purchased on 3/19/19 in the CEC L45-KRL, ASTM D445 test. \*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.

## AMSOIL V-Twin Oil Change Kits include...

- 4-5 quarts of 20W-50 Synthetic V-Twin Motorcycle Oil (MCV)
- 1 chrome or black AMSOIL Motorcycle Oil Filter (EAOM103/EAOM103C)
- 1 drain-plug O-ring



Check out the Motorcycle Product Guide at [amsoil.com](http://amsoil.com) to find the right kit for your Harley-Davidson.



## PRODUCT SPOTLIGHT:

### Synthetic Polymeric Off-Road Grease (GPOR1, GPOR2)

#### WHAT IS IT?

- **Exclusive synthetic polymeric grease** custom-built to provide superior protection for heavy-duty, off-road equipment

#### WHAT DOES IT DO?

- **Provides** exceptional wear protection and load-bearing capacity
- **Tenaciously** stays in place and provides maximum impact resistance in heavily loaded, extreme-pressure applications
- **Extends** service intervals and reduces grease consumption

#### WHO IS IT FOR?

- Owners of heavy-duty, heavy-load-bearing equipment operating in the adverse conditions found in agricultural, construction, landscaping, logging and mining environments. Applications include power shovels, drag lines, wheel and track loaders, excavators, bulldozers, skid steers, dump trucks and other heavy-duty equipment with heavily loaded pivot pins, king pins, bucket pins and bushings. Ideal for equipment that pivots, slides or has bearings that don't make a full rotation.
- Formulated with 5% moly for maximum wear protection that meets Caterpillar's\* requirement for pin and bushing applications.

Spring is here, and now is a great time to contact your commercial accounts to ensure they're fully stocked with AMSOIL products for all their needs.



NLGI #1  
Below 40°F  
(4.4°C)



NLGI #2  
Above 40°F  
(4.4°C)

# DEFINING BASE OIL PROPERTIES

Today's crude petroleum oil dates back millions of years. There are two main theories for the origin of crude oil. One suggests that crude oil comes from carbon deposits deep in the earth; the other suggests it was created from the remains of tiny animals and plants that settled with mud and silt.

Over millions of years of intense pressure and heat, this organic matter turned into what is now known as crude oil. Regardless of crude oil's origins, humankind has found many ways to harness this dark, thick, stinky substance.

The composition of crude oil is complex. It contains individual hydrocarbons or hydrocarbon compounds. Hydrocarbons are organic compounds that are entirely composed of hydrogen and carbon atoms.

Crudes have varying amounts of elemental compounds such as sulfur, nitrogen, oxygen and metals such as nickel or vanadium. Water-containing salts also can be found in crude oil. Many of these inherent compounds of crude petroleum must be removed to make the oil usable.

A refining process removes the materials that inhibit the use of crude oils. As an example, sulfur must be removed to meet environmental regulations. The many materials found in crude oil add complexity to the refining process, meaning there is a higher cost to removing these materials.

Unprocessed crude can be used, but there are limited applications for it, such as in power plants and some internal-combustion engines. Most often crude is distilled into different fractions. Fractions are batches of a particular substance, in this case, different molecules of hydrocarbons.

Anyone who has driven past an oil refinery will recall that these plants appear to be very large mazes of piping and other large units with smoke stacks scattered about. The complex maze consists of piping, distillation units, furnaces, hydrocrackers and a number of other units needed to refine crude oil. All of these components are necessary to separate the hundreds of different types of hydrocarbon molecules into simpler, more usable forms.

A detailed discussion of the oil refining process is beyond the scope of this article, but Figure 1 does a good job of illustrating the process. As crude oil begins the refining process, it enters a distillation tube. From there the separated molecules enter additional treatment centers to be further broken down into usable oils and substances such as sulfur, butanes, jet fuel, kerosene, diesel oil, fuel oil, petroleum coke, asphalt and gasoline.

The refining of crude oils can produce a variety of lubricant types of varying quality and viscosity grades. These lubricants can be refined to maximize their beneficial characteristics and minimize those that are not desirable; however, it's an expensive process.

## Base Oil Categories

The American Petroleum Institute (API) developed a classification system for base oils that focuses on the paraffin and sulfur content and degree of saturation of the oil. The saturate level indicates the level of molecules completely saturated with hydrogen bonds, leaving them inherently un-reactive.

There are five groups in the classification system, ranging from Group I – Group V. Figure 2 details the five groups by their manufacturing process, saturate and sulfur level and their viscosity index (VI). General group characteristics are listed below.

## Base Oil Characteristics by Group

### Group I Characteristics

Group I base oils are the least refined of all the groups. They are usually a mix of different hydrocarbon chains with little uniformity. While some automotive oils use these stocks, they are generally used in less-demanding applications.

### Group II Characteristics

Group II base oils are common in mineral-based motor oils. They have fair-to-good performance in the areas of volatility, oxidation stability, wear prevention and flash/fire points. They have only fair performance in areas such as pour point and cold-crank viscosity.

### Group III Characteristics

Group III base oils consist of reconstructed molecules that offer improved performance in a wide range of areas, as well as good molecular uniformity and stability. These synthesized materials can be used in the production of synthetic and semi-synthetic lubricants.

### Group IV Characteristics

Group IV base oils are made from polyalphaolefins (PAO), which are chemically engineered synthesized base stocks. PAOs offer excellent stability, molecular uniformity and improved performance.

### Group V Characteristics

Group V is a catch-all category. Most base oils in this category are chemically engineered base oils that do not fall



into any of the categories previously mentioned. Typical examples of Group V stocks are esters, polyglycols and silicone, but the category also includes vegetable oils and other base oils that don't fit under the other categories. As with Group IV stocks, Group V stocks tend to offer performance advantages over Groups I – III.

### Defining Mineral Oil Properties

Mineral oils are generally classified as paraffinic and naphthenic. The difference between paraffinic stocks and naphthenic stocks is one of molecular composition, resulting in inherent solvent differences between the two types of stock.

### Paraffinic Stock

Paraffinic oils are characterized by straight chains of hydrocarbons where the hydrogen and carbon atoms are connected in a long linear composition, similar to a chain.

The wax matter within the paraffinic stock results in these elements turning to solids at low temperatures; therefore, untreated paraffinic stocks do not have good cold-temperature performance and consequently, the pour point of paraffinic stocks is higher. For a paraffinic stock to flow at low temperatures, the heaviest waxes must be removed and usually pour-point depressants are necessary.

Paraffinic stocks display good high-temperature performance with high oxidation stability and high flash/fire

points. Paraffinic stocks also have a high viscosity index (VI), meaning they exhibit high viscosity stability over a range of temperatures.

### Naphthenic Stock

Naphthenic oil stocks are much like paraffinic stocks in that they contain only hydrocarbons. However, naphthenic stocks differ and are characterized by a high amount of ring hydrocarbons, where the hydrogen and carbon atoms are linked in a circular pattern. Conventionally, when the paraffinic carbon content of oil is less than 55-60 percent, the oil is labeled as naphthenic.

Naphthenic crudes contain little to no wax and therefore remain liquid at low temperatures; however, they thin considerably when heated. Naphthenic stocks generally have a low VI. These stocks have higher densities than paraffinic stocks, and they have greater solvency abilities than their paraffinic counterparts. Because naphthenic stocks contain little wax, they display lower pour points than paraffinic stocks. These stocks are also volatile and have a lower flash point.

Because naphthenic crudes contain degradation products that are soluble in oils, they present fewer problems with the formation of sludge and deposits. Due to the performance characteristics of naphthenic oils, they are generally used in applications where low pour points are required and the application temperature range is narrow.

## WE KNOW WHAT YOU'RE THINKING ...

So, what kind of base oils does AMSOIL use?

We are in a highly competitive market where gaining an advantage is difficult. We have the advantage of being an independent lubricant manufacturer with unmatched technological expertise.

That means we are not tied to a single source of base oils and additives; we can source chemistry from around the world to create the products that deliver our desired results, and we do. We also have the expertise to put that chemistry to work for our customers with products that deliver tangible benefits and best-in-class performance.

We hold formulation details as proprietary and do not divulge base oil information. We view synthetic base oils the same as we view additives, with each having its own set of unique properties.

Therefore, we do not insist on a particular type of synthetic base oil, but insist on particular performance parameters. We choose whichever synthetic base oil or combination of base oils delivers the desired result and tailor our lubricants to be application-specific.

At the end of the day, the type of base oil used to formulate the oil is inconsequential; the product's performance is what matters.

Base Oil Categories				
Group	Manufacturing Process	Saturate Level	Sulfur Level	Viscosity Index
Group I	Solvent Freezing	< 90%	> 0.03%	80 - 120
Group II	Hydroprocessing and Refining	≥ 90%	≤ 0.03%	80 - 120
Group III	Catalytic Dewaxing	> 90%	< 0.03%	> 120
Group IV	Chemical Reactions	All polyalphaolefins (PAOs)		
Group V	As Indicated	All others not included in Groups I, II, III, or IV		

Figure 2  
Base Oil  
Categories

# PROTECTING YOUR CUSTOMERS' PERSONAL INFORMATION

AMSOIL is committed to protecting the privacy and security of the information provided by our customers. Last year we implemented several new policies to further help protect customers and accounts from fraud and theft. It's important that you also adopt appropriate safeguards to protect the security of your customers' and accounts' personal information.

## What we do at AMSOIL:

- Strict adherence to PCIDSS (Payment Card Industry Data Security Standards) best practices.
- All information is encrypted within secure databases and systems.
- Use of strong passwords, user lockout after failed login attempts and inactivity timeout to prevent others from logging into accounts.
- Frequent scanning of our systems for vulnerabilities and stringent patching protocol.
- Data Loss Prevention scans for all sensitive data.
- Strong antivirus and antimalware scans and protection.
- Mandatory security awareness training.

## What Dealers should do:

- Do not store customers' credit card information.
- Refrain from transferring sensitive information like credit card numbers, expiration dates and security codes (CVV) by non-secure means, including fax, SMS (text messages), email and chats. This sensitive information may be intercepted by third parties and used to make fraudulent purchases.
- Ensure all of your electronic devices that you conduct business on are up to date and feature antivirus protection.
- Avoid using public Internet. Information can be intercepted on open networks.
- Use strong passwords for all your accounts.
- Make sure your website contains a privacy policy. If visitors to your website submit any personal information, such as their name, email, phone number or mailing address, let them know if you're collecting this info from them and how it will be used.
- Do not share any information you've gathered with outside parties. Names, addresses, phone numbers, email addresses and other information collected through AMSOIL websites, online contact forms, email or by phone are confidential.
- Store physical documents that contain private or confidential information in a secure location and shred them after you're through with them.

Taking steps to protect customers' credit-card information, Social Security/insurance numbers and other personal information from identity theft is a key part of running any business. Not only is it important, it's the law. By following these guidelines, you help ensure the safety of your customers and the safety of your business. Make sure to review the AMSOIL Privacy Policy at [amsoil.com](http://amsoil.com) to stay up to date on all privacy protection and security guidelines for your Dealership.



**Len Groom** | TECHNICAL PRODUCT MANAGER, POWERSPORTS

Most people know that two- and four-stroke engines have different lubrication requirements, but many don't know why. The differences in lubrication requirements are a result of the differences in the two- and four-stroke combustion processes.

In a typical four-stroke automotive engine, a steady supply of filtered oil lubricates the engine. The oil pump circulates oil throughout the engine to lubricate, cool and clean engine parts. Eventually, the oil drains back into the oil sump, where the pump again sends it on its way in a continuous cycle.

In a two-stroke engine, however, lubricating oil is consumed during combustion. That's why you either pre-mix oil and gas in a gas can or add oil to a reservoir that slowly depletes, like in most modern two-stroke snowmobiles and outboard motors. In addition, combustion occurs on every revolution of the crankshaft in a two-stroke application, compared to every-other revolution in a four-stroke engine. This generates increased heat and places greater demand on the lubricant. To protect the engine and deliver long life, **two-stroke oil must deliver two primary features: detergency and lubricity.**

#### **Clean, protected power**

Because two-stroke engines are designed to burn oil, deposits can form on the piston crown, in the ring grooves and in the exhaust port or on the spark-arrestor screen (if equipped). Crown deposits can absorb heat from the burning fuel and oil, creating hot spots that can ignite the fuel/oil mixture before the spark plug fires, which is known as pre-ignition. Pre-ignition can spike combustion-chamber temperature

## What's the difference between two- and four-stroke oil?

Detergency and lubricity are a two-stroke oil's two most important characteristics.

and pressure, resulting in catastrophic engine damage.

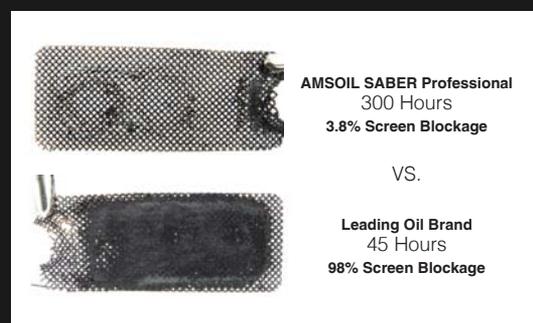
Deposits can also cause the rings to stick in their grooves rather than press tightly against the cylinder wall and seal the combustion chamber. If a proper seal is not formed, gases and heat from combustion can escape past the piston and burn the lubricant off the cylinder wall. This is known as blow-by, which results in piston scuffing, lost performance and even engine failure. Heavy exhaust-port or spark-arrestor-screen deposits, meanwhile, can restrict air enough to reduce engine power and even kill the engine. This is especially frustrating for professional landscapers using string trimmers or backpack blowers that start hard and lack power to get the job done. To avoid these problems and maximize engine operability and life, two-stroke oil must contain potent detergents that fight deposits and keep components clean. This translates into equipment that starts easily, delivers optimum power and lasts for years. As the spark-arrestor-screen images show, AMSOIL SABER® Professional Synthetic Two-Stroke Oil (ATP) delivers clean, protected power so equipment provides maximum power and lasts for years.

#### **Maximum lubricity**

Lubricity describes an oil's friction-reduction properties. It's critical for managing the excess heat and high rpm common to two-stroke engines.

### SABER Professional Fights Carbon

Equipment using SABER Professional was **96% carbon-free**.<sup>N</sup>



<sup>N</sup>Based on spark-arrestor testing.

High heat is generated not only from combustion, but from piston-to-cylinder friction. If the oil burns too easily from combustion or does not provide the needed lubricity for piston lubrication, piston scuffing will occur, causing reduced performance and even engine failure.

The base oils provide the lubricant's lubricity, and synthetics deliver the level of friction-reduction hot-running two-stroke engines need. In fact, AMSOIL SABER Professional provides such good lubricity, it's guaranteed for any mix ratio up to 100:1. Even when using half the oil compared to traditional 50:1 mix ratios, it provides exceptional protection. What's more, using half the oil saves operators up to 50 percent on oil costs. SABER Professional not only delivers the detergency and lubricity two-stroke engines need, it does so at half the cost. That's something your customers can get behind.



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faster and easier option for challenging lubricant installations.  
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May 2020

**"More AMSOIL  
product testing,  
please!"**

**"Can do."**

### AMSOIL Resists Cavitation

In independent, industry-standard testing, cylinder liners protected by AMSOIL showed virtually **no signs of cavitation**.<sup>11</sup>



<sup>11</sup>Based on results of the ASTM D7583 cavitation test.

## YOU ASKED FOR MORE PRODUCT TESTING... AND HERE IT IS.

Dealers frequently request more support to defend against competing brands.

The Performance Tests page at [amsoil.com](http://amsoil.com) is your source for all current test results comparing AMSOIL products to the competition and the toughest industry standards. We've also published most test results in our catalogs.

Make sure you're using our performance tests during the sales process.

- **Visit the Performance Tests section at [amsoil.com](http://amsoil.com)** ([www.amsoil.com/performance-tests.aspx](http://www.amsoil.com/performance-tests.aspx)). Tests are now available as jpeg images, making them **easier to download and share**.
- **Share tests relevant to your prospects or customers.** Share results on social media or via text/email with a Dealer-number transferring link to ensure you receive credit for all registrations and sales.

We all know AMSOIL is the best. Make sure your prospects know, too. Visit the Performance Tests page at [amsoil.com](http://amsoil.com) today.

Find all AMSOIL product tests at [amsoil.com/performance-tests.aspx](http://amsoil.com/performance-tests.aspx)