AMSOIL® MAGAZINE

JULY 2017

WORLD'S MOST POWERFUL OUTBOARD MOTORS RELY ON AMSOIL

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New Diesel Fuel Additives Provide Improved Performance

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AMSOIL MAGAZINE

JULY 2017

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THE COVER

Four of Seven Marine's 627-hp outboard motors power this 53' boat. That's a total of 2,508 hp driving a single watercraft.

From the Presidents

This issue of *AMSOIL Magazine* is one of our favorites so far this year. It has a little bit of everything – testimonials, technical information, new products – and it's all good news. Sometimes you have to stop to appreciate all of the good things happening around you.

Take Lavon Miller, for example. What a great story. He started by solving his own problems, gained attention and earned a following because of his skills and now stands atop the diesel world. What a great example of the American Dream. He's dominated the top diesel competitions, he genuinely loves AMSOIL products and he's not afraid to tell people why they're great.

The Tech Talk column offers another example. In it you're introduced to our new V.P., Technical Development Michael Meuli. Michael has been with us for a few months now and we're already grateful for his contribution. He has a solid background in product development, thrives on innovation and he used and appreciated AMSOIL products before coming onboard.

Then there's the interview with the V.P. of Seven Marine. The world's most powerful outboards rely on AMSOIL products – how cool is that? Seven's most powerful engine produces 627 hp. These are high-end engines on large watercraft that frequently travel far from shore. A premium engine that breaks down not only ruins the manufacturer's reputation, it potentially leaves the vessel's occupants stranded at sea. Seven Marine is all too aware of those issues and has carefully chosen AMSOIL products to prevent them.

We also have new diesel fuel additives on the way. The most exciting part of this launch is the new Diesel All-In-One product. You and your customers have been asking for a product like this for years. In the past, maintaining highly concentrated, highly potent chemistries in an all-in-one formula would have been too expensive. We would have had to either charge so much no one would buy it, or dilute the product to the point where it would not perform to our standards. We've been experimenting with new technology for a while now, and we finally have a solution that delivers outstanding results at a competitive price.

Lastly, there's the information on turbos and direct injection. These technologies will be a big part of the automotive industry moving forward, and they pose big challenges for motor oil. The good news is, we have excellent products for TGDI applications.

Dean Alexander
Co-President

Alan Amatuzio
Co-President & COO

Lavon Miller Turns Passion into Successful Business – and Championships

AMSOIL-sponsored diesel builder Lavon Miller of Plain City, Ohio developed a keen interest in turbodiesels when he needed a powerful truck to haul equipment for his construction job. Putting the truck through the paces, he performed his own repairs and modifications to keep it on the job and increase its power, absorbing as much knowledge and experience as he could along the way. Soon he found himself modifying trucks for others, working on his own builds and testing them at the local dragstrip.

Firepunk Diesel

Developing a strong following for his work through the Internet and social media, Miller followed his passion and started working on diesel trucks full-time in 2010, building Firepunk Diesel into a well-known shop that specializes in everything from basic modifications to complete builds, developing a reputation for testing the limits and pushing the diesel market forward and becoming a leader in the field.

"Our primary customers are really the work-base people who buy a truck for their businesses: landscape companies, farmers," explained Miller. "They're upgrading their horsepower and, along with that, their drivelines are failing. That's where the aftermarket transmission market really comes from, something that supports their added horsepower for their added fuel economy and a little extra grunt for their workhorse. I think the biggest thing that draws people to our brand is we've set the foundation of using our trucks on a daily basis; we drive to the racetrack, we race our trucks and we use them. We're in it to make the product as good as it can be."

Multi-Time Champion

Miller has continued to increase exposure for Firepunk Diesel by bringing his expertise to the national stage, dominating high-profile turbodiesel competitions like the Diesel Power Challenge and Ultimate Callout Challenge. After earning back-to-back Diesel Power Challenge championships in 2014 and 2015, he was ineligible to win a third (DPC allows a maximum of two championships), so he brought his talents to the inaugural Ultimate Callout Challenge in 2016. Without skipping a beat, he won the championship, then successfully defended his crown at the 2017 event. Most recently, he set a new world record at the 2017 NHRDA Oklahoma Diesel Nationals, becoming the first Pro Street racer to break the 8-second barrier in the quarter mile (7.993 seconds).

AMSOIL Products

Miller is a proud advocate of AMSOIL synthetic lubricants, relying on them to keep his powerful turbodiesel trucks protected and running at peak performance throughout the intense, high-heat conditions of competition.

"With AMSOIL products, we run the Severe Gear® Gear Oil in the front and rear differentials," said Miller. "We run the Transmission Fluid in the transmission. In comparison to just running some of the standard fluids, we see better heat distribution in the bearings and in the steels on an extreme application. And also the oil analysis has looked really good coming back from the engine in running the AMSOIL products."

LETTERS TO THE EDITOR

SMALL-ENGINE OIL FILTRATION

I enjoyed your article, "Perfect Pairing: Signature Series Motor Oil and Ea® Oil Filters," in the February 2017 issue of *AMSOIL Magazine*. I've been telling my customers for a long time that combining the best synthetic motor oil with outstanding filtration is the best way to extend the life of any engine. I should know; my own car went 170,000 miles without an oil change using Signature Series Motor Oil, AMSOIL air filters, AMSOIL spin-on and bypass oil filters and yearly oil analysis.

Unfortunately, not all modern-day, high-performance engines have pressurized oil filters. Many smaller engines, including my own fuel-injected motor scooter, have only a screen for oil filtration. Does AMSOIL have any plans to engineer and sell products expressly tailored for the huge market of consumers who own and operate engines which, unfortunately, have no oil filters? Are synthetic motor oil changes, even more frequently than the manufacturer's recommendation, the only recourse to ensure a rich, long life for these hard-working engines? Thank you for your consideration.

Sincerely,

Dale C. Yaeger

AMSOIL: *We sure do, Dale. In fact, AMSOIL Synthetic Small-Engine Oil (ASE, ASF) is a prime example. We perform extensive testing on engines designed with and without oil filters to ensure it provides the best possible protection and performance for both. Formulating oil for engines without filters requires extra care, but we invest the time and money necessary to ensure Small-Engine Oil provides an extra measure of protection, even beyond the manufacturer-recommended drain interval.*

MAGNETIC DRAIN PLUGS

I have a 2015 Honda* CRV* with 36,000 miles on it. I've run Signature Series 0W-20 and an AMSOIL filter in it and used a magnetic drain plug since the first oil change at 6,000 miles. I've changed the oil twice since then, but saw no signs of any metal particles or even metal fuzz on the plug.

I recently purchased a 2017 Honda Ridgeline* pickup, and it is about due for the first oil change. I will be using Signature Series 0W-20 and an AMSOIL filter in it also. I'm thinking of putting a magnetic plug in it and also a magnet on the bottom of the filter.

Is there any advantage or disadvantage to using magnetic drain plugs or filter magnets on any vehicle?

Floyd Hoffman

AMSOIL: *Using a magnetic drain plug or filter magnet is a matter of preference, and we don't know of any disadvantage to using them. Although they can remove iron particles from the oil, which is always a good thing, keep in mind they cannot remove dirt or aluminum particles. Oil analysis provides much more accurate and useful data regarding the condition of the engine and oil.*

PRE-MIXED GASOLINE

My next-door neighbor has a weed whacker with a steel blade for cutting. When I mentioned AMSOIL to him, he said he uses a pre-mix (100:1) in approximately a one-quart size. This pre-mix is made by Stihl*. Several other companies are going with the pre-mix. Is there any chance that AMSOIL may come out with a pre-mix of their own?

Cordie Turbeville

AMSOIL: *Thank you for your suggestion. We are constantly monitoring the market to understand the types of products customers want. We are currently watching the pre-mix fuel market very closely, but have not yet decided on a course of action.*

DEVOTED TO PROTECTION

AMSOIL uses the word "protection" quite often. To the many non-technical, I think, it resonates like "use protection," which makes them think of something entirely different than lubrication. Printing "Devoted to Helping Equipment/Autos/Machinery Last Longer" is what you're really trying to get across at first glance.

Greg Finnican

AMSOIL: *That's funny, Greg, and you're not the first to point that out. We're confident, however, that it isn't a problem. AMSOIL promotional material that includes the phrase "Devoted to Protection," along with imagery of motor oil bottles and vehicles/equipment, leaves no question what we're promoting.*

GDI ENGINES

Does the Signature Series line, with its PAO-based oils, provide additional benefits over the XL line or other mineral-based oils when used in vehicles with GDI engines? Will Signature Series burn cleaner, leaving less deposits in the combustion chamber in and around the valves, which we know is a problem over time in GDI engines?

What about sulfated ash? Competing oils intended for passenger cars advertise sulfated ash in the range of 0.8-1.0. Why is it that AMSOIL does not publish their numbers?

Thank you,

John Antonelli

AMSOIL: *There is some evidence that suggests oils with lower NOACK volatility numbers, like Signature Series, help slow the formation of intake valve deposits on GDI engines. Volatility, however, represents only one cause of deposit formation. The other primary source is internal EGR, where the valves and intake system are exposed to combustion gases. Sulfated ash is not a main focus for gasoline motor oils. The API SN and ILSAC GF-5 specifications do not have a sulfated ash limit. Because low-sulfated-ash oils help delay the plugging of diesel particulate filters, sulfated ash is more relevant for oils recommended in diesel applications.*

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Letters are subject to editing for length and clarity; please include your name, address and phone number.

Develop solutions, not products

Remaining innovative requires solving our customers' biggest performance challenges.

Michael Meuli | VICE PRESIDENT, TECHNICAL DEVELOPMENT

Many of you know by now that Dan Peterson, my predecessor, has moved on to another role in the company. His promotion opened up this opportunity for me, and I'm thrilled to join a company known for unrivaled quality and performance.

My first exposure to AMSOIL came many years ago when I was snowmobiling. While I didn't know the details behind the product, I did know that snowmobilers who used AMSOIL synthetic two-stroke oil were passionate about the brand and product performance. They also took better care of their sleds and were often faster than others. While that was many years ago, it did stick with me as I grew from snowmobiles to boats and cars.

Fast forward to late 2016 when I first learned that AMSOIL was seeking a Vice President of Technical Development. The position promised a chance to innovate and develop industry-leading products, areas where I find particular enjoyment. I'm especially excited about joining a company with a strong premium brand and rich history of excellence. I am also somewhat of a gearhead outside of work, enjoying all things mechanical and motorized. I see this opportunity as a great match for my background, experience and interests.

Another aspect I'm looking forward to is meeting you, our Dealers. From day one, it's been impressed on me how important you are to our success, and I've already heard stories about the passion and enthusiasm you have for the company and products.

To kick off what I hope to be a long, mutually beneficial relationship, let me tell you a bit about myself.

I've spent most of my life around eastern Wisconsin, first graduating from Lawrence University, in Appleton, with a B.A. in Chemistry/Biology and later at graduate school, where I received an M.S. degree from the Institute of Paper Chemistry. While in graduate school, I focused on chemical engineering. I also have an M.B.A. from the University of Wisconsin.

I spent more than 20 years at Kimberly Clark, where I led product development and innovation teams for many of their billion-dollar brands, including HUGGIES® and KLEENEX®. I also worked at Miller Electric, where I was responsible for new products and innovation for their Industrial Products area. In that role I was responsible for identifying new solutions for the company's largest customers in the ship-building, structural steel, power-generation and construction areas. My recent positions included leading the corporate innovation efforts for The Newark Group, a company located on the east coast, but with converting and manufacturing plants in northern Illinois and Wisconsin.

On a personal note, my wife and I have two grown sons. During time away from work, we enjoy downhill skiing, cross-country skiing and snowmobiling during the winter months. In summer, we love to fire up the boat and get out on the water. I also enjoy triathlons, having competed in the Hawaiian Ironman in Kona.

I hope you can see just how involved I've been in my career with innovation. I believe innovation and new products are absolutely critical to a company's growth. While many companies focus on products, I find that in this new world of "online everything" and reduced time for people to do the things they really want, delivering solutions that exceed the needs of customers is essential.

Which brings us back to AMSOIL. The fact that AMSOIL enjoys status as a premium-performance brand resonates with me. AMSOIL has a strong pipeline of products that offer solutions, and I am looking forward to assisting in the launch of even more products to come.

While improving the products we already have is important, it is equally important to identify new solutions and new markets. I enjoy talking to customers to identify gaps in current products and also under-served markets. I find it especially gratifying to develop products that solve problems and then see those products in the hands of people, making their lives better.

Toward that objective, I look forward to meeting you and working together to develop products that meet our customers' needs and continue to pace the industry. I also look forward to keeping you up to speed with what we're doing right here in this column.

World's Most Powerful Outboard Motors Rely on AMSOIL

Seven Marine, maker of the world's most powerful outboard motors, has a saying: We move the people who move the world. The Germantown, Wis. company designs, builds and sells outboard motors that produce up to an astonishing 627 hp and power some of the fastest and most impressive watercraft in the world.

All that power places tremendous stress on their sophisticated motors, which is why they turned to AMSOIL synthetic lubricants as their factory- and service-fill lubricants after having previously used Mobil* products. We sat down with Eric Davis, Seven Marine Vice President, to get the story.

AMSOIL Magazine: What makes Seven Marine unlike any other manufacturer of marine motors?

Eric Davis: We build the most powerful outboards available on the market today. We use a completely different technological approach than any other outboard manufacturer by using the small-block supercharged V-8 out of the Cadillac* CTS V and applying that in its normal horizontal configuration under the cowl. And that really makes Seven Marine unique because all other outboard motors are vertically oriented. That means we can use the performance, quality and emissions advancements that are central to automotive engines and apply that to outboard motors for the first time. In addition, we pair the engine to a ZF* marine wet-disc-clutch transmission. We're the only outboard that uses a transmission. Because of that, our motors don't shift in the lower unit.

AMSOIL Magazine: What performance advantages does that design provide?

Davis: It allows us to optimize the lower unit with a twin-pinion, race-inspired design that's smaller in diameter. That benefits us in high-speed-cruise fuel economy and top-speed capability. A twin-pinion also gives you a tremendous amount of durability.

So, when you use a horizontal crankshaft engine, go with a wet-disc-clutch transmission and finish with a twin-pinion lower unit, you really get an outboard that's built completely different, which is how we're able to deliver the amount of

power and torque to the propeller that sets us apart from everyone else.

AMSOIL Magazine: Your most powerful motor produces 627 hp. On what type of watercraft are people using your outboards?

Davis: The vast majority of our applications are multi-engine, and the trend lately has been more quads than anything [using four engines simultaneously]. We address the market that's called the 'super consoles,' so we're talking about 40-plus-foot, center-console, off-shore boats. Four engines can be done using a boat as short as 43 feet and as long as 61 feet.

AMSOIL Magazine: Who's buying your outboards?

Davis: By the time you find out what they've done or what they do, they've touched your life in some way, shape or form. We use as a corporate tag line, 'The Power to Move Those Who Move the World,' and that really came from the fact that our customers are exactly those people, whether it's the northern hemisphere's largest onion farmer or the family that owns the third-largest grain distributor in the world – all kinds of people like that. They have truly amazing stories.

AMSOIL Magazine: How do they use your outboard motors?

Davis: It varies a lot. In general, they use them for transportation. They're moving great distances, and what makes the applications unique for Seven Marine is that they're trying to traverse those distances at high-speed cruise. They use the applications for everything from island-hopping to poker runs to deep-sea fishing. We have customers in the Gulf of Mexico who are running 150 miles to fish the rigs, so they're cruising three hours at 50 mph to get out there and fish. We have people in Alaska 150 miles from civilization. Generally speaking, they're covering great distances at pretty good clips.

AMSOIL Magazine: Why did you choose AMSOIL synthetic lubricants for your engines and transmissions?

Davis: When you're trying to deliver the most luxurious experience for the customer and deliver the most performance at this level of power, you really have to have the best of everything to make sure it works properly. And you have to be confident that you have the best lubricants to ensure you've got the ultimate in durability. AMSOIL, on the engine and transmission side, has been the best products we can find. That allows us to be confident that when we do a factory-fill and recommended service-fill with AMSOIL, that you're going to get that same factory performance day-in and day-out.

AMSOIL Magazine: What did your own test results tell you about AMSOIL products?

Davis: When we started doing oil sampling from dyno testing and looking at the performance of the oil and its degradation, the AMSOIL results were superior than what we were using before [Mobil products]. We're endeavoring to build the absolute best world-class products we can and innovate in the marine industry, so we prefer to have an oil that we feel is as innovative and technologically advanced as the engines that it's going into, and that leaves us with AMSOIL.

DISTRIBUTOR IMPACT

- Seven Marine, maker of the world's most powerful outboard motors, chose AMSOIL from all the lubricant manufacturers in the world to provide factory-fill and recommended-service-fill lubricants for its outboard motors.
- The company's trust adds prestige and credential to our synthetic lubricants in marine applications.
- Mention Seven Marine to prospects at the appropriate time in the buy-sell process, such as during step one when creating curiosity: "Did you know that the makers of the world's most powerful outboard motors on the planet use AMSOIL synthetic lubricants? How do you think they'll stand up in your motor?"

New Diesel Fuel Additives Provide Improved Performance

Available July 20, the new diesel fuel additive line boasts several improvements and a new Diesel All-In-One product, helping customers preserve the power and efficiency of their vehicles.

AMSOIL Diesel All-In-One (ADB)

Diesel All-In-One combines the premium detergency, lubricity, cold-flow and cetane benefits of Diesel Injector Clean, Diesel Cold Flow and Diesel Cetane Boost in one convenient package, providing the full potency and benefits of all three products at an affordable price.

Label representation only. Bottle sizes remain unchanged.

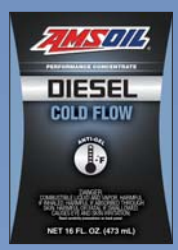
Diesel All-In-One replaces Diesel Injector Clean + Cold Flow (DFC), which is available while supplies last.

Stock No.: ADB
Treat Rate: 2 oz. per 5 gallons

- **Cleans** dirty injectors
- **Lubricates** fuel pump and injectors to reduce wear
- **Extends** fuel filter life
- **Improves** fuel economy up to 8%
- **Combats** fuel-system corrosion
- **Fights** gelling in cold weather
- **Prevents** wax settling during storage
- **Improves** cold filter-plugging point (CFPP) by up to 40°F
- **Delivers** maximum horsepower
- **Increases** cetane up to 4 points
- **Safe for use** in all diesel fuels, including biodiesel
- **Alcohol-free**

AMSOIL Diesel Cold Flow (ADD)

Diesel Cold Flow has been reformulated with new chemistry that provides a lower cold filter-plugging point (CFPP), improved potency that treats double the fuel as the old formulation (saving time and money) and a wax anti-settling component not found in competing products.



Label representation only. Bottle sizes remain unchanged.

Formulation Change? Yes
New Stock No.? Yes, it's now ADD.
New Treat Rate? Yes. Now treats double the fuel (1 oz. per 5 gallons)
Pricing Change? Yes. A minimal increase in initial price yields double the potency. The net result is a cost reduction. ACF wholesale cost per gallon treated: $0.14. ADD wholesale cost per gallon treated: $0.08

- **Fights** gelling in cold weather
- **Inhibits** fuel filter icing
- **Improves** cold filter-plugging point (CFPP) by up to 40°F
- **Enhances** engine reliability in cold temperatures
- **Improves** low-temperature startability
- **Prevents** wax settling during storage
- **Reduces** downtime and maintenance costs
- **Safe for use** in all diesel fuels, including biodiesel
- **Alcohol-free**

The old formulation of Diesel Cold Flow (ACF) is available while supplies last.

Do All-in-One Diesel Fuel Additives Compromise Performance?

Test data on competing all-in-one diesel fuel additives has revealed less-potent formulas that fail to provide the performance required by today's diesel engines. We invested considerable time and resources to ensure our new Diesel All-In-One doesn't compromise performance. It provides the full potency and benefits of Diesel Injector Clean, Diesel Cold Flow and Diesel Cetane Boost in one convenient package, at a cost-effective price.

AMSOIL Diesel Injector Clean (ADF)

Diesel Injector Clean has been reformulated with a new chemistry that provides even better cleaning performance and lubricity to help prevent premature failure of fuel injectors and fuel pumps.

Formulation Change? Yes
New Stock No.? No
New Treat Rate? No
Pricing Change? No

Label representation only. Bottle sizes remain unchanged.

- **Extends** fuel filter life
- **Cleans** dirty injectors
- **Improves** fuel economy up to 8%
- **Restores** power and torque
- **Reduces** smoke and emissions
- **Lubricates** fuel pump and injectors to reduce wear
- **Helps** prolong time between EGR and DPF regenerations
- **Combats** fuel-system corrosion
- **Reduces** downtime and maintenance costs
- **Safe for use** in all diesel fuels, including biodiesel
- **Alcohol-free**

AMSOIL Diesel Cetane Boost (ACB)

Diesel Cetane Boost raises the cetane number of diesel fuel up to seven points for maximum horsepower, increased fuel economy and easier starts in all diesel engines.

Formulation Change? No
New Stock No.? No
New Treat Rate? No
Pricing Change? No

Label representation only. Bottle sizes remain unchanged.

- **Increases** cetane up to 7 points
- **Delivers** maximum horsepower
- **Increases** fuel economy
- **Improves** startability
- **Smooths** idle
- **Reduces** smoke and emissions
- **Safe for use** in all diesel fuels, including biodiesel
- **Alcohol-free**

See Centerlines for US pricing information.

EXTENDS FILTER LIFE

Modern diesel engines run hot, raising the temperature of the fuel returned to the tank and causing carbonaceous deposits that collect in the fuel filter (see picture), plugging it and causing premature failure issues. AMSOIL Diesel All-In-One and AMSOIL Diesel Injector Clean effectively protect against deposits, extending fuel filter life.

PREVENTS WAX SETTLING

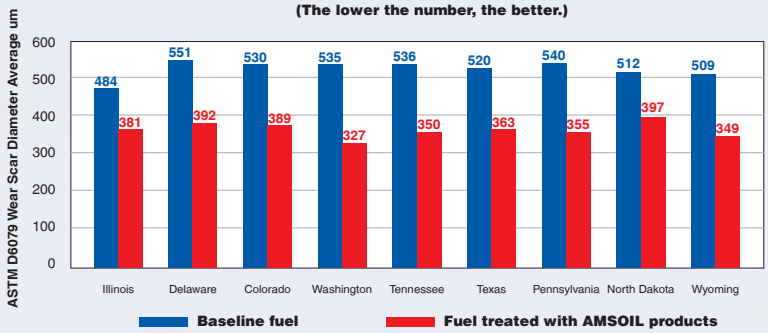
Wax crystals can settle and clog fuel filters (see picture). AMSOIL Diesel All-In-One and AMSOIL Diesel Cold Flow are formulated with wax anti-settling additives that drastically reduce the size of wax crystals, preventing them from settling and allowing them to more effectively pass through the filter, improving low-temperature operability.

UPDATED DATA BULLETINS

Stock #	Description	Qty.	U.S.	Can.
G3525	Diesel All-In-One	25	4.10	5.60
G3526	Diesel Cold Flow	25	4.10	5.60
G3186	Diesel Injector Clean	25	4.10	5.60
G3188	Diesel Cetane Boost	25	4.10	5.60

Lubricity Improvement

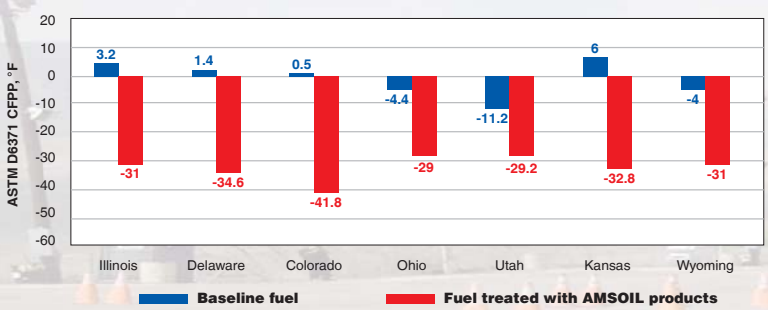
(The lower the number, the better.)



The ASTM D975 diesel fuel standard specifies a wear scar below 520 µm in ASTM D6079 testing, while the Engine Manufacturers Association (EMA) specifies a wear scar below 460 µm. Testing reveals AMSOIL Diesel All-In-One and AMSOIL Diesel Injector Clean provide significant lubricity improvement in diesel fuels found across the U.S., delivering improved wear protection.

Cold Flow Improver

(The lower the number, the better.)



Testing reveals AMSOIL Diesel All-In-One and AMSOIL Diesel Cold Flow provide significant cold-flow improvement in diesel fuels found across the U.S., delivering improved cold-weather performance.

The Effects of Turbochargers and Gasoline Direct Injection

These increasingly common features of modern engines heighten power and efficiency, but also present serious challenges to motor oil.

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 (TDGI). While these advanced technologies enhance performance, they also present serious challenges to motor oil.

	Turbocharger	Direct Fuel Injection
What it Does	Introduces more air into the combustion chamber, increasing efficiency and power	Offers greater control over fuel delivery, improving power and efficiency
How it Challenges Motor Oil	Increases heat, which hastens chemical breakdown	Increases heat and the potential for fuel to contaminate oil
AMSOIL Advantage	Maximum resistance to heat and breakdown, promoting long turbo and engine life	Maximum heat resistance; excellent protection despite fuel contamination

Turbochargers: Bringing The Heat

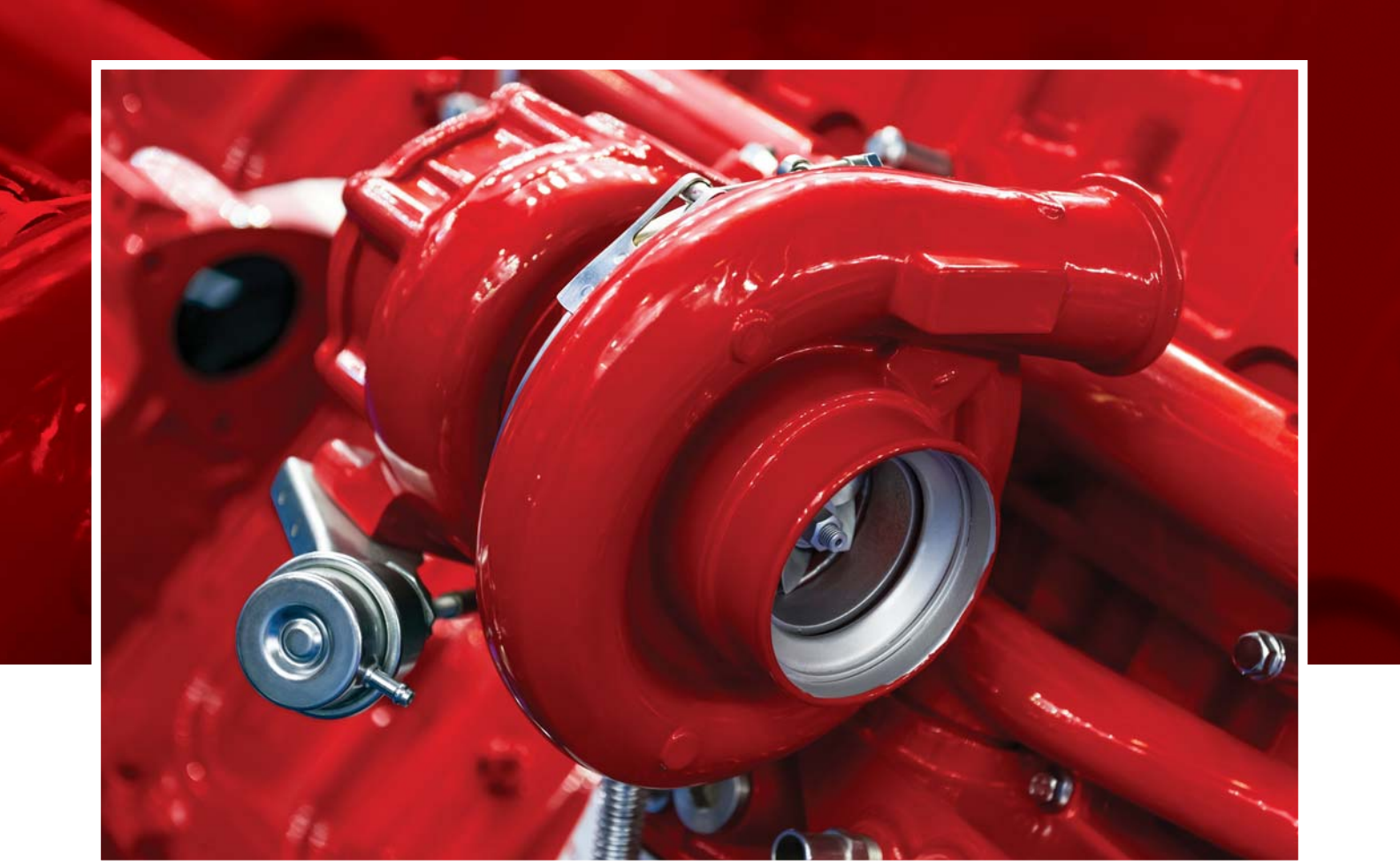
An engine is essentially an air pump, and the more air it ingests, the more fuel it can burn – and the more power it can produce. Turbocharging has emerged as the favored choice of automakers to increase the amount of air their engines take in. Unfortunately, extreme temperatures come along with the increased power.

As shown in the diagram, exhaust gases commonly exceeding 1,000°F spin a turbine which drives the compressor that draws ambient air used to pressurize the combustion chamber. The added oxygen combined with direct injection and advanced engine tuning helps the engine burn fuel more efficiently, boosting fuel economy. It also allows the engine to burn more fuel for increased power. Motorists enjoy the performance and fuel economy they demand, while automakers meet increasingly strict CAFE (Corporate Average Fuel Economy) requirements.

While it seems like a win-win situation, it's the motor oil that gets the short end of the stick. The turbo's center section contains an oil-lubricated bearing. The tremendous heat and stress turbos create can cause some oils to break down and form harmful bearing deposits, known as turbo coking. Over time, turbos can suffer reduced performance or fail altogether.

GDI & Fuel Dilution

Gasoline direct injection delivers accurate and rapid distribution of atomized gasoline. While traditional fuel-injection systems spray fuel into a manifold, GDI systems locate the injectors in the combustion chamber, which enables much more control over the amount of fuel injected and timing of fuel injection, improving combustion



efficiency. Spraying the fuel directly into the chamber also provides in-cylinder cooling, which helps allow higher compression ratios, increasing efficiency. GDI engines use a mixture of 40 parts (or more) air to one part fuel during light loading, while traditional gasoline engines use a mixture close to 14.7 parts air to one part fuel. The 40:1 ratio means less fuel is burned during combustion, resulting in better fuel economy.

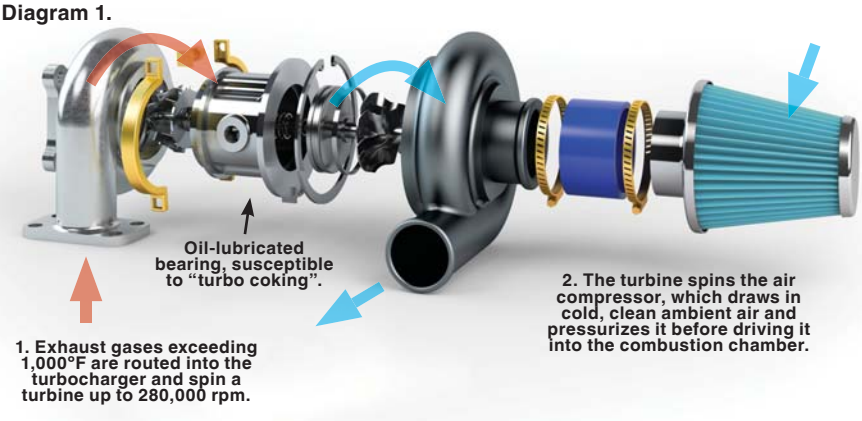
The major side-effect of this technology is the increased risk of fuel dilution. As fuel is sprayed into the combustion chamber, it can wash past the rings and down the cylinder walls, into the oil sump. Fuel dilution can cause a number of problems:

- **Reduced oil viscosity** interferes with formation of a durable lubricating film, inviting wear. Combustion-zone parts are especially prone to wear, including the pistons, rings and liners. Reduced viscosity also negatively affects the oil's ability to function as a hydraulic fluid, which is critical in engines with variable valve timing.
- **Fuel can wash oil from the cylinder wall**, causing higher rates of ring, piston and cylinder wear.
- **Reduced effectiveness of detergency additives** limits the oil's ability to guard against deposits.
- **Increased oil volatility** results in higher oil consumption, requiring more frequent top-offs.
- **Accelerated oxidation** reduces the oil's service life and requires more frequent oil changes.

Maximum Protection

Advanced automotive technology, including turbochargers and gasoline direct injection, requires high-quality motor oil to perform and last as designed. AMSOIL synthetic motor oil enables modern engines to achieve their full potential and service life. It provides superior protection against extreme heat and the harmful deposits that can plague turbochargers and features high film strength to guard against accelerated wear.

Diagram 1.



July Close-Out

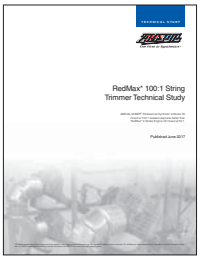
The last day to process July orders in the U.S. and Canada is the close of business on Monday, July 31. Individual telephone and walk-in orders will be processed if initiated by the close of business. Internet and fax orders will be accepted until 3 p.m. Central Time on that day. All orders received after these times will be processed for the following month. Volume transfers for July business will be accepted until 3 p.m. Central Time on Friday, Aug. 4. All transfers received after this time will be returned.

Holiday Closings

The Toronto Distribution Center will be closed Monday, Aug. 7 for Simcoe Day. The Edmonton Distribution Center will be closed Monday, Aug. 7 for Heritage Day.

New Technical Study Now Available

The RedMax* 100:1 String Trimmer Technical Study (G3522) compares the performance of AMSOIL SABER® Professional Synthetic 2-Stroke Oil mixed at 100:1 to RedMax 2-Stroke Engine Oil mixed at 50:1 in RedMax-brand string trimmers. It's excellent for showing the ability of SABER Professional to reduce oil costs by 50 percent or more while fighting performance-robbing carbon deposits and helping maintain power. It is also available to view free at www.amsoil.com/ performancetests.aspx.



Stock #	U.S.	Can.
G3522	1.05	1.45

STEP THREE IN THE BUY-SELL PROCESS:

Assessment

TAILOR YOUR RECOMMENDATIONS TO THE CUSTOMER'S GOALS

- **Assess** what you've learned about the customer's situation and tailor your recommendations to his or her specific goals.
- **Provide** information and guidance on all aspects of adding AMSOIL products to the customer's business. Don't focus only on ordering.
- **Help** the customer develop a comprehensive plan to move forward.
- **Showcase** the value of AMSOIL products and let the customer discover his or her own solutions.

The First in Synthetics®

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Label representations only. Bottle sizes remain unchanged.

Diesel All-In-One

Stock #	Units	Pkg./Size	Wt. Lbs.	U.S. Wholesale	U.S. MSRP
ADBPCN	EA	(1) 8-oz. Bottle	0.97	4.30	5.70
ADBPCN	CA	(6) 8-oz. Bottles	5.82	24.34	33.60
ADBCN	EA	(1) 16-oz. Bottle	1.19	7.90	10.45
ADBCN	CA	(12) 16-oz. Bottles	14.28	89.85	124.00
ADBHG	EA	(1) 64-oz. Bottle	4.26	27.20	35.10
ADBHG	CA	(6) 64-oz. Bottles	25.55	155.40	209.80
ADB05	EA	(1) 5-gal. Pail	41.09	234.75	312.25
ADB55	EA	(1) 55-gal. Drum	451.99	2398.00	2949.55

Diesel Cold Flow

Stock #	Units	Pkg./Size	Wt. Lbs.	U.S. Wholesale	U.S. MSRP
ADDCN	EA	(1) 16-oz. Bottle	1.17	6.35	8.40
ADDCN	CA	(12) 16-oz. Bottles	14.09	72.15	99.60
ADD05	EA	(1) 5-gal. Pail	40.46	175.75	233.75
ADD55	EA	(1) 55-gal. Drum	445.06	1749.00	2151.30

Diesel Cold Flow is not available in Canada; order Diesel All-In-One.

Diesel Injector Clean

Stock #	Units	Pkg./Size	Wt. Lbs.	U.S. Wholesale	U.S. MSRP
ADFPCN	EA	(1) 8-oz. Bottle	0.96	3.35	4.50
ADFPCN	CA	(6) 8-oz. Bottles	5.75	18.99	26.25
ADFCN	EA	(1) 16-oz. Bottle	1.17	6.15	8.15
ADFCN	CA	(12) 16-oz. Bottles	14.08	69.75	96.30
ADFHG	EA	(1) 64-oz. Bottle	4.19	20.20	26.05
ADFHG	CA	(6) 64-oz. Bottles	25.15	115.20	155.55
ADF05	EA	(1) 5-gal. Pail	40.42	167.75	223.15
ADF55	EA	(1) 55-gal. Drum	444.62	1661.00	2043.05

Diesel Cetane Boost

Stock #	Units	Pkg./Size	Wt. Lbs.	U.S. Wholesale	U.S. MSRP
ACBCN	EA	(1) 16-oz. Bottle	1.26	6.70	8.90
ACBCN	CA	(12) 16-oz. Bottles	15.09	76.43	105.50
ACBHG	EA	(1) 64-oz. Bottle	4.53	21.70	27.95
ACBHG	CA	(6) 64-oz. Bottles	27.18	123.75	167.10
ACB05	EA	(1) 5-gal. Pail	43.00	185.22	246.35
ACB55	EA	(1) 55-gal. Drum	472.99	1878.42	2310.50