

A close-up, high-angle shot of a green fuel nozzle with a black nozzle tip. A stream of bright yellow diesel fuel is being poured from the nozzle, creating a dynamic splash at the bottom of the frame. The background is plain white.

HOW THE RIGHT DIESEL FUEL ADDITIVES CAN SAVE YOUR FLEET MONEY

Diesel fuel additives are among the most powerful and cost-effective tools a fleet manager can use to keep the fleet up and running. An additive provider can help fleets tailor their product selection to the specific season and climate a fleet is operating.



Whether it's a school bus, off-road equipment, or a Class 8 truck, the right diesel fuel additives not only help keep fuel clean and engines operating efficiently, they can save fleets money.

Diesel engines are crucial for many fleets to do their jobs, but due to the variability of diesel fuels coupled with climate conditions and other factors, it can be challenging to keep these powertrains running smoothly. That, in turn, can lead to downtime — taking a toll on a fleet's efficiency and the company's bottom line.

Whether it's a school bus, off-road equipment, or a Class 8 truck, the right diesel fuel additives not only help keep fuel clean and engines operating efficiently, they can save fleets money. Any reputable diesel fuel additive should achieve one or more of the following goals:

- **Improve fuel economy**
- **Increase power**
- **Decrease downtime**
- **Decrease maintenance**

Those four benefits can add up to major cost savings for fleets large and small. There is a true economic upside of using diesel fuel additives year-round. Simply put, consistent use of the correct additives translates into a healthier overall bottom line for the organization.

Myths and Misconceptions

Before exploring various types of additives and their unique benefits, it is important to address the common misconceptions about diesel fuel additives. Some fleet managers may be wary of additives due to these fallacies. An exercise in “perception versus reality” is imperative for fleets that want to save money and keep their vehicles running smoothly.

- **Misconception #1: Additives Will Have a Negative Impact on OEM Warranties** — Some fleets may fear that the use of diesel fuel additives will lead the engine manufacturer to void its warranty. Industry experience shows that this is not a common practice, and, in fact, is highly atypical. In fact, fuel additive manufacturers go to great lengths to repeatedly test their products to verify that they do not harm OEM diesel engines and fuel systems. Some truck and engine manufacturers even recommend the use of some types of fuel additives to improve performance.

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YOU
KNOW?
FIVE OF THE
TOP 100
FLEETS IN
THE U.S. RELY
ON E-ZOIL'S
DIESEL FUEL
ADDITIVES.**

- **Misconception #2: Additives Cause DPF Clogs** — Many fleet managers are concerned that additives will prematurely clog the diesel particulate filter (DPF) in diesel vehicles. However, choosing the right additives — specifically, those that do not contain ash — eliminates the possibility of this problem.

Industry-wide, these are the two most common concerns about the use of additives. However, both are false, and lead fleets to avoid using additives that can keep their vehicles up and running. Rather, the truth is that the consistent, year-round use of diesel fuel additives can add up to significant savings for fleets.

Age Matters

Diesel fuel additives continue to become more sophisticated and refined in a quest to keep up with today's rapidly advancing engine technology. Additives can offer numerous benefits from improved lubrication to increased miles per gallon (MPG). But how should a fleet manager go about choosing the right additives for his or her particular diesel vehicles?

For starters, age matters. Older fleets with engines designed and built prior to the 2007 law that required diesel engines to run on ultra-low sulfur diesel (ULSD) fuel will want to seek out additives that offer

improved mileage and reduced emissions. Newer fleets, with engines designed to function on ULSD, will likely be concerned with additives that offer improved lubrication in addition to better mileage and reduced emissions.

Age is just one of a multitude of factors to consider when selecting the right diesel fuel additives for any given fleet's vehicles.

Additives for All Seasons

For today's organizations, achieving and maintaining a healthy bottom line means keeping the fleet up and running all year long. Various types of additives are designed to solve specific engine challenges. Some of those challenges are more likely to occur in the winter, while others arise in warmer weather. Left untreated, these challenges can cost fleets money — whether due to downtime or inefficiency.

The following are some typical engine challenges: When they are likely to occur, the damage and financial impact they can cause, and the type of additive that can solve the problem.

Challenge: The Big Chill and Downtime

Keeping a fleet running in frigid temperatures is no easy feat. Many factors can have an impact on a vehicle's cold weather





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performance. For example, most diesel sold in the U.S. contains few additives, so when the temperature drops, with the exception of a few fueling terminals in the U.S. that sell winterized fuel, fleets will find no protections from the problems of fuel gelling in cold weather.¹

Industry experts agree that the number one wintertime challenge for diesel vehicle fleets is water in the fuel system. If there is water in the fuel system and the temperature drops below freezing, the frozen water in the fuel line will starve the engine of fuel. This leads to diesel engines that refuse to start, and, ultimately, downtime that, depending on how long it goes on, can range from minor costs to ruinous expense.

Secondly, all diesel fuel contains wax, which provides energy to the fuel system and engine. But as the temperature drops, diesel fuel will form more wax and gel up. Simply put, if there is too much wax and it's too cold, wax can precipitate out of the fuel, resulting in gelled fuel lines and fuel filters.

Finally, if the Cetane rating of diesel fuel gets too low in winter, it can be very difficult to start an engine — especially if the vehicle has been dormant for a few days.

Solution: Anti-Gel Additives

A high-quality anti-gel additive will prevent fuel gelling and protect against cold weather breakdowns. The best products on the market will improve cold flow and keep diesel engines running during the coldest weather while also increasing lubricity. A modest investment in an anti-gel package can help fleets eliminate downtime during the winter months, saving valuable dollars over the long haul.

Moreover, some anti-gel additives offer additional benefits. For example, specific all-around cold weather performance additives such as E-ZOIL's Artic Power are made to also increase Cetane, which improves cold starts, provides more power and improves fuel economy. Clearly, better fuel economy boosts productivity and the bottom line.

Finally, an investment in emergency cold weather performance additives makes smart sense. When the cold has already taken a toll on an engine, the goal is to get the vehicle back in action as soon as possible. This is where an emergency additive specifically engineered to liquefy gelled and iced diesel fuel and filters can save the





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day — and save fleets money. The sooner a vehicle is back up and running, the less stress on the company's bottom line.

Challenge: Water Damage — Breakdowns, Repairs and Costly Clean Ups

Winter isn't the only time of year that fleet managers need to stay on top of diesel fuel issues. Water is one of the biggest enemies for fleets that operate on diesel fuel — at any time of year. In the spring and summer, for example, temperatures tend to fluctuate between day and night and this causes water to condense in the engine. Left untreated, water can cause corrosion of the fuel system including the fuel tank, the fuel pump, and the fuel injector. This, in turn, means the fleet is faced with costly repairs.

Secondly, water creates an environment where microorganisms can proliferate — leading to sludge, which can clog the fuel system and result in clogged fuel filters. The outcome: repairs and downtime. Lost driving time is lost money for any fleet.

Finally, vehicles that do not use a diesel fuel additive may, at some point, need to

have their tanks drained and cleaned in order to rid the fuel of water. Professional companies that perform this service can be quite costly. In the long run, it is far more economical to use a diesel fuel additive regularly to avoid the need for professional tank cleaning.

Solution: All-Season Performance Additives and System Cleaners

Specific types of diesel fuel additives can disperse water, which is critical to keeping engines healthy and ensuring longevity and efficient operation. By choosing the right additives to use all year long, fleets can greatly reduce or eliminate water problems and prevent fuel system failure and control microbial slime. This, in turn, helps fleets avoid expensive breakdowns, reducing the need for repairs and saving money.

Fuel additives offer a good defense against contaminants. They provide many benefits and prevent the spread of microbial growth in fuel, dispersing moisture, improving lubricity, and inhibiting corrosion. All-season performance additives such as E-ZOIL's Diesel Aid and Diesel Aid + Cetane attack water problems head on — protecting critical fuel system parts while improving power.





As a consequence of the Environmental Protection Agency's mandate requiring reduced particulate matter levels to no more than .01g/bhp-hr, all diesel engines built after 2006 are equipped with DPFs, which are designed to catch and collect ash, or unspent fuel and particulate matter, so it is not released into the atmosphere.

In addition, the right fuel system cleaners can remove fuel system deposits that reduce fuel economy and asphaltene that plug fuel filters — all of which add up to reduced fuel costs for fleets.

There's no escaping these problems, because even though diesel engines are now more robust, they are still susceptible to contaminants that may be present in fuel or from deposits that occur because of the combustion process.² But an appropriate system cleaner such as E-ZOIL's Carbon Crusher can alleviate these problems. It reduces fuel costs by cleaning the entire fuel system from top to bottom.

The goal is to choose proper fuel additives and cleaners that increase the quality of fuel and provide more efficient engine pow-

er. This, in turn, protects the entire fuel system from rust and corrosion, which can lead to costly repairs and replacement parts.

Reduced Regenerations: An Additional Benefit

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Periodic maintenance is required to remove the particulate matter that has accumulated over time. This occurs through a process known as regeneration — which involves raising the temperature inside the DPF

THE COST OF ADDITIVES VS. UNTREATED FUEL

An ounce of prevention is worth a pound of cure. That adage certainly applies to diesel fuel additives.

Unfortunately, fuel is dirty and leaves behind deposits. These rob the engine of precious fuel economy, negatively affecting the ability of the fleet to perform its mission of delivering goods or services. But a fuel additive with a detergent package can remove deposits and restore fuel economy. What's more, additives can prevent poor fuel quality that leads to failure of fuel system components — saving fleets the cost of expensive downtime and repairs.

Consider the cost of fuel additives versus the cost of common repairs caused by the use of untreated fuel:

Fuel Additives

The cost to treat diesel fuel with a reputable additive ranges from \$0.02 to \$0.10 per gallon.

Repairs

New fuel pump — **\$1,000-\$2,000**
New fuel injector — **\$250-\$400**
Complete set of fuel injectors (6) — **\$1,500-\$2,400**
Labor rates — **\$100-\$200** per hour.





Providers use state-of-the-art advanced technology to create additives that are highly effective at solving fuel problems — and can do so economically and efficiently, effectively eliminating downtime caused by contaminated fuel.

high enough to combust the accumulated particulate matter and reduce it to ash. The downside is that the regeneration process uses fuel, and, in some cases, may result in vehicle downtime, which can cut into a fleet's bottom line. While some diesel additives, can contribute to the plugging of a DPF filter because they use ash, E-ZOIL's diesel fuel additives don't contain ash, so will not cause premature plugging of the truck's diesel particulate filter (DPF).

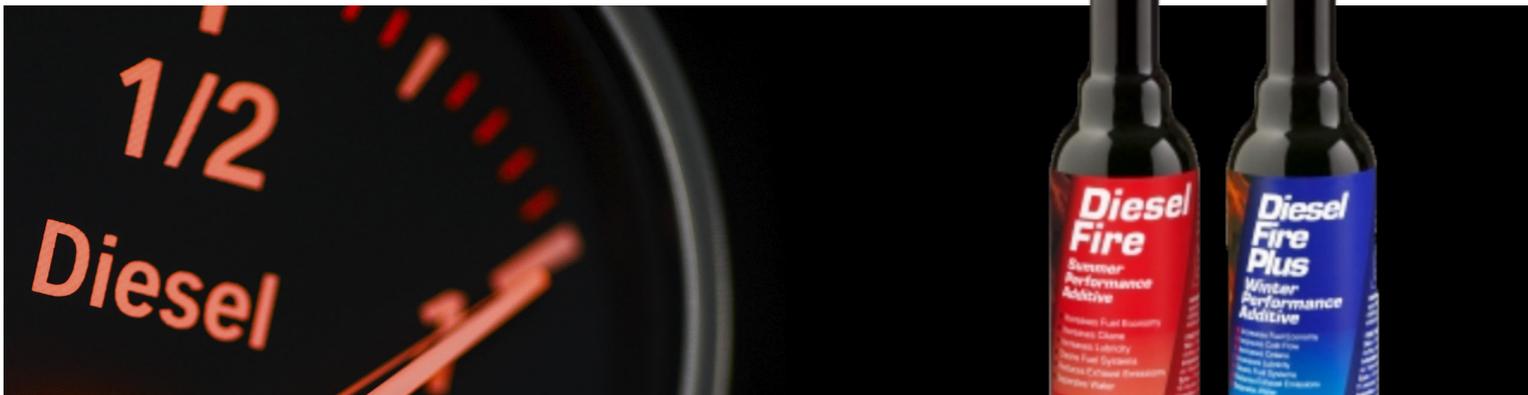
Diesel Fuel Additives Add Up to a Wise Investment

Diesel fuel additive chemistry is a sophisticated process that has vastly improved over the years. Providers use state-of-the-art advanced technology to create additives that are highly effective at solving fuel problems — and can do so economically and efficiently, effectively eliminating downtime caused by contaminated fuel.

Investing in a robust fuel additive package — designed specifically for your fleet's needs — can translate into major savings for the bottom line. The right diesel fuel additives will help keep your fleet up and running all-year round. Moreover, the “bang for the buck” is undeniable — fewer breakdowns, less costly repairs, reduced fuel costs, minimal downtime. Diesel fuel additives are a wise investment for fleets large and small.

R E S O U R C E S

1-2 "Know Your Fluids: Additives." Ernst, Shelley. *Work Truck*. June 2017. www.worktruckonline.com/channel/maintenance/article/story/2017/06/know-your-fluids-additives.aspx. Accessed Nov. 14, 2017.



About E-ZOIL

Founded in 1980 with headquarters near Buffalo, New York, E-ZOIL manufactures a complete line of performance-enhancing fuel additives and cleaning solutions for fleet owners, owner operators and consumers to protect their diesel vehicles and equipment. E-ZOIL specializes in highly concentrated formulas developed by the company's in-house chemists and backed by over three decades of expertise. E-ZOIL products improve vehicle power and mileage, reduce costly breakdowns and downtime, assist with preventive maintenance and enhance and protect vehicle appearance. For more information, visit www.ezoil.com.