



Olson Marketing  
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in partnership with Insane Oil of Omaha

**Your Amsoil Information News Source**

## **Amsoil Monthly Highlight:** **Upper Cylinder Lubricant**

This newsletter we move in to the third part of my research into Amsoil's newest product: [Upper Cylinder Lubricant](#).

Over the past two newsletters ([Issue #99](#) and [Issue #100](#)), we have explored multiple reasons that utilizing [Amsoil's Upper Cylinder Lubricant](#) can benefit the health and increase the longevity of your engine.

1. The harsh environment within the trijecta engine (Ethanol Gasoline, Gas Direct Injection, Turbochargers) are 30-40 times worse than older port fuel injector technology and require additional lubrication.

2. Prevention of "Flash Corrosion", and corrosion in general, within the upper cylinder area, especially if using Ethanol fuels which absorb water.

3. Increasing lubricity of valve stems and guides decrease friction and ensure proper seating and sealing.

4. Reduction of valve shock load (and ultimately valve tuliping) by creating an Oil Cushion on valve faces and valve seats.

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

### **Dealer Contact**

#### **Lincoln - Olson Marketing**

Don & Peg Olson  
ZO Referral# 4901  
402-489-3930  
<http://om.shopamsoil.com>  
[lubedealerdon@gmail.com](mailto:lubedealerdon@gmail.com)

#### **Omaha - Insane Oil**

Dr. Jonathan D. & Stacey L. Olson  
ZO Referral# 10458  
402-990-7940 (text or call)  
<http://insaneoil.com>  
[info@insaneoil.com](mailto:info@insaneoil.com)

### **Congratulations:**

#### **New Dealer**

Chris & Kelly Richardson  
Omaha, NE

Steve Ostransky  
Lincoln, NE

#### **New Preferred Customer**

Ernest Sigala  
Sylmar, CA

Ernie Schwarz  
Unadilla, NE

Thomas Breit  
Tuscon, AZ

Eric Gunderson  
Cincinnati, OH

Jesse Vanlandingham  
Beatrice, NE

Bob Scheideler  
La Vista, NE

#### **New Catalog Customers**

Fausto Lopez  
Bronx, NY

Ryan Hanley  
Lowellville, OH

Gerardo Diaz  
Cottonwood, AZ

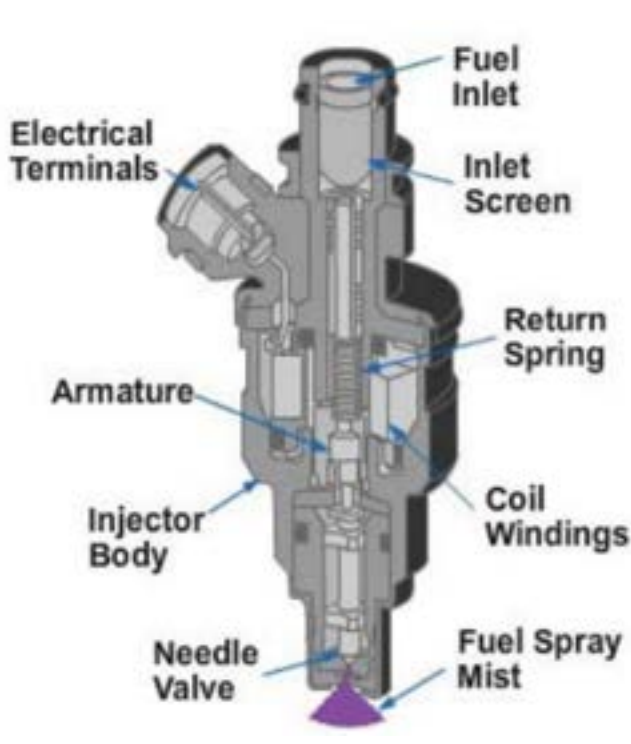
# Upper Cylinder Lubricant...Part 3

Fuel injectors are a part of an engine's fuel delivery system that receives and sprays gasoline (or diesel) into the engine in the form of a high pressure mist. Fuel injectors are controlled by the engine's computer to optimize the amount of fuel as well as the timing of the fuel injection. There is one injector per cylinder that delivers fuel to the engine.

In a traditional fuel injector setup, the injector sprays fuel into the intake manifold, where it mixes with air before entering the combustion chamber where the air-fuel mixture can then be ignited. In recent years, more manufacturers have made the switch to direct injection, a system in which the fuel injector sprays atomized gasoline directly into the cylinder, instead of the intake manifold. This method allows for higher fuel efficiency and better emissions control as well as higher power output from smaller engines.

A fuel injector is nothing but an electronically controlled valve. It is supplied with pressurized fuel by the fuel pump in your car, and is capable of opening and closing many times per second. When the injector is energized, an electromagnet moves a plunger that opens the valve, allowing the pressurized fuel to squirt out through a tiny nozzle. The nozzle is designed to create as fine a mist as possible so that it can burn easily; called fuel atomization.

Fuel injectors are not classified as a "wear item" in a vehicle and have the potential to last the life



of the vehicle. However, as with every mechanical part, there are issues that can and do occur.

1. The electrical components of the injector can fail from age, heat, and moisture damage. There is little that can be done to prevent this.
2. A fuel injector can leak due to a crack in the injector housing. There is also not much that can be done to prevent this issue.
3. The most common issue is clogging of the nozzle from fuel contaminants (such as dirt, carbon buildup, or low quality fuel). [Amsoil P.I. Performance Improver](#) is designed to prevent clogging from occurring, as well as help clear a clogged injector. Using [Amsoil P.I. Performance Improver](#) is like using a power washer to clean your deck with "soap and water power", but in this case we

are cleaning your injectors with Amsoil Power. The best procedural method is to utilize [Amsoil P.I. Performance Improver](#) in your fuel system every 4,000 miles. [Amsoil Upper Cylinder Lubricant](#) also helps maintain injector cleanliness. Think of switching the power washer from "rip the boards right off of the deck" ([Amsoil P.I. Performance Improver](#)) to "gently wash away the dirt and grime continuously" ([Amsoil Upper Cylinder Lubricant](#)).

4. A fuel injector can also leak due to aging of its rubber seals. Increasing the life of rubber seals can be done through ensuring the rubber is continually lubricated. [Amsoil Upper Cylinder Lubricant](#) can aid in maintaining lubrication on these seals.

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## continued...Upper Cylinder Lubricant...Part 3

5. Fuel injectors have a bunch of really tiny parts that move really fast. A vehicle on idle will have an "injector open time" lasting between 1 to 10 milliseconds. The close time will then last between 50 to 100 milliseconds. It would not be uncommon for an engine idling to have each injector opening and closing between 10 to 20 times per second.

After doing a little quick math, if you drive your car for 10 years, the components within the injector can easily cycle 500 million times on average, per injector. That correlates to a lot of movement. I myself have a hard time just moving up the stairs in my house without something malfunctioning.

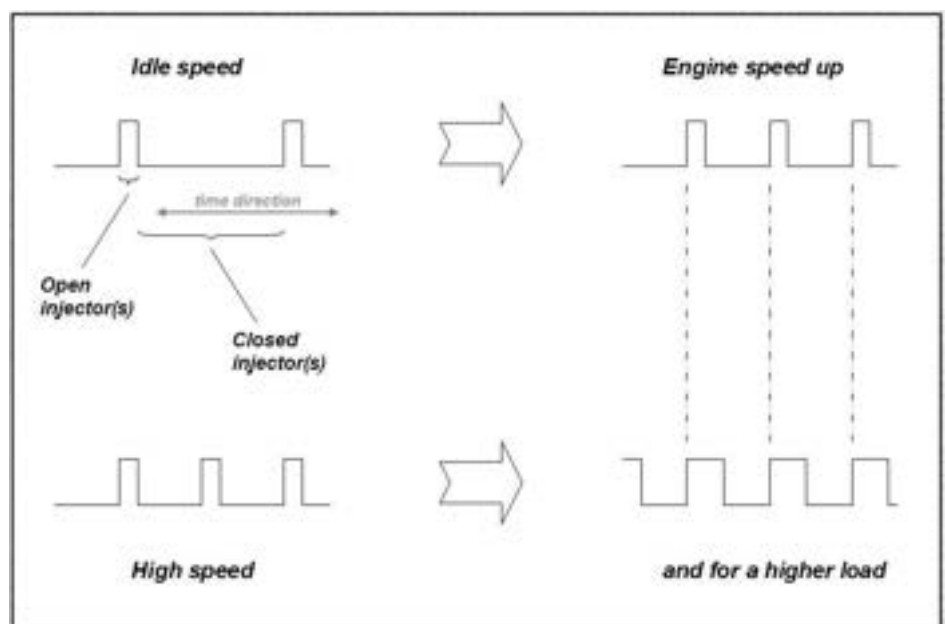
Keeping all of these tiny moving parts operating at peak performance can be assisted through the use of introducing a lubricating oil into the fuel flow so that the lubricant will coat the components it comes in contact with.

As far as carburetors go, the concept is similar in that there are many little tiny passage ways and moving parts to get clogged or stuck. Those components will increase longevity if they consistently come in contact with a lubricating oil.

Much like lubricating your garage door tension springs (and other

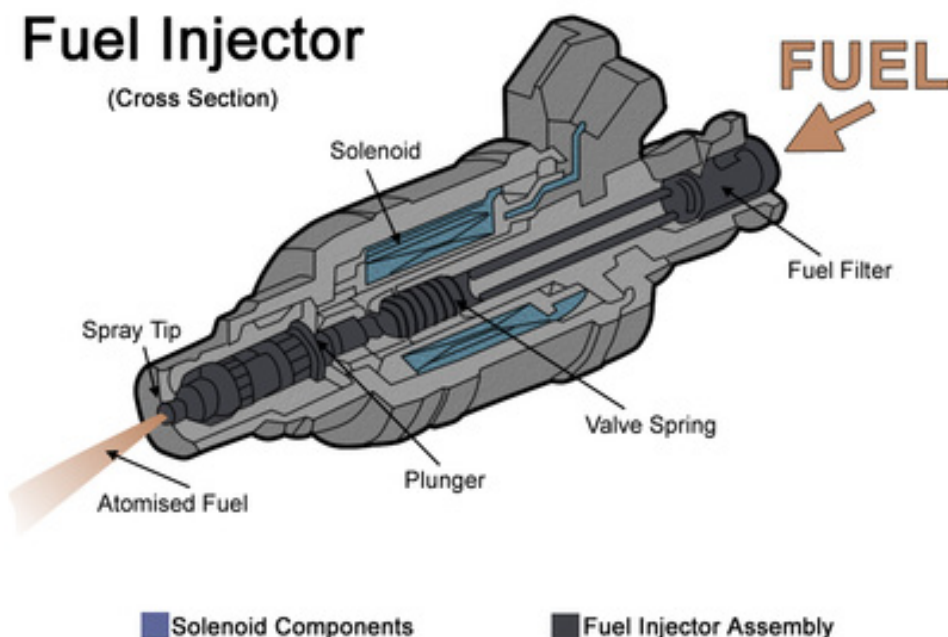
components), this type of preventative maintenance task will help prevent rust, dirt, and corrosion buildup on the integral components within these systems. It will help the parts function smoother and in-turn last longer than unlubricated parts.

Continued below...



### Fuel Injector

(Cross Section)



The last component that I want to discuss is the Fuel Pump. Specifically, I am focusing on modern vehicles where the fuel pump is electric and submerged inside the fuel tank.

Fuel pump manufacturers have incorporated many technologies into fuel pumps to increase their life. One such technology is a solid-state control which allows the fuel pressure to be controlled via pulse-width modulation of the pump voltage. This not only

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## continued...Upper Cylinder Lubricant...Part 3

increases fuel pump life but it allows for a smaller and lighter device to be used.

Unfortunately, there are some things that fuel pump manufacturers cannot control. Fuel pump oxidation is one of the most common reasons that a fuel pump will cease to function. Oxidation is the interaction of oxygen molecules with the fuel. Hydrocarbons, the essential component of petroleum-based fuels, react with atmospheric oxygen and with one another. Changes will occur such as discoloration of fuel, the presence of nonvolatile, macromolecular substances (gum), as well as a development of particulate matter followed by sediment deposits.

Even in a controlled and stable storage environment a slow pro-

cess of uncontrollable oxidation (called auto-oxidation or self-oxidation) may occur within the fuel molecules.

Oxidation ultimately results in the formation of gums and varnishes throughout the entire fuel system. As discussed previously, this contamination can clog fuel injectors. Much in the same, these gums and varnishes can also wreak havoc on the fuel pump as well. Utilization of a lubricant can prevent the oxidation process as the oils in the lubricant will form a protective barrier to counteract the oxidation process from beginning in the first place.

As a consumer, we can also increase fuel pump life by simply keeping our fuel tank filled above 1/4 of a tank, as the fuel helps to keep the fuel pump cool and lu-

bricated while it is in operation. Often times you can burn out or damage a fuel pump if you run out of gas because the components are starved of cooling and lubrication. This brings me back to the original point that a well lubricated fuel pump will operate more efficiently and last longer than one that lacks proper lubrication.

