



# Direct Injection Fuel Injector Cleaning

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Our **direct injection fuel injector cleaning** includes before and after results and comes with a written report.

**Only \$25.00 per injector (24-48 hr turn around times)**

[FOR FAST AND RELIABLE SERVICE CLICK HERE FOR INSTRUCTIONS AND LET'S GET STARTED TODAY!](#)

Or call us today at [1.800.381.2065](tel:1.800.381.2065) for more information. We can clean your direct injectors and save you money! We service injectors for people nationwide!

Engine manufacturers are switching to Direct Injection to meet emissions standards, better performance and greater fuel economy. GDI or Gasoline Direct Injection is the way forward.

## What is Direct Injection

Instead of delivering the fuel via an injector in the intake track before the intake valve, GDI or gasoline direct injected engines inject a very fine mist of fuel directly in to the combustion chamber hence the name **Direct Injection**. Direct injectors operate at fuel pressures that vary between 450 – 3000 Psi. To achieve these pressures, the gasoline is pressurized by a high pressure fuel pump that is mechanically driven and electronically controlled.



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## Why use Gasoline Direct Fuel Injectors?

GDI or Gasoline Direct Injection enables the engine to operate at a stratified charge combustion, described by most of the vehicle manufacturers as an Ultra Lean Burn mode, giving a much improved fuel efficiency, great engine torque and reduced Exhaust Emission levels at low load.

With the sequential firing GDI systems, the injectors only opens to a maximum of 7mS. As the fuel requirement increases, the injector remains at 7mS and the pump pressure increases to meet the demand, allowing the injector to open and close quickly and efficiently. No more “Duty Cycle” as we have known it. These engines use expensive high specification injectors, with Hitachi, Bosch, Denso and Siemens being the major suppliers.

## Direct Injection and Carbon Buildup!

Direct injectors are prone to carbon build up and are affected by the hostile environment in the combustion chamber as well as ethanol, hydrocarbons and additives which forms part of today’s fuels.

Because there is no cleaning agent, such as gasoline, present to clean the valves from any debris the current drawback from direct injection systems in 4 cycle engines is the buildup of carbon and dirt behind the intake valves and ports . Engines start losing performance after 45000 miles and the only remedy on some models is costly because it requires removal of the cylinder head to remove the dirt buildup from the intake valves and ports. Newer models such as the Subaru BRZ now make use of both direct injection and manifold injection to curb some of these problems. Another work around is to route the engine breather through an oil catch can.

## The importance of direct injection fuel injector cleaning.



GDI Before Cleaning GDI After Cleaning

Depending on the engine requirements, this style of injectors can have varying types of spray patterns. All direct injectors will atomizing a much smaller fuel droplet size than a normal MPI injector. Conventional injector would have a fuel droplet size of +/- 165 micron, where some GDI injectors would produce a fuel droplet of only +/- 65 micron. To maintain this kind of atomization it is important to include direct injection fuel injector cleaning in your

- 
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- 
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-

maintenance schedule.

### **GDI Fuel Distribution and Atomization**

Fuel Distribution and Atomization is equally critical to the engine's performance, fuel economy and emission outputs. A clogged direct injector or a set of dirty direct fuel injectors will cause a range of problems and in some instances even severe engine damage.

Our testing equipment allows us to critically examine direct injectors for correct electronic operation in response to changes in mS, RPM and proper atomization as well as the proper cleaning techniques that will allow us to restore your GDI injectors to original specification.

Most direct injection fuel injectors are difficult and time consuming to remove and re-fit; would you fit a set of injectors without ensuring they are working correctly?

Insist your dealer/mechanic/technician send your dirty clogged or leaking direct fuel injectors to us for cleaning before they attempt to replace them with expensive new ones. If the injector does not perform up to spec or we can not clean them, **we will not charge** you for the time spent on that injector. You will only be responsible for return shipping.

### **Why flow testing direct injectors at 72.5 psi or 5 Bar**

Many customers want to know why we do not test direct injectors at operating pressure.

1. It is dangerous
2. The equipment is very expensive
3. We can determine flow rate at lower pressure by applying math.
4. We can determine and develop a good understanding of spray pattern and atomization at lower pressures

Direct injection fuel injector manufacturers usually will supply test pressure in MPa (Megapascal) and the flow rate in g/s (Grams per second)

1 MPa = 10 Bar = 145.0377 psi

1g/s = 7.937 lb/hr

1 lb/hr = 10.5 cc/min

A manufacturer's direct injector has the following specification: @ 20 MPa delivering 24 g/s. This means that.

Up to 24 g/s of fuel will be delivered at an operating pressure of 20 MPa and in layman's terms this means that:

24 x 7.937 = 190.48 lb/hr of fuel will be delivered at a pressure of 20 x 145.0377 = 2900.75 psi.

= 190.48 lb/hr @ 2900.75 psi

To calculate the amount of fuel the direct injector will flow at 72.5 psi we will use the following calculation:

$$\sqrt{\frac{\text{New fuel pressure}}{\text{Old Fuel Pressure}}} \times \text{Old flow rate} = \text{New flow rate}$$

$$= \sqrt{(72.5 \div 2900.75)} \times 190.48$$

$$= 0.1581 \times 190.48$$

$$= 30.1148 \text{ lb/hr}$$

Now that we have determined the amount the injector should flow at 72.5 psi we can proceed with the flow testing and measure the testing result against the calculated result.

### Acronyms associated with Direct Injectors

GDI = Gasoline Direct Injection (Mitsubishi GDI)

FSI = Fuel Stratified Injection (VW)

SCi = Smart Charge injection (Ford)

HPi = High Precision Injection (BMW)

JTS = Jet Thrust Stoichiometric (Alfa Romeo)

GTDI = Gasoline Turbocharged Direct Injection (Ford)

IDE = Injection Direct Essence

SIDI = Spark Ignition Direct Injection (Holden)

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**Note: Due to cost we currently do not replace some of the O-rings and seals on most of the GDI injectors we service.**

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*Injector RX<sup>®</sup> - 12201 Dover St, Houston, TX 77031. Phone: 281-738-3635*

Monday - Friday 8:00 AM - 6:00 PM - Central Standard Time. Saturdays 8:00 AM - 2 PM - Central Standard Time.

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