

STANDARD[®]

PRECISION
REMANUFACTURING

PROVEN QUALITY

COMPREHENSIVE
COVERAGE

DIESEL



DIESEL FUEL HEATER • DIESEL INTAKE HEATER • EGR VALVE • EGR VALVE MOUNTING GASKET • DIESEL FUEL INJECTOR MODULE • FUEL INJECTOR DIESEL • FUEL PRESSURE SENSOR • FUEL SHUT-OFF SOLENOID • DIESEL GLOW PLUG • TURBO CHARGER • DIESEL GLOW PLUG TEMP SENSOR • EXHAUST BACK PRESSURE SENSOR • FUEL/WATER SEPARATOR SENSOR • INJECTOR INSTALLATION KIT • FORD 6.0L FICM BOARD • DIESEL FUEL INJECTION HEAT SHIELD • DIESEL HIGH PRESSURE OIL PUMP • FUEL INJECTION CONTROL PRESSURE SENSOR • DIESEL FUEL INJECTION PUMP • DIESEL INJECTOR PUMP MODULE • CRANKSHAFT CAMSHAFT SENSOR • FUEL PRESSURE REGULATOR • FUEL PRESSURE REGULATOR • FUEL PRESSURE RELIEF VALVE • RELAYS • DIESEL FAST IDLE TEMPERATURE SWITCH • EGR PRESSURE FEEDBACK SENSOR • EXHAUST GAS TEMPERATURE SENSOR • DIESEL GLOW PLUG CONTROL SENSOR • DIESEL FUEL HEATER • DIESEL INTAKE HEATER • EGR VALVE • EGR VALVE MOUNTING GASKET • DIESEL FUEL INJECTOR MODULE • FUEL INJECTOR • DIESEL FUEL HEATER • DIESEL INTAKE HEATER • EGR VALVE DIESEL FUEL INJECTOR MODULE • FUEL INJECTOR • FUEL PRESSURE SENSOR • DIESEL FUEL SHUT-OFF SOLENOID • DIESEL GLOW PLUG TURBO CHARGER • DIESEL GLOW PLUG TEMP SENSOR • EXHAUST BACK PRESSURE SENSOR • FUEL PRESSURE REGULATOR UPGRADE KIT TURBOCHARGER ACTUATOR • DIESEL FUEL INJECTOR • FUEL PRESSURE

DIESEL The Next Global Transportation Fuel

Compared to gasoline, Diesel has 20-40% better fuel economy and 10-20% fewer emissions.

For high-quality bio-diesel blends, emissions are even lower. That's one of the reasons why industry experts are so bullish on diesel fuel. In fact, the International Energy Agency predicts diesel will remain the "dominant growth fuel" through 2035. Considering these positive forecasts, it's no wonder OEM's are expanding their use of Clean Diesel Engine platforms.



Vehicle MPG the Government CAFE standard is calling for by 2025



Number of diesel makes and models introduced by vehicle manufacturers between 2013 - 2016



Expected diesel share of U.S. Passenger Car/ Light Truck market by 2020



Percentage of service stations offering diesel fuel

Standard's Plan to Lead the Diesel Market

To account for the burgeoning diesel market, Standard® has fully invested in diesel. Today, **Standard® Diesel** offers hundreds of parts in dozens of unique diesel engine management categories, and we're a basic manufacturer in most of them. Looking ahead, Standard® Diesel is determined to deliver the finest quality diesel products, which is evident from our expansive diesel offering and revamped remanufacturing processes. The following are highlights of our current vehicle platform coverage.

High Pressure Oil Pumps

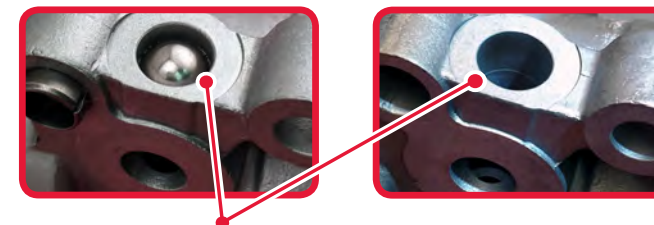
Ford/International 7.3L and 6.0L Applications



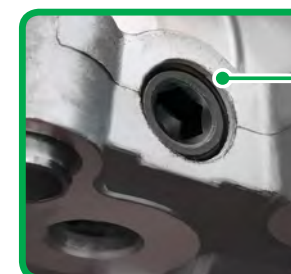
Every High Pressure Oil Pump features **Standard®** engineered enhancements to ensure proper sealing and improved performance.

Standard® High Pressure Oil Pump Enhancements Help Eliminate Common 6.0L Failures

Common OE Failure
Housing Leaks



The original 6.0L high pressure oil pump is prone to failure due to a leaking housing. The problem, inherent in the OE design, uses a check ball that can easily become displaced.



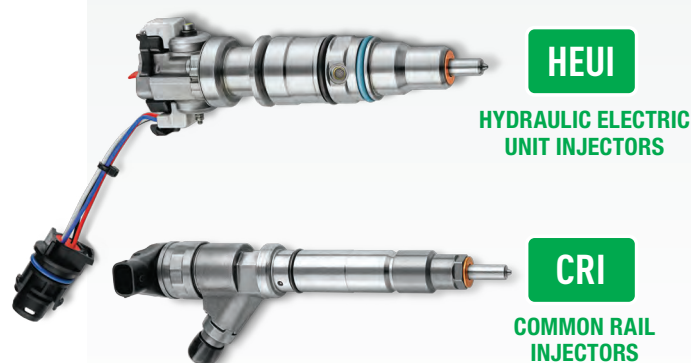
Our Improvement

We replace the check ball housing with a new casting that has a threaded plug to ensure proper sealing.

Diesel Fuel Injectors

Chevrolet/GMC 6.5L
Chevrolet/GMC 6.6L CRI
Ford 7.3L, 6.0L, and 6.4L

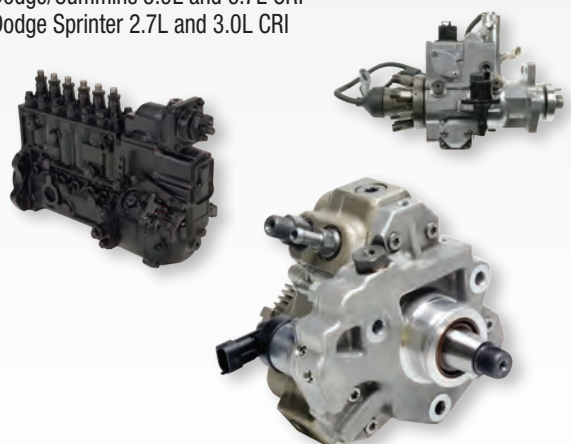
Dodge 5.9L Inline/Rotary Style
Dodge 5.9L and 6.7L CRI
VW, Nissan, Mercedes, Sprinter



Every Standard® Diesel injector goes through a rigorous process to deliver the finest diesel fuel injector available. Check out "**Anatomy of Standard Injector Remanufacturing**" inside this brochure.

Diesel Fuel Injection Pumps

Chevrolet/GMC 6.2L, 6.5L, 6.6L
Ford/International 6.9L, 7.3L, 6.0L, 6.7L
Dodge/Cummins 5.9L Inline/Rotary Style
Dodge/Cummins 5.9L and 6.7L CRI
Dodge Sprinter 2.7L and 3.0L CRI



All Standard® Diesel Injection Pumps are the product of an exhaustive remanufacturing process designed to ensure maximum quality and durability.

Fuel Injection Control Module (FICM)



Our FICM for 6.0L Ford Trucks (R76001), features a completely redesigned circuit layout with performance upgrades and more advanced electronics to prevent heat failure that other boards experience.

"Blue Spring" Fuel Pressure Regulator Upgrade Kit



Our 6.0L Ford Truck upgrade kit (R81001) includes everything needed to rebuild the fuel filter housing including O-Rings, hardware, and a blue spring that increases fuel pressure by 10-15 psi to eliminate potential injector damage.

Turbocharger Actuator



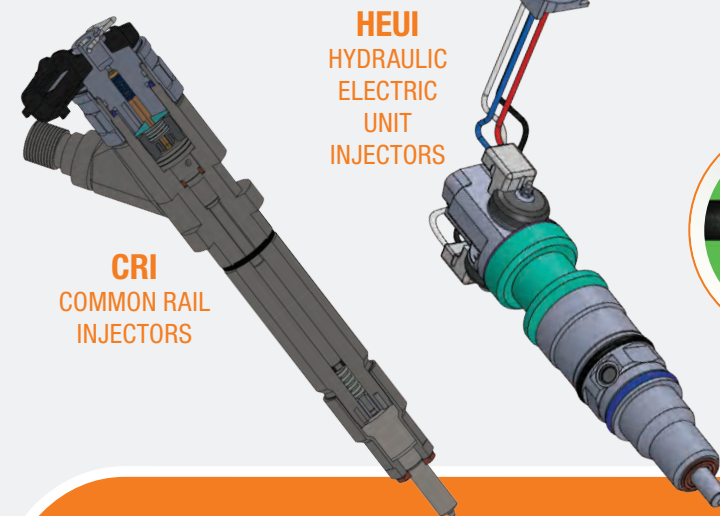
This direct-fit turbocharger actuator (R75002) for 6.0L Ford Trucks delivers a high-quality matching replacement for the failed original.

The Anatomy of Standard® Injector Remanufacturing

In order to provide the finest quality remanufactured diesel injectors, we performed an intensive review of every process from design to inspection, from teardown to assembly, from testing to packaging. The result of this exhaustive study is a remanufacturing process at our TS16949, ISO9001, and ISO14001 certified facility in Grapevine, TX that's second to none. We can say with confidence that every step in our remanufacturing process exceeds the highest standards and delivers the finest diesel fuel injectors.

1 Support from Engineering Design

The first step is to make sure high-wear items get replaced. To do that, our engineers manually examine hundreds of component parts for consistency in critical wear points and use sophisticated computer programs to simulate the injector inner workings. The right components get replaced, every time.



HEUI
HYDRAULIC
ELECTRIC
UNIT
INJECTORS

CRI
COMMON RAIL
INJECTORS

A Few of Our Engineering Improvements

Problem

Failure-prone OE oil seals on 6.0L units.

Our Solution

High-pressure oil seal with improved shape and higher-quality material that operates better in high-pressure situations and hot and cold temperatures.

Problem

OE springs on 6.0L units tend to collapse and wear on one side, leading to spring collisions.

Our Solution

Improved spring design that prevents micro-cracks and hot-setting to minimize load loss over time. The new design passes 10MM cycle fatigue testing.

3 Sourcing Quality Cores

Thanks to our sophisticated demand planning and expansive core resources, we have a continuous flow of incoming raw materials for remanufacturing components. Our experienced core buyers scour all supply avenues across North America and today we have tens of thousands of cores in stock, to ensure product availability and quick order fill.



2 Inspecting New Components

Our Quality Control technicians perform supplier validation and new component qualification to ensure that all remanufactured diesel injectors meet the highest standards and comply with ISO requirements. We replace the following core components with new: O-rings, springs, nozzles, delivery valves, shims, gaskets, and solenoids.



QUALITY LAB

5 Cleaning the Components

- First, we pre-clean in a hot-water detergent cycle to clean injector surfaces and remove oil that could contaminate successive steps.
- Next, we transmit ultrasonic waves through the 150° water solution to create cavitation, which produces a micro-brushing effect that cleans hard-to-reach areas.
- Finally, we rinse the components, apply a rust inhibitor, and dry them in a baking oven as well as with compressed air.

This rigorous, environmentally safe cleaning process before reassembly, removes all oil and debris yielding clean, identifiable parts for reclamation inspection.



4 Taking Accountability for Teardown and Verification

Our skilled technicians follow an extremely detailed step-by-step workflow process for proper inspection and component teardown. Once complete, they submit the injector components to pre-qualification for further reclamation. This controlled, reliable, repeatable process leads to a quality injector with traceable documentation.



6 Inspecting Reclaimable Components

We verify reclaimable components by measuring their critical tolerances and putting them through visual inspections and electrical testing. On top of that, we inspect all metal-to-metal sealing surfaces for potential issues. Based on our findings, we either replace or recondition the components as required. Nothing is left to chance.



7 Reassembling the Components

Our reassembly process is broken down into two operations (upper and lower assembly) to ensure consistency. We follow a detailed work instruction for every step of the process and all reassembly including critical tolerance measuring is performed in a temperature- and humidity-controlled room with fixturing on all stations. By using precision tooling and measurement instrumentation, we're able to remanufacture high-quality, high first-time yield injectors.



CRI



HEUI

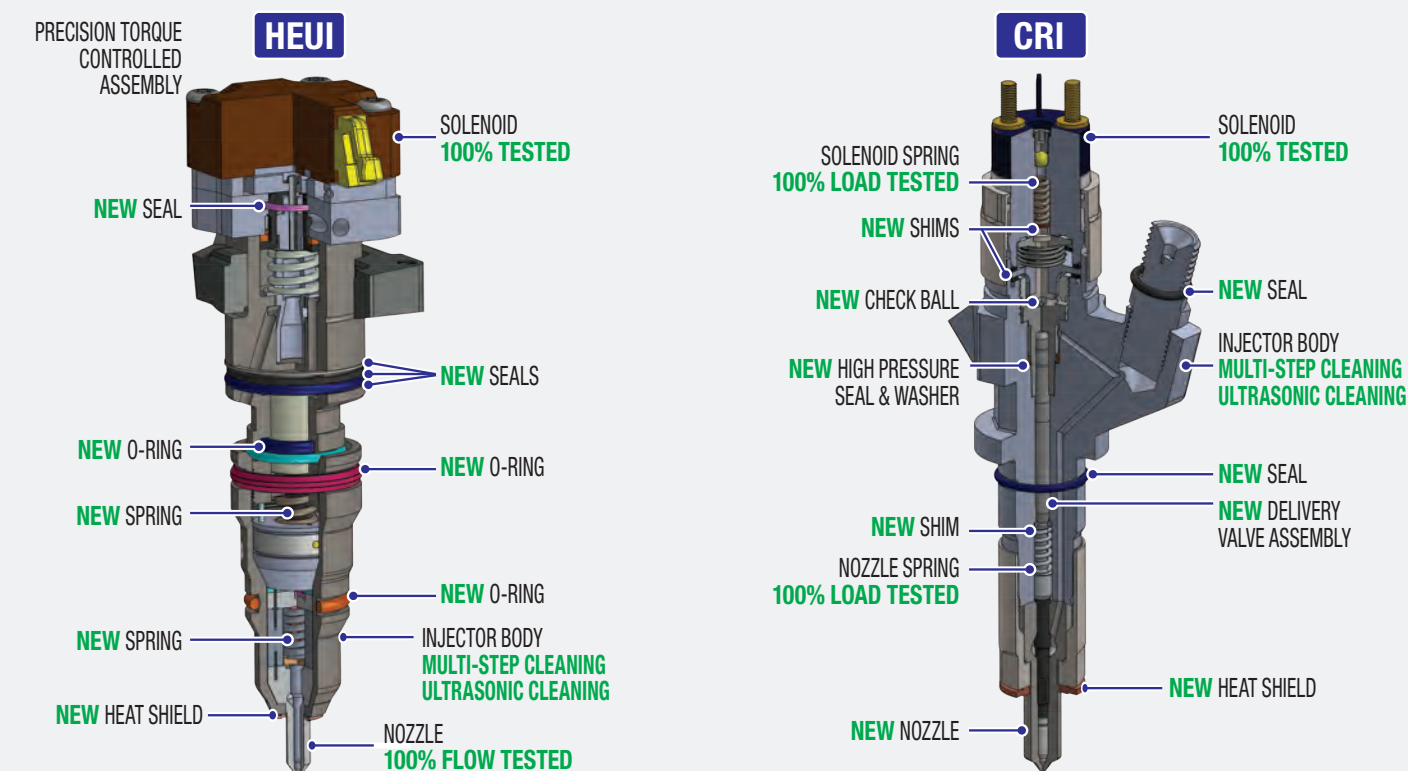


8 Testing the Injectors

We measure our injectors' performance against OEM during a battery of tests, including shot-to-shot, fuel delivery, and response time tests at different pulse widths, pressure levels, and RPMs. Each injector is tested for at least 30 minutes, a significant amount of machine time to ensure every injector can be installed with complete confidence.

Did You Know Our injectors are subjected to random lot testing at an independent testing lab, and we perform extensive durability testing on our dedicated testing vehicle fleet.

Injectors are completely disassembled for cleaning and components are carefully measured



Reassembly Checklist

- 100% flow test and/or replace all delivery valves and nozzles.
- 100% replace all internal and external shims, nozzle and intensifier springs, and O-rings.
- Torque all components to exacting OEM specifications.
- Place components already identified as 100% replacement parts in queue for use on assembly line.
- Precisely identify shim size in microns using wireless micrometers.
- On CRI injectors, we measure no fewer than eight times during assembly process for injector pulse, timing, fuel delivery, back leak, response time, pressure, and more.
- On HEUI injectors, we assemble the complete head and solenoid together to reduce the chance of contaminating and damaging spool valve.

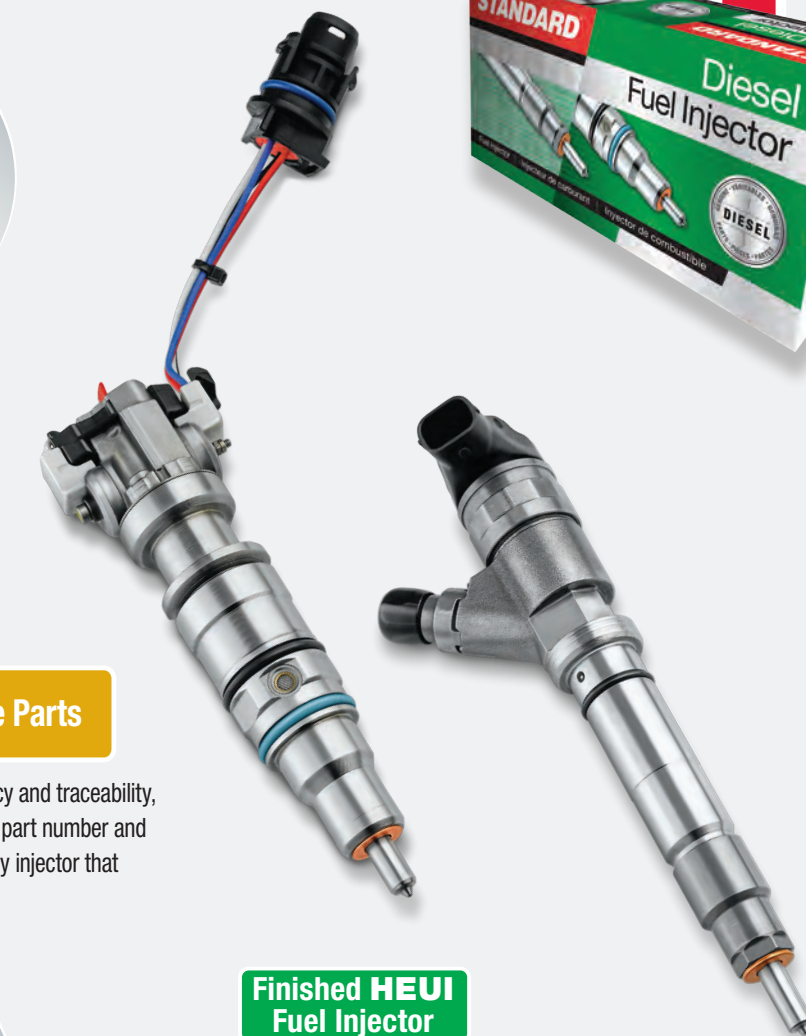
10 Packaging the Parts

For the last step, we seal each injector to protect it from elements it may encounter during shipping and storage. The finished product is a quality-remanufactured injector that delivers performance and durability right out of the box.



9 Identifying the Parts

To ensure accuracy and traceability, we laser-etch the part number and date code on every injector that leaves our facility.



Finished HEUI
Fuel Injector

Finished CRI
Fuel Injector

STANDARD Diesel

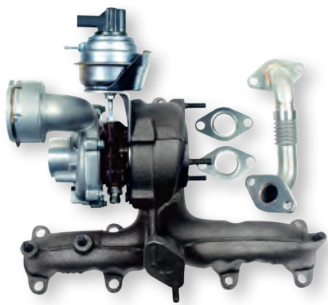
PRECISION REMANUFACTURING • PROVEN QUALITY • COMPREHENSIVE COVERAGE

The Upward Trend in Turbocharger Coverage

Vehicle manufacturers are adding turbochargers at a double-digit rate. While Diesel passenger cars are the main consumers of turbochargers, gasoline powered vehicles utilize them as well. **Why turbo?** Simple. Downsized engines are needed to meet new fuel and emissions standards. Turbochargers improve power and economy up to 40%.

Standard's turbo coverage will be skyrocketing.

Our extensive research has helped us determine the numbers you'll need to compete in this market. Our coverage for Chevrolet/GMC, Ford/International Powerstroke,



Dodge Sprinter, Dodge/Cummins, Audi/VW and Saab will be expanded to include new applications for Jeep, Chevrolet Cruze and Cruze Diesel, Chevrolet/GMC Duramax, Ford/International, Dodge/Cummins, Ford, Volvo, Subaru, Mazda, BMW, Mercedes, Mini, Fiat and Porsche.

Now that's what we call full line coverage!



8.0M

The turbo market is **expected to grow significantly over the next 5 years to more than 8 million turbocharged vehicles.**