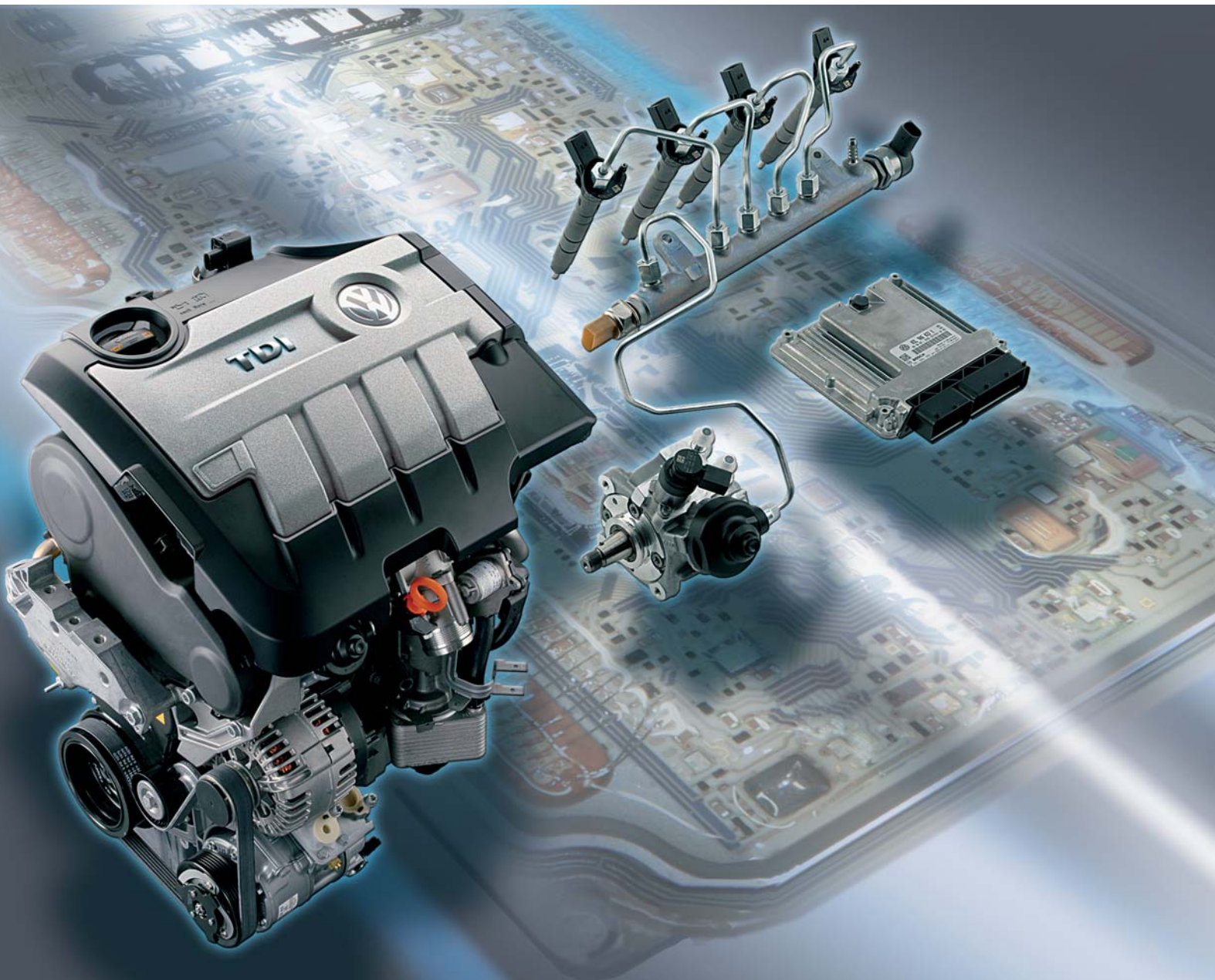




**Self Study Program 826803**

**2.0 Liter TDI Common Rail  
BIN5 ULEV Engine**



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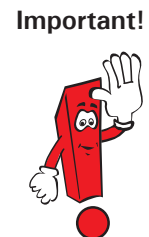
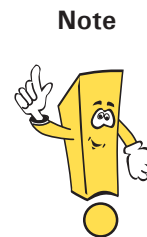
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This Self-Study Program provides information regarding the design and function of new models. This Self-Study Program is not a Repair Manual.

**This information will not be updated.** For maintenance and repair procedures, always refer to the latest electronic service information.





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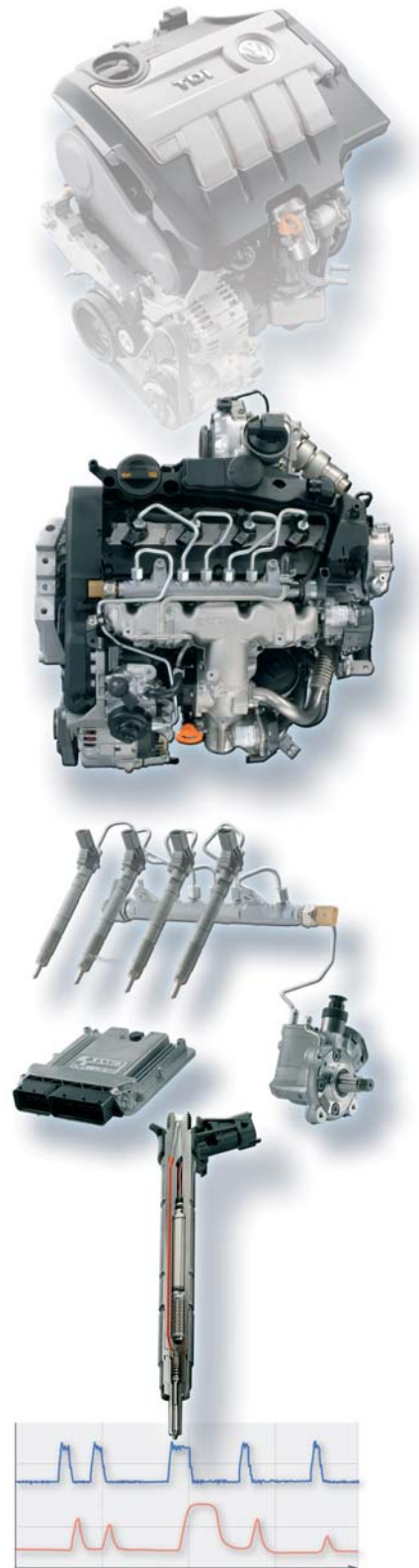
## A New Generation of Diesel Engines from Volkswagen

The 2.0 Liter TDI engine with common rail injection system is the first of a new generation of dynamic and efficient diesel engines from Volkswagen.

By combining the successful and proven 2.0 Liter TDI engine with common rail technology, Volkswagen is setting new standards in terms of such characteristic TDI attributes as dynamics, driving enjoyment, economy, and reliability. The superior qualities of the 2.0 Liter TDI engine with common rail injection system are oriented towards future challenges in acoustics, comfort, and exhaust gas after-treatment.

The lead taken on by Volkswagen in 1993 with the introduction of the first turbocharged direct injection (TDI) diesel engine in a passenger car continues with the 2.0 Liter TDI engine, confirming Volkswagen's role as a pioneer in diesel technology.

The engine offers the potential for future improvements in exhaust gas standards and the associated technologies.



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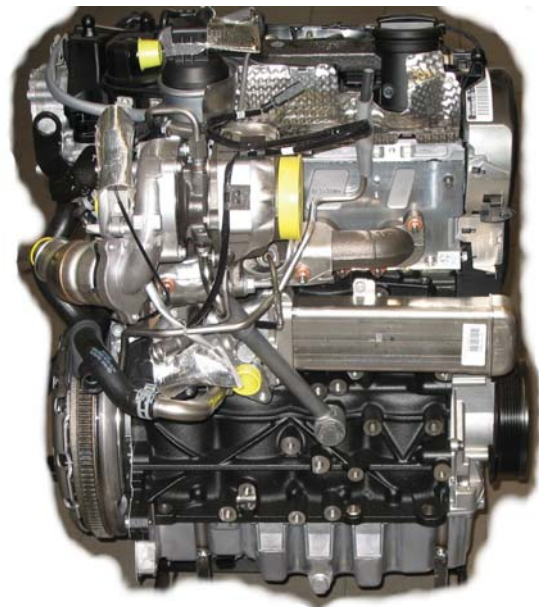
# Notes

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## Heritage

The 2.0 Liter TDI engine with common rail injection system is based on the 1.9 Liter TDI engine with the Unit Injector System (UIS) also known as the “pumpe düse.” This predecessor engine is one of the most frequently built diesel engines in the world and has seen the broadest use within the Volkswagen Group, from passenger cars to transport vehicles.

To accommodate the increasing demand for improvements in acoustics, fuel consumption, and exhaust gas emissions, a large number of engine components were redesigned. The conversion of the injection system to a common rail design is one of the major changes to this engine. Equipped with a special after-treatment system, this engine meets current emissions standards.



# Overview

## Technical Characteristics

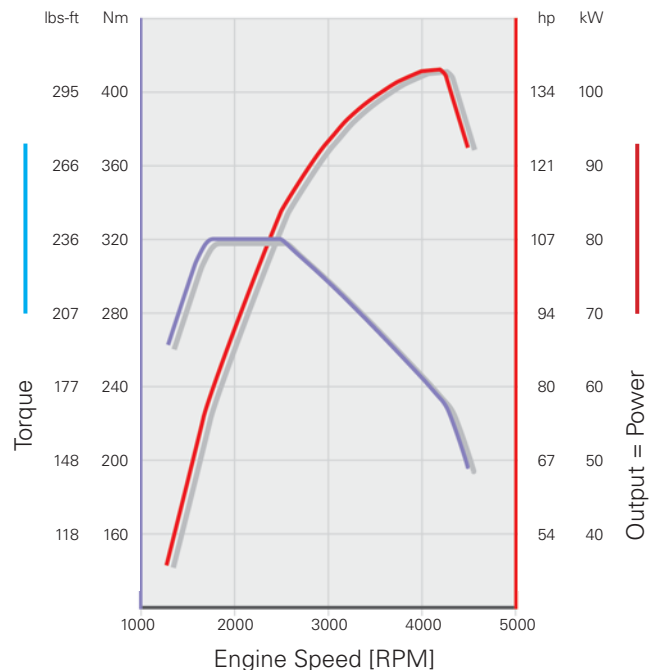
- Common rail injection system with Piezo fuel injectors
- Diesel particulate filter with upstream oxidation catalyst
- Intake manifold with flap valve control
- Electric exhaust gas return valve
- Adjustable exhaust gas turbocharger with displacement feedback
- Low and high pressure Exhaust Gas Recirculation (EGR) system



## 2.0 Liter TDI Technical Data

Design	4-Cylinder In-Line Engine
Displacement	120 in <sup>3</sup> (1968 cm <sup>3</sup> )
Bore	3.189 in. (81 mm)
Stroke	3.760 in. (95.5 mm)
Valves per Cylinder	4
Compression Ratio	16.5:1
Maximum Output	140 hp (103 kW) at 4000 rpm
Maximum Torque	236 lb-ft (320 Nm) at 1750 rpm up to 2500 rpm
Engine Management	Bosch EDC 17 (Common Rail Control Unit)
Fuel	ULSD / ASTM D975-06b 2-D-S<15 (Ultra-Low Sulfur Diesel, under 15 ppm)
Exhaust Gas Treatment	High and Low Pressure Exhaust Gas Return, Oxidation Catalytic Converter, Diesel Particulate Filter, NOx Storage Catalytic Converter

## 2.0 Liter TDI Torque and Power





## Crankshaft

The 2.0 Liter TDI common rail engine uses a forged crankshaft to accommodate high mechanical loads.

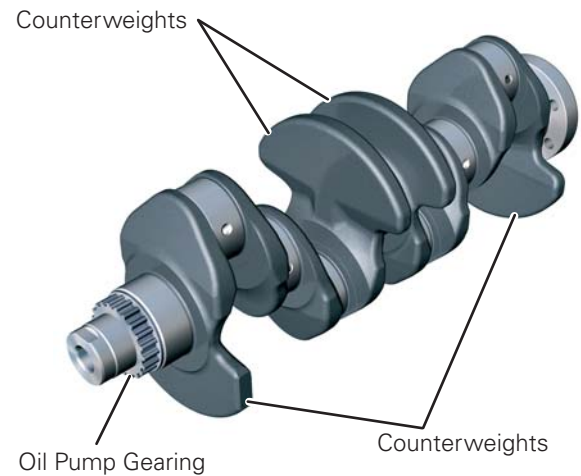
Instead of the customary eight counterweights, this crankshaft has only four. Using four counterweights reduces the load on the crankshaft bearings, as well as noise emissions that can occur due to the intrinsic motion and vibrations of the engine.

## Pistons

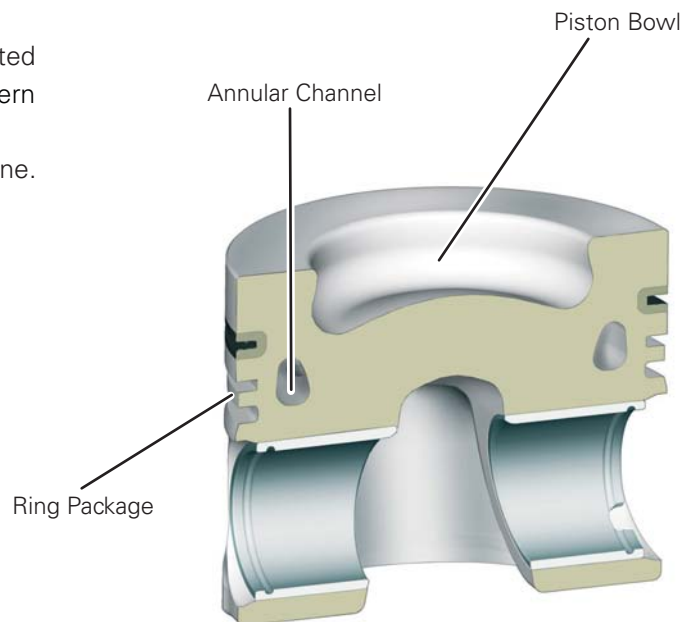
The 2.0 Liter TDI common rail engine pistons have no valve pockets. This reduces the cylinder clearance and improves the swirl formation in the cylinder. Swirl is the circular flow about the vertical axis of the cylinder. Swirl has a significant influence on the mixture formation.

For cooling the piston ring zone, the piston has an annular cooling channel into which piston spray jets inject oil.

The piston bowl, where the injected fuel is circulated and mixed with air, is matched with the spray pattern of the injection jets and has a wider and flatter geometry than the piston in a pump-injection engine. This allows more homogeneous carburation and reduces soot formation.



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