



Das Auto.

1.8L TSI Engine: Smaller, Lighter, Turbocharged!

When it comes to engines, smaller, lighter, and more efficient are the road signs to the future. Volkswagen launches a new turbocharged direct injection engine built at a new, state-of-the-art engine facility in Mexico for the North American market: the Gen 3 1.8L TSI®.



The New 1.8L TSI Delivers:

- More Torque
- Higher Estimated Fuel Economy
- Lower Emissions
- Stronger Acceleration
- Better Throttle Response

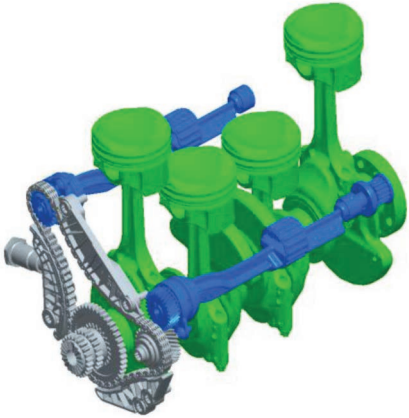
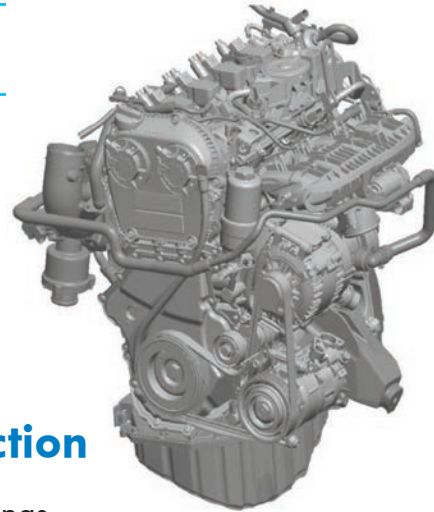
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Technical Features

The NEW 1.8L TSI®

Known internally as EA888, the Gen 3 1.8L TSI engine debuts in the U.S. market with a number of significant technological advances. This all-new 1.8L TSI engine is no relation to Volkswagen's previous 1.8L turbocharged engine.

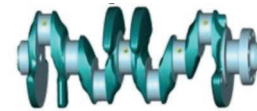


Friction Reduction

- Smaller main bearings
- Balance shafts with roller bearings
- Lowered, optimized pressure for the oil circuit and oil pump
- Reduced tensioner forces in belt drive system

Lightweight

Key weight-reduction factors:



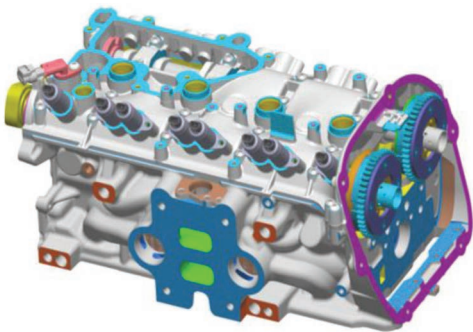
- Thin-walled engine block (3 mm thick)
- Crankshaft with four counterweights instead of eight
- Cylinder head with integrated exhaust manifold
- Integrated exhaust gas cooling system
- Lighter turbo housing
- Plastic lower oil pan
- Use of aluminum bolts

Thermodynamics

The 1.8L features an integrated exhaust manifold in the cylinder head, which saves weight and allows for a comparatively compact and light turbocharger. The exhaust manifold is water cooled to lower the exhaust gas temperature on its way to the turbocharger. This lets the engine run more efficiently, especially under load, without the risk of overheating the turbo.

The cooling system is designed to:

- Reach optimal operating temperature more rapidly to reduce emissions
- Minimize internal friction
- Provide quicker heater response for passenger comfort



FSI Intake Manifold

- The 1.8L engine's intake manifold uses direct injection technology for maximum efficiency
- The fuel straight injection (FSI) system has fuel pressure as high as 200 bar – about 50 bar more than most injection systems
- High pressure helps achieve low emissions and efficient combustion.

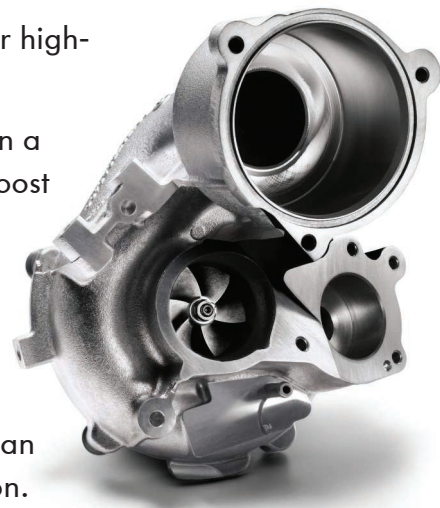


Compact Turbocharger

Volkswagen's turbo engines are designed to combine strong low-end torque with maximum power output. The 1.8L TSI achieves maximum torque at a low engine speed of only 1,500 rpm. The 1.8L engine's turbocharger features:

- Lightweight die-cast aluminum housing
- Twin-scroll compressor rotor, milled from a solid block for greater high-speed strength and better acoustics
- A new electric wastegate actuator – faster and more precise than a standard pressurized actuator – designed to maintain optimal boost levels from the turbo
- Internal water cooling and oil cooling/lubrication
- Integrated exhaust manifold cooling also helps keep the turbo's temperature within operating parameters

The turbo compresses the engine's intake air and passes it through an intercooler to help make it even more dense for stronger combustion.



Valvetrain

- Double overhead camshaft, chain-driven
- Each cylinder has two intake and two exhaust valves
- Variable intake timing helps ensure smooth operation and maximum performance at all engine speeds



Key Advantages

1.8L TSI Selling Points

Now that we know some of the technological highlights, what do you tell your customers about the new 1.8L TSI engine? What are its strong points?

Stronger acceleration



Although the 1.8L TSI has the same horsepower rating of 170 that the 2.5L engine has, the new engine is lighter and produces more torque. That means that acceleration is significantly stronger. In the Jetta, 0-60 mph takes only 7.3 seconds with a manual transmission, compared to an estimated 8.6 seconds in a Jetta powered by the 2.5L engine.

High torque at low rpm

The 1.8L TSI engine produces more torque than the 2.5L engine. From engine speeds as low as 1,600 rpm, the 1.8L TSI “High” variant with automatic transmission generates its impressive maximum torque of 200 lb.-ft. The 2.5L engine is rated at 177 lb.-ft. of torque at a much higher engine speed: 4,250 rpm. Low-speed torque provides a more satisfying driving experience, quicker acceleration, and faster throttle response.



High fuel economy

The 1.8L TSI is designed for maximum fuel efficiency. The new 1.8L TSI is estimated to provide better fuel economy than the 2.5L engine that it replaces. For example, the 2014 Jetta (with the 1.8L TSI and 6-speed automatic) EPA estimates are 26/36 mpg (city/hwy) compared to 24/31 EPA mpg (city/hwy) with the 2.5L engine – that’s a 16% improvement in highway fuel efficiency! The Passat, Beetle, and Beetle Convertible also boast improved fuel economy estimates compared to their 2.5L ratings, giving you even more exciting news to share with your customers.



Regular gas

Many turbocharged engines require premium fuel for maximum performance. Thanks to variable valve timing, water-cooled exhaust manifold, and other factors, the 1.8L TSI was designed to run on regular gas, an important cost savings for owners.



Lightweight

Thanks to the weight savings described in the Technical Features section of this module, the 1.8L TSI weighs less than the 2.5L 5-cylinder used previously. The lighter weight 1.8L engine means faster acceleration, improved handling dynamics, and better fuel economy than the 2.5L engine.



Lower emissions

With a pre-catalyst positioned close to the engine to reach operating temperatures quickly, along with a secondary catalyst, the 1.8L TSI is clean and green. It meets or exceeds emission standards in all 50 states, and qualifies for Bin5/EPA and PZEV California Emissions standards.



Built in North America

This year, Volkswagen inaugurated its 100th plant worldwide with a new, environmentally advanced engine factory in Silao, Mexico. This engine plant localizes production as part of Volkswagen's ongoing \$5 billion investment in the North American market. With a maximum annual capacity of 330,000 engines, the new factory will supply engines for Volkswagen models produced in Puebla, Mexico, and Chattanooga, TN.