

MAZDA'S ALL-NEW CX-9 TO FEATURE NEW 2.5-LITER DIRECT-INJECTION TURBOCHARGED GASOLINE ENGINE

PREMIER ENGINE OF THE SKYACTIV-G SERIES DELIVERS IMPRESSIVE LOW- TO MID-RANGE TORQUE AND EXCELLENT REAL-WORLD FUEL ECONOMY

HIROSHIMA, Japan—Mazda Motor Corporation has enhanced its SKYACTIV-G engine series with the range-topping SKYACTIV-G 2.5T. This 2.5-liter direct-injection turbocharged gasoline engine powers the all-new CX-9 midsize three-row crossover SUV that will go on sale starting from North America in spring 2016.

The SKYACTIV engine series aims to offer customers a combination of outstanding fuel economy and excellent dynamic performance in everyday driving situations. Mazda's development philosophy is to offer this combination across all vehicle lines, using the most appropriate engine displacement and simplest configuration of technologies for a given vehicle size. Developed in line with this philosophy and based on the naturally aspirated SKYACTIV-G 2.5 featured in the Mazda6 (known as Atenza in Japan), SKYACTIV-G 2.5T is the first turbocharged engine in the SKYACTIV-G series. It delivers exceptional catalog and real-world fuel economy, excellent response without turbo lag,^{*1} and linear and powerful acceleration in the low- to mid-rpm range where CX-9 drivers spend the vast majority of their time.^{*2} Maximum torque is 310 ft-lb, comparable with a naturally aspirated 4-liter gasoline engine.

Traditionally, turbocharged engines have suffered from poor dynamic performance at low rpms, including turbo lag, and disappointing real-world fuel economy. SKYACTIV-G 2.5T overcomes these problems with the Dynamic Pressure Turbo, the world's first turbocharging system that can vary the degree of exhaust pulsation depending on engine speed, and a cooled exhaust gas recirculation (EGR) system that allows the engine to maintain the ideal air-fuel ratio^{*3} ($\lambda=1$) over a wider output range.

Mazda will continue to offer all customers driving pleasure and outstanding environmental performance through its SKYACTIV engines which aim to achieve the ideal in combustion. The company hopes to enrich people's lives and become a brand that maintains an emotional connection with customers.

■ Features of SKYACTIV-G 2.5T

High compression ratio

Mazda engineers achieved a compression ratio 10.5:1, one of the highest for any turbocharged engine with an 89-mm bore size that can run on regular gasoline.^{*4}

Dynamic Pressure Turbo

SKYACTIV-G 2.5T is the world's first turbocharged engine with the ability to change the degree of exhaust pulsation depending on engine speed. At low rpms (below 1620 rpm), the volume of the exhaust ports is reduced by closing a series of valves located just before the turbine that drives the turbocharger. This reduces interference between exhaust pulses and maximizes the energy of each pulse to obtain a high turbine driving force. At higher rpms there is sufficient energy in the exhaust flow and the valves open, allowing the turbine to be driven by a steady flow of exhaust gases as in a traditional turbocharger. Whereas existing variable turbochargers adjust the speed or direction of exhaust gas flowing into the turbine, Dynamic Pressure Turbo is a unique technology that varies the degree of exhaust pulsation.

Cooled Exhaust Gas Recirculation (EGR)

This system takes some of the inert exhaust gas that results from the combustion process and reduces its temperature by passing it through a cooler before introducing it back into the engine's air intake. This lowers the temperature of combustion in the engine, preventing knocking, expanding the range in which the engine can maintain the ideal air-fuel ratio and reducing the need to retard ignition timing.

Inherits SKYACTIV-G principals of efficient combustion

SKYACTIV-G 2.5T is based on the naturally aspirated SKYACTIV-G 2.5 and features the same bore, stroke and bore pitch. Parts of the fuel system, such as the fuel pump and fuel injection system are also shared, helping SKYACTIV-G 2.5T to achieve the highly efficient combustion for which SKYACTIV-G engines are known.

■ SKYACTIV-G 2.5T Specifications (Based in-house measurements)

Inline 4-cylinder 2.5-liter direct-injection turbocharged gasoline engine

Displacement:	2488 cc
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Bore x Stroke:	89.0mm x 100.0 mm
Compression Ratio:	10.5:1
Maximum Output (net):	227HP (169kW) /5,000rpm*5
Maximum torque (net):	310ft-lb (420Nm) /2,000rpm

*1 A delay in acceleration response common in turbocharged engines due to the time required for the compressor to take effect.

*2 Below 3000 rpm. Based on Mazda's in-house investigations.

*3 The ratio of air to fuel that provides exactly enough oxygen to burn all of the fuel present. For gasoline the ratio is 14.7:1.

*4 As of November 2015. Based on Mazda's in-house investigation.

*5 When using AKI 87 regular gasoline. Maximum output with AKI 93 premium gasoline is 250HP (186kW) /5,000rpm.

<https://news.mazdausa.com/2015-11-18-mazdas-new-cx-9-feature-new-2-5-liter-direct-injection-turbocharged-gasoline-engine>