NISSAN

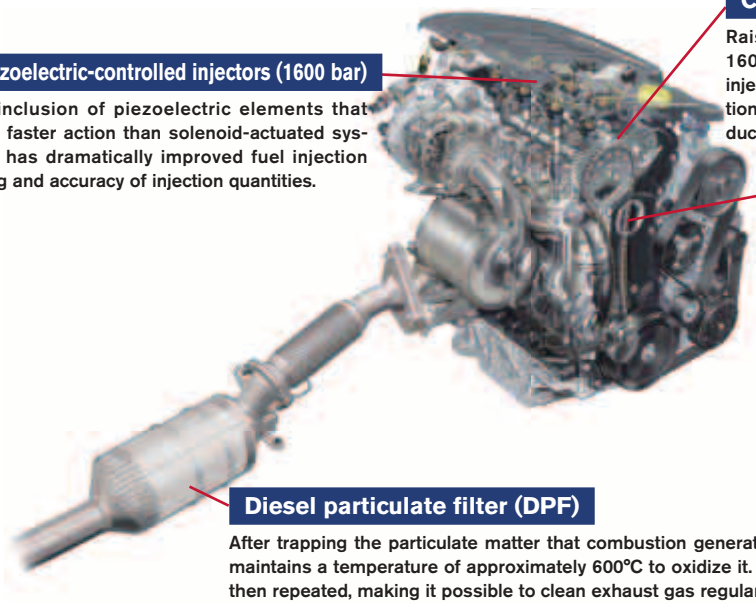
Clean Diesel Technology

Diesel engines have the advantage of emitting smaller amounts of carbon dioxide (CO_2) than gasoline engines. As part of our midterm environmental action plan, known as "Nissan Green Program 2010," we will increase the number of clean diesel vehicles that satisfy the exhaust gas regulations that go into effect in 2010. Furthermore, we are actively promoting research and development to make our ultimate goal of "emissions matching atmospheric levels" practical.

M9R Engine

We developed the new M9R clean diesel engine with our Alliance partner, Renault, and introduced it in Europe in 2007. The M9R combines the crucial elements of power, quiet operation and affordability. This clean diesel also significantly reduces emission levels of nitrogen oxides (NOx) and particulate matter.

Main Technologies Adopted



Piezoelectric-controlled injectors (1600 bar)

The inclusion of piezoelectric elements that allow faster action than solenoid-actuated systems has dramatically improved fuel injection timing and accuracy of injection quantities.

Common rail system

Raising injection pressures to extra-high levels—1600 bars—and using the piezoelectric-controlled injector enhances fuel injection control and combustion efficiency. Particulate matter levels are also reduced.

Double swirl port

Placing the exhaust and intake ports in opposing positions accelerates swirl flows. This allows a more efficient mixture of air and fuel, and contributes to superior combustion.

Diesel particulate filter (DPF)

After trapping the particulate matter that combustion generates, the DPF maintains a temperature of approximately 600°C to oxidize it. The cycle is then repeated, making it possible to clean exhaust gas regularly.

Diesel Technology for SULEV-Level Clean Exhaust Gas

Nissan has developed clean diesel technology that meets the state of California's standard for super-ultra-low emission vehicles. (SULEV standards are equivalent to Tier2 Bin2 standards for gas emissions in North America.) This is part of the Nissan's goal of making engine exhaust equal to the atmospheric level.

Features

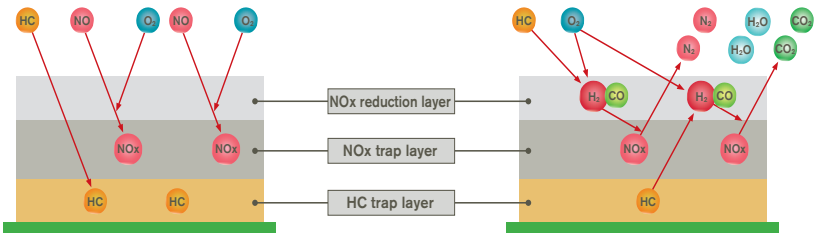
Improved combustion technology

Nissan's original MK combustion technology controls the generation of regulated substances from the source.

New HC-NOx trap catalyst

Conventional NOx trap catalysts only purify NOx. This new catalyst adds a hydrocarbon (HC) trap layer to effectively utilize HC (a regulated substance) in NOx purification. That enables highly efficient reduction of both HC and NOx, improving combustion and engine control.

Conditions for lean burn (diagram) | Conditions for rich burn (diagram)



1 NO is oxidized, and the trap layer absorbs the NOx created

2 The HC trap layer absorbs HC

3 The system uses O_2 with HC to generate H_2 and CO, which together perform a highly efficient NOx chemical reaction.

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