

Komatsu's New Engine Technologies in Response to Next Emission Regulations in Japan, North America and Europe



While present emission regulations in effect are very stringent on nitrogen oxides (NOx) and particulate matter (PM) in Japan, North America and Europe, upcoming regulations require further reduction of NOx and PM down to about 10%, which calls for a very advanced level of technologies on the part of manufacturers.

**[New engine designed to meet new emission regulations
in Japan, North America and Europe]**



Note: This photo was created by computer graphics.

To reduce NOx, we need to lower the combustion temperature, which will, in most cases, increase the amount of PM and worsen fuel economy. Therefore, the development of diesel engines necessitates reduction of both NOx and PM at the same time, while improving fuel economy. In addition, construction equipment engines are also required to generate high performance, always at maximum power output and torque due to the nature of demanding use.

Komatsu has engaged in integrated production of diesel engines for construction equipment from R&D. Ranging from 3.3- to 46-liter emission engines*, they are mounted on PC120 hydraulic excavators and other medium-sized equipment to large haul trucks. Furthermore, by taking advantage of in-house development and production of engines, hydraulic units, control systems and major components, we have designed engines and equipment structures as an integrated whole and introduced engines which generate best possible performance under all kinds of conditions. By integrating leading-edge technologies into our proprietary engine technologies accumulated over the years, we have developed new engine technologies capable of reducing environmental impact while improving fuel economy.

*Including some engine models which are jointly developed and manufactured by Cummins Inc.

New Komatsu Engine Technologies



Applying New
Technologies
Developed with Our
Time-tested Portfolio
to New Engine

New

Variable Geometry Turbo System

New

Diesel Particulate Filter

Heavy Duty HPCR System

Heavy Duty Cooled EGR System

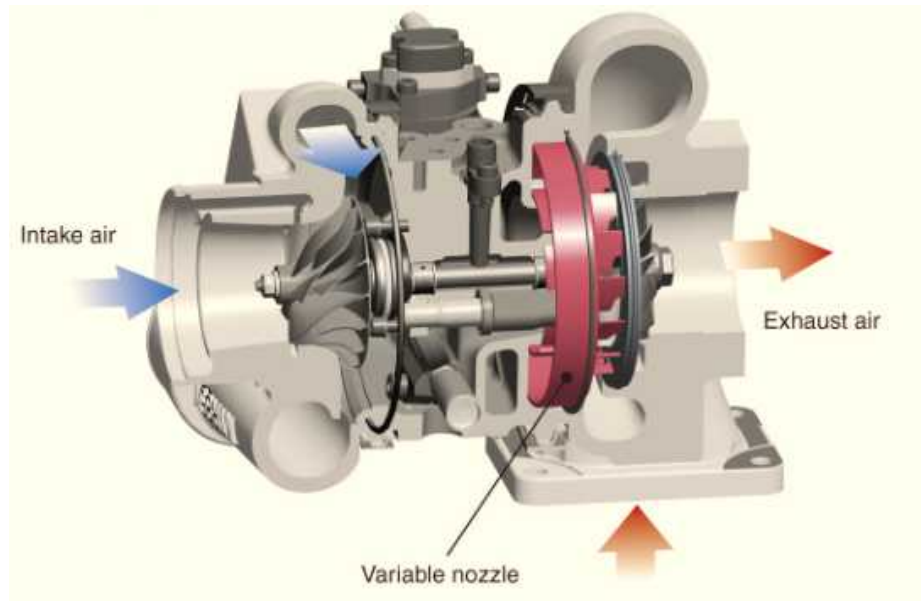
New Combustion System

Electronic Control System

New Komatsu Engine Technologies



Variable Geometry Turbo System

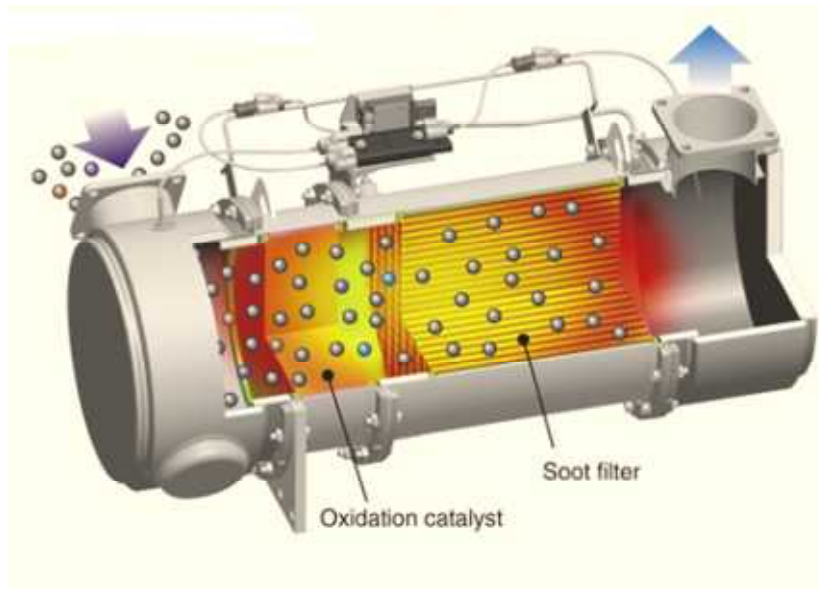


We have developed a new turbo charger which features our proprietary technology for variable controls of air-flow and volume and supplies air optimally according to load conditions. This system achieves both purification of exhaust gas and fuel economy by means of high-efficiency combustion.

New Komatsu Engine Technologies



Diesel Particulate Filter

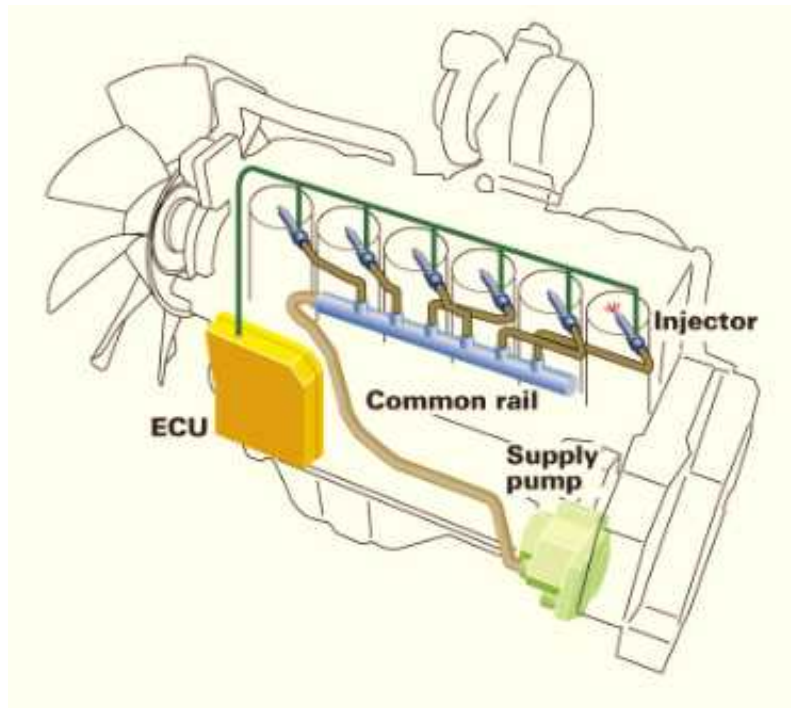


We have achieved in-house development and production of a new diesel particulate filter which captures PM to a maximum degree. The filter burns and removes PM accumulated inside by combining a special catalyst and fuel injection, thus purifying exhaust gas.

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Heavy Duty HPCR System

(HPCR = High Pressure Common Rail fuel injection)

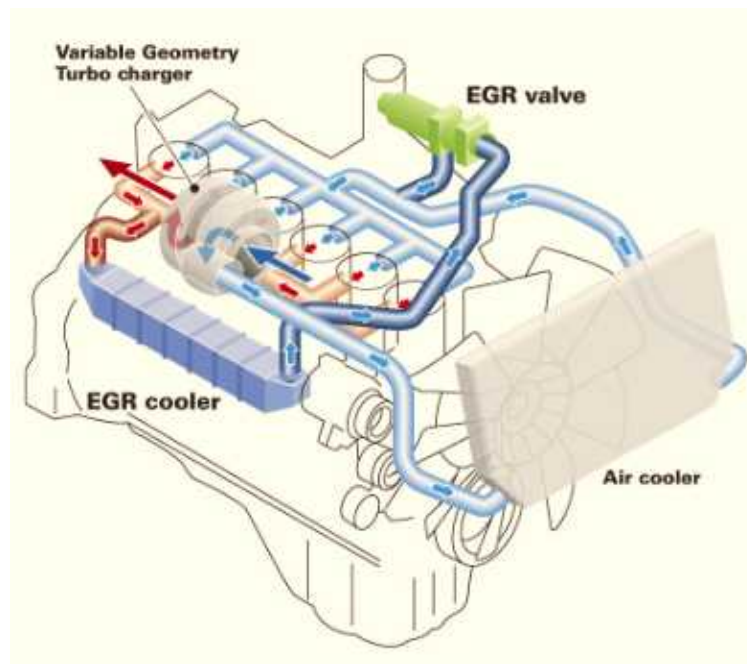


This system injects pressurized fuel optimally by means of computer control and promotes complete combustion to reduce the emission of PM. While this technology is applied to existing engines, the new system pressurizes fuel at a higher point for injection so that it can reduce both PM in the entire zone of engine revolution and fuel consumption.

New Komatsu Engine Technologies

Heavy Duty Cooled EGR System

(EGR = Exhaust Gas Recirculation)



Already well proven in existing engines, this is our proprietary system to reuse a portion of exhaust gas for combustion in order to reduce NOx. The new system incorporates the EGR cooler with a larger volume in order to ensure more stable performance of construction equipment under demanding conditions of use.

New Komatsu Engine Technologies



New Combustion System

We have improved the design of the combustion chamber located above the piston in order to further reduce not only NOx and PM but also fuel consumption and noise.

Electronic Control System

The electronic control system performs high-speed processing of all signals from sensors installed in the equipment body and engine to ensure total control of the equipment according to all kinds of conditions of use. It reduces fuel consumption and noise in addition to NOx and PM.