

Komatsu EU Stage IV Engines

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The commercial production of Komatsu's diesel engines with EU Stage IV technology began in 2014. Built on Komatsu's progressive engineering improvements to reduce emissions, EU Stage IV technology continues to be integrated into Komatsu Europe International's construction and mining engines. Along with lower emission levels, most machines see quite noticeable reductions in fuel consumption, below the already low levels that have long been a hallmark of the Komatsu product line.

The new regulations require the reduction of NOx emissions to one tenth or below of levels required by earlier rules. Komatsu's EU Stage IV solution builds on proven and reliable Komatsu technologies utilized for EU Stage IIIB engines. Examples of these Komatsu developed technologies include: a next-generation High-Pressure Common Rail fuel injection (HPCR) system, a high-efficiency Exhaust Gas Recirculation (EGR) system, a Komatsu Variable Geometry Turbocharger (KVGt), a Komatsu Diesel Particulate Filter (KDPF).

These Komatsu EU Stage IIIB technologies were well received by customers in Europe. In addition to refining these technologies through continuous improvement, Komatsu also developed a newly designed proprietary Selective Catalytic Reduction (SCR) system. This additional solution provides a high amount of passive regeneration of the KDPF with negligible impact on machine operation and production.

Over the years Komatsu has consistently engaged in the research, development, manufacture and improvement of diesel engines. In-house development and manufacturing capabilities are leveraged for key components, such as hydraulic devices and control systems, in order to reduce environmental impact and improve fuel economy.

Technologies applied to EU Stage IV engines

1. Heavy-duty after treatment system

This new system combines a Komatsu Diesel Particulate Filter (KDPF) and Selective Catalytic Reduction (SCR). The SCR NOx reduction system injects the correct amount of AdBlue® at the proper rate, thereby decomposing NOx into non-toxic water (H2O) and nitrogen gas (N2). With the addition of the SCR system, a stringent design target of "fluid neutral" or better was established. In a "fluid neutral" situation, the cost of fuel burned plus the cost of AdBlue® consumed is equal to or less than the total cost of fuel burned in previous generation machines. This achievement lowers operating costs for the end customer. To ensure product reliability and durability in demanding conditions, Komatsu developed the entire system, including the control

software which is critical to the efficient operation of the after treatment system. This control system is also integrated into the machine's on-board diagnostics systems and KOMTRAX™, Komatsu's telematics system, which constantly monitors the machine's health.

2. Heavy-duty cooled Exhaust Gas Recirculation (EGR) system

The system recirculates a portion of exhaust gas into the air intake and lowers combustion temperatures to reduce NOx emissions. Incorporating a high-efficiency and compactly designed cooling system, increases EGR gas flow, which reduces NOx and helps to lower fuel consumption, as an additional benefit.

3. Advanced electronic control system

To ensure control of equipment in all work conditions, the electronic control system performs high-speed processing from sensors installed in the vehicle and engine. While maintaining the powerful and quick response of Komatsu equipment, the precise system helps to greatly reduce NOx and particulate matter emissions, and lowers fuel consumption and noise levels.

Inside the cab, the machine operator is informed of engine conditions via the on-board colour monitor. KOMTRAX™ helps to manage the information and keeps customers informed of appropriate operational factors and required maintenance.

4. Komatsu Variable Geometry Turbocharger (KVGT) system

The KVGT system features Komatsu-original hydraulic technology for variable control of intake air-flow and supplies proper airflow according to load conditions. The machine's control system uses the KVGT to provide precise exhaust temperature management for the regeneration process. The system achieves high efficiency combustion, further purification of exhaust gas and improved fuel economy.

5. Heavy-duty High-Pressure Common Rail (HPCR) fuel injection system

Utilizing computerised control, the system is designed for proper injection of high-pressure fuel. Building on the technology in previous Komatsu engines, the new system uses higher-pressure injection for better fuel atomisation, reducing both Particulate Matter (PM) emissions and fuel consumption under the wide range of engine-operating conditions.

All new Komatsu EU Stage IV machines come with Komatsu CARE®, a complimentary maintenance program for Komatsu customers. For the first three years or 2.000 hours, Komatsu CARE® covers factory-scheduled maintenance performed by Komatsu-trained technicians with Komatsu Genuine parts. Komatsu CARE® offers up to a maximum of 2 complimentary Komatsu Diesel Particulate Filter (KDPF) exchanges. Additionally, both the KDPF and the SCR system are covered by a warranty for the first 5 years or 9.000 hours. Komatsu has proudly provided high-quality and reliable products for nearly a century.

Source: Komatsu