



Hanover, November 2011

## **FPT INDUSTRIAL REDUCES NOX EMISSIONS BY MORE THAN 95%.**

**FPT Industrial presents its exclusive "SCR Only" solution for Tier 4 Final / Stage IV compliance at Agritechnica 2011.**

Previewed at Samoter for engines in earth-moving equipment and extended in May to heavy commercial vehicles, buses and coaches (which must comply with Euro VI regulations), FPT Industrial also confirms its choice of "SCR Only" technology for engines in agricultural off-road applications with a power higher than 130 kW, to comply with forthcoming Tier 4 Final / Stage IV regulations on emissions.

Thanks to combustion optimisation and developments in the exhaust gas post-treatment system, the new engines will occupy a leadership position in terms of consumption and performance, whilst at the same time improving its environmental impact. This result has been achieved by improving the efficiency of the ECU (Engine Control Unit), patented by FPT Industrial, which allows more than 95% of NOx emissions to be efficiently converted.

The company's unfailing commitment to continuous innovation to satisfy the needs of its clients brings considerable benefits. In addition to a reduction in operating costs throughout the lifecycle of the product, FPT Industrial's "SCR Only" technology guarantees the highest power/displacement ratio. Great attention has been given to ease of installation and system flexibility, in order to avoid the requirement for drastic changes to vehicle architecture.

NEF and CURSOR Series engines are exhibited on the company's stand (Hall 25, Stand G 17). The wide range of power and displacement in the two series can satisfy any type of requirement and they rank at the top of their category for performance, reliability and fuel economy.

**Press Release**

### **Tier 4 Final / Stage IV Scenario**

The commitment to reduce the most serious pollutants, nitrogen oxides (NOx) and atmospheric particulate (PM), dates from 1996 when, in both Europe and the United States, legislation imposed a progressive reduction over the course of the following years, with deadlines varying according to power.

The most recent legislation which has come into effect dates from January 2011, with the introduction of Tier 4 Interim (North America) / Stage III B (Europe) for diesel engines with a power of 130 to 560 kW for off-road applications. The same emissions legislation will come into effect in January 2012 for engines with a power between 56 and 130 kW.

From 1996 to today, cutting nitrogen oxides and atmospheric particulate by around 60% has been sufficient to comply with the legislation.

But the big challenge will come in January 2014, when the new limit imposed by the further legislative step, Tier 4 Final / Stage IV, will set a final drastic reduction in nitrogen oxides. These will have to be cut by 80% in relation to the current legal level.

### **The technologies for cutting emissions**

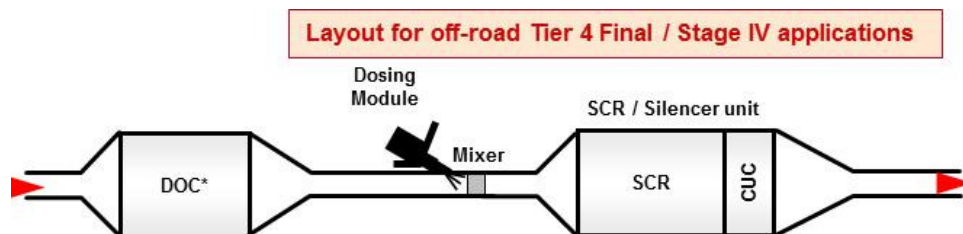
Diesel engines, because of the chemistry of combustion and the impurity of the fuel, produce pollutants that are damaging the environment. NOx (Nitrogen Oxides) and Particulate (PM) are definitely the most critical. The possible strategies for reducing them are the EGR (Exhaust Gas Recirculation) system with the addition of a DPF anti-particulate filter, a combination of SCR (Selective Catalytic Reduction) and EGR, or the SCR technology adopted by FPT Industrial. The use of the EGR system, and therefore the reduction of NOx emissions in the combustion chamber, essentially allows for exhaust gas to recirculate with a consequential increase in the production of particulate and a reduction in combustion efficiency, all to the detriment of fuel consumption and engine performance.

FPT Industrial has chosen instead to reduce the particulate produced in the combustion chamber to a minimum, in this way increasing engine efficiency. NOx is then reduced in the exhaust system, thanks to "SCR Only" technology. This allows engine functioning to be optimized, improving consumption and performance.

## **FPT Industrial's "SCR Only" technology**

FPT Industrial's "SCR Only" technology is completely exclusive because it can meet the extremely stringent limits on NOx emissions using only the SCR system, without having to resort to other emissions treatment systems, such as exhaust gas recirculation.

The system uses a separate DOC (Diesel Oxidation Catalyst) unit. The temperature of the AdBlue injection module, located immediately afterwards, is controlled by the coolant from the engine. The post-treatment system is completed by the SCR and the CUC (Clean Up Catalyst). The whole system is fitted with a network of integrated sensors to control the NOx and any excess of NH<sub>3</sub> (ammonia) emitted.



The use of this system allows NOx to be cut by more than 95%, over the entire engine cycle. To reach these levels, the conversion efficiency of the catalyser must be significantly raised.

This has been possible because of the evolution of the engine management system (ECU: Engine Control Unit), which controls AdBlue dosing and the thermal properties of the post-treatment system extremely accurately and precisely.

"SCR Only" technology sees the introduction of a new generation after treatment system that is the result of concentrated research by FPT Industrial, research that has led to the creation of numerous significant patents for:

- "Closed" control to allow precise dosing of AdBlue in order to cut the level of NOx emissions entering the SCR catalyser.
- Adaptive AdBlue dosing thanks to control technology based on the use of NOx and ammonia sensors to provide accurate information on the composition of the exhaust gases.
- Thermally insulated high turbulence mixing, to allow homogeneous hydrolysis of urea and correct distribution in exhaust gas flow.



The use of these patents makes it possible to achieve reductions of more than 95% in NOx levels, over the entire engine cycle.

### **Advantages for customers:**

- Dramatic reduction in operating costs over the entire product lifecycle
- The highest power/displacement ratios on the market.
- Flexible system, characterised by ease of installation thus avoiding the necessity of radical changes to vehicle architecture.
- Compact system making it possible to optimize the space available and minimize the weight impact, as all the components are integrated.

### **The range of engines**

The F5, NEF and CURSOR ranges represent FPT Industrial's range for agricultural applications.

#### **The NEF Series**

The NEF Series includes a 4.5 litre engine with four cylinders and a 6.7 litre engine with six cylinders. They cover a power range of 80 to 220 kW. FPT Industrial's choice has allowed it to increase the power of engines in the transition from Tier 4 interim to Final, without falling back on particularly complicated air feed systems. Also confirmed, as with Tier 4 interim, the Common Rail solution for the fuel injection system on both capacities, guaranteeing high injection pressures and multiple injection management. A new engine control Unit (ECU) is mounted, which, on Tier 4 Final versions, is also responsible for controlling the SCR system. The compact size of the propulsion unit should also be emphasized, even when looking at the engine unit plus radiator. In fact, the choice not to use an EGR means that the radiator does not need to be enlarged to guarantee greater thermal dispersion.

The NEF Series continues to be available in Tier 3 / Stage III and Tier 4 Interim / Stage IIIB versions.

FPT Industrial is present at Agritechnica 2011 with the N67 ERT engine.

#### **The CURSOR Series**

The CURSOR Series, in addition to the 8.7 litre and 12.9 litre capacities, will be enhanced with an 11.1 litre version. The technical differences with the Tier 4 version relate principally to optimisation of the injection system. Common Rail will be extended to the entire range. In particular, the 11.1 and 12.9 litre engines will



see the use of an HD (Heavy Duty) Common Rail able to guarantee injection pressures up to 2200 bar.

The 12.9 litre version, as with the Tier 4 interim version, will also be available in the 2StT (Dual Stage Turbocharged) version. This Cursor, fitted with twin turbo in series, is able to reach a power of up to 500 kW.

As with the NEF Series, a new engine control unit (ECU) will be adopted for the CURSOR Series that will also be responsible for managing the SCR system.

The CURSOR Series will cover a power range from 200 kW to 500 kW.

The CURSOR Series continues to be available in Tier 3 / Stage III and Tier 4 Interim / Stage IIIB versions.

At Agritechnica 2011, FPT Industrial presents C9, C11 and C13 2StT engines.

### The F5 Series

The F5 series with a displacement of 3.2 litres, 4 inline cylinder architecture and power from 55 to 65 kW at 2500 rpm, is currently available in Tier 3 / Stage III A and Tier 4 Interim / Stage III B versions.

### **FPT INDUSTRIAL**

FPT Industrial is a company of FIAT Industrial dedicated to the design, production and sale of power-engines for on/off-road vehicle, marine and power generation uses. The company employs approx. 7,500 persons worldwide, in 9 plants and 5 R&D Centres. The FPT Industrial sales network consists of 100 dealers and over 1,000 service centres in about 100 countries. A wide range of products (5 engine ranges from 37 up to 640 kW, and transmissions with maximum torque from 300 up to 470 Nm) and a close focus on R&D activities, make FPT Industrial a world leader in industrial power-engines.

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