FPT INDUSTRIAL AND TIER 4 FINAL / STAGE IV

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In partnership with FPT Industrial and its HI-eSCR technology, Case IH's off-road machinery range is well equipped for the upcoming Tier 4 Final / Stage IV introduction.

The unique FPT Industrial solution is the latest evolution of Selective Catalytic Reduction (SCR) technology, developed at what is now FPT Industrial's Arbon R&D Centre in 1991, and selected as its after-treatment system to meet Nitrogen Oxide (NOx) emission regulations, such as Tier 4A/B and Stage III B/IV.

Along with agricultural machinery and vehicles, SCR has been proven in over 350,000 on-road and construction engines. NOx emissions are handled in the exhaust, with a focus on optimising combustion efficiency, which also results in higher specific power output, and lower fuel consumption and operating costs.

Continuing a history of innovation dating back to 1903, FPT Industrial introduced High Efficiency SCR (HI-eSCR) in 2012 to take this technology to a superior level, ahead of new Tier 4 Final / Stage IV legislation requiring further, significant NOx reductions. From 1 January 2014, new engines in off-road and agricultural vehicles must achieve an 80% reduction compared to Stage IIIB levels.

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Case IH Press Officer:.
Rene Laglstorfer
Tel. +43 7435 500638
Email: rene.laglstorfer@caseih.com
Web: www.caseih.com

FPT Industrial Press Officer:
Marika Comino
Tel. +39 011 0074053
Email: Press@FPTIndustrial.com
Web: FPTIndustrial.com

The use of HI-eSCR engines, operating without the need of Exhaust Gas Recirculation (EGR), within Case IH equipment is the latest step in the successful partnership between the company and FPT Industrial.

In 2012, the Case IH Steiger 600, powered by FPT Industrial Cursor 13 Twin Stage engines, set the record for drawbar horsepower and fuel efficiency at the Nebraska Tractor Test. The combination proved 8.4% more fuel efficient than its nearest competitor, and 10.5% more fuel efficient at 75% drawbar pull maximum power.

Case IH sits alongside FPT Industrial within the Fiat Industrial Group. It is the market leader in agricultural equipment, with a history spanning over 150 years.

FPT Industrial's High Efficiency SCR

The more stringent Tier 4 Final / Stage IV emission requirements can only be met through the use of SCR, with or without EGR.

While EGR lowers NOx emissions in the combustion chamber, the use of recirculated exhaust gas reduces the combustion efficiency, and particulate matter production increases, necessitating a Diesel Particulate Filter (DPF).

With HI-eSCR, the use of clean air in the engine plays a major role in optimising efficiency, while NOx is converted to harmless diatomic nitrogen and water in the exhaust after-treatment system, reducing emissions by more than 95%.

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In addition to improving performance, fuel consumption and reliability, FPT Industrial's solution minimises the production of particulate matter, negating the need for a DPF.

On-road, HI-eSCR has already featured in award-winning machinery from the Fiat Industrial group, with the Iveco STRALIS HI-Way receiving the prestigious 'International Truck of the Year 2013' Award.

The system is composed of the following elements:

- The Diesel Oxidation Catalyst (DOC)
- The AdBlue dosing module
- The AdBlue mixer
- The Selective Catalytic Reduction (SCR)
- The Clean Up Catalyst (CUC)

Through a new integrated development programme, patents established include:

- 'Closed' loop control for precise AdBlue dosing
- Adaptive dosing system based on NOx and ammonia sensors
- Thermally insulated high-turbulence mixing
- Enhanced exhaust gas temperature control

The entire network is monitored and controlled electronically with integrated sensors, while the exhaust after-treatment system is fully contained to reduce weight and space requirements.

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HI-eSCR engines for off-road applications

The new HI-eSCR technology is partnered with a focus on combustion efficiency in Tier 4 Final / Stage IV NEF and Cursor Series engines within Case IH models.

A result of FPT Industrial's ongoing commitment to R&D across six technical centres and its renowned lean engineering, the reliable and cost-effective engines produce up to 500 kW and offer rapid throttle response.

Through crankcase and cylinder head developments to maximise structural rigidity and coolant flow, and the latest generation of common rail fuel injection technology, high mean effective cylinder pressures work with peak injector nozzle pressures of up to 2,200 bar.

HI-eSCR engines feature a new electronic control unit to manage the engine and after-treatment system, fully integrating all engine and SCR functions. Operating without recirculated exhaust gasses during the combustion process, fuel consumption is improved and engine wear is low, enabling service intervals of up to 600 hours to minimise running costs and downtime.

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About FPT Industrial
FPT Industrial is a company of FIAT Industrial dedicated to the design, production and sale of powertrains for on and off-road vehicles, marine and power generation applications. The company employs approximately 8,000 people worldwide, in ten plants and six R&D Centres. The FPT Industrial sales network consists of 100 dealers and over 1,300 service centres in almost 100 countries. A wide product offering, including five engine ranges from 31 kW up to 740 kW and transmissions with maximum torque from 300 Nm up to 500 Nm, and a close focus on R&D activities make FPT Industrial a world leader in industrial powertrains.