

FPT INDUSTRIAL SHOWS INNOVATIVE NATURAL GAS ENGINE CONCEPT FOR HEAVY-DUTY VEHICLES AT TECH DAY 2018

Turin, November 23rd, 2018

Environmental sustainability is one of the most important challenges that the powertrain industry must tackle. With the aspiration to achieve air quality improvement and the reduction of heavy-duty vehicles' impact on climate change, **FPT Industrial** is showcasing its **Cursor 13 NG EVO Prototype** during its **Tech Day 2018** event.

The Brand is a **leader in the Natural Gas segment**, with **more than 40,000 Natural Gas (NG) engines** sold worldwide in the last 20 years. Taking advantage of its experience, FPT Industrial started the Cursor 13 NG EVO R&D project with the aim to develop a highly innovative direct injection system for the **next generation of Heavy-Duty Natural Gas engines**. It is a user-friendly 100% Natural Gas **mono-fuel engine**, not requiring Diesel nor Urea refill systems. Moreover, it adopts a simple after treatment, a **3-way catalyst** without DPF and SCR.

The new positive ignition NG engine can improve brake thermal efficiency, increase torque and rated power, and **reduce greenhouse gas emissions**, have all improved by 10% when compared to the NG baseline engine. During tests, the FPT Industrial engine reached a performance of **370 kW @ 1,900 rpm and 2,200 Nm @ 1,000 rpm**. The fuel consumption also proved to be well below the target of 200g/kWh in a large area of the engine's operating map. Overall, the Cursor 13 NG EVO can reach an **efficiency of 41%**.

The Cursor 13 NG EVO concept integrates different components to achieve these results and is supported by state-of-the-art simulation tools for hardware selection and optimization, as well as a single cylinder engine for testing and calibration. Among the main features, the concept has a **specific cylinder** head featuring a pent-roof combustion chamber with tumble intake ports, designed for optimal positive-ignition combustion; a **fuel direct injection system**, which brings advantages such as higher specific engine power output and better and more flexible control of fuel mixture. The latter results in an overall emission reduction during transient operations, contributing to better fuel economy. Moreover, the Cursor 13 NG EVO components include a **high-pressure cooled EGR circuit**, which helps reduce throttling losses at partial load; and a **Variable Valve Timing system**, that uses cam-phaser technology to achieve the best phasing conditions, volumetric efficiency and turbulence level in every operating condition, thus reducing fuel consumption.

FPT INDUSTRIAL ON-ROAD NATURAL GAS PORTFOLIO

FPT Industrial is also presenting its complete Natural Gas line-up for On-Road applications. Today, the Brand has an engine portfolio that ranges from 3.0 to 12.9 liters of displacement and power from 100 to 338 kW, covering **light and medium commercial vehicles, buses and trucks**.

Natural Gas is the most sustainable solution that is immediately **viable and cost-effective**. Gas engines have a competitive Total Cost of Ownership and low pump cost, while also delivering all the advantages of traditional thermal engines, including reliability. Natural Gas can also lead the industry to a **green future**, since methane can be generated as a renewable fuel by recycling organic waste, reducing CO2 emissions nearly to zero.

All FPT Industrial Natural Gas engines use **stoichiometric combustion** to generate their power. The company has more than 20 years of experience with this technology, which has proved to be a viable and cost-efficient solution to comply with the **Euro VI** emission standards. Also, for more flexibility, each engine from the FPT Industrial NG portfolio can run on **CNG** (Compressed Natural Gas) and **LNG** (Liquefied Natural Gas), starting from "methane number" 70, as well as **biomethane**.

Cursor 13 NG



Launched in 2017, the Cursor 13 NG is the most powerful 100% Natural Gas engine available on the market, delivering **maximum power of 338 kW (460 hp) @ 1900 rpm** and maximum **torque of 2000 Nm @ 1100 rpm**. It is the first purely NG engine on the market specifically developed to guarantee the reliability necessary for long-haul missions.

The engine's CO2 emission level is **9% lower** than that of Diesel and can reach almost zero with biomethane. Cursor 13 NG allows a **98% Particulate Matter reduction** and **48% lower NOx** emissions when compared to Euro VI Diesel engines. Moreover, the engine provides fuel cost **savings of 30%-40%** compared to the Cursor 460 hp Diesel engine for long haul applications.

Thanks to a compact and maintenance-free ATS, the stoichiometric combustion technology contributes to a more compact solution, providing an optimized payload and space availability on

the truck. As a result, it is possible to install larger fuel tanks on the vehicle to extend the mission range.

Cursor 13 Natural Gas Euro VI Specifications

Architecture:	6 Cylinder in line
Injection System:	Multipoint Injection with Stoichiometric Combustion
Air Handling:	Water cooled Wastegate Turbocharger
Valves per cylinder (number):	4
Displacement (L):	12.9
Bore per stroke (mm):	135x150
Max Power hp (kW) @ rpm:	460 (338) @ 1,900
Max Torque (Nm @ rpm):	2,000 @ 1,100
Dimensions L / W / H (mm):	1,610 / 1,027 / 1,178
Dry Weight (kg):	1,240

Cursor 9 NG



With a displacement of 8.7 liters, the Cursor 9 NG delivers **maximum power of 294 kW (400 hp) @ 2000 rpm** and **torque up to 1700 Nm @ 1200 rpm**. With stoichiometric combustion, the engine emissions are lower than Euro VI limits.

The six-cylinder engine is the ideal solution for applications such as heavy haulage, garbage collection and city and intercity transportation.

Besides low emissions, the Cursor 9 NG provides **reliability, performance and class-leading fuel consumption**. Launched in 2016, it was the first alternative-fuel engine specifically designed for industrial transportation with diesel-like performance.

Cursor 9 Natural Gas Euro VI specifications

Architecture:	6 Cylinder in line
Injection System:	Multipoint Injection with Stoichiometric Combustion
Air Handling:	Wastegate Turbocharged with Aftercooler
Valves per cylinder (number):	4
Displacement (L):	8.7

Bore per Stroke (mm):	117x135
Max Power hp (kW) @ rpm:	400 (294) @ 2,000
Max Torque (Nm @ rpm):	1,700 @ 1,200
Dry Weight (kg):	870
Dimensions L / W / H (/mm) (bus):	1,186 / 902 / 981
Dimensions L / W / H (/mm) (truck):	1,181 / 1,001 / 1,079

NEF N60 Natural Gas



From the NEF family, the N60 NG is the most compact and efficient solution for buses, coaches and trucks from 6 to 18 tons. The 6-cylinder, 6-liter engine can reach maximum **power of 150 kW (204 hp) @ 2700 rpm** and **maximum torque of 750 Nm @ 1400 rpm** with any load, on any route.

Compared to the Diesel version, the N60 NG **saves up to 30% of the fuel cost**. Its reliability and easy serviceability contribute to low maintenance costs, and the oil change intervals reach up to 30,000 km.

NEF N60 Natural Gas specification

Architecture:	6 Cylinder in line
Injection System:	Multipoint Injection with Stoichiometric Combustion
Air Handling:	Wastegate Turbocharged with Aftercooler
Valves per cylinder (number):	2
Displacement (L):	5.9
Bore per Stroke (mm):	102 x 120
Max Power hp (kW) @ rpm:	204 (150) @ 2,700
Max Torque (Nm @ rpm):	750 @ 1,400
Dry Weight (kg):	520
Dimensions L / W / H (/mm):	1,095 / 902 / 875

F1 C Natural Gas

The F1 C Natural Gas is the **best-selling NG engine for light commercial vehicles**, as it offers the same robustness and reliability as a Diesel engine. The 3-liter engine provides **maximum power of 100 kW (136 hp) and maximum torque of 350 Nm**.

The F1 C NG was launched in 2006 and re-engineered in 2017 to include more technological innovations. It can reduce costs by up to 35% and, when compared to similar competitor products, it delivers higher torque, better transient response, lower noise and vibration and more durability.

F1C Natural Gas Euro VI Specifications

Architecture:	4 Cylinder in line
Injection System:	Multipoint Injection with Stoichiometric Combustion
Air Handling:	Wastegate Turbocharged with Aftercooler
Valves per cylinder (number):	4
Displacement (L):	3.0
Bore per Stroke (mm):	96 x 104
Max Power hp (kW) @ rpm:	136 (100) @ 3,500
Max Torque (Nm @ rpm):	350 @ 1,500
Dry Weight (kg):	245
Dimensions L / W / H (/mm):	745 / 695 / 750

FPT Industrial is a brand of CNH Industrial, dedicated to the design, production and sale of powertrains for on and off-road vehicles, marine and power generation applications. The company employs more than 8,000 people worldwide, in ten manufacturing plants and seven R&D Centres. The FPT Industrial sales network consists of 73 dealers and about 800 service centres in almost 100 countries. A wide product offering, including six engine ranges from 42 hp up to 1,006 hp, transmissions with maximum torque of 200 Nm up to 500 Nm, front and rear axles from 2 to 32 ton GAW (Gross Axle Weight). FPT Industrial offers the most complete Natural Gas engines line-up on the market for industrial applications, including engine ranges from 136 hp up to 460 hp. This extensive offer and a close focus on R&D activities make FPT Industrial a world leader in industrial powertrains. For further information, visit www.fptindustrial.com.

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