

New Heavy-Duty Engine Technology

Cummins unveils new 15-liter hydrogen engine

BY DAVE HAGEN

Last May, Cummins Inc. presented a new 15-liter hydrogen engine to the trucking world. The revelation came during the three day Advanced Clean Transportation (ACT Expo) event in Long Beach, California.

According to the company, the X15H engine is part of a new fuel-independent platform from Cummins. This version of its 15 liter engine is expected to be fully produced in 2027 and combines clean hydrogen fuel with zero carbon emissions.

“We have set significant targets as part of our PLANET 2050 sustainability strategy, including a zero emissions target. According to the company, the plan “includes quantifiable goals for 2030 and long-term visionary aspirations for 2050.”

“Reducing well-to-wheel carbon emissions requires innovation in energy sources and energy solutions. While the use cases for battery and fuel cell electric motors are promising, pairing green hydrogen in proven combustion engine technology internal design provides an important complement to future zero-emission solutions,” said Srikanth Padmanabhan, President, Engine Business, Cummins Inc.

The first tests of the hydrogen internal combustion technology were carried out by Cummins in July 2021 and the company says that the initial results were “impressive”, reaching the production power and torque targets (torque greater than 111.9 Nm and 290 engine hp for medium duty). According to Cummins itself, “additional testing on more advanced prototypes will begin shortly”. The company’s goal is to leverage its broad global manufacturing presence to scale production quickly.

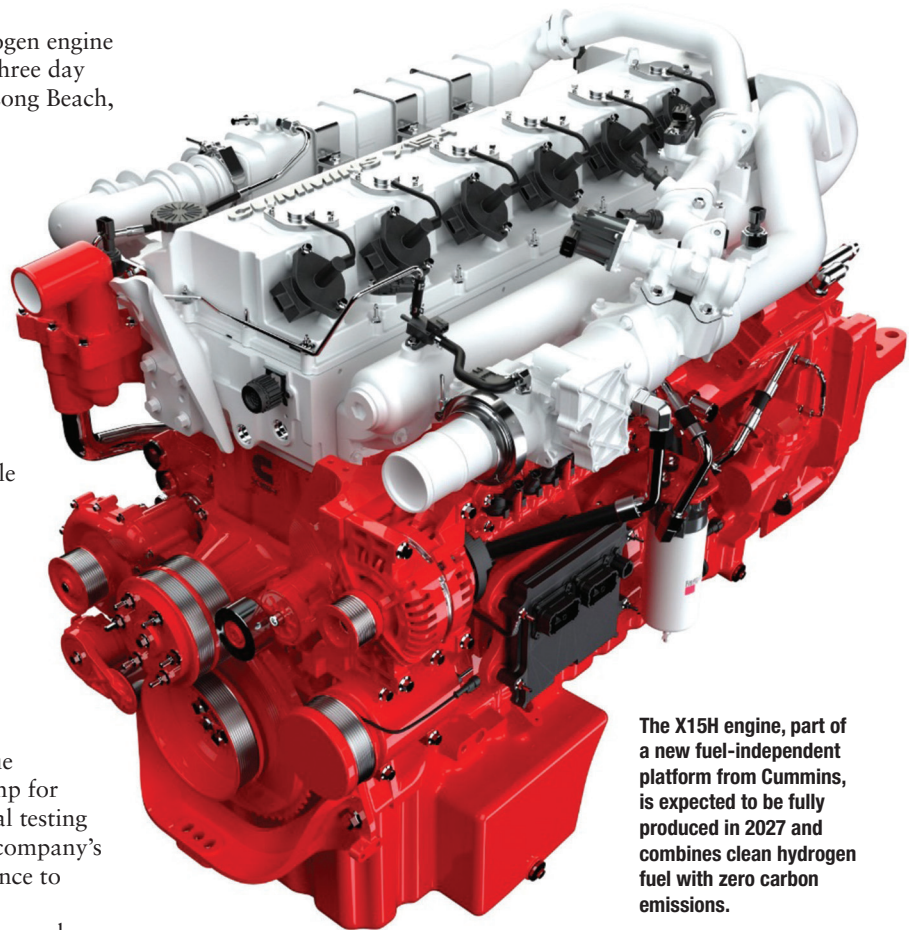
Cummins believes that the adoption of hydrogen-powered vehicles can be driven by “high technology maturity, low initial cost, extended vehicle range, rapid fueling, uniformity of powertrain installation and end-user familiarity.”

Technologies for a ‘greener’ future

In addition to the new X15H engine, Cummins showcased other technologies that can contribute to reducing pollutant emissions:

X15N: The engine offers reduced size and weight compared to diesel, as well as nearly identical power and torque curves. Building on 30 years of experience in producing natural gas engines, this solution begins production in the US in 2024.

B6.7 Propane: This engine is the industry’s first medium-duty turbocharged spark ignition platform for fuels propane. It builds on the legacy of Cummins’ legendary B-Series platform and delivers diesel-like durability and performance. Another attraction is the lower total cost of operation than any propane motor on the market. The B6.7 Propane engine aims for ultra-low



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NOx certification at launch, meeting EPA and CARB emission regulations for 2024 and 2027. As shown in the graphic above the popular B6.7 will be available in five fuel choices including gasoline and hydrogen.

Cummins Clean Fuel Technologies Fuel Systems: Natural gas fuel system configurations integrate with a variety of bodywork factory equipment and include cab-rear, front-body, side-mount, roof-mount, and roof-mount systems. back cover. Truck applications include garbage, road, construction, port and beverage delivery, among others.

Fuel Cell Electric Prototype: The fuel cell and battery electric power system is designed for professional applications such as urban delivery operations, port transportation and terminal container handling. The truck uses an electric power train, which is powered by high voltage batteries and fuel cell engines.

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The system operates the dual fuel cell engines and dynamically manages the charging of high voltage batteries as required by the power load demands of vehicle operation.

Energy storage is carried out in seven hydrogen fuel tanks, which result in a total of 32 kg of hydrogen gas compressed at 350 bar. The system is equipped with seven high-voltage batteries (each with a capacity of 53.4 kWh), providing a range of approximately 200 miles - or 320 km.

Continuing to show its commitment to the future Cummins recently announced it has joined the Hydrogen Engine Alliance, an initiative bringing together industry representatives across Europe to support the research and development of sustainable hydrogen internal combustion engine technology.

Cummins joins the alliance with significant experience in developing and manufacturing internal combustion engines, as well as in hydrogen fuel cell,



X15
Clean Diesel
Natural Gas
Hydrogen



L9
Clean Diesel
Natural Gas
Hydrogen



B6.7
Clean Diesel
Natural Gas
Gasoline
Propane
Hydrogen

battery electric and drivetrain component technologies. The company recently announced the development of a fuel-agnostic engine range which will include hydrogen internal combustion engines in 6.7 to 15 liter displacement for both on-road and off-road applications. In addition, the company's joint venture partnership with hydrogen storage specialist NProxx adds an important resource in terms of integrating hydrogen engines with onboard

gas tanks and the vehicle's fuel supply system.

Jonathan Atkinson, Cummins executive director, On-Highway Europe, commented, "We are delighted to participate in the Hydrogen Engine Alliance and look forward to working together with fellow members to advance decarbonization of the power industry. Internal combustion engines are efficient, robust and can operate continuously under heavy load – attributes that will carry forward with hydrogen fuel. These advantages, combined with CO² neutrality, means hydrogen has the potential to play a significant role in decarbonizing both commercial and industrial applications."

Alongside Cummins, the Hydrogen Engine Alliance comprises of major automotive companies, industry suppliers and academic institutions including Bosch, Daimler Truck and Karlsruhe Institute of Technology.

"While we face headwinds related to the COVID-19 pandemic, supply-chain

4.6, 5.4, 6.8 MODULAR FORD Hard-to-Find Engine Parts

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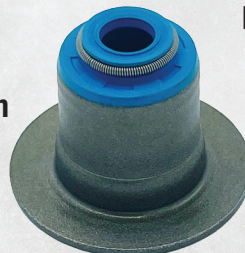
Head Bolt 4.6, 5.4, 6.3L
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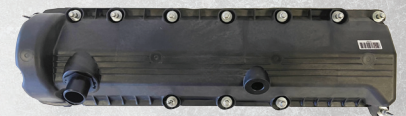


Exhaust Manifold Stud Torx
#FM3902

Exhaust Manifold Nut
#FM1706



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Right #DC2Z6582C
(includes bolts, gasket)



Left #DC2Z6582D
(includes bolts, gasket)



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disruption, raw materials cost increases and more, our team in North America continues to rise to meet those challenges and support growth and recovery of the business here in the region,” says Mike Mansuetti, president of Bosch in North America, which posted sales of \$13.5 billion last year.

“We are all-in for the hydrogen economy,” Mansuetti says, including development of mobile fuel cells for heavy-duty trucks, electrolysis, and stationary fuel cells for home or commercial uses such as heating.

“Our hydrogen portfolio is expansive across multiple domains in a way no other company can match. This cross-domain knowledge will enable Bosch to lead when it comes to driving hydrogen as a climate-neutral solution. And we are committed to local production of hydrogen solutions in the North American region in the coming years,” he says. Globally, Bosch will increase its capital spending for mobile fuel cells to more than \$1 billion between 2021 and 2024.

Last spring Stellantis announced that it would be looking at offering a hydrogen-



powered Ram Heavy Duty pickup sometime later this decade. The automaker has slowly been implementing hydrogen-powered commercial vans over the past year in Europe, showing that Stellantis is not just focusing on electrified vehicles as its only option for zero-emission freedom.

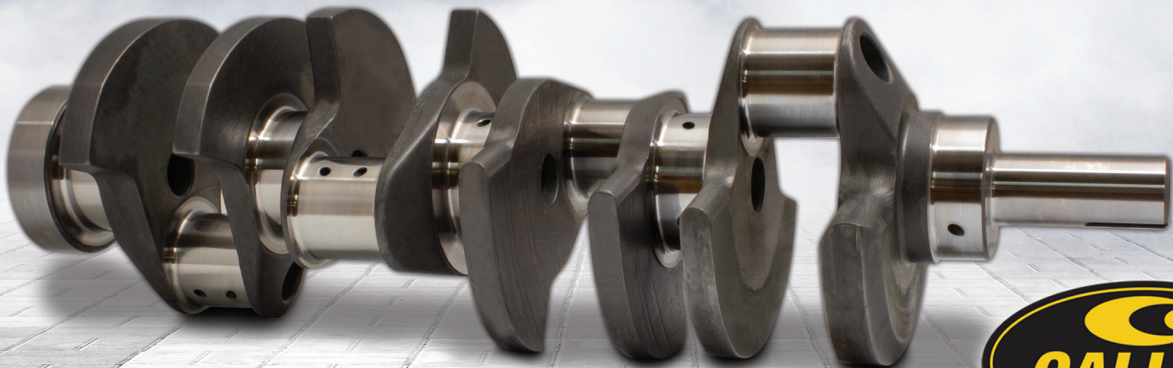
That offering in the Ram Heavy Duty pickups may be sooner than expected if one believes a recent post from a Cummins Facebook page: “Check out this n(ICE) addition to our corporate lobby! @Cummins is testing a 6.7-liter and 15-liter hydrogen internal combustion engine (ICE), the X15H, which is currently on display at our Corporate Office Building (COB) in Columbus, IN (US). Hydrogen ICE engines provide a low cost zero-carbon solution and are capable of virtually eliminating CO2 emissions.” ■



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