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## **MAN Engines: The first dual fuel hydrogen engines in use on a work boat**

### **Retrofit of V12 marine diesel engine; 749 kW output; up to 80% CO<sub>2</sub> reduction**

On 10th May 2022, MAN Engines put its first two dual fuel hydrogen-powered engines for work boats into serial operation. These comprise two twelve-cylinder diesel engines of type MAN D2862 LE448, each with an output of 749 kW (1019 hp) at 2100 rpm. The engines are IMO Tier III-certified and equipped with a Selective Catalytic Reduction exhaust gas aftertreatment system. Both V12 engines have been prepared for dual fuel operation by MAN Engines, and supplemented with a hydrogen injection system by development partner CMB.TECH. The low-emission engine is used on the world's first hydrogen-powered crew transfer vessel (CTV), the "Hydrocat 48" from Windcat Workboats.

"What's special about our technology is that we use a conventional diesel engine, which doesn't need to be optimised for hydrogen," says Werner Kübler, Head of Development at MAN Engines. A proven V12 marine engine is thus used in which hydrogen is introduced into the charge air via an adapter and is added to the combustion cycle. The combustion process is thereby started according to the diesel principle, which requires the injection of approx. 5% of diesel fuel. The diesel fuel common rail injection parameters have been optimised here for dual fuel operation. "MAN Engines has long-standing experience in the development of fuel-saving and reliable diesel engines, including for work boats. Building on this experience, we were also able to achieve the best consumption values in dual fuel operation, and ensure the same operating behaviour as displayed by diesel operation at full load. At the same time, we also reduce CO<sub>2</sub> tailpipe emissions through the use of hydrogen by an average of approx. 50%, and even up to 80% as a peak value," adds Kübler.

MAN Truck & Bus is one of Europe's leading commercial vehicle manufacturers and transport solution providers, with an annual revenue of just under 11 billion euros (2021). The company's product portfolio includes vans, trucks, buses/coaches and diesel and gas engines along with services related to passenger and cargo transport. MAN Truck & Bus is a company of TRATON GROUP and employs more than 34,000 people worldwide.

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A further advantage of using the conventional and sophisticated diesel engine is the accustomed easy handling when it comes to maintenance and service. Moreover, pure diesel operation can continue without interruption if the hydrogen supply is exhausted, for instance. Availability, driving comfort and operational safety are thus always guaranteed at the high level that a traditional diesel engine is known for.

MAN Engines offers its customers and partners solutions like the “MAN Smart HYBRID Experience” hybrid system or engines for gas/electric drives, to contribute to CO<sub>2</sub> reduction and sustainable shipping. Now that the MAN D2862 LE448 dual fuel engines for work boats are ready for series production, a further milestone has been reached to that effect. “By starting with dual fuel combustion engines, we can make hydrogen technology operational in the industry and kick-start further development of the technology, regulation, supply chain, etc.,” says Willem van der Wel, Managing Director of Windcat Workboats.



### **About MAN Engines**

MAN Engines – a business unit of MAN Truck & Bus – develops, manufactures and sells diesel and gas engines of excellent quality for an endless array of applications such as commercial vehicles, power generation and cogeneration systems, agricultural machinery, rail, marine and special-purpose vehicles. MAN Engines supports volume manufacturers with medium and high requirements as well as manufacturers with individual and tailor-made solutions with its pioneering products.

### **About the Hydrocat 48**

The Hydrocat is the first hydrogen-powered CTV whose technology reduces more than 50% of its traditional fuel usage. The Hydrocat is a further “green development” based on an already very fuel efficient and high performing Windcat MK3.5 hull design. The Hydrocat is a vessel that excels in vessel performance, safety and comfort. In addition, noise levels have been reduced to extremely low values (65 dB) at maximum speed for extra comfort by separating the passenger area from the main structure. The Hydrocat is numbered 48 because it follows on from the series of vessels of the Windcat MK3.5.

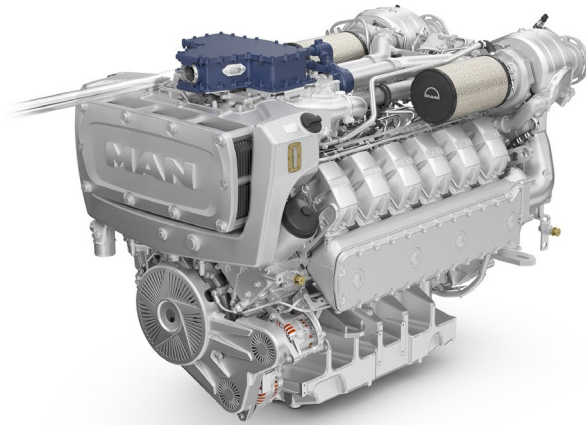
### **About CMB and CMB. TECH**

CMB (Compagnie Maritime Belge) is a diversified shipping and logistics group based in Antwerp, Belgium. CMB owns and operates 147 seagoing vessels in dry bulk (Bocimar), container transport (Delphis), chemical tankers (Bochem) and crew transfer vessels (Windcat). CMB is also active in cleantech (CMB. TECH) and real estate (MCA Facilities, Maritime Campus Antwerp). CMB has offices in Tokyo, Singapore, Hong Kong, Germany (Hamburg), UK (Lowestoft and Brentwood) and The Netherlands (Amsterdam). CMB.TECH is a cleantech company that builds, owns, operates and designs large marine and industrial applications that run on hydrogen and ammonia. CMB.TECH also offers hydrogen and ammonia fuel to its customers, either through its own production or by sourcing it from third party producers.

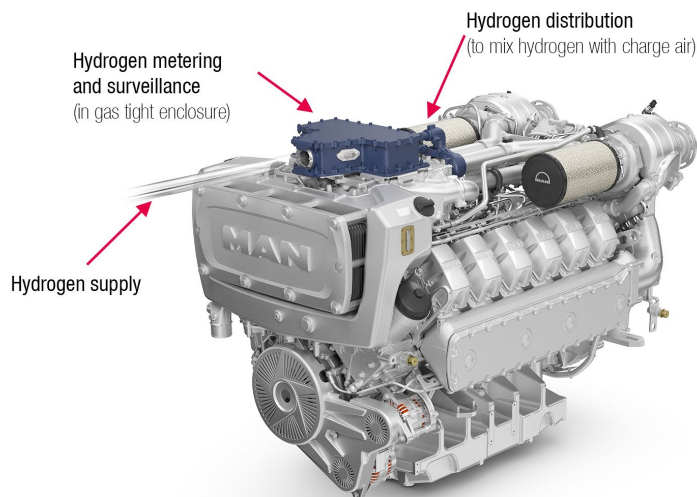
### **About Windcat Workboats**

Windcat Workboats owns and operates a growing fleet of over 48 offshore crew transfer vessels, mainly in the European offshore wind sector, but also in the oil and gas industry and outside Europe. The vessels are designed and built by ourselves and, as such, include over 19 years of experience in the field. The vessel’s layout and propulsion is optimised to transfer personnel offshore in a safe and comfortable environment.

**Images:**



*For dual fuel operation with hydrogen and/or diesel fuel, MAN Engines has converted a conventional diesel engine of type MAN D2862 LE428 into the D2862 LE448.*



*Only the hydrogen injection system (shown here in blue) has been retrofitted. The output, operating behaviour and other characteristics of the diesel engine remain unchanged.*



*Compact diesel engine for dual fuel operation. The MAN D2862 LE448 – 749 kW (1029 hp) at 2100 rpm.*

