



## **Giant, Offshore-Installation Vessel Features Powerful, MAN Tier-III, Dual-Fuel Propulsion Package**

12 x 51/60DF engines + SCR exceed emission requirements

MAN Diesel & Turbo has signed a contract with Sembcorp Marine in Singapore to supply the dual-fuel propulsion system – including exhaust-gas after-treatment – for a New Semi-submersible Crane Vessel (NSCV) for Heerema Offshore Services.

The scope of the contract – signed on 30 October, 2015 – provides for 12 x MAN 8L51/60DF four-stroke engines + 12 x MAN SCR (Selective Catalytic Reduction) systems. MAN Diesel & Turbo states that the total power output of the engines is some 96 MW and believes it – with the exception of power barges – to be one of the largest engine installations the world has ever seen aboard a single ship. Certainly, it is the first vessel of this size to feature dual-fuel technology and, upon completion, will be the largest vessel of its kind globally. Engine delivery is scheduled for Q1, 2017 with vessel delivery due in Q4, 2018.

This highly efficient package ensures full fuel-flexibility and still more than meets NO<sub>x</sub> Tier III emission limits at all times – whether within Tier III zones or not – both during operation on LNG, as well as during operation on MGO with the help of the SCR system. MAN Diesel & Turbo states that the engines maintain their high efficiency – also during SCR operation – through integrated and customised control strategies.

“The entire project has special requirements in all aspects – it is absolutely a customised solution and a notable feather in our cap to have been selected as propulsion-system supplier for this unique vessel”, commented Lex Nijsen – Head of Four-Stroke Marine – MAN Diesel & Turbo. “This is not just the largest, dual-fuel propulsion system ever featured on a single vessel, it also ensures Tier-III compliance in all operational scenarios, whether in gas- or MGO-modes, and whether within or without NO<sub>x</sub> Tier III-controlled areas. The solution MAN Diesel & Turbo is delivering to Sembcorp Marine and Heerema is reliable, efficient, flexible and meets the highest safety and environmental standards.”

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**MAN Diesel & Turbo SE**  
Teglhølmegade 41  
DK-2450 Copenhagen SV  
DENMARK  
[www.mandieselturbo.com](http://www.mandieselturbo.com)

### **Marketing & Documentation**

Further information:  
Peter Dan Petersen  
Tel.: +45 33 85 14 70  
[peterd.petersen@man.eu](mailto:peterd.petersen@man.eu)

Graphics and images:  
Mia Glarborg  
Tel.: +45 33 85 15 90  
[mia.glarborg@man.eu](mailto:mia.glarborg@man.eu)



### **51/60DF special characteristics**

A key determinant in the choosing of the 51/60DF engine was its ability to fulfill the particularly high load-ramp requirements demanded by the NSCV's giant 2 x 10,000 ton cranes in both diesel and gas modes while maintaining its efficiency.

Another key characteristic of the four-stroke unit is its ability to operate at 100% MCR and above, in gas mode, and to switch smoothly and seamlessly from gas to liquid-fuel operation (and vice versa) at full load without any fluctuation in output or speed. These are all essential features to satisfy the NSCV's vital DP-3 (dynamic positioning) station-keeping requirement.

Furthermore, with the aim of becoming the most environmentally friendly crane vessel ever built, operation will be on ultra-low sulphur fuel, a fuel type that the 51/60DF readily handles.

### **Perpetual green operation**

The prospect of individual countries and regions designating so-called Emission Control Areas (ECAs) in advance of the IMO Tier III starting date is now a reality with the first NO<sub>x</sub> ECA\* being the U.S. and Caribbean Sea from January 1, 2016 and more to follow.

MAN Diesel & Turbo's SCR system provides an integrated solution for its entire portfolio of four-stroke engines and serves as a standard solution to meet Tier III emission limits.

The SCR system is available in fourteen different sizes, in this way fully covering its entire portfolio of medium-speed engines. For the design and development of the MAN SCR System, MAN Diesel & Turbo brought together a diverse range of competences.

Special system features include:

- communication with the engine control system that optimises the temperature for the SCR system at individual load-points
- integration of the SCR control system into the overall engine control system
- adaptation of injection control from MAN with electronic fuel injection



- general system reliability.

The MAN SCR solution is a modular system, with the built-in flexibility to adjust to the NSCV's particular requirements such as its long exhaust-gas lines, the distance between the SCR and engine. Nor does the SCR system negatively affect load-ramp requirements. In this respect, MAN's SCR is very much a customised solution.

### **Onboard layout**

With a length of 220 metres and a width of 102 metres, the NSCV will be the world's largest crane vessel. Despite these impressive dimensions, optimally locating the engines and SCR systems aboard proved a challenge, one which MAN Diesel & Turbo and the flexibility of the SCR system helps resolve. The vessel features four engine rooms, each with 3 x MAN 8L51/60DF engines.

The integration of SCR and engine-control system enables the SCR to be operated at a relatively low exhaust-gas temperature, which is the basis for a high engine efficiency, and enables the SCR to be positioned further away from engines. In this way, no compromises have to be made with the vessel layout and the SCR systems will be positioned under the ship's funnel in a vertical arrangement, some 80 metres away from the engines.

### **Vessel applications**

The dual cranes will provide the heavy lifting capacity to install and remove offshore facilities and be utilised for the installation of subsea structures, foundations, moorings and floating structures in deep water. Each crane will be capable of lifting 10,000 tonnes in revolving mode, making them the largest offshore cranes in the world.

When the new vessel enters operation, MAN Diesel & Turbo will be able to lay claim to powering several of the largest vessels in the offshore segment.



### **About Heerema Offshore Services**

Heerema Offshore Services is a subsidiary of Heerema Marine Contractors (HMC), a world leading marine contractor in the international offshore oil and gas industry. HMC excels at transporting, installing and removing offshore facilities. These include fixed and floating structures, subsea pipelines and infrastructures in shallow waters, deep and ultra-deep waters. The company is headquartered in Leiden, the Netherlands.

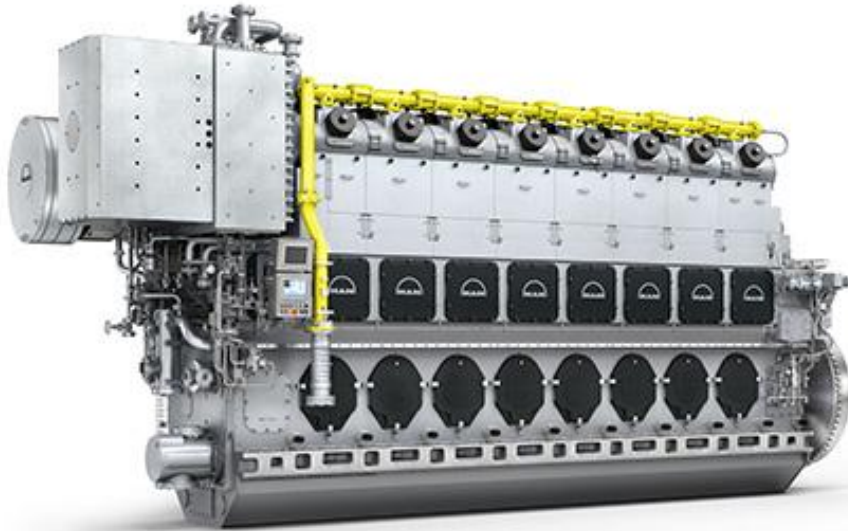
### **About Sembcorp Marine**

Sembcorp Marine provides innovative engineering solutions to the global marine and offshore industry, drawing upon more than 50 years of track record. It focuses on four key capabilities, namely, rigs & floaters; repairs & upgrades; offshore platforms; and specialised shipbuilding.

Customers include major oil companies, drilling contractors, shipping companies as well as owners and operators of floating production units.

Sembcorp Marine operates shipyards strategically located in Singapore, India, Indonesia, the United Kingdom and Brazil.

[www.sembmarine.com](http://www.sembmarine.com)



*Library picture of the MAN 8L51/60DF four-stroke engine*

*\*More explicitly, the Tier III zone entering into force on 1 January 2016 encompasses the US and Canada, including the French islands of St. Pierre and Miquelon, but excluding the Arctic Sea and seas towards Greenland. Similarly, the new Tier III zone includes that part of the Caribbean Sea that encircles USA territory, that is, the islands of Puerto Rico and the US Virgin Islands. All other US/Caribbean areas remain under Tier II limits.*



*Graphical rendering of Heerema's NSCV and its prominent cranes*

**About MAN Diesel & Turbo**

MAN Diesel & Turbo SE, based in Augsburg, Germany, is the world's leading provider of large-bore diesel engines and turbomachinery. The company employs around 14,500 staff at more than 100 international sites, primarily in Germany, Denmark, France, Switzerland, the Czech Republic, India and China. The company's product portfolio includes two-stroke and four-stroke engines for marine and stationary applications, turbochargers and propellers as well as gas and steam turbines, compressors and chemical reactors. The range of services and supplies is rounded off by complete solutions like ship propulsion systems, engine-based power plants and turbomachinery trains for the oil & gas as well as the process industries. Customers receive worldwide after-sales services marketed under the MAN PrimeServ brand.

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