

MAN B&W ME-B Engines

Stronger, Shorter, Lighter



Engineering the Future – since 1758.

MAN Diesel & Turbo





The MAN B&W ME-B engine series offers optimal engine performance in powerful, economic, weight-saving and future-oriented diesel engines, ensuring that the MAN Diesel & Turbo design will remain market leader for decades to come.

Stronger, Shorter, Lighter

The MAN B&W ME-B engine

The shipping market is dynamic and constantly requires more competitive propeller systems and engines, allowing the lowest possible propeller speeds, lower fuel and lube oil consumption. At the same time, more flexibility in regard to emissions and adjustment of engine parameters is required, which calls for an evaluation of design parameters, engine controls and layout.

In tune with the market acceptance of electronically controlled engines turning into a market demand, MAN Diesel & Turbo introduced the engine series, designated ME-B.

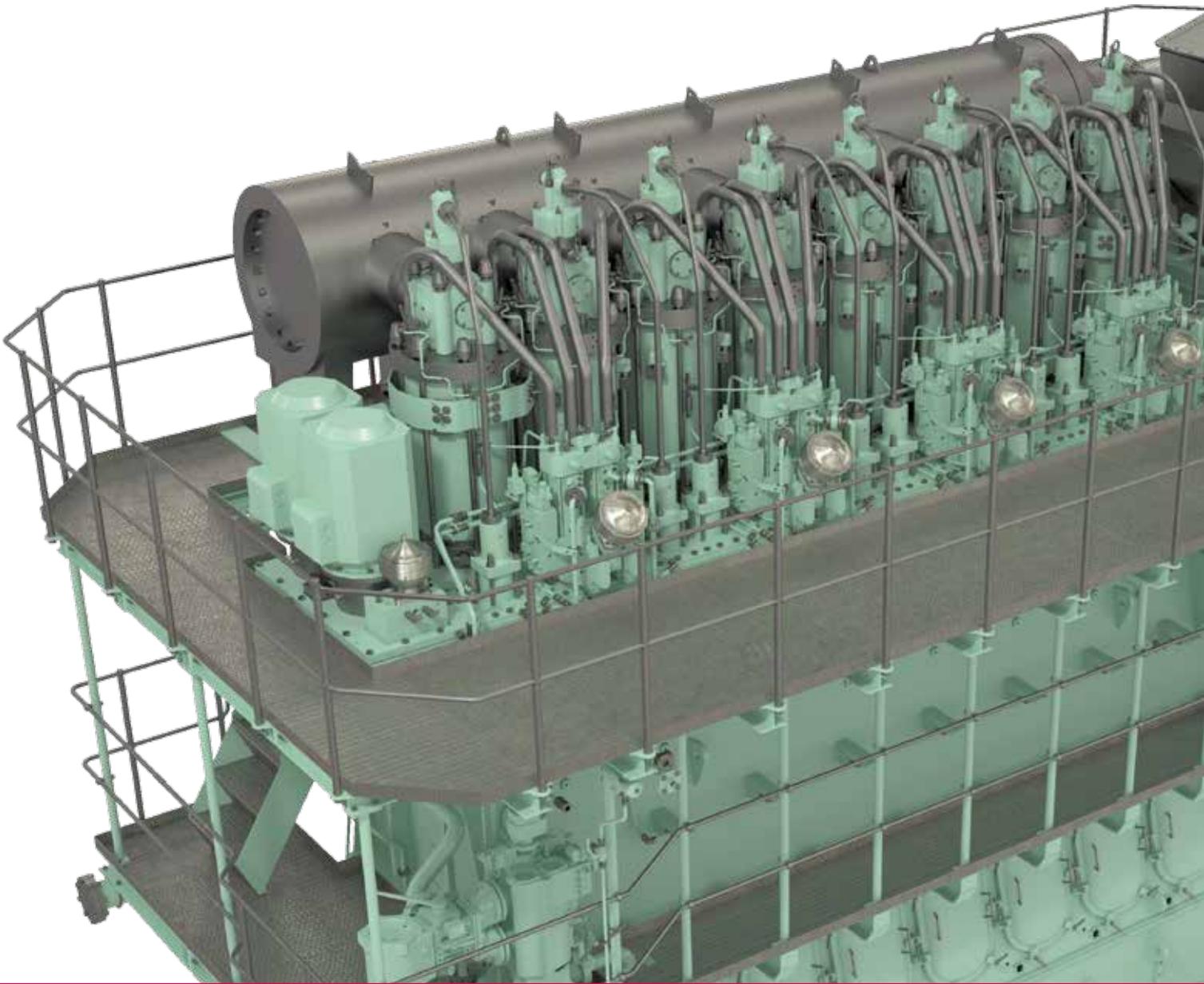
MAN Diesel & Turbo is using the ME-B series to broaden the application of the ME concept in its two-stroke engines, using the electronic, fuel injection control already introduced in its large bore, ME-C engines.

The ME-B design is based on that of the existing, mechanical MC-C range – the market's most popular two-stroke diesel engines ever – but represents an upgrade with electronic controls that provide improved operational economy and flexibility, and manoeuvrability.

The ME-B series is the optimal solution of a concerted evaluation of cost, emissions and oil consumption. MAN Diesel & Turbo introduced the ME-B series in mid-2006 with the S35ME-B9, S40ME-B9 and S50ME-B9, and later followed by the S46ME-B8, S50ME-B8 and S60ME-B8 engines. Subsequently, the series has been expanded with the launch of the new MAN B&W S30ME-B9 and the ultra-long-stroke G40ME-B9, G45ME-B9 and G50ME-B9 engines, with the result that the entire ME-B programme now comprises a total output range from 3,200 kW to 19,040 kW.

8S35ME-B9 Engine

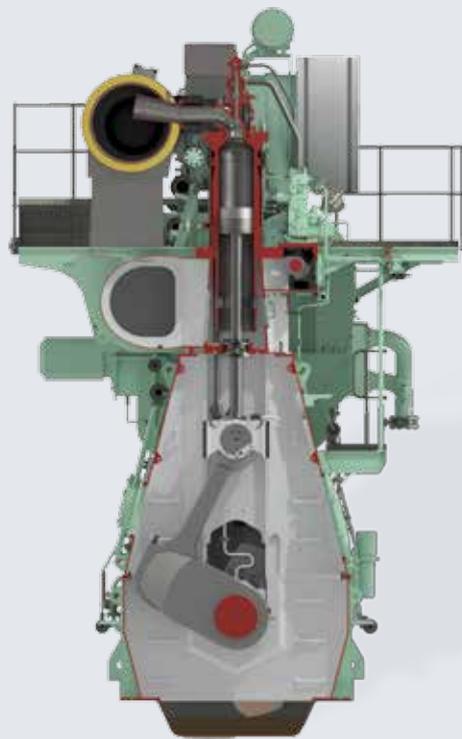
Engine benefits





Based on well-proven diesel technology, the ME-B series provides engines geared to market requirements for:

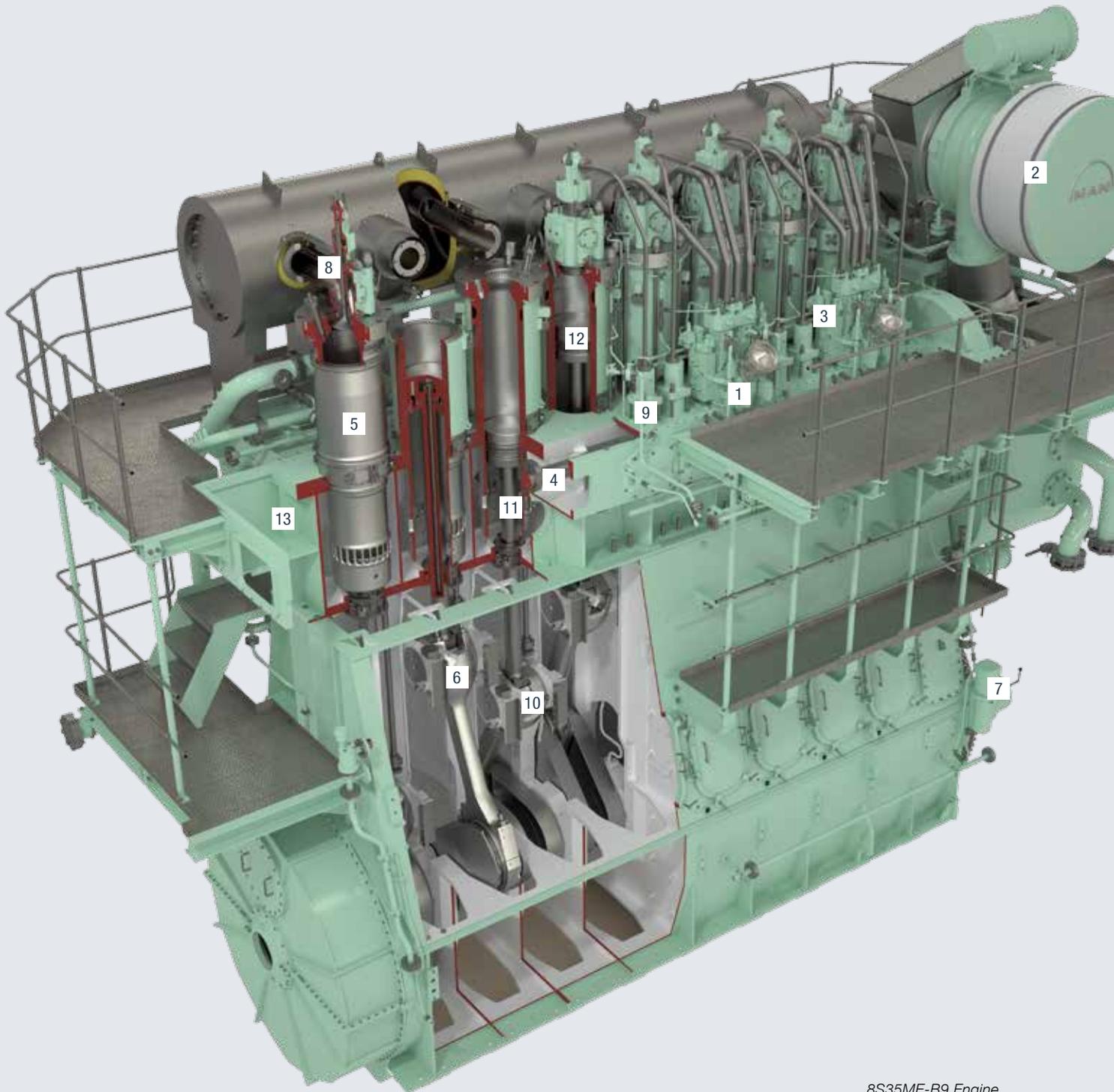
- Electronic fuel injection control
- Fuel economy
- High power reliability
- Longer time between overhauls
- Low propeller speed
- Better vessel manoeuvrability
- Very low life cycle costs
- Tier II emissions compliance.



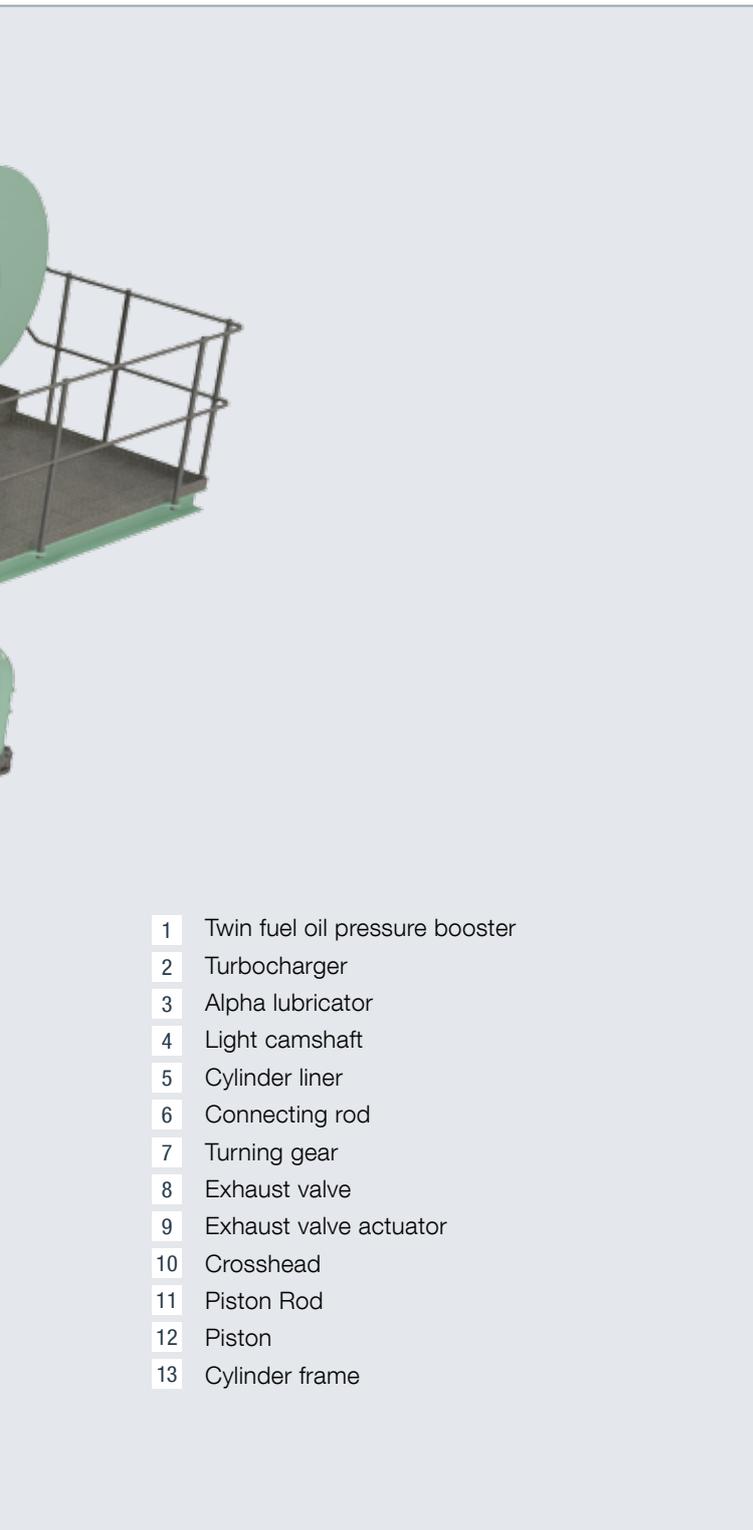
8S35ME-B9 Engine

8S35ME-B9 Engine

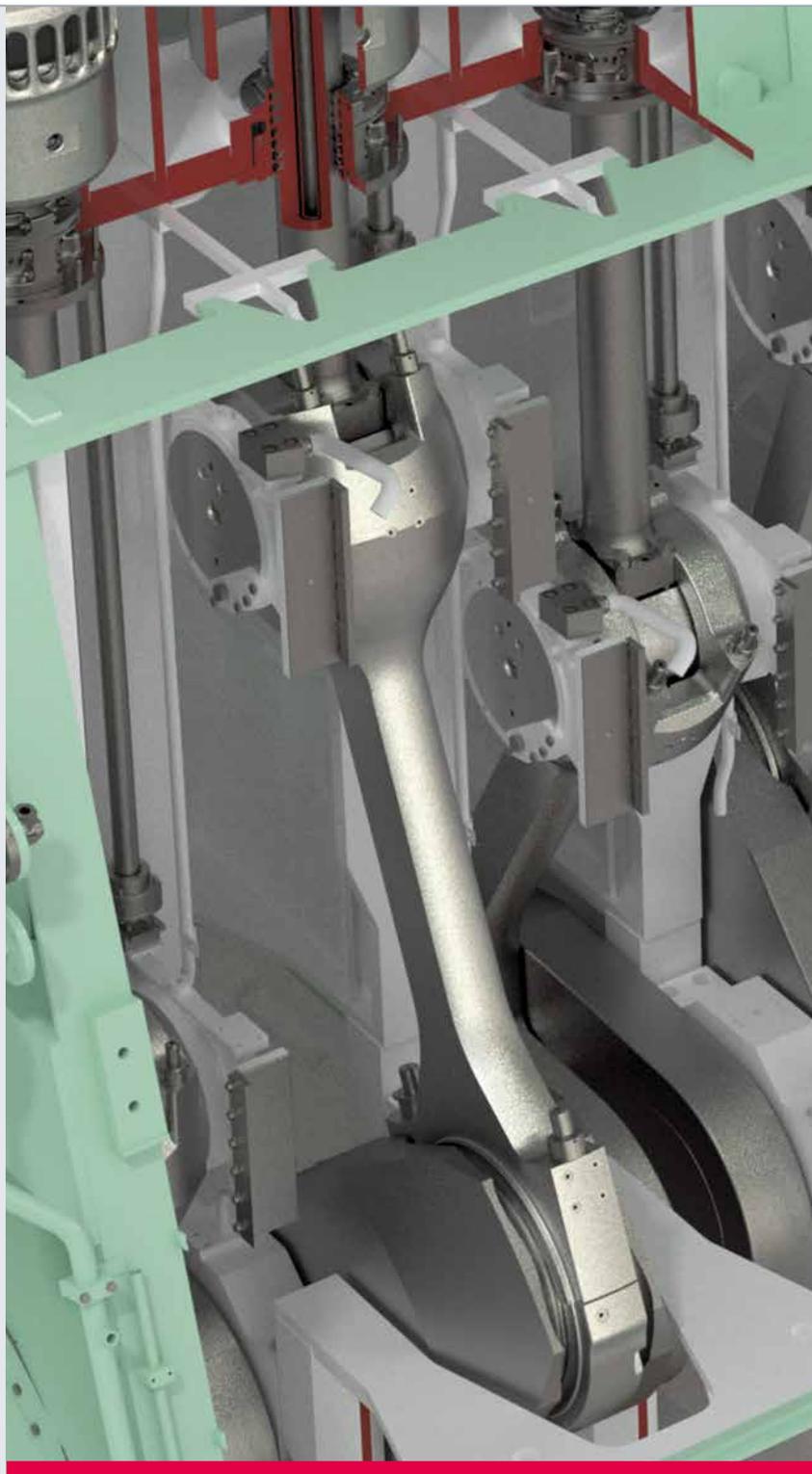
Engine components



8S35ME-B9 Engine



- 1 Twin fuel oil pressure booster
- 2 Turbocharger
- 3 Alpha lubricator
- 4 Light camshaft
- 5 Cylinder liner
- 6 Connecting rod
- 7 Turning gear
- 8 Exhaust valve
- 9 Exhaust valve actuator
- 10 Crosshead
- 11 Piston Rod
- 12 Piston
- 13 Cylinder frame



Emission

Tier II (IMO)



Inherent operational experience

The ME-B design is based on the experience gathered from MAN Diesel & Turbo's existing engine ranges, which are among the most popular engines available on today's market. The economical ME-B design represents an upgrade with an electronic controls that provide improved, operational economy and flexibility, and manoeuvrability, utilising electronically controlled fuel injection system among other technical innovations. The new ME-B engines are equipped with a new exhaust gas valve that enables control of the closing time of the exhaust gas valve and, thereby, lower fuel consumption at part-load.

Electronic fuel injection makes the new ME-B engines well-equipped to meet the new Tier II emission requirements, and is an efficient way of managing current, environmental emission requirements. The Alpha Lubricator also comes as standard with all ME-B

engines, ensuring a very low, cylinder lubricating oil consumption. Its advanced, electronic, user-friendly interface allows precise adjustment and helps secure longer time between overhauls.

Environmentally responsible technology

Indeed, MAN Diesel & Turbo has committed itself to making all its engines compatible with the limits established by the International Maritime Organisation (IMO) in its Tier II regulations.

To ensure that the electronically controlled ME-B range satisfies IMO regulations, MAN Diesel & Turbo has focused on advanced combustion rate shaping, a unique feature of the injection process of the company's ME system. Having addressed Tier II, MAN Diesel & Turbo will next turn its focus to ensure that its engines meet Tier III, successor to Tier II and due to come into force in a decade.

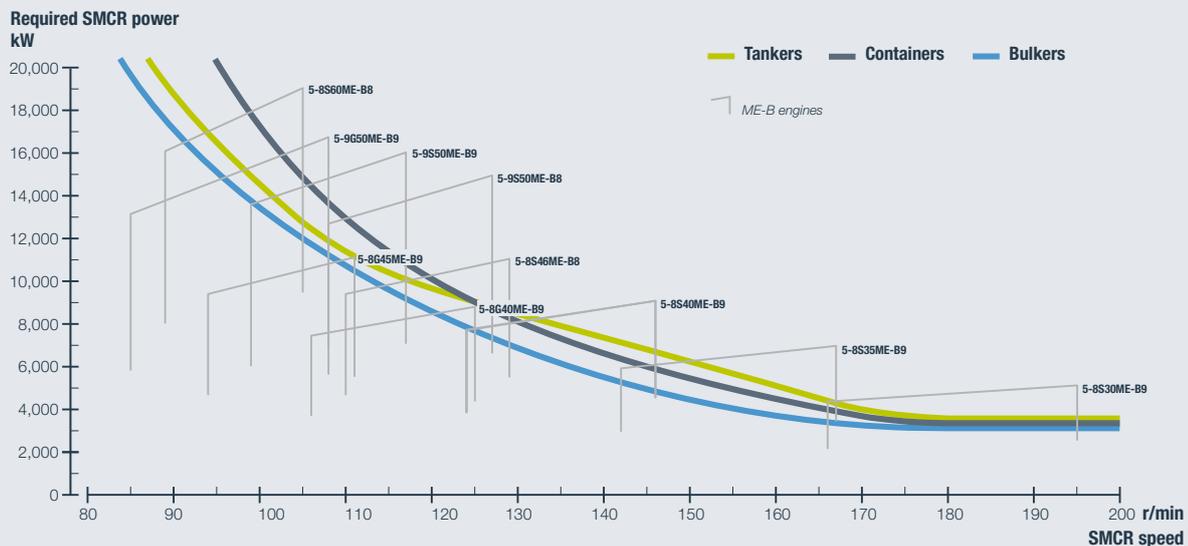
Engine Programme

MAN B&W ME-B engine

Tier II, MAN B&W ME-B engines – principal data (L₁)

	S60ME-B8	G50ME-B9	S50ME-B9	S50ME-B8	S46ME-B8
Cyl. No.	5-8	5-9	5-9	5-9	5-8
Bore (mm)	600	500	500	500	460
Stroke (mm)	2,400	2,500	2,214	2,000	1,932
MEP (bar)	20	21	21	20	20
Engine Speed (r/min)	105	100	117	127	129
Mean Piston Speed (m/s)	8.4	8.3	8.6	8.4	8.3
Power (kW)	11,900-19,040	8,600-15,480	8,900-16,020	8,300-14,940	6,900-11,040
SFOC (g/kWh)	168	168	168	169	170

	G45ME-B9	G40ME-B9	S40ME-B9	S35ME-B9	S30ME-B9
Cyl. No.	5-8	5-8	5-8	5-8	5-8
Bore (mm)	450	400	400	350	300
Stroke (mm)	2,250	2,000	1,770	1,550	1,328
MEP (bar)	21	21	21	21	21
Engine Speed (r/min)	111	125	146	167	195
Mean Piston Speed (m/s)	8.3	8.3	8.6	8.6	8.6
Power (kW)	6,950-11,120	5,500-8,800	5,675-9,080	4,350-6,960	3,200-5,120
SFOC (g/kWh)	169	174	174	175	176



Engine Data

MAN B&W ME-B engines

ME-B9

The Mark 9 series of engines have a stroke-bore ratio of 4.4:1 to facilitate a low propeller speed. This results in minimum speed values ranging from 166 rpm for the S30ME-B and down to 99 rpm for the S50ME-B, and even lower for the ultra-long-stroke G45ME-B and G50ME-B, i.e. 94 and 85 rpm respectively. The engines have all been introduced with a mean effective pressure of 21 bar.

ME-B fuel injection control system

The advanced fuel injection control is an efficient way of managing current and future environmental emission requirements, while maintaining an outstanding fuel economy down to 162 g/kWh. The Alpha Lubricator comes as standard, ensuring a very low cylinder lubricating oil consumption whose electronic, user-friendly interface allows precise adjustment.

Fuel injection is performed by one fuel booster per cylinder, similar to the present ME engine. The exhaust gas valve is equipped with a special exhaust actuator with a timing piston, and a control valve enables control of the closing time of the exhaust valve. Two electrically driven pumps provide the hydraulic power for the injection system. In case of failure of one pump, more than 50% engine power will be available, enabling around 80% ship speed.

The ME-B system has the same possibility rate-shaping as the existing ME engines and grants you the freedom to choose the injection profile to minimise the SFOC, while keeping emissions within given limits.

Bedplate, frame box and cylinder frame

The structural parts have been strengthened to accommodate the higher engine output with the bedplate using a well-proven, welded design. The engines' cast

parts are made from rolled steel plates, ensuring homogeneity and reducing the risk of casting imperfections.

Similarly, the frame box uses the tried and tested triangular, guide-plane design with twin staybolts giving excellent support to the guide shoe forces, while the cylinder frames are manufactured from nodular cast iron or welded design due to its high strength and high E-modulus that counteracts the high ignition force. When compared with grey cast iron, the weight of, for example, a 6S35ME-B cylinder frame, can be reduced by 3 tonnes.

FEM-calculations show that all deformations and stresses are lower or equal to that of MAN Diesel & Turbo's existing engine range, meaning the engine structure is as reliable as the existing engines, which have performed excellently.

Crankshaft

Even though the stroke/bore ratio has been increased for the mark 9 engines, the cylinder distance has been only slightly increased. Comprehensive FEM calculations ensure that the crankshaft geometry is optimised to hold rigidity, shrink-fit and stress values on a level with MAN B&W MC-C engines.

Connecting rod

The connecting rod is the one used in MAN Diesel & Turbo's entire small bore engine programme, while the ME-B combines elements of the MC-C and cross-head design to reduce oscillating forces.

Bearings

ME-B bearings are the same as those used successfully on MAN Diesel & Turbo's other engines for over 15 years, with the loads on the large bearings well below design targets.

Combustion chamber

This has been designed to accommodate the higher ignition pressure and thermal load, while simultaneously increasing the TBOs.

Cylinder liner

The ME-B series uses a slim cylinder liner, as used on MAN Diesel & Turbo's other MC-C/ME engines, but the material has been upgraded to counteract the higher firing pressure. A piston cleaning ring has also been introduced to prevent bore polish.

Piston

The piston is bore-cooled while the piston crown shape has been carefully designed to cope with the engines' increased power. All piston ring running surfaces are Alu-coated for safe running-in.

Thrust bearing

Due to the higher engine power, a flexible thrust cam has been introduced to obtain a more even load distribution on the pads. The smaller dimension of the parts allows for a more compact installation.

Turbocharger

ME-B engines can also be delivered with TCA turbochargers with variable nozzle ring technology (VTA) which facilitates the control of the scavenge air pressure, thereby reducing fuel consumption at part load.

Summary

The ME-B series offers optimal engine performance in powerful, economic, weight-saving and future-oriented diesel engines, ensuring that they will remain market leaders for decades to come. Based on well-proven

diesel technology, the ME-B series provides engines geared to market requirements for:

- Electronic fuel injection control
- Fuel economy
- Higher power reliability
- Longer time between overhauls
- Lower propeller speed
- Better manoeuvrability
- Very low life cycle costs.

ME-B8

In continuation of the introduction of the ME-B9 engines, MAN Diesel & Turbo has introduced the ME-B concept on its S46, S50 and S60 engines as an ME-B8 version. The ME-B8 design is based on the experience gathered from MAN Diesel & Turbo's existing engine ranges, among the most popular engines available on today's market with a combined total of over 3,000 engines in service. The economical ME-B8 design utilises a camshaft-operated exhaust valve and an electronically controlled fuel injection system. In addition, the physical dimensions of the S46- S50- and S60ME-B bedplates are identical to those of their MC-C and ME-C equivalents, greatly facilitating installation of the technology with the same footprint if required.

Electronic fuel injection equips the ME-B engines well to meet Tier II, and is an efficient way of managing current, environmental emission requirements.

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