

Marine Engine

IMO Tier II and Tier III

Programme 2nd edition 2017



Engineering the Future – since 1758.

MAN Diesel & Turbo



All data provided in this document is non-binding. This data serves informational purposes only and is especially not guaranteed in any way.

Depending on the subsequent specific individual projects, the relevant data may be subject to changes and will be assessed and determined individually for each project. This will depend on the particular characteristics of each individual project, especially specific site and operational conditions.

If this document is delivered in another language than English and doubts arise concerning the translation, the English text shall prevail.

| | Contents |
|---|------------------|
| MAN B&W Two-Stroke Propulsion Engines | 4 – 121 |
| Fuel oil and GI dual fuel engines | 18 – 107 |
| Alternative fuels Tier II and Tier III | 108 – 121 |
| MAN B&W Two-Stroke Propulsion Systems | 122 – 129 |
| MAN Four-Stroke Propulsion Engines | 130 – 165 |
| MAN Four-Stroke Marine GenSets | 166 – 191 |
| S.E.M.T. Pielstick Four-Stroke Mechanical and Diesel Electric Propulsion Engines | 192 – 193 |
| MAN Four-Stroke Propulsion Systems | 194 – 211 |
| MAN Turbochargers and Exhaust Gas Systems | 212 – 225 |
| MAN PrimeServ | 226 – 229 |
| Contacts | 230 – 241 |
| Headquarters | 232 – 233 |
| Worldwide Offices | 234 – 240 |
| Licensees | 241 – 245 |





MAN B&W Two-Stroke Propulsion Engines



Scan the code to get the Engine Programme app.



MAN B&W Two-Stroke Propulsion Engines

MAN Diesel & Turbo Tier II and Tier III Engine Programme

The two-stroke engines in this programme are either:

- Tier II engines complying with IMO Tier II
- Tier III engines complying with Tier II when operated in Tier II mode and with Tier III when operated in Tier III mode

Engine Type Designation

To ensure that the engine designation describes the engine with regard to the fuel injection concept and applied Tier III technologies, the engine type designation has been expanded to include these concepts, as described below (full designation, see page 16):

8S70ME-C10.5-GI-EGRBP

Tier III technology (EGRBP, EGRTC, HPSCR, LPSCR)
No designation = Tier II

Fuel injection concept (GI, GIE, LGIM, LGIP)
No designation = MDO/HFO

Tier III technologies and fuel injection concepts are explained in detail on page 11 (GI and LGI Dual Fuel Engines) and page 12 (Tier III Technologies).

ME-C engines

The electronic control of ME engines includes flexible control of the cylinder process, i.e. fuel injection timing and actuation of exhaust valves, starting valves and cylinder lubrication.

ME-B engines

On ME-B engines, the injection timing is electronically controlled whereas actuation of the exhaust valves is camshaft operated, but with electronically controlled variable closing timing.

CEAS and Turbocharger Selection (TCS)

CEAS and TCS applications include all available Tier II, Tier III technologies and dual fuel options. These applications include all available engines and variants, and specifications can be further investigated with respect to basic data essential for the design and dimensioning of a ship's engine room (CEAS) and applicable turbochargers (TCS).

MAN B&W Two-Stroke Propulsion Engines

CEAS and TCS are available at: www.marine.man.eu → Two-Stroke under *CEAS Engine Calculations* and *Turbocharger Selection*.

All engines in this programme are designated '.5' in CEAS and TCS, except the new G95ME-C9.6, S50ME-C9.6 and G50ME-C9.6 which are designated '.6' and can be selected from the category 'Official Catalogue'.

Earlier versions of this engine programme mention additional engine types. Some of these are still available in CEAS and TCS under the category 'Replaced Catalogue'. New development will only be implemented in these designs to the extent considered necessary based on service experience. New efficiency enhancing features will not be available on older engine types.

Engine Power

The engine brake power is stated in **kW**.

The power values stated in the tables are available up to tropical conditions at sea level, i.e.:

- turbocharger inlet air temperature 45°C
- turbocharger inlet air pressure 1,000 mbar
- cooling water (sea/fresh) temperature 32/36°C

Specific Fuel Oil Consumption (SFOC)

The figures in the two-stroke chapter represent the values obtained when the engine and turbocharger are matched to the lowest possible SFOC values while fulfilling the IMO NO_x Tier II or Tier III emission limits.

The SFOC figures are given in g/kWh and are based on the use of a fuel oil with a lower calorific value (LCV) equal to 42,700 kJ/kg at ISO conditions:

- turbocharger inlet air temperature 25°C
- turbocharger inlet air pressure 1,000 mbar
- cooling water temperature 25°C

Most commercially available HFOs with a viscosity below 700 cSt at 50°C can be used.

Tolerances

The energy efficiency design index (EEDI) has increased focus on part-load SFOC. Therefore, we offer the option of selecting the SFOC guarantee at a load point in the range from 50% to 100%. It is recommended that the SFOC guarantee point should be limited to the range 50% to 85% for part-load or low-load tuning methods.

MAN B&W Two-Stroke Propulsion Engines

All engine design criteria, for example heat load, bearing load and mechanical stress on the construction, are defined at 100% load, independent of the selected guarantee point. This means that turbocharger matching, engine adjustment and engine load calibration must also be performed at 100% load, independent of the guarantee point.

When choosing an SFOC guarantee at or below 100%, the tolerances, adjustment and calibration at 100% will affect engine running at the lower SFOC guarantee load point. This includes tolerances on measurement equipment, engine process control and turbocharger performance.

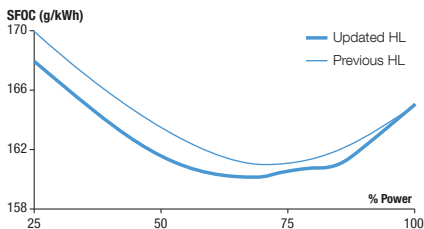
Consequently, SFOC guarantee tolerances are as follows:

- 5% tolerance for 100-85% engine load
- 6% tolerance for <85-65% engine load
- 7% tolerance for <65-50% engine load

Please note that the SFOC guarantee can only be given in one load point for Tier II engines. For Tier III engines see page 12.

Updated fuel consumption on selected engines

As a result of tests, the fuel consumptions of G95ME-C9.5, G90ME-C10.5, G80ME-C9.5 and S90ME-C10.5 engines have been updated. The graph below shows an example illustrating the improvement for a Tier II, L₁ rated G90ME-C10.5 engine in high-load (HL) optimisation.



The fuel consumption for Tier III options and dual fuel engines has also been updated. Similar improvements can be realised with part load and low load tuning. A general overview of the changes can be seen on the individual engine pages in this programme. For detailed information, please use the CEAS application

The above fuel consumption behavior also applies to the new engine type G70ME-C10.5 and the updated S50ME-C9.6 and G50ME-C9.6 type engines.

MAN B&W Two-Stroke Propulsion Engines

Turbocharging System

Two-stroke engines can be delivered with MAN, ABB or MHI turbochargers as standard.

The SFOC figures given in the two-stroke chapter are based on turbocharging with the best possible turbocharging efficiency generally available, which means 67% for all engines with 45-cm bore and larger, and 64% for engine bores smaller than 45 cm. Both efficiency figures refer to 100% SMCR.

Recently we have added exceptions to this rule. Today, the G40ME-C9.5 is available as a high-efficiency application offering all Tier II standard tunings and all Tier III options requiring a high-efficiency turbocharger.

The S40ME-B9 and S35ME-B9 type engines are also available as high-efficiency applications offered with high-load tuning and Tier III options with conventional-efficiency turbocharging.

Only engine specifications for which an applicable high-efficiency turbocharger is available are subject to firm order.

All Tier II engines with high-efficiency (67%) turbochargers can be ordered with lower (conventional) turbocharging efficiency. Utilising this possibility will result in higher exhaust gas temperatures, lower exhaust gas amounts, and a slight change in SFOC. It is not possible to apply tuning methods (part- or low-load) when making such a conversion.

Fuel Consumption and Optimisation Possibilities for Tier II Engines

Various optimisation possibilities for improved part-load and low-load SFOC are available for the MAN B&W type engines. High-load optimisation is for best possible SFOC at 100% engine load.

Optimisation of SFOC in the part-load range (50-85%) or low-load range (25-70%) requires selection of the EGB (exhaust gas bypass) tuning method.

Also high-pressure tuning (HPT) is available on request for ME engines.

The above tuning methods are available for all SMCR points, but cannot be combined. The SFOC reduction potential of each tuning method at L_1 rating can be seen on each individual engine page.

In cases where part-load or low-load EGB tuning is applied, and a higher exhaust gas temperature is needed, a solution exists for additional automatic control of the EGB, the so-called economiser energy control (EEC).

MAN B&W Two-Stroke Propulsion Engines

Forcing an open EGB at loads where the EGB is normally closed results in a higher exhaust gas temperature, but with an SFOC penalty. Calculations with this feature are made on request.

GI and LGI Dual Fuel Engines

This engine programme includes a number of engines designed for gas fuel (GI engines) and liquid gas fuel (LGI engines) operation.

| Fuel | Fuel designation | LCV [kJ/kg] |
|----------|------------------|-------------|
| Methane | GI | 50,000 |
| Ethane | GIE | 47,500 |
| Methanol | LGIM | 19,900 |
| LPG* | LGIP | 46,000 |

*LPG is a mixture of liquid propane and butane.

In this engine programme, GI figures are included for engines where GI is applicable. As examples, figures for GIE and LGIP are included for S60ME-C10.5 and G60ME-C9.5 engines, and figures for GIE and LGIM are included for the G50ME-C9.6 engine (see pages 104-117).

SFOC figures are shown for dual fuel mode operation (i.e. operation on gas or liquid gas fuels). Fuel oil mode SFOC is identical to the SFOC for a similar fuel oil engine. Data for both modes can be found in the CEAS report.

Dual fuel engines are available with standard tuning methods for part-load and low-load optimisation in both fuel oil mode and dual fuel mode.

In dual fuel mode for GI, GIE and LGIP, fuel consumption consists of 3%, and 5% for LGIM, mass-based pilot liquid fuel of L_1 rating (SPOC = specific pilot oil consumption) and gas fuel (SGC = specific gas consumption).

All types of GI engines can operate with fuel sharing, also referred to as specified dual fuel (SDF) operation, where the ratio between pilot fuel oil and gas fuel can be selected according to preset values.

Guarantee figures for dual fuel engines are given for heat rate, which has the same tolerances as SFOC guarantees, i.e. see page 9.

Heat rate is defined as follows [kJ/kWh] (example for methane as dual fuel):

$$\text{Heat rate (kJ/kWh)} = \text{SGC (g/kWh)} \times 50 \text{ kJ/g} + \text{SPOC (g/kWh)} \times 42.7 \text{ kJ/g}$$

The pilot oil amount typically accounts for about 5% of the heat rate, and the distribution between SGC and SPOC as well as the heat rate over the load range are available in the CEAS report.

MAN B&W Two-Stroke Propulsion Engines

Please note that dual fuel engines must have cylinder lubrication systems capable of supplying both low-BN lubricating oils and high-BN lubricating oils.

Tier III Technologies

To ensure compliance with IMO Tier III regulations, one of the two major NO_x reduction technologies must be selected – EGR or SCR. Which technology is preferred depends on market demands, engine size, other requirements and operational pattern.

See our Emission Project Guide for more detailed descriptions of these technologies at www.marine.man.eu → Two-Stroke → Project Guides → Other Guides → Emission Project Guide

All Tier III engines have two operating modes:

- Tier III mode fulfilling the IMO Tier III regulations
- Tier II mode fulfilling the IMO Tier II regulations

The Tier III technologies are designed for the use of low-sulphur fuels (0-0.1% sulphur) in Tier III mode. This limitation for sulphur content applies to Tier III operation only. In Tier II operation, the engine is in all cases capable of using fuels with a high sulphur content.

Tier III designs for use of high-sulphur fuels in Tier III mode are available on request. Fuel consumption guarantees can be given for engines for both Tier II and Tier III mode.

EGR

Two EGR-matching concepts are available depending on engine type:

| EGR Concept | Description |
|-------------|---|
| EGRTC | T/C cut-out matching for engines with bores ≥ 80 cm and more than one turbocharger applied |
| EGRBP | Bypass matching for engines with bores ≤ 70 cm and one high-efficiency turbocharger and for engines with bores ≤ 40 cm and one conventional efficiency turbocharger |

EGR operation is possible on ME and ME-B engines, including engine types for dual fuel, except GIE.

For the smallest bore engines, especially with 5 and 6 cylinders, the availability of applicable turbochargers makes it difficult to apply EGR. Therefore, SCR is recommended for these engines.

MAN B&W Two-Stroke Propulsion Engines

SCR

Two SCR concepts are available:

| SCR Concept | Description |
|-------------|---|
| MAN SCR-HP | High-pressure SCR with a static mixer and SCR reactor installed upstream the turbocharger(s) |
| MAN SCR-LP | Low-pressure SCR with a static mixer and SCR reactor installed downstream the turbocharger(s) |

SCR operation applies to ME and ME-B engines, including engine types with dual fuel.

The SCR system must be supplied by an approved supplier.

For some large-bore engines (bores ≥ 90 cm) with a high cylinder number, SCR-HP is only available on special request.

Application of High-Sulphur Fuels and SO_x Scrubbers

All two-stroke engines in the MAN Diesel & Turbo marine engine programme are compatible with SO_x scrubbers.

A SO_x scrubber installation will increase the back pressure, thereby affecting engine performance. Accordingly, we require that a SO_x scrubber installation does not increase the back pressure by more than 30 mbar at SMCR.

MAN Diesel & Turbo will issue a scrubber installation guideline and update CEAS with the SO_x scrubber options available. Until then, SO_x scrubber installations will be handled case by case.

MAN B&W Two-Stroke Propulsion Engines

Waste Heat Recovery Systems

On engines with high-efficiency turbochargers, waste heat can be economically recovered by installing equipment for waste heat recovery (WHR) and matching the engine for WHR. WHR systems are available for both Tier II and Tier III engines on request.

The following types of WHR systems have been approved for application:

- Power turbines with a power output equal to 3-5% of the engine shaft power at SMCR.
- Power turbines and steam turbines with a power output corresponding to 8-10% of the engine shaft power at SMCR.
- Steam turbine system – with a power output corresponding to 4-6% of the engine shaft power at SMCR.
- Turbochargers with a motor/generator attached to the turbocharger shaft, and with a power output equal to 3-5% of the engine shaft power at SMCR.

Lubricating Oil Consumption

The system oil consumption varies according to engine sizes and, operational and maintenance patterns.

Specific Cylinder Oil Consumption

Alpha ACC (Adaptive Cylinder-oil Control) is the lubrication mode for MAN B&W two-stroke engines that involves lube oil dosing proportional to the engine load and to the sulphur content in the fuel oil being burned. The specific minimum dosage for low-sulphur fuels is set to 0.6 g/kWh. The typical ACC dosage for a BN 100 cylinder oil is $0.3 \text{ g/kWh} \times \text{S}\%$.

Our Service Letter SL2014-587 offers further information:

www.marine.man.eu → Two-Stroke → Service Letters → SL2014-587

Extent of Delivery

The final and binding extent of delivery of MAN B&W two-stroke engines is to be supplied by our licensee, the engine maker, who should be contacted in order to determine the execution for the actual project.

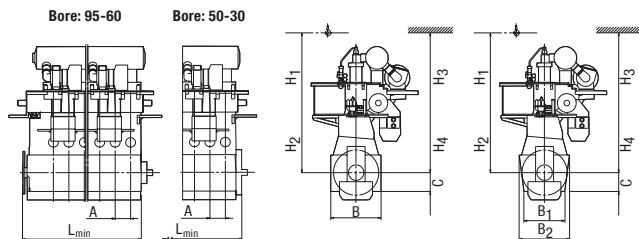
To facilitate negotiations between the yard, the engine maker and the customer, a set of guiding 'Extent of Delivery' (EoD) forms are available in which MAN Diesel & Turbo's recommended basic and optional executions are specified.

The licensees may select a different extent of delivery as their standard.

MAN B&W Two-Stroke Propulsion Engines

Engine Dimensions

The minimum length L_{\min} is stated from the aft end of the crankshaft to the fore end of the engine.



L_{\min} Minimum length of engine

A Cylinder distance

B Bedplate width

B_1 Bedplate width at foot flange

B_2 Bedplate width at top flange

C Crankshaft to underside of foot flange

H_1 Normal lifting procedure

H_2 Reduced height lifting procedure

H_3 Reduced height lifting procedure with MAN B&W double-jib crane

H_4 Normal lifting procedure with MAN B&W double-jib crane.

MAN B&W Two-Stroke Propulsion Engines

Dry Masses

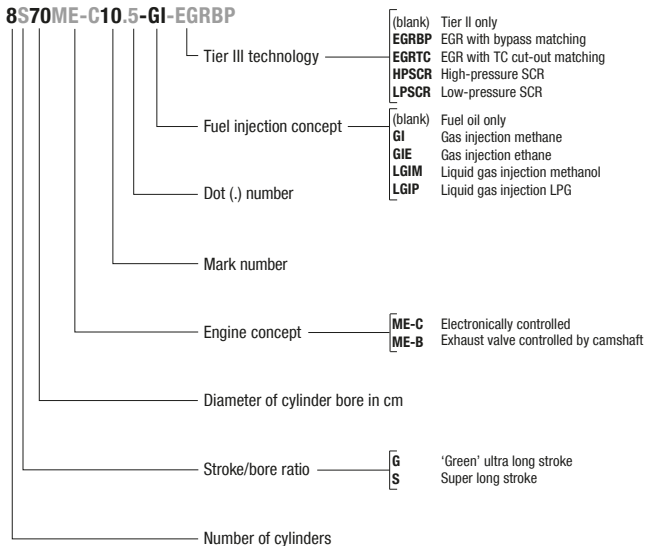
Dry masses are stated in metric tonnes for engines with MAN turbocharger(s) and a standard turning wheel. Figures will vary depending on the design and options chosen, e.g. moment compensators, tuning wheel, etc.

Dry masses for Tier III engines cover components directly integrated on the engine.

Indicated values are for guidance only and are not binding.

Engine Type Designation

8S70ME-C10.5-GI-EGRBP



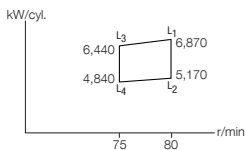


MAN B&W G95ME-C9.6

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 34,350 |
| 6 | 41,220 |
| 7 | 48,090 |
| 8 | 54,960 |
| 9 | 61,830 |
| 10 | 68,700 |
| 11 | 75,570 |
| 12 | 82,440 |

Stroke: 3,460 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.6

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 161.5 | 160.5 | 165.0 |
| Part load | EGB | 159.5 | 159.0 | 167.5 |
| Low load | EGB | 157.5 | 160.0 | 167.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.6-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

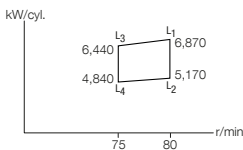
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 157.5 | 156.5 | 164.0 |
| Part load | EGB | 159.5 | 159.0 | 167.5 |
| Low load | EGB | 157.5 | 160.0 | 167.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 127.8 (7.8) | 128.7 (6.0) | 135.9 (4.9) |
| Part load | EGB | 129.4 (8.0) | 130.7 (6.1) | 138.8 (5.0) |
| Low load | EGB | 127.7 (8.0) | 131.5 (6.1) | 138.8 (5.0) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW | Stroke: 3,460 mm |
|------|-------------------|------------------|
| 5 | 34,350 | |
| 6 | 41,220 | |
| 7 | 48,090 | |
| 8 | 54,960 | |
| 9* | 61,830 | |
| 10* | 68,700 | |
| 11* | 75,570 | |
| 12* | 82,440 | |



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.6-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.0 |
| Tier III mode | 163.5 | 163.5 | 169.0 |

MAN B&W G95ME-C9.6-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 159.0 | 161.0 | 168.0 |

MAN B&W G95ME-C9.6-LPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 158.5 | 161.0 | 168.5 |

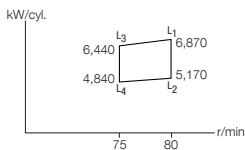
* Available on request for HPSCR.

MAN B&W G95ME-C9.6

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 34,350 |
| 6 | 41,220 |
| 7 | 48,090 |
| 8 | 54,960 |
| 9* | 61,830 |
| 10* | 68,700 |
| 11* | 75,570 |
| 12* | 82,440 |

Stroke: 3,460 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.6-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.0 |
| Tier III mode | 163.5 | 163.5 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.6 (8.0) | 131.5 (6.1) | 138.3 (5.1) |
| Tier III mode | 132.8 (8.0) | 134.5 (6.1) | 140.0 (5.1) |

MAN B&W G95ME-C9.6-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 159.0 | 161.0 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.6 (8.0) | 131.5 (6.1) | 138.7 (5.0) |
| Tier III mode | 128.9 (8.0) | 132.4 (6.1) | 139.2 (5.0) |

MAN B&W G95ME-C9.6-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 158.5 | 161.0 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

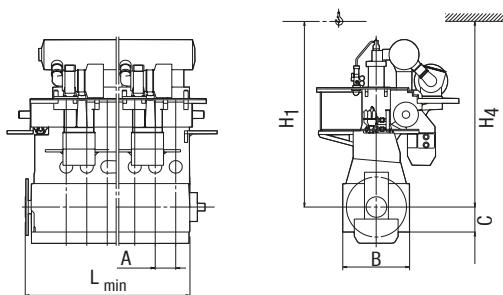
| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.7 (8.0) | 131.5 (6.1) | 138.7 (5.1) |
| Tier III mode | 128.5 (8.0) | 132.4 (6.1) | 139.6 (5.1) |

* Available on request for HPSCR.

** Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B | C | H ₁ | H ₄ |
|---------------|----------|-------------|-------------|----------------|----------------|
| mm | 1,574 | 5,380 | 2,060 | 15,925 | 15,525 |
| Cyl. distance | 5-9 cyl. | 10 cyl. | 11 cyl. | 12 cyl. | |
| mm | 1,574 | 1-6: 1,574 | 1-6: 1,574 | 1-6: 1,574 | |
| mm | | 7-10: 1,670 | 7-11: 1,670 | 7-12: 1,670 | |

| Cylinders: | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| L _{min} mm | 11,468 | 13,042 | 14,616 | 16,190 | 17,804 | 19,779 | 21,489 | 23,159 |

Tier II

| | | | | | | | | | |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Dry mass: | t | 1,080 | 1,250 | 1,430 | 1,625 | 1,820 | 2,010 | 2,210 | 2,400 |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|

Tier III

| | | | | | | | | | |
|-------------------|---|----|----|----|----|----|----|----|----|
| Dry mass (added): | | | | | | | | | |
| EGR | t | 18 | 19 | 20 | 22 | 35 | 35 | 37 | 38 |
| HP SCR | t | 10 | 15 | 15 | 15 | | | | |
| LP SCR | t | - | - | - | - | - | - | - | - |

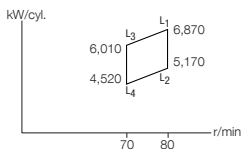


MAN B&W G95ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 34,350 |
| 6 | 41,220 |
| 7 | 48,090 |
| 8 | 54,960 |
| 9 | 61,830 |
| 10 | 68,700 |
| 11 | 75,570 |
| 12 | 82,440 |

Stroke: 3,460 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 162.5 | 161.5 | 166.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

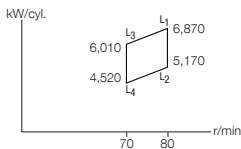
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 158.5 | 157.5 | 165.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 128.6 (7.9) | 129.5 (6.0) | 136.7 (5.0) |
| Part load | EGB | 130.2 (8.0) | 131.5 (6.1) | 139.6 (5.1) |
| Low load | EGB | 128.5 (8.0) | 132.4 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW | Stroke: 3,460 mm |
|------|-------------------|------------------|
| 5 | 34,350 | |
| 6 | 41,220 | |
| 7 | 48,090 | |
| 8 | 54,960 | |
| 9* | 61,830 | |
| 10* | 68,700 | |
| 11* | 75,570 | |
| 12* | 82,440 | |


Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G95ME-C9.5-EGRTC
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

MAN B&W G95ME-C9.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

MAN B&W G95ME-C9.5-LPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

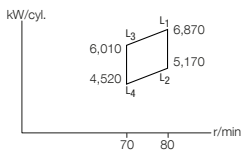
* Available on request for HPSCR.

MAN B&W G95ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 34,350 |
| 6 | 41,220 |
| 7 | 48,090 |
| 8 | 54,960 |
| 9* | 61,830 |
| 10* | 68,700 |
| 11* | 75,570 |
| 12* | 82,440 |

Stroke: 3,460 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G95ME-C9.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.4 (8.1) | 132.3 (6.2) | 139.1 (5.1) |
| Tier III mode | 133.6 (8.1) | 135.3 (6.2) | 140.8 (5.1) |

MAN B&W G95ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.4 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.7 (8.1) | 133.2 (6.2) | 140.0 (5.1) |

MAN B&W G95ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

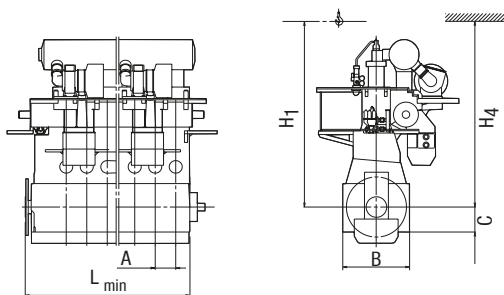
| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.5 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |

* Available on request for HPSCR.

** Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B | C | H ₁ | H ₄ |
|---------------|----------|-------------|-------------|----------------|----------------|
| mm | 1,574 | 5,380 | 2,060 | 15,925 | 15,525 |
| Cyl. distance | 5-9 cyl. | 10 cyl. | 11 cyl. | 12 cyl. | |
| mm | 1,574 | 1-6: 1,574 | 1-6: 1,574 | 1-6: 1,574 | |
| mm | | 7-10: 1,670 | 7-11: 1,670 | 7-12: 1,670 | |

| Cylinders: | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| L _{min} mm | 11,468 | 13,042 | 14,616 | 16,190 | 17,804 | 19,779 | 21,489 | 23,159 |

Tier II

| | | | | | | | | | |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Dry mass: | t | 1,080 | 1,250 | 1,430 | 1,625 | 1,820 | 2,010 | 2,210 | 2,400 |
|-----------|---|-------|-------|-------|-------|-------|-------|-------|-------|

Tier III

| | | | | | | | | | |
|-------------------|---|----|----|----|----|----|----|----|----|
| Dry mass (added): | | | | | | | | | |
| EGR | t | 18 | 19 | 20 | 22 | 35 | 35 | 37 | 38 |
| HP SCR | t | 10 | 15 | 15 | 15 | | | | |
| LP SCR | t | - | - | - | - | - | - | - | - |

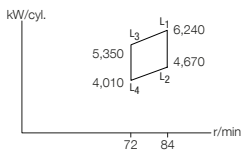


MAN B&W G90ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 31,200 |
| 6 | 37,440 |
| 7 | 43,680 |
| 8 | 49,920 |
| 9 | 56,160 |
| 10 | 62,400 |
| 11 | 68,640 |
| 12 | 74,880 |

Stroke: 3,260 mm



Fuel Oil

L₁ MEP: 21.5 bar

MAN B&W G90ME-C10.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 161.5 | 160.5 | 165.0 |
| Part load | EGB | 159.5 | 159.0 | 167.5 |
| Low load | EGB | 157.5 | 160.0 | 167.5 |

Dual Fuel Mode for GI (Methane)

MAN B&W G90ME-C10.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

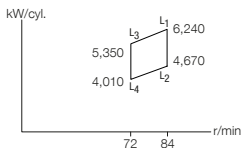
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 157.5 | 156.5 | 164.0 |
| Part load | EGB | 159.5 | 159.0 | 167.5 |
| Low load | EGB | 157.5 | 160.0 | 167.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 127.8 (7.8) | 128.7 (6.0) | 135.9 (4.9) |
| Part load | EGB | 129.4 (8.0) | 130.7 (6.1) | 138.8 (5.0) |
| Low load | EGB | 127.7 (8.0) | 131.5 (6.1) | 138.8 (5.0) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW | Stroke: 3,260 mm |
|------|-------------------|------------------|
| 5 | 31,200 | |
| 6 | 37,440 | |
| 7 | 43,680 | |
| 8 | 49,920 | |
| 9 | 56,160 | |
| 10* | 62,400 | |
| 11* | 68,640 | |
| 12* | 74,880 | |



Fuel Oil

L₁ MEP: 21.5 bar

MAN B&W G90ME-C10.5-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.0 |
| Tier III mode | 163.5 | 163.5 | 169.0 |

MAN B&W G90ME-C10.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 159.0 | 161.0 | 168.0 |

MAN B&W G90ME-C10.5-LPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 158.5 | 161.0 | 168.5 |

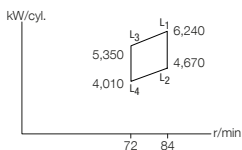
* Available on request for HPSCR.

MAN B&W G90ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 31,200 |
| 6 | 37,440 |
| 7 | 43,680 |
| 8 | 49,920 |
| 9 | 56,160 |
| 10* | 62,400 |
| 11* | 68,640 |
| 12* | 74,880 |

Stroke: 3,260 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.5 bar

MAN B&W G90ME-C10.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.0 |
| Tier III mode | 163.5 | 163.5 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.6 (8.1) | 131.5 (6.1) | 138.3 (5.1) |
| Tier III mode | 132.8 (8.1) | 134.5 (6.1) | 140.0 (5.1) |

MAN B&W G90ME-C10.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 159.0 | 161.0 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.6 (8.1) | 131.5 (6.1) | 138.7 (5.0) |
| Tier III mode | 128.9 (8.1) | 132.4 (6.1) | 139.2 (5.0) |

MAN B&W G90ME-C10.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 157.5 | 160.0 | 167.5 |
| Tier III mode | 158.5 | 161.0 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

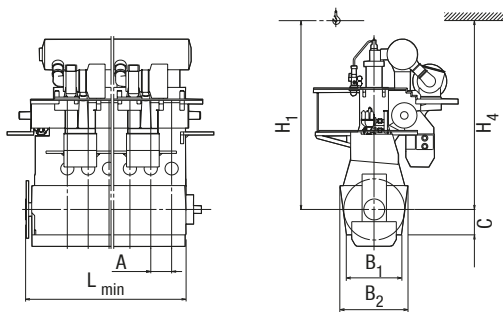
| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 127.6 (8.0) | 131.5 (6.1) | 138.7 (5.1) |
| Tier III mode | 128.5 (8.0) | 132.4 (6.1) | 139.6 (5.1) |

* Available on request for HPSCR.

** Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₄ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|
| mm | 1,490 | 5,110 | 5,034 | 1,885 | 14,425 | 13,975 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------|--------|--------|--------|---------|---------|--------|--------|--------|
| L _{min} mm | 10,740 | 12,040 | 12,855 | 14,345* | 15,835* | 18,040 | 19,530 | 21,020 |

Tier II

| Dry mass: | t | 876 | 1,014 | 1,153 | 1,295* | 1,457* | 1,619 | 1,771 | 1,915 |
|-----------|---|-----|-------|-------|--------|--------|-------|-------|-------|
|-----------|---|-----|-------|-------|--------|--------|-------|-------|-------|

Tier III

| Dry mass (added): | | | | | | | | | |
|-------------------|---|----|----|----|----|----|----|----|----|
| EGR | t | 13 | 15 | 16 | 18 | 16 | 16 | 18 | 20 |
| HP SCR | t | 7 | 10 | 15 | 15 | 15 | | | |
| LP SCR | t | - | - | - | - | - | - | - | - |

* 8-9-cylinder engines can be ordered with either divided or undivided crankshaft. Data is given for undivided crankshaft.

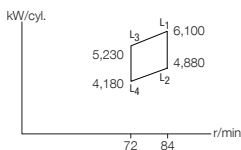


MAN B&W S90ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 30,500 |
| 6 | 36,600 |
| 7 | 42,700 |
| 8 | 48,800 |
| 9 | 54,900 |
| 10 | 61,000 |
| 11 | 67,100 |
| 12 | 73,200 |

Stroke: 3,260 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S90ME-C10.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 162.5 | 161.5 | 166.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S90ME-C10.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

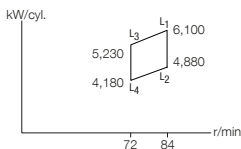
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 158.5 | 157.5 | 165.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 128.6 (7.9) | 129.5 (6.0) | 136.7 (5.0) |
| Part load | EGB | 130.2 (8.0) | 131.5 (6.1) | 139.6 (5.1) |
| Low load | EGB | 128.5 (8.0) | 132.4 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW | Stroke: 3,260 mm |
|------|-------------------|------------------|
| 5 | 30,500 | |
| 6 | 36,600 | |
| 7 | 42,700 | |
| 8 | 48,800 | |
| 9 | 54,900 | |
| 10* | 61,000 | |
| 11* | 67,100 | |
| 12* | 73,200 | |



Fuel Oil

MAN B&W S90ME-C10.5-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

MAN B&W S90ME-C10.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

MAN B&W S90ME-C10.5-LPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

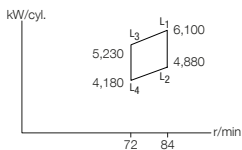
* Available on request for HPSCR.

MAN B&W S90ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 30,500 |
| 6 | 36,600 |
| 7 | 42,700 |
| 8 | 48,800 |
| 9 | 54,900 |
| 10* | 61,000 |
| 11* | 67,100 |
| 12* | 73,200 |

Stroke: 3,260 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S90ME-C10.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.4 (8.1) | 132.3 (6.2) | 139.1 (5.1) |
| Tier III mode | 133.6 (8.1) | 135.3 (6.2) | 140.8 (5.1) |

MAN B&W S90ME-C10.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.4 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.7 (8.1) | 133.2 (6.2) | 140.0 (5.1) |

MAN B&W S90ME-C10.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]**

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

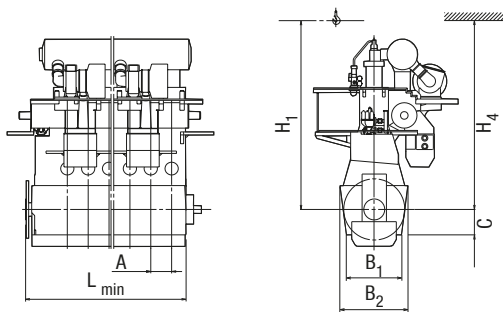
| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.5 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |

* Available on request for HPSCR.

** Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₄ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|
| mm | 1,590 | 5,160 | 5,450 | 1,900 | 15,000 | 14,875 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| L _{min} mm | 10,312 | 11,902 | 13,492 | 16,135 | 17,725 | 19,315 | 20,905 | 22,495 |

Tier II

| Dry mass: | t | 953 | 1,104 | 1,255 | 1,446 | 1,626 | 1,771 | 1,942 | 2,088 |
|-----------|---|-----|-------|-------|-------|-------|-------|-------|-------|
|-----------|---|-----|-------|-------|-------|-------|-------|-------|-------|

Tier III

Dry mass (added):

| EGR | t | 16 | 18 | 19 | 20 | 21 | 33 | 35 | 37 |
|--------|---|----|----|----|----|----|----|----|----|
| HP SCR | t | 7 | 10 | 15 | 15 | 15 | | | |
| LP SCR | t | - | - | - | - | - | - | - | - |

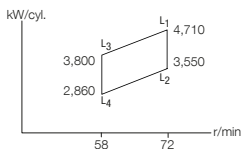


MAN B&W G80ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 28,260 |
| 7 | 32,970 |
| 8 | 37,680 |
| 9 | 42,390 |

Stroke: 3,720 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G80ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 162.5 | 161.5 | 166.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G80ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 158.5 | 157.5 | 165.0 |
| Part load | EGB | 160.5 | 160.0 | 168.5 |
| Low load | EGB | 158.5 | 161.0 | 168.5 |

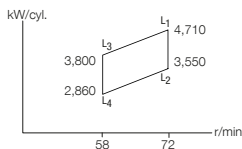
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 128.7 (7.9) | 129.5 (6.0) | 136.7 (5.0) |
| Part load | EGB | 130.2 (8.0) | 131.5 (6.1) | 139.6 (5.1) |
| Low load | EGB | 128.5 (8.0) | 132.4 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 28,260 |
| 7 | 32,970 |
| 8 | 37,680 |
| 9 | 42,390 |

Stroke: 3,720 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G80ME-C9.5-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

MAN B&W G80ME-C9.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

MAN B&W G80ME-C9.5-LPSCR

L₁ SFOC [g/kWh]

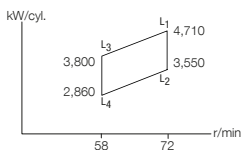
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

MAN B&W G80ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 28,260 |
| 7 | 32,970 |
| 8 | 37,680 |
| 9 | 42,390 |

Stroke: 3,720 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G80ME-C9.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.0 |
| Tier III mode | 164.5 | 164.5 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.5 (8.1) | 132.3 (6.2) | 139.1 (5.1) |
| Tier III mode | 133.6 (8.1) | 135.3 (6.2) | 140.8 (5.1) |

MAN B&W G80ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 160.0 | 162.0 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.5 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.7 (8.1) | 133.2 (6.2) | 140.0 (5.1) |

MAN B&W G80ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 158.5 | 161.0 | 168.5 |
| Tier III mode | 159.5 | 162.0 | 169.5 |

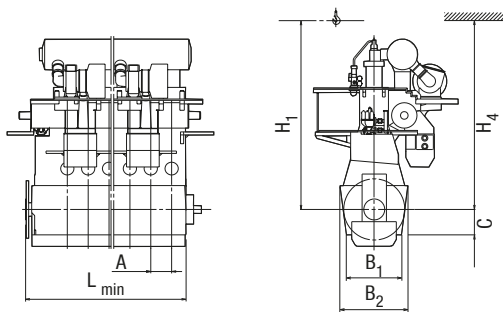
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 128.5 (8.1) | 132.3 (6.2) | 139.6 (5.1) |
| Tier III mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₄ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|
| mm | 1,400 | 5,320 | 5,680 | 1,960 | 16,100 | 15,825 |

| Cylinders: | 6 | 7 | 8 | 9 |
|---------------------|--------|--------|---------|--------|
| L _{min} mm | 10,735 | 12,135 | 13,535* | 15,880 |

Tier II

| | | | | | |
|-----------|---|-----|-------|--------|-------|
| Dry mass: | t | 945 | 1,055 | 1,175* | 1,350 |
|-----------|---|-----|-------|--------|-------|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 16 | 17 | 18 | 19 |
| HP SCR | t | 6 | 10 | 10 | 15 |
| LP SCR | t | - | - | - | - |

* Dry mass and cylinder L_{min} are with undivided crankshaft and chain in aft, with divided crankshaft and chain in mid, dry mass is 1,223 t and cylinder L_{min} is 14,480 mm.

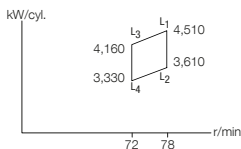


MAN B&W S80ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 27,060 |
| 7 | 31,570 |
| 8 | 36,080 |
| 9 | 40,590 |

Stroke: 3,450 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S80ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 166.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S80ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 160.5 | 158.0 | 165.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

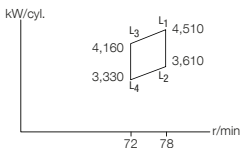
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 130.4 (7.9) | 129.9 (6.0) | 136.7 (5.0) |
| Part load | EGB | 131.1 (8.0) | 132.0 (6.1) | 138.8 (5.0) |
| Low load | EGB | 129.4 (8.0) | 132.8 (6.1) | 138.8 (5.0) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 27,060 |
| 7 | 31,570 |
| 8 | 36,080 |
| 9 | 40,590 |

Stroke: 3,450 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S80ME-C9.5-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.0 |
| Tier III mode | 166.5 | 165.0 | 170.0 |

MAN B&W S80ME-C9.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

MAN B&W S80ME-C9.5-LPSCR

L₁ SFOC [g/kWh]

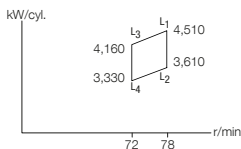
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

MAN B&W S80ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 6 | 27,060 |
| 7 | 31,570 |
| 8 | 36,080 |
| 9 | 40,590 |

Stroke: 3,450 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S80ME-C9.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.0 |
| Tier III mode | 166.5 | 165.0 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 132.7 (6.2) | 138.3 (5.1) |
| Tier III mode | 135.3 (8.1) | 135.7 (6.2) | 140.8 (5.1) |

MAN B&W S80ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.0) | 132.8 (6.1) | 138.7 (5.0) |
| Tier III mode | 130.6 (8.0) | 133.6 (6.1) | 139.2 (5.0) |

MAN B&W S80ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

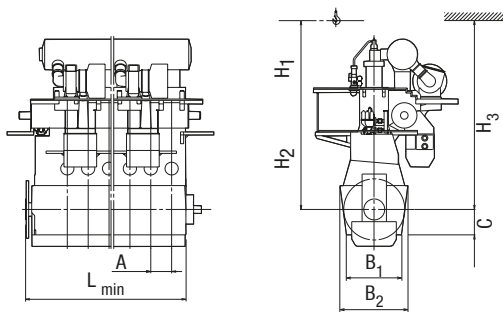
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.4 (8.0) | 132.8 (6.1) | 138.7 (5.1) |
| Tier III mode | 130.2 (8.0) | 133.6 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,334 | 5,180 | 5,374 | 1,890 | 15,175 | 13,925 | 13,800 |

| Cylinders: | 6 | 7 | 8 | 9 |
|---------------------|--------|--------|--------|--------|
| L _{min} mm | 10,100 | 11,434 | 12,768 | 14,102 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-------|-------|
| Dry mass: | t | 833 | 933 | 1,043 | 1,153 |
|-----------|---|-----|-----|-------|-------|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 16 | 17 | 18 | 19 |
| HP SCR | t | 6 | 10 | 10 | 15 |
| LP SCR | t | - | - | - | - |

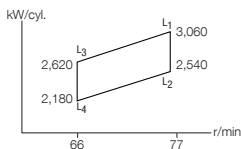


MAN B&W G70ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 15,300 |
| 6 | 18,360 |

Stroke: 3,256 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G70ME-C10.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 160.5 | 158.5 | 163.0 |
| Part load | EGB | 158.5 | 157.0 | 165.5 |
| Low load | EGB | 156.5 | 158.0 | 165.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G70ME-C10.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

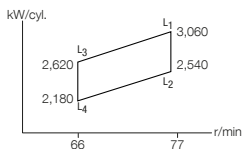
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 156.5 | 155.0 | 162.0 |
| Part load | EGB | 158.5 | 157.0 | 165.5 |
| Low load | EGB | 156.5 | 158.0 | 165.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 126.3 (8.7) | 126.8 (6.6) | 133.7 (5.5) |
| Part load | EGB | 127.7 (8.8) | 128.4 (6.8) | 136.6 (5.6) |
| Low load | EGB | 126.0 (8.8) | 129.3 (6.8) | 136.6 (5.6) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 15,300 |
| 6 | 18,360 |

Stroke: 3,256 mm

Fuel Oil
L₁ MEP: 21.0 bar

MAN B&W G70ME-C10.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 166.0 |
| Tier III mode | 163.5 | 162.5 | 168.0 |

MAN B&W G70ME-C10.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 165.5 |
| Tier III mode | 158.0 | 159.0 | 166.0 |

MAN B&W G70ME-C10.5-LPSCR
L₁ SFOC [g/kWh]

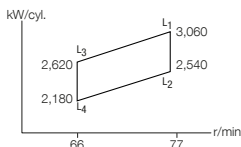
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 165.5 |
| Tier III mode | 157.5 | 159.0 | 166.5 |

MAN B&W G70ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 15,300 |
| 6 | 18,360 |

Stroke: 3,256 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G70ME-C10.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 166.0 |
| Tier III mode | 163.5 | 162.5 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 125.9 (9.0) | 129.2 (6.9) | 136.9 (5.7) |
| Tier III mode | 131.9 (9.0) | 133.0 (6.9) | 138.6 (5.7) |

MAN B&W G70ME-C10.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 165.5 |
| Tier III mode | 158.0 | 159.0 | 166.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 126.0 (8.9) | 129.2 (6.8) | 136.5 (5.6) |
| Tier III mode | 127.2 (8.9) | 130.1 (6.8) | 137.0 (5.6) |

MAN B&W G70ME-C10.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 156.5 | 158.0 | 165.5 |
| Tier III mode | 157.5 | 159.0 | 166.5 |

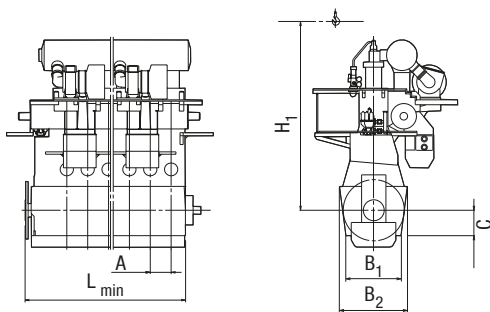
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 126.0 (8.9) | 129.2 (6.8) | 136.5 (5.6) |
| Tier III mode | 126.8 (8.9) | 130.1 (6.8) | 137.4 (5.6) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ |
|-------------|--------|----------------|----------------|---|----------------|
| mm | 1,180* | - | - | - | - |

| Cylinders: | 5 | 6 |
|---------------------|---|---|
| L _{min} mm | - | - |

Tier II

| | | | |
|-----------|---|------|---|
| Dry mass: | t | 530* | - |
|-----------|---|------|---|

Tier III

| Dry mass (added): | | | |
|-------------------|---|---|---|
| EGR | t | - | - |
| HP SCR | t | - | - |
| LP SCR | t | - | - |

* Estimated figures

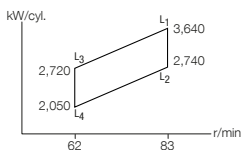


MAN B&W G70ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 18,200 |
| 6 | 21,840 |
| 7 | 25,480 |
| 8 | 29,120 |

Stroke: 3,256 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G70ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 165.5 | 163.0 | 167.0 |
| Part load | EGB | 162.5 | 161.5 | 168.5 |
| Low load | EGB | 160.5 | 162.5 | 168.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G70ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

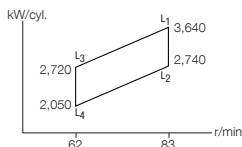
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 161.5 | 159.0 | 166.0 |
| Part load | EGB | 162.5 | 161.5 | 168.5 |
| Low load | EGB | 160.5 | 162.5 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 131.2 (7.9) | 130.7 (6.0) | 137.5 (5.0) |
| Part load | EGB | 131.9 (8.0) | 132.8 (6.1) | 139.6 (5.1) |
| Low load | EGB | 130.2 (8.0) | 133.7 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 18,200 |
| 6 | 21,840 |
| 7 | 25,480 |
| 8 | 29,120 |

Stroke: 3,256 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G70ME-C9.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 169.0 |
| Tier III mode | 168.5 | 167.0 | 172.0 |

MAN B&W G70ME-C9.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 162.0 | 163.5 | 169.0 |

MAN B&W G70ME-C9.5-LPSCR
L₁ SFOC [g/kWh]

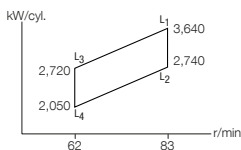
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 161.5 | 163.5 | 169.5 |

MAN B&W G70ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 18,200 |
| 6 | 21,840 |
| 7 | 25,480 |
| 8 | 29,120 |

Stroke: 3,256 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G70ME-C9.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 169.0 |
| Tier III mode | 168.5 | 167.0 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.1 (8.2) | 133.5 (6.3) | 139.9 (5.2) |
| Tier III mode | 136.9 (8.2) | 137.4 (6.3) | 142.5 (5.2) |

MAN B&W G70ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 162.0 | 163.5 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.2 (8.1) | 133.6 (6.2) | 139.6 (5.1) |
| Tier III mode | 131.4 (8.1) | 134.5 (6.2) | 140.0 (5.1) |

MAN B&W G70ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 161.5 | 163.5 | 169.5 |

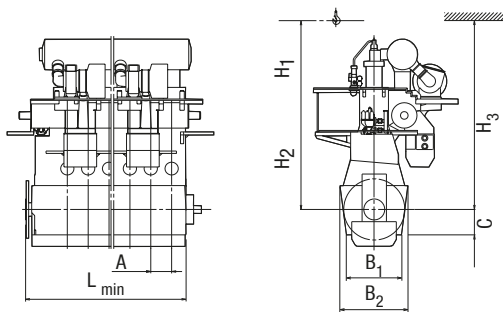
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.2 (8.1) | 133.6 (6.2) | 139.6 (5.1) |
| Tier III mode | 131.0 (8.1) | 134.5 (6.2) | 140.4 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,260 | 4,760 | 4,900 | 1,750 | 14,225 | 13,250 | 12,800 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|--------|--------|
| L _{min} mm | 8,486 | 9,596 | 10,856 | 12,116 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 585 | 665 | 750 | 855 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 16 | 17 | 18 |
| HP SCR | t | 5 | 5 | 6 | 7 |
| LP SCR | t | - | - | - | - |

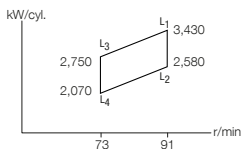


MAN B&W S70ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 17,150 |
| 6 | 20,580 |
| 7 | 24,010 |
| 8 | 27,440 |

Stroke: 2,800 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S70ME-C10.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 166.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S70ME-C10.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 160.5 | 158.0 | 165.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

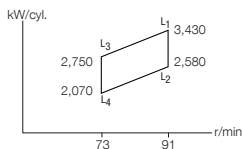
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 130.4 (7.9) | 129.9 (6.0) | 136.7 (5.0) |
| Part load | EGB | 131.1 (8.0) | 132.0 (6.1) | 138.8 (5.0) |
| Low load | EGB | 129.4 (8.0) | 132.8 (6.1) | 138.8 (5.0) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 17,150 |
| 6 | 20,580 |
| 7 | 24,010 |
| 8 | 27,440 |

Stroke: 2,800 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S70ME-C10.5-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 168.0 |
| Tier III mode | 167.5 | 166.0 | 171.0 |

MAN B&W S70ME-C10.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

MAN B&W S70ME-C10.5-LPSCR

L₁ SFOC [g/kWh]

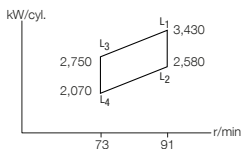
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

MAN B&W S70ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 17,150 |
| 6 | 20,580 |
| 7 | 24,010 |
| 8 | 27,440 |

Stroke: 2,800 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S70ME-C10.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 168.0 |
| Tier III mode | 167.5 | 166.0 | 171.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 132.7 (6.2) | 139.1 (5.1) |
| Tier III mode | 136.1 (8.1) | 136.6 (6.2) | 141.7 (5.1) |

MAN B&W S70ME-C10.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.0) | 132.8 (6.1) | 138.7 (5.0) |
| Tier III mode | 130.6 (8.0) | 133.6 (6.1) | 139.2 (5.0) |

MAN B&W S70ME-C10.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

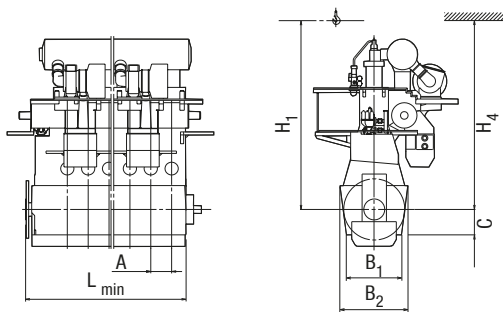
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.4 (8.0) | 132.8 (6.1) | 138.7 (5.1) |
| Tier III mode | 130.2 (8.0) | 133.6 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₄ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|
| mm | 1,098 | 4,012 | 4,140 | 1,520 | 12,500 | 11,750 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|--------|
| L _{min} mm | 7,445 | 8,543 | 9,641 | 10,739 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 442 | 523 | 593 | 667 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 15 | 16 | 17 | 18 |
| HP SCR | t | 4 | 5 | 6 | 6 |
| LP SCR | t | - | - | - | - |

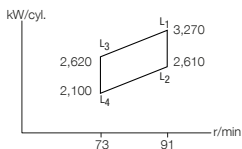


MAN B&W S70ME-C8.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 16,350 |
| 6 | 19,620 |
| 7 | 22,890 |
| 8 | 26,160 |

Stroke: 2,800 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S70ME-C8.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 167.5 | 165.0 | 169.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S70ME-C8.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

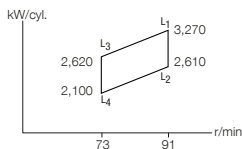
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 163.5 | 161.0 | 168.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 132.8 (8.0) | 132.4 (6.1) | 139.2 (5.0) |
| Part load | EGB | 133.6 (8.1) | 134.4 (6.2) | 141.2 (5.1) |
| Low load | EGB | 131.8 (8.1) | 135.3 (6.2) | 141.2 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 16,350 |
| 6 | 19,620 |
| 7 | 22,890 |
| 8 | 26,160 |

Stroke: 2,800 mm

Fuel Oil
L₁ MEP: 20.0 bar
MAN B&W S70ME-C8.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

MAN B&W S70ME-C8.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

MAN B&W S70ME-C8.5-LPSCR
L₁ SFOC [g/kWh]

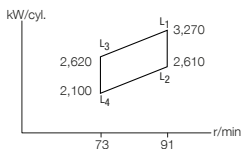
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

MAN B&W S70ME-C8.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 16,350 |
| 6 | 19,620 |
| 7 | 22,890 |
| 8 | 26,160 |

Stroke: 2,800 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S70ME-C8.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.7 (8.3) | 135.2 (6.3) | 141.6 (5.2) |
| Tier III mode | 138.5 (8.3) | 139.0 (6.3) | 144.1 (5.2) |

MAN B&W S70ME-C8.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 133.1 (8.2) | 136.1 (6.2) | 141.7 (5.1) |

MAN B&W S70ME-C8.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

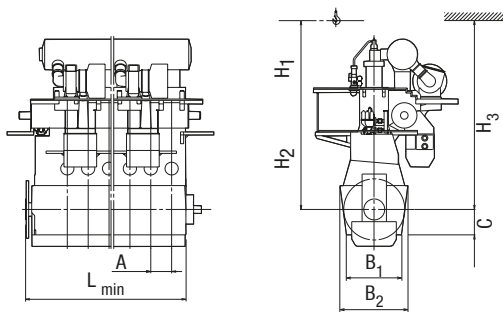
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 132.7 (8.2) | 136.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,190 | 4,390 | 4,454 | 1,521 | 12,550 | 11,725 | 11,500 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|--------|--------|
| L _{min} mm | 7,781 | 8,971 | 10,161 | 11,351 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 451 | 534 | 605 | 681 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 15 | 16 | 17 | 18 |
| HP SCR | t | 4 | 5 | 6 | 6 |
| LP SCR | t | - | - | - | - |

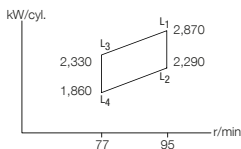


MAN B&W S65ME-C8.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 14,350 |
| 6 | 17,220 |
| 7 | 20,090 |
| 8 | 22,960 |

Stroke: 2,730 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S65ME-C8.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 167.5 | 165.0 | 169.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S65ME-C8.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

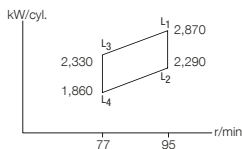
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 168.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 133.7 (8.0) | 133.2 (6.1) | 139.2 (5.0) |
| Part load | EGB | 133.5 (8.1) | 134.4 (6.2) | 141.2 (5.1) |
| Low load | EGB | 131.8 (8.1) | 135.3 (6.2) | 141.2 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 14,350 |
| 6 | 17,220 |
| 7 | 20,090 |
| 8 | 22,960 |

Stroke: 2,730 mm

Fuel Oil
L₁ MEP: 20.0 bar
MAN B&W S65ME-C8.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

MAN B&W S65ME-C8.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

MAN B&W S65ME-C8.5-LPSCR
L₁ SFOC [g/kWh]

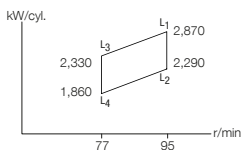
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

MAN B&W S65ME-C8.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 14,350 |
| 6 | 17,220 |
| 7 | 20,090 |
| 8 | 22,960 |

Stroke: 2,730 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S65ME-C8.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.7 (8.3) | 135.2 (6.3) | 141.6 (5.2) |
| Tier III mode | 138.5 (8.3) | 139.0 (6.3) | 144.1 (5.2) |

MAN B&W S65ME-C8.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 133.1 (8.2) | 136.1 (6.2) | 141.7 (5.1) |

MAN B&W S65ME-C8.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

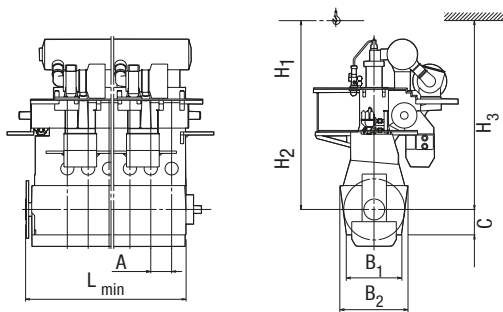
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 132.7 (8.2) | 136.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,084 | 4,124 | 4,170 | 1,410 | 11,950 | 11,225 | 11,025 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|--------|
| L _{min} mm | 7,148 | 8,232 | 9,316 | 10,400 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 382 | 451 | 512 | 575 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 15 | 16 | 17 |
| HP SCR | t | 4 | 5 | 6 | 6 |
| LP SCR | t | - | - | - | - |

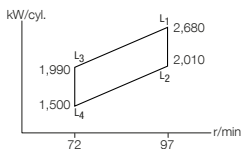


MAN B&W G60ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 165.5 | 163.0 | 167.0 |
| Part load | EGB | 162.5 | 161.5 | 168.5 |
| Low load | EGB | 160.5 | 162.5 | 168.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

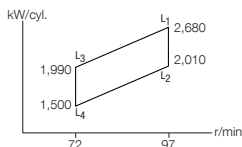
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 161.5 | 159.0 | 166.0 |
| Part load | EGB | 162.5 | 161.5 | 168.5 |
| Low load | EGB | 160.5 | 162.5 | 168.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 131.2 (7.9) | 130.7 (6.0) | 137.5 (5.0) |
| Part load | EGB | 131.9 (8.0) | 132.8 (6.1) | 139.6 (5.1) |
| Low load | EGB | 130.2 (8.0) | 133.7 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G60ME-C9.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 169.0 |
| Tier III mode | 168.5 | 167.0 | 172.0 |

MAN B&W G60ME-C9.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 162.0 | 163.5 | 169.0 |

MAN B&W G60ME-C9.5-LPSCR
L₁ SFOC [g/kWh]

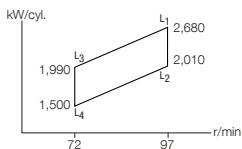
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 161.5 | 163.5 | 169.5 |

MAN B&W G60ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 169.0 |
| Tier III mode | 168.5 | 167.0 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.1 (8.2) | 133.5 (6.2) | 139.9 (5.2) |
| Tier III mode | 136.9 (8.2) | 137.4 (6.2) | 142.5 (5.2) |

MAN B&W G60ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 162.0 | 163.5 | 169.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.2 (8.1) | 133.6 (6.2) | 139.6 (5.1) |
| Tier III mode | 131.4 (8.1) | 134.5 (6.2) | 140.0 (5.1) |

MAN B&W G60ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 161.5 | 163.5 | 169.5 |

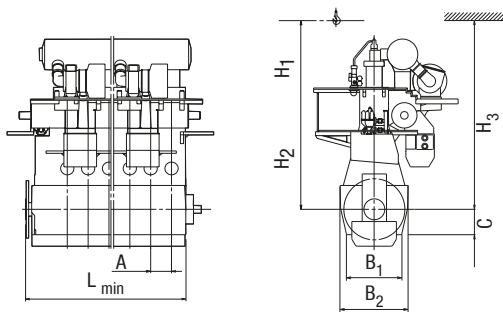
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 130.2 (8.1) | 133.6 (6.2) | 139.6 (5.1) |
| Tier III mode | 131.0 (8.1) | 134.5 (6.2) | 140.4 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,080 | 4,090 | 4,220 | 1,500 | 12,175 | 11,400 | 11,075 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|--------|
| L _{min} mm | 7,390 | 8,470 | 9,550 | 10,630 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 395 | 439 | 491 | 543 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 14 | 15 | 16 |
| HP SCR | t | 3 | 4 | 5 | 5 |
| LP SCR | t | - | - | - | - |

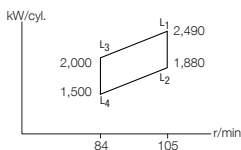


MAN B&W S60ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 166.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

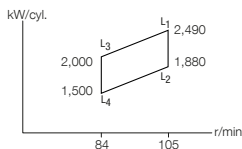
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 160.5 | 158.0 | 165.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 130.4 (7.9) | 129.9 (6.0) | 136.7 (5.0) |
| Part load | EGB | 131.1 (8.0) | 132.0 (6.1) | 138.8 (5.0) |
| Low load | EGB | 129.4 (8.0) | 132.8 (6.1) | 138.8 (5.0) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W S60ME-C10.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 168.0 |
| Tier III mode | 167.5 | 166.0 | 171.0 |

MAN B&W S60ME-C10.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

MAN B&W S60ME-C10.5-LPSCR
L₁ SFOC [g/kWh]

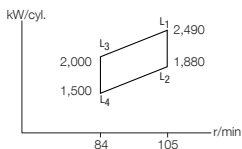
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

MAN B&W S60ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 168.0 |
| Tier III mode | 167.5 | 166.0 | 171.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 132.7 (6.2) | 139.1 (5.1) |
| Tier III mode | 136.1 (8.1) | 136.6 (6.2) | 141.7 (5.1) |

MAN B&W S60ME-C10.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.0) | 132.8 (6.1) | 138.7 (5.0) |
| Tier III mode | 130.6 (8.0) | 133.7 (6.1) | 139.2 (5.0) |

MAN B&W S60ME-C10.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

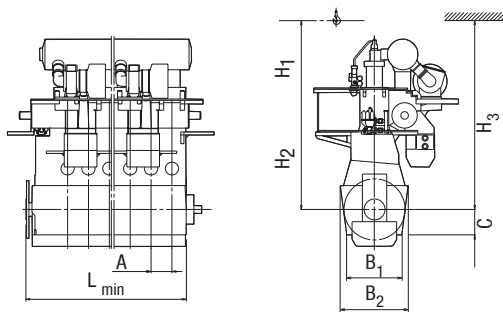
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.4 (8.0) | 132.8 (6.1) | 138.7 (5.1) |
| Tier III mode | 130.2 (8.0) | 133.7 (6.1) | 139.6 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 940 | 3,440 | 3,520 | 1,300 | 10,500 | 10,000 | 9,775 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 6,440 | 7,380 | 8,320 | 9,260 |

Tier II

| Dry mass: | t | 302 | 343 | 385 | 443 |
|-----------|---|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 14 | 15 | 16 |
| HP SCR | t | 3 | 4 | 5 | 5 |
| LP SCR | t | - | - | - | - |

* Data is available on request.

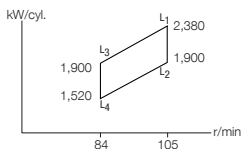


MAN B&W S60ME-C8.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 11,900 |
| 6 | 14,280 |
| 7 | 16,660 |
| 8 | 19,040 |

Stroke: 2,400 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S60ME-C8.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 167.5 | 165.0 | 169.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S60ME-C8.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

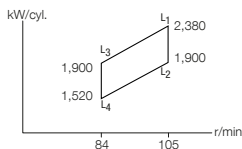
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 168.0 |
| Part load | EGB | 164.5 | 163.5 | 170.5 |
| Low load | EGB | 162.5 | 164.5 | 170.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 133.7 (8.0) | 133.2 (6.1) | 139.2 (5.0) |
| Part load | EGB | 133.6 (8.1) | 134.4 (6.2) | 141.2 (5.1) |
| Low load | EGB | 131.8 (8.1) | 135.3 (6.2) | 141.2 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 11,900 |
| 6 | 14,280 |
| 7 | 16,660 |
| 8 | 19,040 |

Stroke: 2,400 mm

Fuel Oil
L₁ MEP: 20.0 bar
MAN B&W S60ME-C8.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

MAN B&W S60ME-C8.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

MAN B&W S60ME-C8.5-LPSCR
L₁ SFOC [g/kWh]

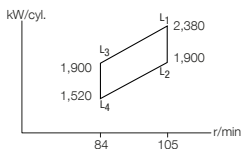
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

MAN B&W S60ME-C8.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 11,900 |
| 6 | 14,280 |
| 7 | 16,660 |
| 8 | 19,040 |

Stroke: 2,400 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S60ME-C8.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 171.0 |
| Tier III mode | 170.5 | 169.0 | 174.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.7 (8.3) | 135.2 (6.3) | 141.6 (5.2) |
| Tier III mode | 138.5 (8.3) | 139.0 (6.3) | 144.1 (5.2) |

MAN B&W S60ME-C8.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 164.0 | 165.5 | 171.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 133.1 (8.2) | 136.1 (6.2) | 141.7 (5.1) |

MAN B&W S60ME-C8.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 164.5 | 170.5 |
| Tier III mode | 163.5 | 165.5 | 171.5 |

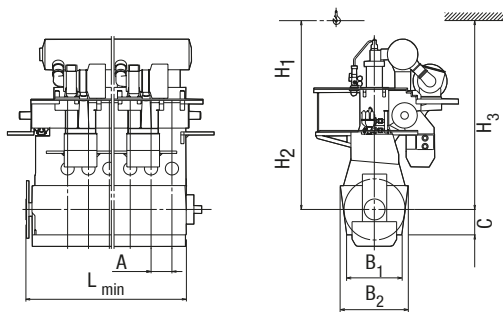
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 131.8 (8.2) | 135.3 (6.2) | 141.2 (5.1) |
| Tier III mode | 132.7 (8.2) | 136.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,020 | 3,770 | 3,840 | 1,300 | 10,800 | 10,000 | 9,775 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 6,668 | 7,688 | 8,708 | 9,728 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 308 | 350 | 393 | 452 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 14 | 15 | 16 |
| HP SCR | t | 3 | 4 | 5 | 5 |
| LP SCR | t | - | - | - | - |

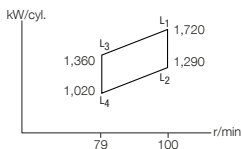


MAN B&W G50ME-C9.6

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 163.5 | 162.5 | 167.0 |
| Part load | EGB | 161.5 | 161.0 | 169.5 |
| Low load | EGB | 159.5 | 162.0 | 169.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*L₁ MEP: 21.0 bar

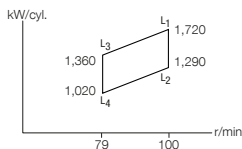
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 159.5 | 158.5 | 166.0 |
| Part load | EGB | 161.5 | 161.0 | 169.5 |
| Low load | EGB | 159.5 | 162.0 | 169.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 129.5 (7.9) | 130.3 (6.0) | 137.5 (5.0) |
| Part load | EGB | 131.0 (8.1) | 132.3 (6.2) | 140.4 (5.1) |
| Low load | EGB | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G50ME-C9.6-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 170.0 |
| Tier III mode | 166.5 | 166.5 | 172.0 |

MAN B&W G50ME-C9.6-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 161.0 | 163.0 | 170.0 |

MAN B&W G50ME-C9.6-LPSCR
L₁ SFOC [g/kWh]

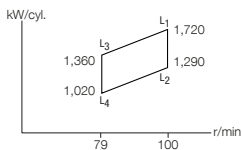
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 160.5 | 163.0 | 170.5 |

MAN B&W G50ME-C9.6

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 170.0 |
| Tier III mode | 166.5 | 166.5 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.2 (8.2) | 133.1 (6.3) | 140.8 (5.2) |
| Tier III mode | 135.2 (8.2) | 137.0 (6.3) | 142.5 (5.2) |

MAN B&W G50ME-C9.6-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 161.0 | 163.0 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |
| Tier III mode | 130.5 (8.1) | 134.0 (6.2) | 140.8 (5.1) |

MAN B&W G50ME-C9.6-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 160.5 | 163.0 | 170.5 |

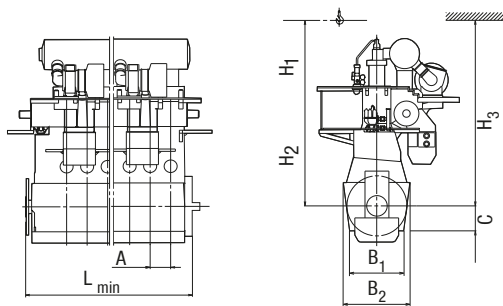
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |
| Tier III mode | 130.1 (8.1) | 134.0 (6.2) | 141.2 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 872 | 3,776 | 3,652 | 1,205 | 10,775 | 10,075 | 9,775 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 |
|---------------------|-------|-------|-------|-------|-------|
| L _{min} mm | 6,260 | 7,132 | 8,004 | 8,876 | 9,748 |

Tier II

| Dry mass: | t | 210 | 245 | 275 | 310 | 345 |
|-----------|---|-----|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | | |
|-------------------|---|---|---|---|----|----|
| EGR | t | 6 | 8 | 9 | 10 | 12 |
| HP SCR | t | 4 | 4 | 5 | 6 | 6 |
| LP SCR | t | - | - | - | - | - |

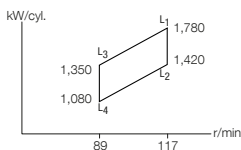


MAN B&W S50ME-C9.6

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,900 |
| 6 | 10,680 |
| 7 | 12,460 |
| 8 | 14,240 |
| 9 | 16,020 |

Stroke: 2,214 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S50ME-C9.6

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 163.5 | 162.5 | 167.0 |
| Part load | EGB | 161.5 | 161.0 | 169.5 |
| Low load | EGB | 159.5 | 162.0 | 169.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S50ME-C9.6-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

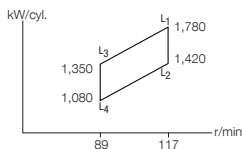
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 159.5 | 158.5 | 166.0 |
| Part load | EGB | 161.5 | 161.0 | 169.5 |
| Low load | EGB | 159.5 | 162.0 | 169.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 129.5 (7.9) | 130.3 (6.0) | 137.5 (5.0) |
| Part load | EGB | 131.0 (8.1) | 132.3 (6.2) | 140.4 (5.1) |
| Low load | EGB | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,900 |
| 6 | 10,680 |
| 7 | 12,460 |
| 8 | 14,240 |
| 9 | 16,020 |

Stroke: 2,214 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W S50ME-C9.6-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 170.0 |
| Tier III mode | 166.5 | 166.5 | 172.0 |

MAN B&W S50ME-C9.6-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 161.0 | 163.0 | 170.0 |

MAN B&W S50ME-C9.6-LPSCR
L₁ SFOC [g/kWh]

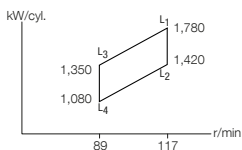
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 160.5 | 163.0 | 170.5 |

MAN B&W S50ME-C9.6

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,900 |
| 6 | 10,680 |
| 7 | 12,460 |
| 8 | 14,240 |
| 9 | 16,020 |

Stroke: 2,214 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S50ME-C9.6-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 170.0 |
| Tier III mode | 166.5 | 166.5 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.2 (8.2) | 133.1 (6.3) | 140.8 (5.2) |
| Tier III mode | 135.2 (8.2) | 137.0 (6.3) | 142.5 (5.2) |

MAN B&W S50ME-C9.6-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 161.0 | 163.0 | 170.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |
| Tier III mode | 130.5 (8.1) | 134.0 (6.2) | 140.8 (5.1) |

MAN B&W S50ME-C9.6-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 160.5 | 163.0 | 170.5 |

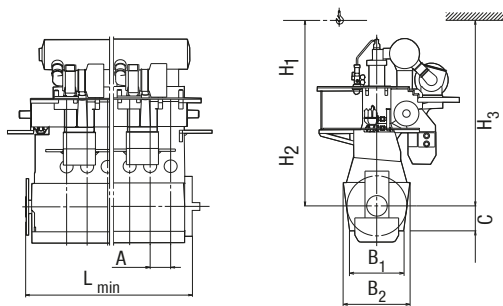
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 129.3 (8.1) | 133.2 (6.2) | 140.4 (5.1) |
| Tier III mode | 130.1 (8.1) | 134.0 (6.2) | 141.2 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 875 | 3,350 | 3,290 | 1,190 | 9,875 | 9,125 | 8,850 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 |
|---------------------|-------|-------|-------|-------|-------|
| L _{min} mm | 6,073 | 6,948 | 7,823 | 8,698 | 9,573 |

Tier II

| Dry mass: | t | 190 | 220 | 255 | 285 | 315 |
|-----------|---|-----|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | | |
|-------------------|---|---|---|---|----|----|
| EGR | t | 7 | 8 | 9 | 11 | 12 |
| HP SCR | t | 4 | 4 | 5 | 6 | 7 |
| LP SCR | t | - | - | - | - | - |

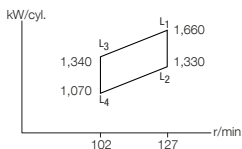


MAN B&W S50ME-C8.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,300 |
| 6 | 9,960 |
| 7 | 11,620 |
| 8 | 13,280 |
| 9 | 14,940 |

Stroke: 2,000 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S50ME-C8.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 168.5 | 166.0 | 170.0 |
| Part load | EGB | 165.5 | 164.5 | 171.5 |
| Low load | EGB | 163.5 | 165.5 | 171.5 |

Dual Fuel Mode for GI (Methane)

MAN B&W S50ME-C8.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 169.0 |
| Part load | EGB | 165.5 | 164.5 | 171.5 |
| Low load | EGB | 163.5 | 165.5 | 171.5 |

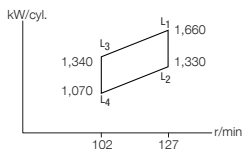
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 133.6 (8.0) | 133.2 (6.1) | 140.0 (5.1) |
| Part load | EGB | 134.4 (8.2) | 135.3 (6.2) | 142.1 (5.1) |
| Low load | EGB | 132.7 (8.2) | 136.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,300 |
| 6 | 9,960 |
| 7 | 11,620 |
| 8 | 13,280 |
| 9 | 14,940 |

Stroke: 2,000 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S50ME-C8.5-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 172.0 |
| Tier III mode | 171.5 | 170.0 | 175.0 |

MAN B&W S50ME-C8.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 165.0 | 166.5 | 172.0 |

MAN B&W S50ME-C8.5-LPSCR

L₁ SFOC [g/kWh]

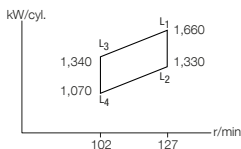
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 164.5 | 166.5 | 172.5 |

MAN B&W S50ME-C8.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,300 |
| 6 | 9,960 |
| 7 | 11,620 |
| 8 | 13,280 |
| 9 | 14,940 |

Stroke: 2,000 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S50ME-C8.5-GI-EGRTC

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 172.0 |
| Tier III mode | 171.5 | 170.0 | 175.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.5 (8.3) | 136.0 (6.4) | 142.4 (5.3) |
| Tier III mode | 139.3 (8.3) | 139.9 (6.4) | 145.0 (5.3) |

MAN B&W S50ME-C8.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 165.0 | 166.5 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.6 (8.2) | 136.1 (6.3) | 142.1 (5.2) |
| Tier III mode | 133.9 (8.2) | 136.9 (6.3) | 142.5 (5.2) |

MAN B&W S50ME-C8.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 164.5 | 166.5 | 172.5 |

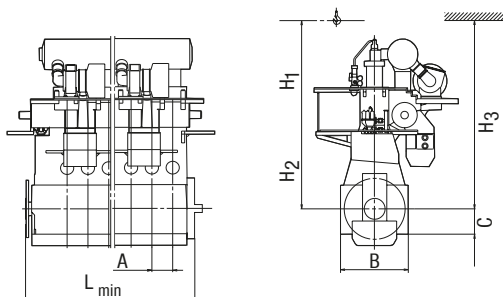
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.6 (8.2) | 136.1 (6.3) | 142.0 (5.2) |
| Tier III mode | 133.5 (8.2) | 136.9 (6.3) | 142.9 (5.2) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|-------|-------|----------------|----------------|----------------|
| mm | 850 | 3,150 | 1,085 | 9,050 | 8,500 | 8,250 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 |
|---------------------|-------|-------|-------|-------|-------|
| L _{min} mm | 5,924 | 6,774 | 7,624 | 8,474 | 9,324 |

Tier II

| Dry mass: | t | 180 | 210 | 240 | 270 | 295 |
|-----------|---|-----|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | | |
|-------------------|---|---|---|---|----|----|
| EGR | t | 6 | 7 | 9 | 10 | 11 |
| HP SCR | t | 3 | 4 | 5 | 5 | 6 |
| LP SCR | t | - | - | - | - | - |

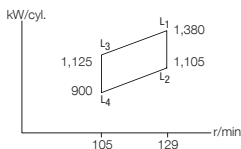


MAN B&W S46ME-B8.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,900 |
| 6 | 8,280 |
| 7 | 9,660 |
| 8 | 11,040 |

Stroke: 1,932 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S46ME-B.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 169.5 | 167.0 | 170.0 |
| Part load | EGB | 166.5 | 165.5 | 171.5 |
| Low load | EGB | 164.5 | 166.5 | 171.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S46ME-B.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 169.5 | 167.0 | 170.0 |
| Part load | EGB | 166.5 | 165.5 | 171.5 |
| Low load | EGB | 164.5 | 166.5 | 171.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

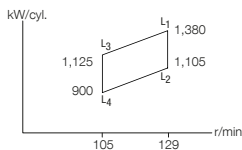
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 137.8 (8.1) | 137.6 (6.2) | 140.8 (5.1) |
| Part load | EGB | 135.2 (8.2) | 136.2 (6.2) | 142.1 (5.1) |
| Low load | EGB | 133.5 (8.2) | 137.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,900 |
| 6 | 8,280 |
| 7 | 9,660 |
| 8 | 11,040 |

Stroke: 1,932 mm



Fuel Oil

L₁ MEP: 20.0 bar

MAN B&W S46ME-B.5-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 172.0 |
| Tier III mode | 172.5 | 171.0 | 175.0 |

MAN B&W S46ME-B.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 171.5 |
| Tier III mode | 166.0 | 167.5 | 172.0 |

MAN B&W S46ME-B.5-LPSCR

L₁ SFOC [g/kWh]

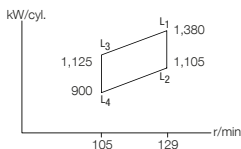
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 171.5 |
| Tier III mode | 167.5 | 167.5 | 172.5 |

MAN B&W S46ME-B8.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,900 |
| 6 | 8,280 |
| 7 | 9,660 |
| 8 | 11,040 |

Stroke: 1,932 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 20.0 bar

MAN B&W S46ME-B.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 172.0 |
| Tier III mode | 172.5 | 171.0 | 175.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 133.4 (8.3) | 137.0 (6.4) | 142.4 (5.3) |
| Tier III mode | 140.2 (8.3) | 140.8 (6.4) | 145.0 (5.3) |

MAN B&W S46ME-B.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 171.5 |
| Tier III mode | 166.0 | 167.5 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 133.4 (8.2) | 137.0 (6.3) | 142.1 (5.2) |
| Tier III mode | 134.7 (8.2) | 137.9 (6.3) | 142.5 (5.2) |

MAN B&W S46ME-B.5-GI-LPSCR

L₁ MEP: 20.0 barL₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 164.5 | 166.5 | 171.5 |
| Tier III mode | 167.5 | 167.5 | 172.5 |

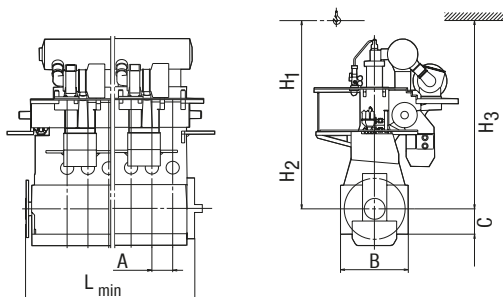
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 133.4 (8.3) | 137.0 (6.3) | 142.0 (5.2) |
| Tier III mode | 135.9 (8.3) | 137.9 (6.3) | 142.9 (5.2) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE, except GIE with EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|-------|-----|----------------|----------------|----------------|
| mm | 782 | 2,924 | 986 | 9,000 | 8,175 | 7,900 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 5,528 | 6,310 | 7,092 | 7,874 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 159 | 177 | 199 | 219 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|---|---|---|---|
| EGR | t | 5 | 6 | 7 | 8 |
| HP SCR | t | 3 | 3 | 4 | 5 |
| LP SCR | t | - | - | - | - |

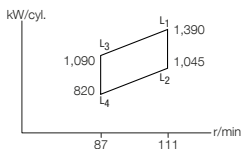


MAN B&W G45ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,950 |
| 6 | 8,340 |
| 7 | 9,730 |
| 8 | 11,120 |

Stroke: 2,250 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G45ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 168.5 | 166.0 | 170.0 |
| Part load | EGB | 165.5 | 164.5 | 171.5 |
| Low load | EGB | 163.5 | 165.5 | 171.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G45ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 169.0 |
| Part load | EGB | 165.5 | 164.5 | 171.5 |
| Low load | EGB | 163.5 | 165.5 | 171.5 |

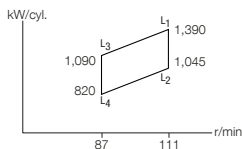
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 133.6 (8.0) | 133.2 (6.1) | 140.0 (5.1) |
| Part load | EGB | 134.4 (8.2) | 135.3 (6.2) | 142.1 (5.1) |
| Low load | EGB | 132.7 (8.2) | 136.1 (6.2) | 142.1 (5.1) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,950 |
| 6 | 8,340 |
| 7 | 9,730 |
| 8 | 11,120 |

Stroke: 2,250 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G45ME-C9.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 172.0 |
| Tier III mode | 171.5 | 170.0 | 175.0 |

MAN B&W G45ME-C9.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 165.0 | 166.5 | 172.0 |

MAN B&W G45ME-C9.5-LPSCR
L₁ SFOC [g/kWh]

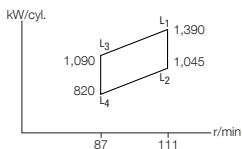
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 164.5 | 166.5 | 172.5 |

MAN B&W G45ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 6,950 |
| 6 | 8,340 |
| 7 | 9,730 |
| 8 | 11,120 |

Stroke: 2,250 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G45ME-C9.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 172.0 |
| Tier III mode | 171.5 | 170.0 | 175.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.5 (8.3) | 136.0 (6.4) | 142.4 (5.3) |
| Tier III mode | 139.3 (8.3) | 139.9 (6.4) | 145.0 (5.3) |

MAN B&W G45ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 165.0 | 166.5 | 172.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.6 (8.2) | 136.1 (6.3) | 142.1 (5.2) |
| Tier III mode | 133.9 (8.2) | 136.9 (6.3) | 142.5 (5.2) |

MAN B&W G45ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 165.5 | 171.5 |
| Tier III mode | 164.5 | 166.5 | 172.5 |

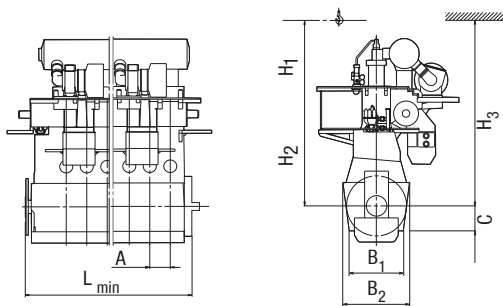
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 132.6 (8.2) | 136.1 (6.3) | 142.0 (5.2) |
| Tier III mode | 133.5 (8.2) | 136.9 (6.3) | 142.9 (5.2) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE, except GIE with EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 784 | 3,350 | 3,260 | 1,169 | 9,725 | 9,525 | 9,250 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 5,638 | 6,464 | 7,290 | 8,116 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 163 | 183 | 206 | 234 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|---|---|---|---|
| EGR | t | 5 | 6 | 7 | 8 |
| HP SCR | t | 3 | 3 | 4 | 5 |
| LP SCR | t | - | - | - | - |

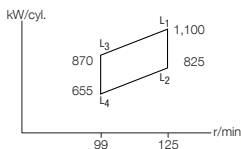


MAN B&W G40ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,500 |
| 6 | 6,600 |
| 7 | 7,700 |
| 8 | 8,800 |

Stroke: 2,000 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W G40ME-C9.5

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 172.5 | 170.0 | 174.0 |
| Part load | EGB | 169.5 | 168.5 | 175.5 |
| Low load | EGB | 167.5 | 169.5 | 175.5 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G40ME-C9.5-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 168.5 | 166.0 | 173.0 |
| Part load | EGB | 169.5 | 168.5 | 175.5 |
| Low load | EGB | 167.5 | 169.5 | 175.5 |

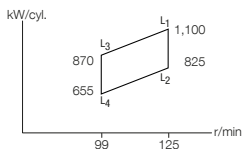
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 136.9 (8.2) | 136.5 (6.3) | 143.3 (5.2) |
| Part load | EGB | 137.6 (8.4) | 138.6 (6.4) | 145.4 (5.3) |
| Low load | EGB | 135.9 (8.4) | 139.4 (6.4) | 145.4 (5.3) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,500 |
| 6 | 6,600 |
| 7 | 7,700 |
| 8 | 8,800 |

Stroke: 2,000 mm

Fuel Oil
L₁ MEP: 21.0 bar
MAN B&W G40ME-C9.5-EGRBP
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 179.0 |
| Tier III mode | 175.5 | 174.0 | 179.0 |

MAN B&W G40ME-C9.5-HPSCR
L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 175.5 |
| Tier III mode | 169.0 | 170.5 | 176.0 |

MAN B&W G40ME-C9.5-LPSCR
L₁ SFOC [g/kWh]

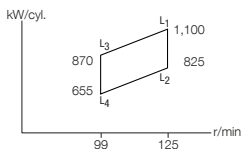
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 175.5 |
| Tier III mode | 168.5 | 170.5 | 176.5 |

MAN B&W G40ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,500 |
| 6 | 6,600 |
| 7 | 7,700 |
| 8 | 8,800 |

Stroke: 2,000 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W G40ME-C9.5-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 179.0 |
| Tier III mode | 175.5 | 174.0 | 179.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 135.8 (8.5) | 139.3 (6.5) | 145.7 (5.4) |
| Tier III mode | 142.6 (8.5) | 143.1 (6.5) | 148.3 (5.4) |

MAN B&W G40ME-C9.5-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 175.5 |
| Tier III mode | 169.0 | 170.5 | 176.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 135.8 (8.4) | 139.4 (6.4) | 145.4 (5.3) |
| Tier III mode | 137.1 (8.4) | 140.2 (6.4) | 145.8 (5.3) |

MAN B&W G40ME-C9.5-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 167.5 | 169.5 | 175.5 |
| Tier III mode | 168.5 | 170.5 | 176.5 |

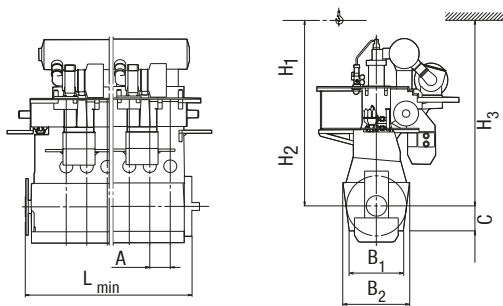
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 135.9 (8.4) | 139.4 (6.4) | 145.4 (5.3) |
| Tier III mode | 136.7 (8.4) | 140.2 (6.4) | 146.2 (5.3) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE, except GIE with EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 700 | 3,020 | 2,942 | 1,039 | 8,700 | * | * |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 5,012 | 5,712 | 6,412 | 7,112 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 119 | 135 | 153 | 173 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|---|---|---|---|
| EGR | t | 4 | 5 | 6 | 7 |
| HP SCR | t | 2 | 3 | 3 | 4 |
| LP SCR | t | - | - | - | - |

* Data is available on request.

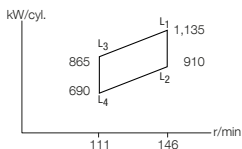


MAN B&W S40ME-B9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,675 |
| 6 | 6,810 |
| 7 | 7,945 |
| 8 | 9,080 |
| 9 | 10,215 |

Stroke: 1,770 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S40ME-B9

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 173.5 | 171.0 | 174.0 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S40ME-B9-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 173.5 | 171.0 | 174.0 |

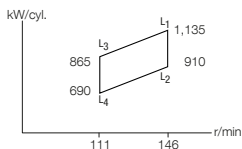
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 141.1 (8.3) | 140.8 (6.3) | 144.1 (5.2) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,675 |
| 6 | 6,810 |
| 7 | 7,945 |
| 8 | 9,080 |
| 9 | 10,215 |

Stroke: 1,770 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S40ME-B9-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 169.5 | 172.0 | 179.0 |
| Tier III mode | 176.5 | 175.0 | 179.0 |

MAN B&W S40ME-B9-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 173.5 | 171.0 | 174.0 |
| Tier III mode | 175.0 | 172.0 | 174.5 |

MAN B&W S40ME-B9-LPSCR

L₁ SFOC [g/kWh]

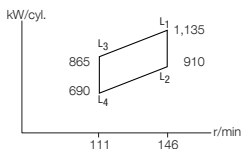
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 173.5 | 171.0 | 174.0 |
| Tier III mode | 174.0 | 171.5 | 174.5 |

MAN B&W S40ME-B9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 5,675 |
| 6 | 6,810 |
| 7 | 7,945 |
| 8 | 9,080 |
| 9 | 10,215 |

Stroke: 1,770 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S40ME-B9-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 169.5 | 172.0 | 179.0 |
| Tier III mode | 176.5 | 175.0 | 179.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 137.5 (8.5) | 141.5 (6.5) | 148.3 (5.4) |
| Tier III mode | 143.5 (8.5) | 144.1 (6.5) | 148.3 (5.4) |

MAN B&W S40ME-B9-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 173.5 | 171.0 | 174.0 |
| Tier III mode | 175.0 | 172.0 | 174.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.0 (8.4) | 140.8 (6.4) | 144.1 (5.2) |
| Tier III mode | 142.3 (8.4) | 141.7 (6.4) | 144.6 (5.2) |

MAN B&W S40ME-B9-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 173.5 | 171.0 | 174.0 |
| Tier III mode | 174.0 | 171.5 | 174.5 |

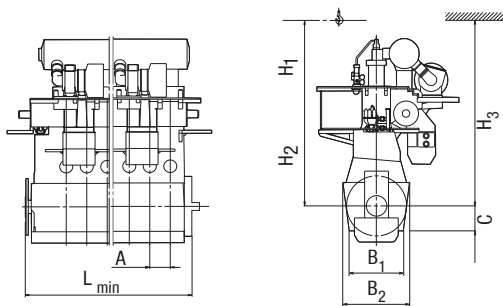
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.1 (8.3) | 140.8 (6.3) | 144.1 (5.2) |
| Tier III mode | 141.5 (8.3) | 141.3 (6.3) | 144.6 (5.2) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE, except GIE with EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-----|----------------|----------------|----------------|
| mm | 700 | 2,650 | 2,610 | 950 | 7,800 | 7,475 | 7,200 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 |
|---------------------|-------|-------|-------|-------|-------|
| L _{min} mm | 5,000 | 5,700 | 6,400 | 7,100 | 7,800 |

Tier II

| Dry mass: | t | 112 | 131 | 148 | 163 | 195 |
|-----------|---|-----|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | | |
|-------------------|---|---|---|---|---|---|
| EGR | t | 4 | 5 | 6 | 7 | 7 |
| HP SCR | t | 2 | 3 | 3 | 4 | 4 |
| LP SCR | t | - | - | - | - | - |

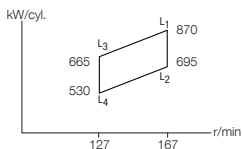


MAN B&W S35ME-B9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 4,350 |
| 6 | 5,220 |
| 7 | 6,090 |
| 8 | 6,960 |

Stroke: 1,550 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S35ME-B9

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 174.5 | 172.0 | 175.0 |

Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S35ME-B9-GI

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 174.5 | 172.0 | 175.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

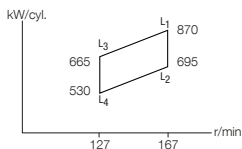
| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 141.9 (8.3) | 141.7 (6.4) | 145.0 (5.3) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 4,350 |
| 6 | 5,220 |
| 7 | 6,090 |
| 8 | 6,960 |

Stroke: 1,550 mm



Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S35ME-B9-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 170.5 | 173.0 | 180.0 |
| Tier III mode | 177.5 | 176.0 | 180.0 |

MAN B&W S35ME-B9-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 174.5 | 172.0 | 175.0 |
| Tier III mode | 176.0 | 173.0 | 175.5 |

MAN B&W S35ME-B9-LPSCR

L₁ SFOC [g/kWh]

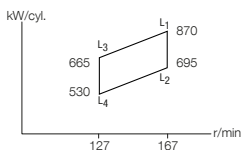
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 174.5 | 172.0 | 175.0 |
| Tier III mode | 175.0 | 172.5 | 175.5 |

MAN B&W S35ME-B9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 4,350 |
| 6 | 5,220 |
| 7 | 6,090 |
| 8 | 6,960 |

Stroke: 1,550 mm



Dual Fuel Mode for GI (Methane)

L₁ MEP: 21.0 bar

MAN B&W S35ME-B9-GI-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 170.5 | 173.0 | 180.0 |
| Tier III mode | 177.5 | 176.0 | 180.0 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 138.3 (8.6) | 142.4 (6.5) | 149.1 (5.4) |
| Tier III mode | 144.3 (8.6) | 144.9 (6.5) | 149.1 (5.4) |

MAN B&W S35ME-B9-GI-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 174.5 | 172.0 | 175.0 |
| Tier III mode | 176.0 | 173.0 | 175.5 |

L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.8 (8.4) | 141.6 (6.4) | 145.0 (5.3) |
| Tier III mode | 143.1 (8.4) | 142.5 (6.4) | 145.4 (5.3) |

MAN B&W S35ME-B9-GI-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 174.5 | 172.0 | 175.0 |
| Tier III mode | 175.0 | 172.5 | 175.5 |

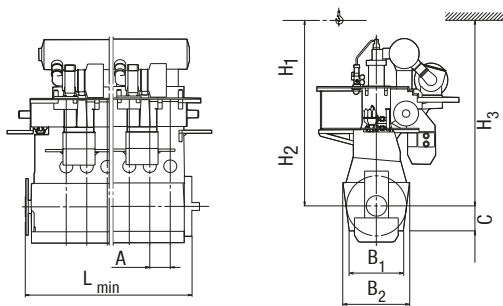
L₁ SGC 50,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.9 (8.4) | 141.7 (6.4) | 145.0 (5.3) |
| Tier III mode | 142.3 (8.4) | 142.1 (6.4) | 145.4 (5.3) |

* Gas fuel LCV (50,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Note: Also available for GIE, except GIE with EGR, see pages 11-13.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-----|----------------|----------------|----------------|
| mm | 612 | 2,300 | 2,288 | 830 | 6,925 | 6,625 | 6,275 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 4,378 | 4,990 | 5,602 | 6,214 |

Tier II

| | | | | | |
|-----------|---|----|----|----|-----|
| Dry mass: | t | 81 | 90 | 99 | 111 |
|-----------|---|----|----|----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|---|---|---|---|
| EGR | t | 3 | 4 | 5 | 5 |
| HP SCR | t | 2 | 2 | 3 | 3 |
| LP SCR | t | - | - | - | - |

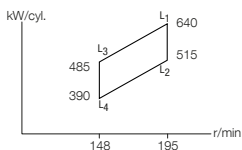


MAN B&W S30ME-B9.5

Tier II Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 3,200 |
| 6 | 3,840 |
| 7 | 4,480 |
| 8 | 5,120 |

Stroke: 1,328 mm



Tier II Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S30ME-B9

L₁ SFOC [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 175.5 | 173.0 | 176.0 |

Tier III Fuel Oil

L₁ MEP: 21.0 bar

MAN B&W S30ME-B9-EGRBP

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 171.5 | 174.0 | 181.0 |
| Tier III mode | 178.5 | 177.0 | 181.0 |

MAN B&W S30ME-B9-HPSCR

L₁ SFOC [g/kWh]

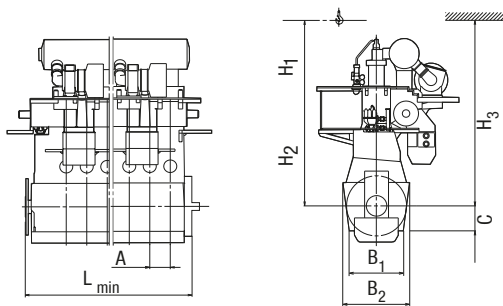
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 175.5 | 173.0 | 176.0 |
| Tier III mode | 177.0 | 174.0 | 176.5 |

MAN B&W S30ME-B9-LPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 175.5 | 173.0 | 176.0 |
| Tier III mode | 176.0 | 173.5 | 176.5 |

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-----|----------------|----------------|----------------|
| mm | 538 | 1,980 | 2,020 | 712 | 6,025 | 5,950 | 5,625 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 4,087 | 4,625 | 5,163 | 5,701 |

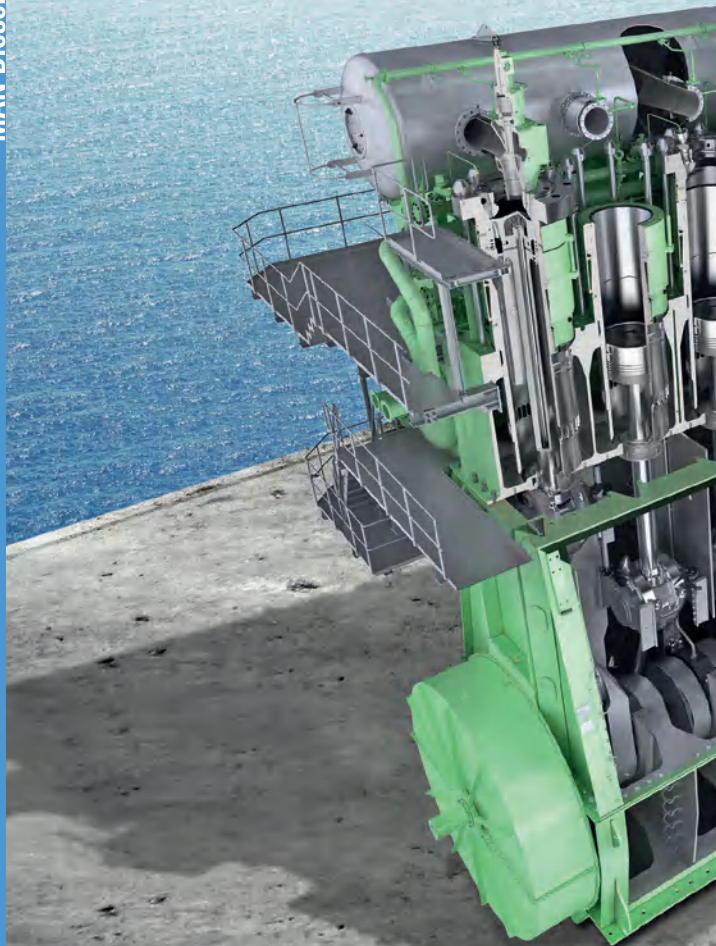
Tier II

| | | | | | |
|-----------|---|----|----|----|----|
| Dry mass: | t | 61 | 69 | 77 | 86 |
|-----------|---|----|----|----|----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|---|---|---|---|
| EGR | t | 2 | 3 | 3 | 4 |
| HP SCR | t | 1 | 2 | 2 | 2 |
| LP SCR | t | - | - | - | - |







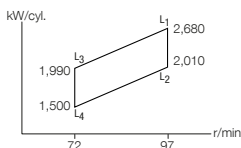
Alternative fuels
Tier II and Tier III

MAN B&W G60ME-C9.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-GIE

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 168.5 | 168.0 | 172.0 |
| Part load | EGB | 165.5 | 166.5 | 173.5 |
| Low load | EGB | 163.5 | 167.5 | 173.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 144.1 (8.2) | 145.5 (6.2) | 150.0 (5.2) |
| Part load | EGB | 141.3 (8.3) | 144.1 (6.3) | 151.3 (5.2) |
| Low load | EGB | 139.5 (8.3) | 145.0 (6.3) | 151.3 (5.2) |

Dual Fuel Mode for LGIP (LPG)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-LGIP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 165.5 | 163.0 | 167.0 |
| Part load | EGB | 162.5 | 161.5 | 168.5 |
| Low load | EGB | 160.5 | 162.5 | 168.5 |

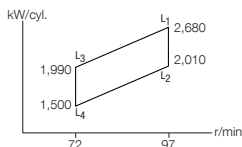
L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 146.2 (8.0) | 145.8 (6.1) | 150.4 (5.0) |
| Part load | EGB | 143.4 (8.0) | 144.3 (6.1) | 151.7 (5.1) |
| Low load | EGB | 141.5 (8.0) | 145.3 (6.1) | 151.7 (5.1) |

* Gas fuel LCV (47,500/46,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-GIE-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 167.5 | 173.5 |
| Tier III mode | 165.0 | 168.5 | 174.0 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 139.5 (8.3) | 145.0 (6.3) | 151.3 (5.2) |
| Tier III mode | 140.8 (8.3) | 145.9 (6.3) | 151.7 (5.2) |

MAN B&W G60ME-C9.5-GIE-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 163.5 | 167.5 | 173.5 |
| Tier III mode | 164.5 | 168.5 | 174.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 139.5 (8.3) | 145.0 (6.3) | 151.3 (5.2) |
| Tier III mode | 140.4 (8.3) | 145.9 (6.3) | 152.2 (5.2) |

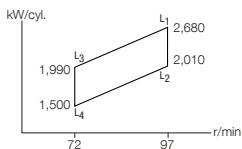
* Gas fuel LCV (47,500 kJ/kg) is converted to diesel fuel LCV (42,700 kJ/kg) for comparison with a diesel operated engine.

MAN B&W G60ME-C9.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 13,400 |
| 6 | 16,080 |
| 7 | 18,760 |
| 8 | 21,440 |

Stroke: 2,790 mm



Dual Fuel Mode for LGIP (LPG)

L₁ MEP: 21.0 bar

MAN B&W G60ME-C9.5-LGIP-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 169.0 |
| Tier III mode | 168.5 | 167.0 | 172.0 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.4 (8.2) | 145.2 (6.2) | 152.1 (5.2) |
| Tier III mode | 148.8 (8.2) | 149.3 (6.2) | 154.9 (5.2) |

MAN B&W G60ME-C9.5-GI-LGIP-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 162.0 | 163.5 | 169.0 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.5 (8.1) | 145.2 (6.2) | 151.7 (5.1) |
| Tier III mode | 142.9 (8.1) | 146.2 (6.2) | 152.2 (5.1) |

MAN B&W G60ME-C9.5-LGIP-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

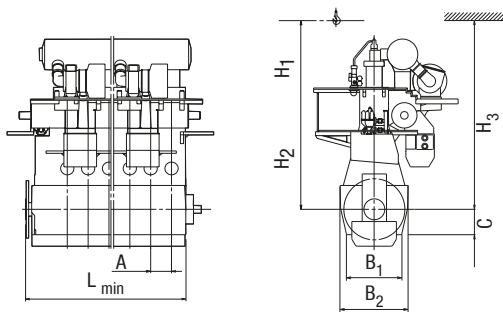
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 160.5 | 162.5 | 168.5 |
| Tier III mode | 161.5 | 163.5 | 169.5 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | 50% | 75% | 100% |
|---------------|-------------|-------------|-------------|
| Tier II mode | 141.5 (8.1) | 145.2 (6.2) | 151.7 (5.1) |
| Tier III mode | 142.4 (8.1) | 146.2 (6.2) | 152.6 (5.1) |

* Liquid gas fuel LCV (46,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-------|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 1,080 | 4,090 | 4,220 | 1,500 | 12,175 | 11,400 | 11,075 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|--------|
| L _{min} mm | 7,390 | 8,470 | 9,550 | 10,630 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 395 | 439 | 491 | 543 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 14 | 15 | 16 |
| HP SCR | t | 3 | 4 | 5 | 5 |
| LP SCR | t | - | - | - | - |

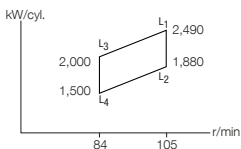


MAN B&W S60ME-C10.5

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-GIE

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 167.5 | 167.0 | 171.0 |
| Part load | EGB | 164.5 | 165.5 | 172.5 |
| Low load | EGB | 162.5 | 166.5 | 172.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 143.3 (8.1) | 144.6 (6.2) | 149.1 (5.1) |
| Part load | EGB | 140.5 (8.2) | 143.3 (6.3) | 150.4 (5.2) |
| Low load | EGB | 138.7 (8.2) | 144.1 (6.3) | 150.4 (5.2) |

Dual Fuel Mode for LGIP (LPG)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-LGIP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 164.5 | 162.0 | 166.0 |
| Part load | EGB | 161.5 | 160.5 | 167.5 |
| Low load | EGB | 159.5 | 161.5 | 167.5 |

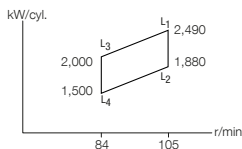
L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 145.4 (7.9) | 144.9 (6.0) | 149.5 (5.0) |
| Part load | EGB | 142.5 (8.0) | 143.4 (6.1) | 150.8 (5.0) |
| Low load | EGB | 140.7 (8.0) | 144.4 (6.1) | 150.8 (5.0) |

* Gas fuel LCV (47,500/46,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-GIE-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 166.5 | 172.5 |
| Tier III mode | 164.5 | 167.5 | 173.0 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 138.6 (8.3) | 144.1 (6.3) | 150.4 (5.2) |
| Tier III mode | 140.4 (8.3) | 145.0 (6.3) | 150.9 (5.2) |

MAN B&W S60ME-C10.5-GIE-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 166.5 | 172.5 |
| Tier III mode | 163.5 | 167.5 | 173.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 138.7 (8.3) | 144.1 (6.3) | 150.4 (5.2) |
| Tier III mode | 139.6 (8.3) | 145.0 (6.3) | 151.3 (5.2) |

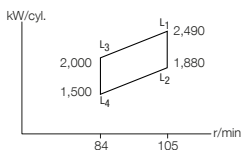
* Gas fuel LCV (47,500 kJ/kg) is converted to diesel fuel LCV (42,700 kJ/kg) for comparison with a diesel operated engine.

MAN B&W S60ME-C10.5

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 12,450 |
| 6 | 14,940 |
| 7 | 17,430 |
| 8 | 19,920 |

Stroke: 2,400 mm



Dual Fuel Mode for LGIP (LPG)

L₁ MEP: 21.0 bar

MAN B&W S60ME-C10.5-LGIP-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 168.0 |
| Tier III mode | 167.5 | 166.0 | 171.0 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 140.6 (8.1) | 144.3 (6.2) | 151.2 (5.1) |
| Tier III mode | 147.9 (8.1) | 148.4 (6.2) | 154.0 (5.1) |

MAN B&W S60ME-C10.5-GI-LGIP-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 161.0 | 162.5 | 168.0 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 140.6 (8.0) | 144.3 (6.1) | 150.8 (5.0) |
| Tier III mode | 142.0 (8.0) | 145.3 (6.1) | 151.3 (5.0) |

MAN B&W S60ME-C10.5-LGIP-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

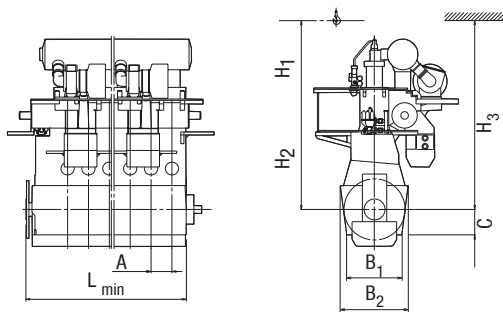
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 161.5 | 167.5 |
| Tier III mode | 160.5 | 162.5 | 168.5 |

L₁ SGC 46,000 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 140.6 (8.0) | 144.3 (6.1) | 150.8 (5.1) |
| Tier III mode | 141.5 (8.0) | 145.3 (6.1) | 151.7 (5.1) |

* Liquid gas fuel LCV (46,000 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 940 | 3,440 | 3,520 | 1,300 | 10,500 | 10,000 | 9,775 |

| Cylinders: | 5 | 6 | 7 | 8 |
|---------------------|-------|-------|-------|-------|
| L _{min} mm | 6,440 | 7,380 | 8,320 | 9,260 |

Tier II

| | | | | | |
|-----------|---|-----|-----|-----|-----|
| Dry mass: | t | 302 | 343 | 385 | 443 |
|-----------|---|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | |
|-------------------|---|----|----|----|----|
| EGR | t | 14 | 14 | 15 | 16 |
| HP SCR | t | 3 | 4 | 5 | 5 |
| LP SCR | t | - | - | - | - |

* Data is available on request.

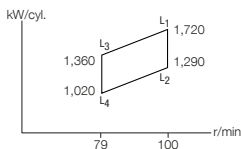


MAN B&W G50ME-C9.6

Tier II

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-GIE

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 166.5 | 167.5 | 172.0 |
| Part load | EGB | 164.5 | 166.0 | 174.5 |
| Low load | EGB | 162.5 | 167.0 | 174.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------------|-------------|-------------|
| High load | - | 142.3 (8.2) | 145.1 (6.3) | 150.0 (5.2) |
| Part load | EGB | 140.4 (8.3) | 143.6 (6.3) | 152.2 (5.2) |
| Low load | EGB | 138.6 (8.3) | 144.5 (6.3) | 152.2 (5.2) |

Dual Fuel Mode for LGIM (Methanol)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-LGIM

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|-------|-------|-------|
| High load | - | 163.5 | 162.5 | 167.0 |
| Part load | EGB | 161.5 | 161.0 | 169.5 |
| Low load | EGB | 159.5 | 162.0 | 169.5 |

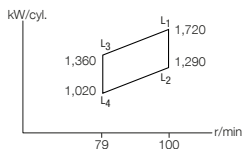
L₁ SGC 19,900 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| SFOC-optimised load range | Tuning | 50% | 75% | 100% |
|---------------------------|--------|--------------|--------------|-------------|
| High load | - | 322.4 (13.3) | 327.2 (10.1) | 340.4 (8.4) |
| Part load | EGB | 317.7 (13.5) | 323.7 (10.3) | 345.5 (8.5) |
| Low load | EGB | 313.4 (13.5) | 325.8 (10.3) | 345.5 (8.5) |

* Gas fuel LCV (47,500/19,900 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm



Dual Fuel Mode for GIE (Ethane)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-GIE-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 167.0 | 174.5 |
| Tier III mode | 164.0 | 168.0 | 175.0 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 138.5 (8.4) | 144.5 (6.4) | 152.1 (5.3) |
| Tier III mode | 139.9 (8.4) | 145.4 (6.4) | 152.6 (5.3) |

MAN B&W G50ME-C9.6-GIE-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 162.5 | 167.0 | 174.5 |
| Tier III mode | 163.5 | 168.0 | 175.5 |

L₁ SGC 47,500 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|-------------|-------------|-------------|
| Tier II mode | 138.6 (8.4) | 144.5 (6.4) | 152.1 (5.3) |
| Tier III mode | 139.5 (8.4) | 145.4 (6.4) | 153.0 (5.3) |

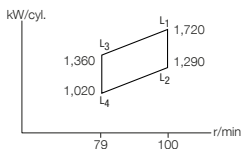
* Gas fuel LCV (47,500 kJ/kg) is converted to diesel fuel LCV (42,700 kJ/kg) for comparison with a diesel operated engine.

MAN B&W G50ME-C9.6

Tier III

| Cyl. | L ₁ kW |
|------|-------------------|
| 5 | 8,600 |
| 6 | 10,320 |
| 7 | 12,040 |
| 8 | 13,760 |
| 9 | 15,480 |

Stroke: 2,500 mm



Dual Fuel Mode for LGIM (Methanol)

L₁ MEP: 21.0 bar

MAN B&W G50ME-C9.6-LGIM-EGRBP

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 170.0 |
| Tier III mode | 166.5 | 166.5 | 172.0 |

L₁ SGC 19,900 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|--------------|--------------|-------------|
| Tier II mode | 312.9 (13.7) | 325.5 (10.4) | 346.3 (8.6) |
| Tier III mode | 328.0 (13.7) | 335.2 (10.4) | 350.6 (8.6) |

MAN B&W G50ME-C9.6-GI-LGIM-HPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 161.0 | 163.0 | 170.0 |

L₁ SGC 19,900 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|--------------|--------------|-------------|
| Tier II mode | 313.1 (13.6) | 325.7 (10.3) | 345.5 (8.5) |
| Tier III mode | 316.3 (13.6) | 327.8 (10.3) | 346.5 (8.5) |

MAN B&W G50ME-C9.6-LGIM-LPSCR

L₁ SFOC equivalent gas + pilot fuel (42,700 kJ/kg) [g/kWh]*

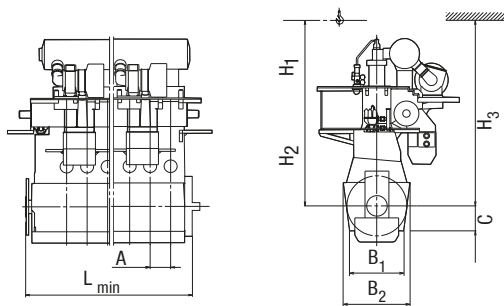
| | 50% | 75% | 100% |
|---------------|-------|-------|-------|
| Tier II mode | 159.5 | 162.0 | 169.5 |
| Tier III mode | 160.5 | 163.0 | 170.5 |

L₁ SGC 19,900 kJ/kg (SPOC pilot fuel 42,700 kJ/kg) [g/kWh]

| | | | |
|---------------|--------------|--------------|-------------|
| Tier II mode | 313.2 (13.5) | 325.7 (10.3) | 345.4 (8.5) |
| Tier III mode | 315.3 (13.5) | 327.8 (10.3) | 347.6 (8.5) |

* Liquid gas fuel LCV (19,900 kJ/kg) is converted to fuel oil LCV (42,700 kJ/kg) for comparison with a fuel oil operated engine.

Engine Dimensions



Specifications

| Dimensions: | A | B ₁ | B ₂ | C | H ₁ | H ₂ | H ₃ |
|-------------|-----|----------------|----------------|-------|----------------|----------------|----------------|
| mm | 872 | 3,776 | 3,652 | 1,205 | 10,775 | 10,075 | 9,775 |

| Cylinders: | 5 | 6 | 7 | 8 | 9 |
|---------------------|-------|-------|-------|-------|-------|
| L _{min} mm | 6,260 | 7,132 | 8,004 | 8,876 | 9,748 |

Tier II

| Dry mass: | t | 210 | 245 | 275 | 310 | 345 |
|-----------|---|-----|-----|-----|-----|-----|
|-----------|---|-----|-----|-----|-----|-----|

Tier III

| Dry mass (added): | | | | | | |
|-------------------|---|---|---|---|----|----|
| EGR | t | 6 | 8 | 9 | 10 | 12 |
| HP SCR | t | 4 | 4 | 5 | 6 | 6 |
| LP SCR | t | - | - | - | - | - |





MAN B&W

Two-Stroke

Propulsion Systems



MAN Alpha**Propeller Programme – FPP and CPP**

6.9-metre MAN Alpha Kappel propeller for a 105,000 dwt crude oil carrier

The MAN Alpha FPP portfolio covers:

- power range of 4-40 MW per shaft
- blade configurations for 3, 4, 5 and 6-bladed propellers
- propellers with integrated shaft line and stern tube solutions
- wide range of stern tube lube and sealing systems
 - oil, water, biodegradable oils.

The MAN Alpha FPPs are characterised by the following benefits:

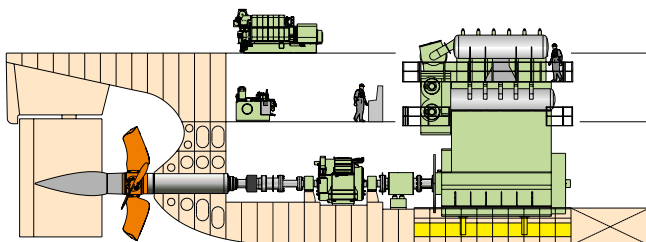
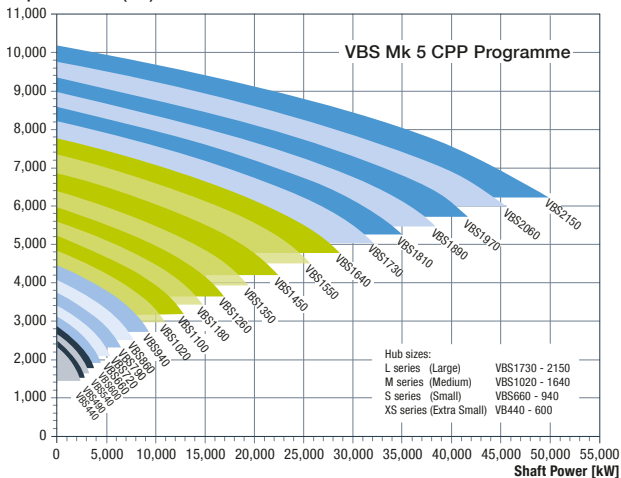
- High-efficient, hydrodynamically optimised blade profiles
 - Kappel designs available
- High reliability: robust approach with ample mechanical design margins
- High-efficient aft-ship integration with rudder, rudder bulb, ducts, etc.
- Layouts for complete two-stroke propulsion systems, e.g. with PTO solutions
- Plant calculations with upfront consideration to torsional vibration calculation (TVC), alignment and control systems.

MAN B&W Two-Stroke Propulsion Systems

MAN Alpha Controllable Pitch Propeller

- Standard Mk 5 versions are 4-bladed – 3 and 5-bladed propellers are available upon request
- The figures stated after the VBS indicate the propeller hub diameter
- Standard blade/hub materials are Ni-Al-bronze; stainless steel is optional
- Propellers are available up to the highest ice classes; however the below standard programme is based on 'no ice'.

Propeller diameter (mm)



Two-stroke propulsion system installation – complete powertrain with propeller and aft ship equipment

MAN B&W Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D ¹⁾ mm | Hub VBS mm | Q mm | R mm | Wmin mm | Prop. mass t ²⁾ |
|-----------------------|--------|----------------------|-----------------------|------------------|---------|---------|------------|-------------------------------|
| G70ME-C9.5/-GI | | | | | | | | |
| 5 | 18,200 | 83 | 8,100 | 1,890 | 1,436 | 1,496 | 3,700 | 90.0 |
| 6 | 21,840 | 83 | 8,450 | 2,060 | 1,565 | 1,593 | 3,700 | 93.5 |
| 7 | 25,480 | 83 | 8,750 | 2,150 | 1,634 | 1,645 | 3,700 | 102.0 |
| 8 | 29,120 | 83 | | | | | | ³⁾ |

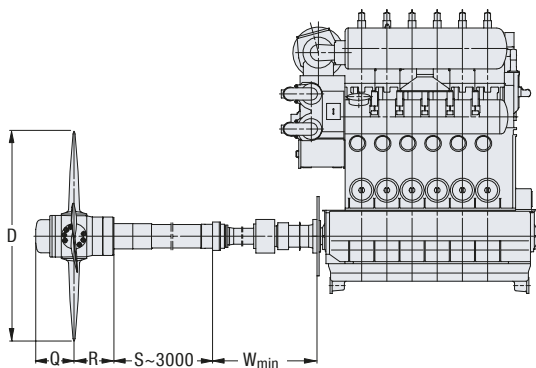
| | | | | | | | | |
|-----------------------|--------|----|-------|-------|-------|-------|-------|-------|
| S70ME-C8.5/-GI | | | | | | | | |
| 5 | 16,350 | 91 | 7,450 | 1,810 | 1,375 | 1,413 | 3,700 | 72.8 |
| 6 | 19,620 | 91 | 7,750 | 1,890 | 1,436 | 1,500 | 3,700 | 84.0 |
| 7 | 22,890 | 91 | 8,050 | 1,970 | 1,497 | 1,550 | 3,700 | 93.4 |
| 8 | 26,160 | 91 | 8,250 | 2,060 | 1,565 | 1,630 | 3,700 | 101.3 |

| | | | | | | | | |
|-----------------------|--------|----|-------|-------|-------|-------|-------|------|
| S65ME-C8.5/-GI | | | | | | | | |
| 5 | 14,350 | 95 | 7,150 | 1,730 | 1,315 | 1,339 | 3,400 | 66.1 |
| 6 | 17,220 | 95 | 7,450 | 1,810 | 1,375 | 1,385 | 3,400 | 73.0 |
| 7 | 20,090 | 95 | 7,700 | 1,890 | 1,436 | 1,466 | 3,400 | 81.2 |
| 8 | 22,960 | 95 | 7,900 | 1,970 | 1,497 | 1,512 | 3,400 | 89.3 |

¹⁾ For optimal Kappel blades, the propeller diameter is reduced by an average of 3-10% compared to the listed standard diameters

²⁾ The masses are stated for 4,000 mm stern tube and 8,000 mm propeller shaft

³⁾ Available on request



MAN B&W Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D ¹⁾ mm | Hub VBS mm | Q mm | R mm | Wmin mm | Prop. mass t ²⁾ |
|-----------------------|--------|-------------------------|-----------------------|------------------|---------|---------|------------|----------------------------------|
| G60ME-C9.5/-GI | | | | | | | | |
| 5 | 13,400 | 97 | 6,950 | 1,640 | 1,246 | 1,287 | 3,300 | 60.0 |
| 6 | 16,080 | 97 | 7,250 | 1,730 | 1,315 | 1,339 | 3,300 | 64.2 |
| 7 | 18,760 | 97 | 7,450 | 1,810 | 1,375 | 1,420 | 3,300 | 70.3 |
| 8 | 21,440 | 97 | 7,700 | 1,890 | 1,436 | 1,496 | 3,100 | 74.6 |

| | | | | | | | | |
|-----------------------|--------|-----|-------|-------|-------|-------|-------|------|
| S60ME-C8.5/-GI | | | | | | | | |
| 5 | 11,900 | 105 | 6,500 | 1,550 | 1,278 | 1,289 | 3,000 | 53.4 |
| 6 | 14,280 | 105 | 6,750 | 1,640 | 1,367 | 1,362 | 3,000 | 59.7 |
| 7 | 16,660 | 105 | 6,950 | 1,730 | 1,367 | 1,367 | 3,000 | 63.2 |
| 8 | 19,040 | 105 | 7,150 | 1,810 | 1,458 | 1,450 | 3,000 | 72.0 |

| | | | | | | | | |
|-----------------------|--------|-----|-------|-------|-------|-------|-------|------|
| G50ME-C9.6/-GI | | | | | | | | |
| 5 | 8,600 | 100 | 6,150 | 1,450 | 1,102 | 1,174 | 3,100 | 42.7 |
| 6 | 10,320 | 100 | 6,450 | 1,550 | 1,178 | 1,231 | 3,100 | 45.1 |
| 7 | 12,040 | 100 | 6,650 | 1,550 | 1,178 | 1,231 | 3,100 | 48.1 |
| 8 | 13,760 | 100 | 6,850 | 1,640 | 1,246 | 1,287 | 2,900 | 50.9 |
| 9 | 15,480 | 100 | 7,050 | 1,730 | 1,315 | 1,339 | 3,100 | 58.1 |

| | | | | | | | | |
|-----------------------|--------|-----|-------|-------|-------|-------|--|--|
| S50ME-C9.6/-GI | | | | | | | | |
| 5 | 8,900 | 117 | 5,650 | 1,350 | 1,037 | 1,096 | | |
| 6 | 10,680 | 117 | 5,850 | 1,450 | 1,114 | 1,148 | | |
| 7 | 12,460 | 117 | 6,050 | 1,450 | 1,114 | 1,148 | | |
| 8 | 14,240 | 117 | 6,200 | 1,550 | 1,175 | 1,256 | | |
| 9 | 16,020 | 117 | 6,350 | 1,640 | 1,260 | 1,288 | | |

| | | | | | | | | |
|-------------------------------------|--------|-----|-------|-------|-------|-------|-------|------|
| S50ME-C8.5/-GI ³⁾ | | | | | | | | |
| 5 | 8,300 | 127 | 5,400 | 1,350 | 1,030 | 1,082 | 2,690 | 31.7 |
| 6 | 9,960 | 127 | 5,600 | 1,350 | 1,100 | 1,145 | 2,690 | 35.4 |
| 7 | 11,620 | 127 | 5,800 | 1,450 | 1,175 | 1,233 | 2,690 | 39.9 |
| 8 | 13,280 | 127 | 5,950 | 1,450 | 1,175 | 1,248 | 2,690 | 42.0 |

¹⁾ For optimal Kappel blades, the propeller diameter is reduced by an average of 3-10% compared to the listed standard diameters

²⁾ The masses are stated for 4,000 mm stern tube and 8,000 mm propeller shaft

³⁾ Data for 9 cylinder is available on request

MAN B&W Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D ¹⁾ mm | Hub VBS mm | Q mm | R mm | Wmin mm | Prop. mass t ²⁾ |
|-----------------------|--------|-------------------------|-----------------------|------------------|---------|---------|------------|----------------------------------|
| S46ME-B8.5/-GI | | | | | | | | |
| 5 | 6,900 | 129 | 5,200 | 1,260 | 975 | 1,035 | 2,650 | 27.4 |
| 6 | 8,280 | 129 | 5,400 | 1,350 | 1,030 | 1,082 | 2,650 | 29.9 |
| 7 | 9,660 | 129 | 5,550 | 1,350 | 1,100 | 1,145 | 2,650 | 34.0 |
| 8 | 11,040 | 129 | 5,700 | 1,450 | 1,175 | 1,233 | 2,650 | 38.9 |

| | | | | | | | | |
|-----------------------|--------|-----|-------|-------|-------|-------|-------|------|
| G45ME-C9.5/-GI | | | | | | | | |
| 5 | 6,950 | 111 | 5,650 | 1,350 | 1,026 | 1,109 | 2,700 | 28.8 |
| 6 | 8,340 | 111 | 5,900 | 1,350 | 1,026 | 1,109 | 2,700 | 30.6 |
| 7 | 9,730 | 111 | 6,100 | 1,450 | 1,102 | 1,197 | 2,700 | 35.1 |
| 8 | 11,120 | 111 | 6,250 | 1,550 | 1,178 | 1,236 | 2,700 | 37.6 |

| | | | | | | | | |
|-----------------------|-------|-----|-------|-------|-------|-------|-------|------|
| G40ME-C9.5/-GI | | | | | | | | |
| 5 | 5,500 | 125 | 5,000 | 1,180 | 897 | 1,054 | 2,520 | 24.1 |
| 6 | 6,600 | 125 | 5,250 | 1,260 | 975 | 1,070 | 2,600 | 28.0 |
| 7 | 7,700 | 125 | 5,400 | 1,260 | 975 | 1,170 | 2,520 | 29.7 |
| 8 | 8,800 | 125 | 5,550 | 1,350 | 1,026 | 1,138 | 2,520 | 32.9 |

| | | | | | | | | |
|-----------------------|--------|-----|-------|-------|-------|-------|-------|------|
| S40ME-B9.5/-GI | | | | | | | | |
| 5 | 5,675 | 146 | 4,650 | 1,100 | 885 | 972 | 2,500 | 22.1 |
| 6 | 6,810 | 146 | 4,800 | 1,180 | 957 | 1,025 | 2,500 | 24.6 |
| 7 | 7,945 | 146 | 4,950 | 1,180 | 957 | 1,025 | 2,500 | 26.0 |
| 8 | 9,080 | 146 | 5,050 | 1,260 | 975 | 1,081 | 2,500 | 29.8 |
| 9 | 10,215 | 146 | 5,550 | 1,350 | 1,026 | 1,140 | 2,700 | 34.4 |

| | | | | | | | | |
|-----------------------|-------|-----|-------|-------|-----|-----|-------|------|
| S35ME-B9.5/-GI | | | | | | | | |
| 5 | 4,350 | 167 | 4,050 | 940 | 821 | 920 | 2,500 | 16.3 |
| 6 | 5,220 | 167 | 4,200 | 1,020 | 821 | 920 | 2,500 | 16.9 |
| 7 | 6,090 | 167 | 4,350 | 1,100 | 885 | 946 | 2,500 | 19.4 |
| 8 | 6,960 | 167 | 4,450 | 1,100 | 885 | 946 | 2,500 | 20.4 |

| | | | | | | | | |
|-----------------------|-------|-----|-------|-----|-----|-----|-------|------|
| S30ME-B9.5/-GI | | | | | | | | |
| 5 | 3,200 | 195 | 3,500 | 860 | 653 | 750 | 2,350 | 10.5 |
| 6 | 3,840 | 195 | 3,600 | 860 | 653 | 750 | 2,350 | 11.0 |
| 7 | 4,480 | 195 | 3,700 | 940 | 714 | 886 | 2,350 | 12.3 |
| 8 | 5,120 | 195 | 3,800 | 940 | 714 | 886 | 2,350 | 13.0 |

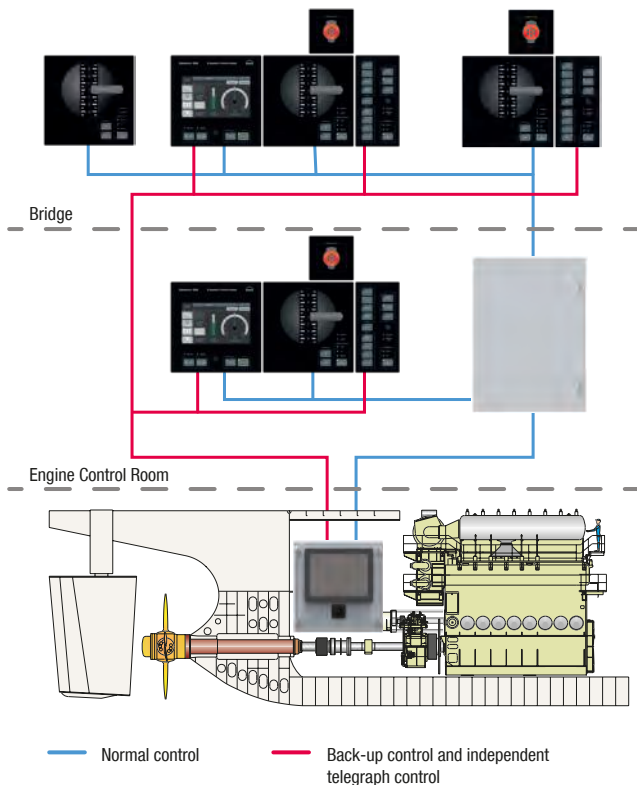
¹⁾ For optimal Kappel blades, the propeller diameter is reduced by an average of 3-10% compared to the listed standard diameters

²⁾ The masses are stated for 3,000 mm stern tube and 8,000 mm propeller shaft

MAN B&W Two-Stroke Propulsion Systems

Alphatronic 3000 Propulsion Control System

A high number of various FPP and CPP propulsion package applications are controlled by the Alphatronic 3000 system – customised for combinations of MAN low and medium speed engines in a wide range of diesel-mechanical, hybrid or diesel-electric propulsion setups.



Simple system architecture for a straightforward two-stroke CPP propulsion plant



MAN 175D

MAN Four-Stroke Propulsion Engines



The diesel engine has always been the most efficient system for converting fuel into mechanical energy.

MAN Diesel & Turbo will ensure it stays that way. Advanced inhouse technologies for efficiency and ecology enable MAN diesel engines to comply with the most stringent emission limits.



MAN Four-Stroke Propulsion Engines

MAN Four-Stroke Propulsion Engines – All Emission Requirements

Besides focus on power density and fuel economy, MAN Diesel & Turbo is committed to a steady reduction of the environmental impact of our engines.

IMO Tier II

Applying well-proven methods to achieve a cleaner and more efficient combustion process, MAN Diesel & Turbo has significantly decreased NO_x emissions. Our four-stroke propulsion engines are IMO Tier II compliant with internal engine measures alone.

IMO Tier III

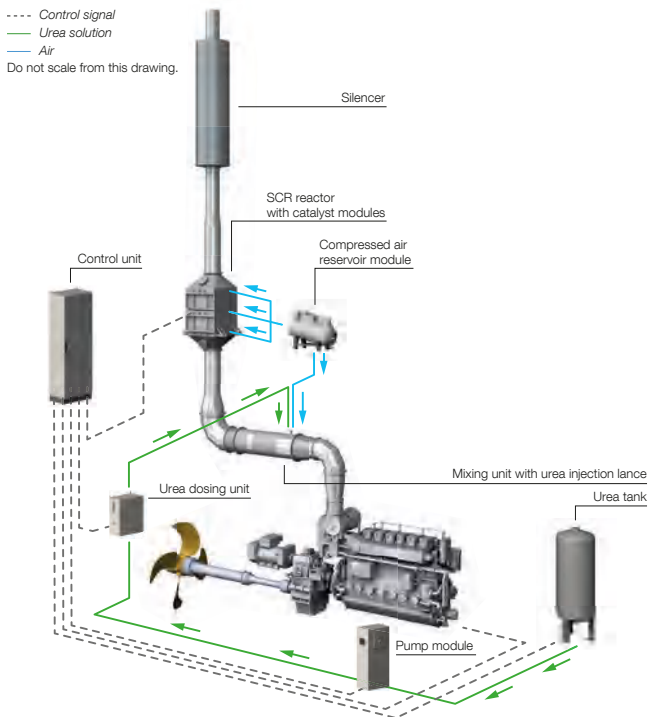
For operation in emission control areas (ECA), MAN Diesel & Turbo has developed a comprehensive range of selective catalytic reduction (SCR) systems that tremendously reduce NO_x levels surpassing IMO Tier III requirements.

MAN Diesel & Turbo is the first manufacturer to successfully produce and offer IMO Tier III compliant four-stroke marine engines based on a fully modular SCR kit covering our entire four-stroke engine portfolio. In 2014 MAN Diesel & Turbo was awarded the first IMO Tier III EIAPP certificate together with the classification society DNV-GL.

MAN Four-Stroke Propulsion Engines

MAN Diesel & Turbo's standard SCR system is available in fourteen different sizes covering our entire portfolio of four-stroke engines. Customised SCR systems are offered on demand.

MAN has developed a complete range of SCR systems that work perfectly with our engines for maximum system efficiency. The intelligent exhaust gas temperature control allows for significant savings in fuel consumptions as compared to third-party supplier systems. MAN SCR systems work with MGO, MDO and HFO with up to 3.5% sulphur.



MAN propulsion plant with complete SCR system

MAN Four-Stroke Propulsion Engines

Our modular system comes in 14 different sizes to match all power demands. Some notable benefits of standardisation are significant cost reduction and simplification of installation.



The modular SCR component kit

Urea Consumption

The urea consumption depends on engine type, selected performance characteristics (engine map), in case of an engine with ECOMAP capability, operating profile, fuel type, ambient conditions, type of reduction agent, etc.

For more detailed information on the expected level of urea consumption, please contact MAN Diesel & Turbo with your project specific request.

MAN Four-Stroke Propulsion Engines

Conventional Injection Engines

Our well-established engine types are used in a vast array of applications all over the world. Based on long-term experience of historical proportions, our engines are in continuous development to increase power, reduce emissions, increase reliability, reduce fuel oil consumption, and increase longevity. Our engines are the prime movers of choice in the maritime sector.

Common Rail (CR) Engines

The flexibility of our CR technology enables a substantial improvement of the combustion process that improves the fuel economy and reduces emission levels. It is particularly advantageous in the low-load and mid-load ranges where our unique ECOMAP system applies different engine maps to reduce fuel consumption while observing IMO emission limits. Another feature is our patented Boost Injection. Our engine control system senses a load increase at a very early stage and tremendously improves the load response with the activation of boost injection in our common rail control. In addition, exhaust gas opacity is markedly reduced, far below the visibility limit. Our CR engines run efficiently on liquid fuels complying with ISO 8217-2012 DMA, DMZ, and DMB, and on residual fuels (HFO) up to 700 cSt (in compliance with ISO-F-RMK 700).

MAN Four-Stroke Propulsion Engines

Diesel Oil (D) Engines

The V28/33D STC features very favourable ratios of power-to-weight and power-to-installation space. The combination of low fuel consumption, low emissions and reduced life cycle costs makes this engine the ideal solution for propulsion in high speed ferries, naval and offshore patrol vessels. The V28/33D STC engine operates on distillates according to ISO 8217 DMA or equivalent fuel types.

Sequential Turbocharging (STC)

The MAN Diesel & Turbo sequential turbocharging system operates with two high-efficiency turbochargers. Depending on the amount of charge air required, the second turbocharger is switched on or off. In this way, the engine is operated at its optimum operating point over the whole applicable load range.

The result is an extended operating envelope at low engine speeds, which gives a power reserve for ship acceleration, ship turning, sprints or towing. Furthermore, the STC system is characterised by a low thermal signature, decreased smoke emission, low vibrations and continuous low-load operation with reduced fuel consumption, which makes it the ideal solution for propulsion in naval applications and offshore patrol vessels.

Dual Fuel (DF) Engines

Dual fuel engines from MAN Diesel & Turbo run efficiently on liquid fuels or natural gas with very low emissions that are compliant with IMO limits. On gaseous fuel, the engines comply with IMO Tier III without the need for additional aftertreatment, and on liquid fuel they either fulfill IMO Tier II, or IMO Tier III together with an SCR system. The possibility to switch over seamlessly from gas to HFO or diesel operation and vice versa provides full flexibility in multiple applications.

All dual fuel engines can run on natural gas with a methane number higher than 80 without adjustments. For lower methane numbers, MAN Diesel & Turbo can deliver well-adapted solutions. The optimised combustion chamber ensures very low fuel consumption in both operational modes.

MAN Four-Stroke Propulsion Engines

MAN Cryo Fuel Gas Supply Systems

MAN Cryo fuel gas systems are the world's leading solution for safely storing energy on board gas fuelled ships and reliably providing it to the engines.

After pioneering in the market for LNG-fuelled ships in 1999, MAN Cryo fuel gas systems have since then been installed on a major part of today's gas fuelled ship fleet, either standardised or tailor-made. The references range from passenger ferries to offshore platform supply vessels, tug boats, bunker barges and even ice breakers.

MAN Diesel & Turbo provides one-stop solutions with complete packages consisting of main engines, auxiliary gensets, propulsion train, LNG fuel tank, coldbox, control system and bunkering station.

In order to deliver cost-optimised systems with shortest delivery times, MAN Diesel & Turbo offers a broad range of standard cryo packages in all required sizes. Beyond this standard scope and for larger tank sizes, customised solutions are engineered in the most efficient way in order to meet all our customers' demands.

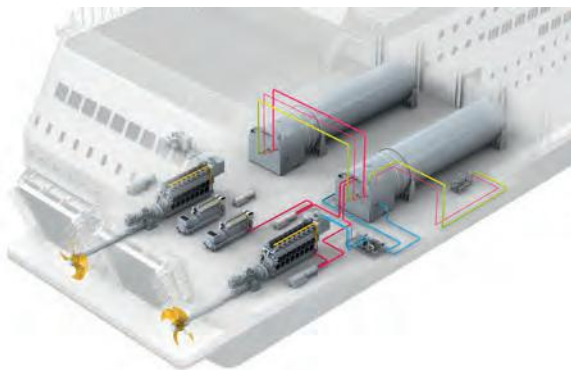


Vacuum-insulated type-C LNG tank including cold box

MAN Four-Stroke Propulsion Engines

MAN Cryo LNG Standard Packages (example sizes)

| Geometrical volume [m ³] | Net filling volume (95%) [m ³] | Outer diameter [m] | Tank length (without TCS) [m] |
|---|---|-----------------------|----------------------------------|
| 76 | 73 | 3.6 | 10.9 |
| 100 | 95 | 3.6 | 13.9 |
| 124 | 118 | 3.6 | 16.9 |
| 142 | 135 | 4.2 | 14.0 |
| 175 | 167 | 4.2 | 17.0 |
| 209 | 199 | 4.2 | 20.0 |
| 249 | 237 | 5.3 | 16.4 |
| 300 | 285 | 5.3 | 19.4 |
| 352 | 335 | 5.3 | 22.4 |
| 385 | 366 | 6.0 | 19.8 |
| 450 | 428 | 6.0 | 22.5 |
| 516 | 491 | 6.0 | 25.8 |
| 600 | 570 | 6.9 | 23.2 |



Dual fuel propulsion package including fuel gas storage and supply system

MAN Four-Stroke Propulsion Engines

Engine Power

Engine brake power is stated in kW.

Ratings are given according to ISO 3046-1:2002.

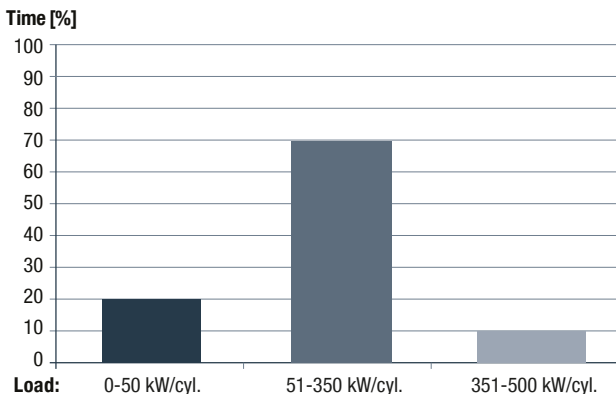
According to ISO 15550:2002, the power figures in the tables are valid within a range of $\pm 3\%$ up to tropical conditions at sea level, i.e.:

- compressor inlet temperature 45 °C
- compressor inlet pressure 1,000 mbar
- sea water temperature 32 °C

For all four-stroke propulsion engines, the power is defined according to the ICN¹ (MCR) definition (ISO 3046-1:2002:ISO standard power) with one exception.

For the load profile type Navy, of the engine types V28/33D STC, the rated power of the engine is stated according to the ICFN¹ power definition (ISO 3046:2002:ISO standard fuel stop power).

Load profile type: Navy (ICFN)



Typical use: fast yachts, corvettes, frigates and OPV

¹ I = ISO power

C = continuous power output

[F = fuel stop power]

N = net

MAN Four-Stroke Propulsion Engines

Specific Fuel Oil Consumption (SFOC) and Heat Rate

The stated consumption figures refer to the following reference conditions according to ISO 3046-1:

- ambient air pressure 1,000 mbar
- ambient air temperature 25 °C (77 °F)
- charge air temperature according to engine type, corresponding to 25 °C cooling water temperature before CAC

The figures are given with a tolerance of +5% and without engine driven pumps. Attached pumps and engines running in suction dredger operation will require additional fuel.

In accordance with the NO_x Technical Code 2008 of the International Maritime Organization, DM-grade fuel oil is used as reference fuel oil for engine tests and, thus, also forms the basis for the SFOC figures stated for engines in liquid fuel operation.

Unless otherwise specifically stated, SFOC figures are based on a lower calorific value of the fuel oil of 42,700 kJ/kg and, in addition for engines with common rail injection (CR-engines), on DMA-grade fuel oil (ISO 8217-2012). For engines with conventional fuel injection, SFOC figures are based on DMB-grade fuel oil (ISO 8217-2012). For further details, please refer to our engine specific project guides available from MAN Diesel & Turbo.

Specific Lube Oil Consumption (SLOC)

The specific lube oil consumption is specified at MCR (maximum continuous rating) with a tolerance of 20%.

Blocking of Output

Blocking of output is made for engines driving a propeller at 100% of the rated output. For engines powering an alternator, blocking of output is made at 110%. However, operation above 100% load is only recommended for a short period of time for recovery and prevention of a frequency drop.

MAN Four-Stroke Propulsion Engines

Weights and Dimensions

For marine main engines, the weights stated refer to engines without a flywheel.

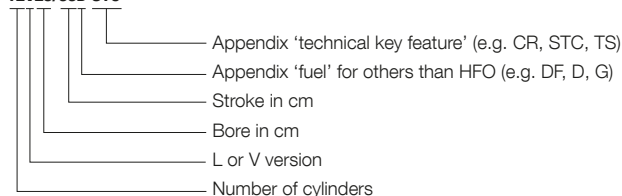
For auxiliary engines (GenSets), weights refer to the unit (including alternator). The weight of the GenSet may vary depending on the alternator make. All weights given are without lube oil and cooling water.

The length of the GenSet unit depends on the alternator make. For a twin engine installation, the centreline distance is stated for each engine type.

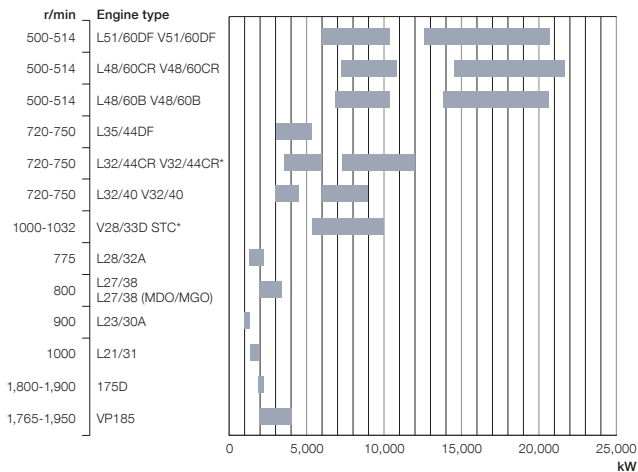
The centreline distance for twin engine installation is given as a minimum value. Specific requirements to the passageway (e.g. of classification societies or flag state authority), seating type or a gallery can lead to higher values.

Engine Type Designation

12V28/33D STC



MAN Four-Stroke Propulsion Engines



* The engine complies with EPA Tier 2

MAN V51/60DF

High efficiency variant

Tier II **Tier III**

Tier III in gas mode

Bore: 510 mm, Stroke: 600 mm

| | | | |
|------------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 20.0 | 20.6 |
| | | kW | kW |
| 12V51/60DF | | 12,600 | 12,600 |
| 14V51/60DF | | 14,700 | 14,700 |
| 16V51/60DF | | 16,800 | 16,800 |
| 18V51/60DF | | 18,900 | 18,900 |

LHV of fuel gas $\geq 28,000$ kJ/Nm³(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)**Specific Fuel Oil Consumption (SFOC) and Heat Rate to ISO conditions**

| | | |
|---|--------------|--------------|
| MCR | 100% | 85% |
| Specific fuel oil consumption ¹⁾ | 179.5 g/kWh | 177.0 g/kWh |
| Heat rate ²⁾ | 7,190 kJ/kWh | 7,200 kJ/kWh |

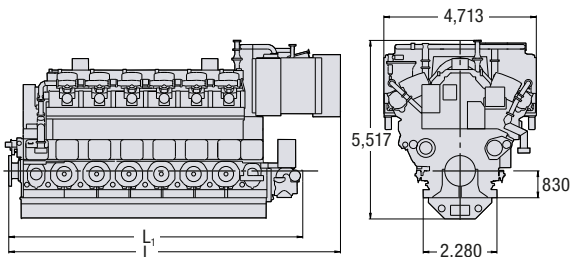
Specific lube oil consumption³⁾: 0.38 g/kWh for nominal output 1,050 kW/cyl.

Engine type specific reference charge air temperature before cylinder 43 °C

¹⁾ Liquid fuel operation²⁾ Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80 ³⁾ Related to 100% actual engine load**Dimensions**

| | | | | | |
|----------------|----|--------|--------|--------|--------|
| Cyl. No. | | 12 | 14 | 16 | 18 |
| L | mm | 10,254 | 11,254 | 12,254 | 13,644 |
| L ₁ | mm | 9,088 | 10,088 | 11,088 | 12,088 |
| Dry mass | t | 187 | 213 | 240 | 265 |

Minimum centreline distance for twin engine installation: 4,800 mm

Project
Guide

Bore: 510 mm, Stroke: 600 mm

| | | | |
|-----------|-------|-------|-------|
| Speed | r/min | 514 | 500 |
| mep | bar | 20.0 | 20.6 |
| | | kW | kW |
| 6L51/60DF | | 6,300 | 6,300 |
| 7L51/60DF | | 7,350 | 7,350 |
| 8L51/60DF | | 8,400 | 8,400 |
| 9L51/60DF | | 9,450 | 9,450 |

LHV of fuel gas $\geq 28,000$ kJ/Nm³

(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)

Specific Fuel Oil Consumption (SFOC) and Heat Rate to ISO conditions

| | | |
|---|--------------|--------------|
| MCR | 100% | 85% |
| Specific fuel oil consumption ¹⁾ | 179.5 g/kWh | 177.0 g/kWh |
| Heat rate ²⁾ | 7,190 kJ/kWh | 7,200 kJ/kWh |

Specific lube oil consumption³⁾: 0.38 g/kWh for nominal output 1,050 kW/cyl.

Engine type specific reference charge air temperature before cylinder 43 °C

¹⁾ Liquid fuel operation

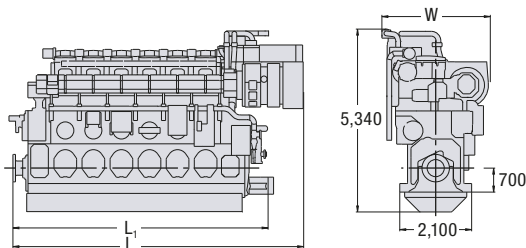
²⁾ Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80

³⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|--------|--------|
| L | mm | 8,494 | 9,314 | 10,134 | 11,160 |
| L ₁ | mm | 7,455 | 8,275 | 9,095 | 9,915 |
| W | mm | 3,165 | 3,165 | 3,165 | 3,283 |
| Dry mass | t | 106 | 119 | 135 | 148 |

Minimum centreline distance for twin engine installation: 3,200 mm



MAN V51/60DF

High power variant

Tier II Tier III

Tier III in gas mode

Bore: 510 mm, Stroke: 600 mm

| | | | |
|------------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 21.9 | 22.5 |
| | | kW | kW |
| 12V51/60DF | | 13,800 | 13,800 |
| 14V51/60DF | | 16,100 | 16,100 |
| 16V51/60DF | | 18,400 | 18,400 |
| 18V51/60DF | | 20,700 | 20,700 |

LHV of fuel gas $\geq 28,000$ kJ/Nm³(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)

Specific Fuel Oil Consumption (SFOC) and Heat Rate to ISO conditions

| | | |
|---|--------------|--------------|
| MCR | 100% | 85% |
| Specific fuel oil consumption ¹⁾ | 188.0 g/kWh | 185.6 g/kWh |
| Heat rate ²⁾ | 7,360 kJ/kWh | 7,420 kJ/kWh |

Specific lube oil consumption³⁾: 0.35 g/kWh for nominal output 1,150 kW/cyl.

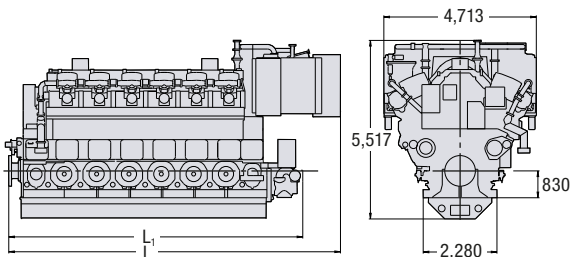
Engine type specific reference charge air temperature before cylinder 43 °C

¹⁾ Liquid fuel operation²⁾ Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80 ³⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 12 | 14 | 16 | 18 |
|----------------|----|--------|--------|--------|--------|
| L | mm | 10,254 | 11,254 | 12,254 | 13,644 |
| L ₁ | mm | 9,088 | 10,088 | 11,088 | 12,088 |
| Dry mass | t | 187 | 213 | 240 | 265 |

Minimum centreline distance for twin engine installation: 4,800 mm

Project
Guide

Bore: 510 mm, Stroke: 600 mm

| | | | |
|-----------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 21.9 | 22.5 |
| | | kW | kW |
| 6L51/60DF | | 6,900 | 6,900 |
| 7L51/60DF | | 8,050 | 8,050 |
| 8L51/60DF | | 9,200 | 9,200 |
| 9L51/60DF | | 10,350 | 10,350 |

LHV of fuel gas $\geq 28,000$ kJ/Nm³

(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)

Specific Fuel Oil Consumption (SFOC) and Heat Rate to ISO conditions

| | | |
|---|--------------|--------------|
| MCR | 100% | 85% |
| Specific fuel oil consumption ¹⁾ | 188.0 g/kWh | 185.6 g/kWh |
| Heat rate ²⁾ | 7,360 kJ/kWh | 7,420 kJ/kWh |

Specific lube oil consumption³⁾: 0.35 g/kWh for nominal output 1,150 kW/cyl.

Engine type specific reference charge air temperature before cylinder 43 °C

¹⁾ Liquid fuel operation

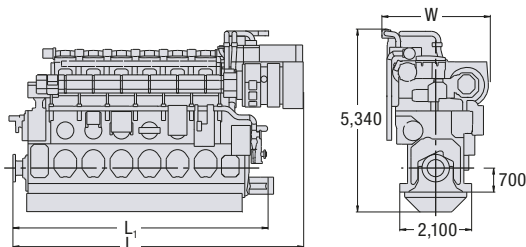
²⁾ Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80

³⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|--------|--------|
| L | mm | 8,494 | 9,314 | 10,134 | 11,160 |
| L ₁ | mm | 7,455 | 8,275 | 9,095 | 9,915 |
| W | mm | 3,165 | 3,165 | 3,165 | 3,283 |
| Dry mass | t | 106 | 119 | 135 | 148 |

Minimum centreline distance for twin engine installation: 3,200 mm



Bore: 480 mm, Stroke: 600 mm

| | | | |
|------------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 25.8 | 26.5 |
| | | kW | kW |
| 12V48/60CR | | 14,400 | 14,400 |
| 14V48/60CR | | 16,800 | 16,800 |
| 16V48/60CR | | 19,200 | 19,200 |
| 18V48/60CR | | 21,600 | 21,600 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|----------|-----------|-----------|
| MCR | 100% | 85% |
| V48/60CR | 181 g/kWh | 173 g/kWh |

Specific lube oil consumption¹⁾: 0.5 g/kWh for nominal output 1,200 kW/cyl.

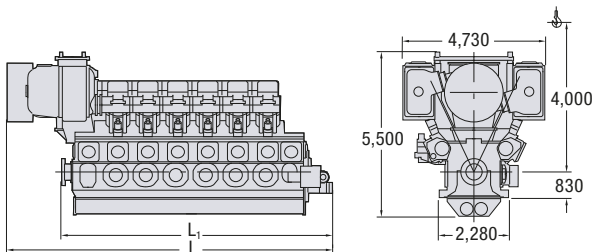
Engine type specific reference charge air temperature before cylinder 37 °C

¹⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 12 | 14 | 16 | 18 |
|----------------|----|--------|--------|--------|--------|
| L | mm | 10,790 | 11,790 | 13,140 | 14,140 |
| L ₁ | mm | 9,088 | 10,088 | 11,088 | 12,088 |
| Dry mass | t | 189 | 213 | 240 | 265 |

Minimum centreline distance for twin engine installation: 4,800 mm



Tier III with SCR

Bore: 480 mm, Stroke: 600 mm

| | | | |
|-----------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 25.8 | 26.5 |
| | | kW | kW |
| 6L48/60CR | | 7,200 | 7,200 |
| 7L48/60CR | | 8,400 | 8,400 |
| 8L48/60CR | | 9,600 | 9,600 |
| 9L48/60CR | | 10,800 | 10,800 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|----------|-----------|-----------|
| MCR | 100% | 85% |
| L48/60CR | 183 g/kWh | 175 g/kWh |

Specific lube oil consumption¹⁾: 0.5 g/kWh for nominal output 1,200 kW/cyl.

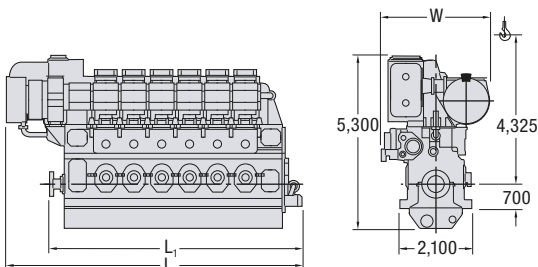
Engine type specific reference charge air temperature before cylinder 37 °C

¹⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|--------|--------|
| L | mm | 8,760 | 9,580 | 10,540 | 11,360 |
| L ₁ | mm | 7,455 | 8,275 | 9,095 | 9,915 |
| W | mm | 3,165 | 3,165 | 3,280 | 3,280 |
| Dry mass | t | 106 | 119 | 135 | 148 |

Minimum centreline distance for twin engine installation: 3,200 mm



Bore: 480 mm, Stroke: 600 mm

| | | | |
|-----------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 24.7 | 25.4 |
| | | kW | kW |
| 12V48/60B | | 13,800 | 13,800 |
| 14V48/60B | | 16,100 | 16,100 |
| 16V48/60B | | 18,400 | 18,400 |
| 18V48/60B | | 20,700 | 20,700 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|---------|-----------|-----------|
| MCR | 100% | 85% |
| V48/60B | 184 g/kWh | 180 g/kWh |

Specific lube oil consumption¹⁾: 0.46 g/kWh for nominal output 1,150 kW/cyl.

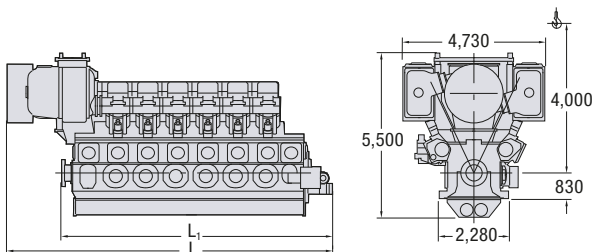
Engine type specific reference charge air temperature before cylinder 37 °C

¹⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 12 | 14 | 16 | 18 |
|----------------|----|--------|--------|--------|--------|
| L | mm | 10,790 | 11,790 | 13,140 | 14,140 |
| L ₁ | mm | 9,088 | 10,088 | 11,088 | 12,088 |
| Dry mass | t | 186 | 209 | 240 | 259 |

Minimum centreline distance for twin engine installation: 4,800 mm



Bore: 480 mm, Stroke: 600 mm

| | | | |
|----------|-------|--------|--------|
| Speed | r/min | 514 | 500 |
| mep | bar | 24.7 | 25.4 |
| | | kW | kW |
| 6L48/60B | | 6,900 | 6,900 |
| 7L48/60B | | 8,050 | 8,050 |
| 8L48/60B | | 9,200 | 9,200 |
| 9L48/60B | | 10,350 | 10,350 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|---------|-----------|-----------|
| MCR | 100% | 85% |
| L48/60B | 186 g/kWh | 182 g/kWh |

Specific lube oil consumption¹⁾: 0.46 g/kWh for nominal output 1,150 kW/cyl.

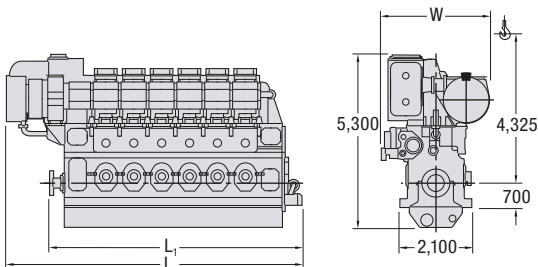
Engine type specific reference charge air temperature before cylinder 37 °C

¹⁾ Related to 100% actual engine load

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|--------|--------|
| L | mm | 8,760 | 9,580 | 10,540 | 11,360 |
| L ₁ | mm | 7,455 | 8,275 | 9,095 | 9,915 |
| W | mm | 3,165 | 3,165 | 3,280 | 3,280 |
| Dry mass | t | 104 | 118 | 134 | 146 |

Minimum centreline distance for twin engine installation: 3,200 mm





Engineering the Future – since 1758.

MAN Diesel & Turbo



Bore: 350 mm, Stroke: 440 mm

| | | | |
|------------|-------|-------|-------|
| Speed | r/min | 750 | 720 |
| mep | bar | 20.0 | 20.1 |
| | | kW | kW |
| 6L35/44DF | | 3,180 | 3,060 |
| 7L35/44DF | | 3,710 | 3,570 |
| 8L35/44DF | | 4,240 | 4,080 |
| 9L35/44DF | | 4,770 | 4,590 |
| 10L35/44DF | | 5,300 | 5,100 |

LHV of fuel gas $\geq 28,000$ kJ/Nm³

(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)

Specific Fuel Oil Consumption (SFOC) and Heat Rate to ISO conditions

| | | |
|---|--------------|--------------|
| MCR | 100% | 85% |
| Specific fuel oil consumption ¹⁾ | 175.5 g/kWh | 175.5 g/kWh |
| Heat rate ²⁾ | 7,470 kJ/kWh | 7,515 kJ/kWh |

Specific lube oil consumption³⁾: 0.5 g/kWh for nominal output 530 kW/cyl. or 0.52 g/kWh for nominal output 510 kW/cyl.

Engine type specific reference charge air temperature before cylinder 40 °C

¹⁾ Liquid fuel operation

²⁾ Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80

³⁾ Related to 100% actual engine load

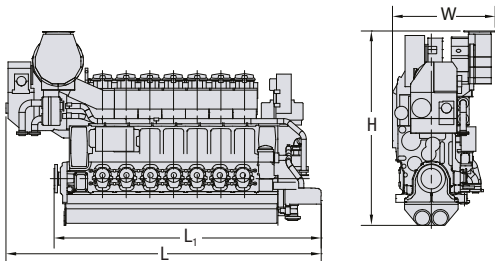
Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 | 10 |
|------------------------|----|-------|-------|-------|-------|-------|
| L | mm | 6,485 | 7,015 | 7,545 | 8,075 | 8,605 |
| L ₁ | mm | 5,265 | 5,877 | 6,407 | 6,937 | 7,556 |
| W | mm | 2,539 | 2,678 | 2,678 | 2,678 | 2,678 |
| H | mm | 4,163 | 4,369 | 4,369 | 4,369 | 4,369 |
| Dry mass ⁴⁾ | t | 43.1 | 48.2 | 53.3 | 57.6 | 62.3 |

Minimum centreline distance for twin engine installation: 2,500 mm

⁴⁾ Including built-on lube oil automatic filter, fuel oil filter and electronic equipment

Speed 720 r/min for generator drive only



Project
Guide



MAN V32/44CR

Tier II Tier III EPA Tier 2

Tier III with SCR

Bore: 320 mm, Stroke: 440 mm

| | | | |
|--------------------------|-------|--------|--------|
| Speed | r/min | 750 | 720 |
| mep | bar | 27.1 | 28.3 |
| | | kW | kW |
| 12V32/44CR | | 7,200 | 7,200 |
| 14V32/44CR ¹⁾ | | 8,120 | 8,120 |
| 16V32/44CR | | 9,600 | 9,600 |
| 20V32/44CR | | 12,000 | 12,000 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|----------------|-------------|-------------|
| MCR | 100% | 85% |
| V32/44CR | 175.5 g/kWh | 172.0 g/kWh |
| 14V32/44CR | 175.5 g/kWh | 173.0 g/kWh |
| V32/44CR FPP | 177.0 g/kWh | 173.5 g/kWh |
| 14V32/44CR FPP | 178.0 g/kWh | 175.0 g/kWh |

Specific lube oil consumption²⁾: 0.5 g/kWh for nominal output 600 kW/cyl., 0.52 g/kWh for nominal output 580 kW/cyl., 0.55 g/kWh for nominal output 550 kW/cyl.

Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| Cyl. No. | | 12 | 14 | 16 | 20 |
|------------------------|----|-------|-------|-------|-------|
| L | mm | 7,195 | 7,970 | 8,600 | 9,860 |
| L ₁ | mm | 5,795 | 6,425 | 7,055 | 8,315 |
| W | mm | 3,100 | 3,100 | 3,100 | 3,100 |
| H | mm | 4,039 | 4,262 | 4,262 | 4,262 |
| Dry mass ³⁾ | t | 70 | 79 | 87 | 104 |

Minimum centreline distance for twin engine installation: 4,000 mm

Speed 720 r/min for generator drive/constant speed operation only

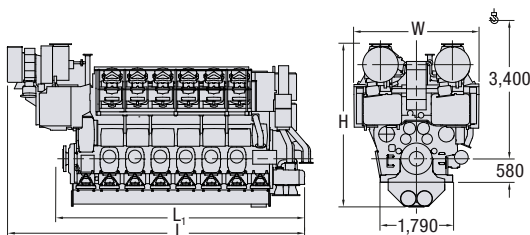
¹⁾ 580 kW/cyl

²⁾ Related to 100% actual engine load

³⁾ Including built-on lube oil automatic filter, fuel oil filter and electronic equipment

Fixed pitch propeller: 550 kW/cyl, 750 r/min

Wet oil sump available upon request

Project
Guide

Tier III with SCR

Bore: 320 mm, Stroke: 440 mm

| | | | |
|-------------------------|-------|-------|-------|
| Speed | r/min | 750 | 720 |
| mep | bar | 27.1 | 28.3 |
| | | kW | kW |
| 6L32/44CR | | 3,600 | 3,600 |
| 7L32/44CR ¹⁾ | | 4,060 | 4,060 |
| 8L32/44CR | | 4,800 | 4,800 |
| 9L32/44CR | | 5,400 | 5,400 |
| 10L32/44CR | | 6,000 | 6,000 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|---------------|-------------|-------------|
| MCR | 100% | 85% |
| L32/44CR | 175.5 g/kWh | 172.0 g/kWh |
| 7L32/44CR | 175.5 g/kWh | 173.0 g/kWh |
| L32/44CR FPP | 177.0 g/kWh | 173.5 g/kWh |
| 7L32/44CR FPP | 178.0 g/kWh | 175.0 g/kWh |

Specific lube oil consumption²⁾: 0.5 g/kWh for nominal output 600 kW/cyl., 0.52 g/kWh for nominal output 580 kW/cyl., 0.55 g/kWh for nominal output 550 kW/cyl.

Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 | 10 |
|------------------------|----|-------|-------|-------|-------|-------|
| L | mm | 6,312 | 6,924 | 7,454 | 7,984 | 8,603 |
| L ₁ | mm | 5,265 | 5,877 | 6,407 | 6,937 | 7,556 |
| W | mm | 2,174 | 2,359 | 2,359 | 2,359 | 2,359 |
| H | mm | 4,163 | 4,369 | 4,369 | 4,369 | 4,369 |
| Dry mass ³⁾ | t | 39.5 | 44.5 | 49.5 | 53.5 | 58.0 |

Minimum centreline distance for twin engine installation: 2,500 mm

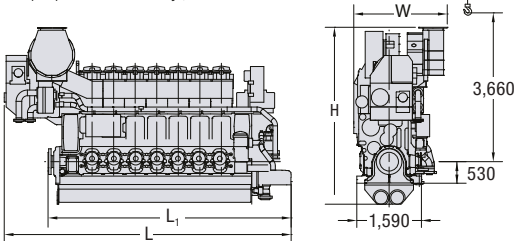
Speed 720 r/min for generator drive/constant speed operation only

¹⁾ 580 kW/cyl

²⁾ Related to 100% actual engine load

³⁾ Including built-on lube oil automatic filter, fuel oil filter and electronic equipment

Fixed pitch propeller: 550 kW/cyl, 750 r/min



Project
Guide



Bore: 320 mm, Stroke: 400 mm

| | | | |
|----------|-------|-------|-------|
| Speed | r/min | 750 | 720 |
| mep | bar | 24.9 | 25.9 |
| | | kW | kW |
| 12V32/40 | | 6,000 | 6,000 |
| 14V32/40 | | 7,000 | 7,000 |
| 16V32/40 | | 8,000 | 8,000 |
| 18V32/40 | | 9,000 | 9,000 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|------------|-----------|-----------|
| MCR | 100% | 85% |
| V32/40 | 184 g/kWh | 182 g/kWh |
| V32/40 FPP | 187 g/kWh | 183 g/kWh |

Specific lube oil consumption¹⁾: 0.5 g/kWh for nominal output 500 kW/cyl., 0.56 g/kWh for nominal output 450 kW/cyl.

Engine type specific reference charge air temperature before cylinder 43 °C

Dimensions

| Cyl. No. | | 12 | 14 | 16 | 18 |
|----------------|----|-------|-------|-------|-------|
| L | mm | 6,915 | 7,545 | 8,365 | 8,995 |
| L ₁ | mm | 5,890 | 6,520 | 7,150 | 7,780 |
| W | mm | 3,140 | 3,140 | 3,730 | 3,730 |
| H | mm | 4,100 | 4,100 | 4,420 | 4,420 |
| Dry mass | t | 61 | 68 | 77 | 85 |

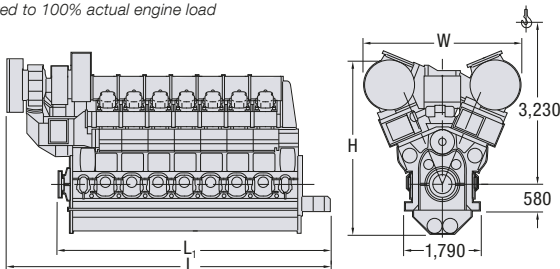
Minimum centreline distance for twin engine installation: 4,000 mm

Speed 720 r/min for generator drive/constant speed operation only

Fixed pitch propeller: 450 kW/cyl, 750 r/min

V32/40 as marine main engine to be applied for multi-engine plants only

¹⁾ Related to 100% actual engine load



Project
Guide

Bore: 320 mm, Stroke: 400 mm

| | | | |
|---------|-------|-------|-------|
| Speed | r/min | 750 | 720 |
| mep | bar | 24.9 | 25.9 |
| | | kW | kW |
| 6L32/40 | | 3,000 | 3,000 |
| 7L32/40 | | 3,500 | 3,500 |
| 8L32/40 | | 4,000 | 4,000 |
| 9L32/40 | | 4,500 | 4,500 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|------------|-----------|-----------|
| MCR | 100% | 85% |
| L32/40 | 186 g/kWh | 183 g/kWh |
| L32/40 FPP | 189 g/kWh | 184 g/kWh |

Specific lube oil consumption¹⁾: 0.5 g/kWh for nominal output 500 kW/cyl., 0.56 g/kWh for nominal output 450 kW/cyl.

Engine type specific reference charge air temperature before cylinder 43 °C

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|-------|-------|
| L | mm | 5,940 | 6,470 | 7,000 | 7,530 |
| L ₁ | mm | 5,140 | 5,670 | 6,195 | 6,725 |
| W | mm | 2,630 | 2,630 | 2,715 | 2,715 |
| H | mm | 4,010 | 4,010 | 4,490 | 4,490 |
| Dry mass | t | 38 | 42 | 47 | 51 |

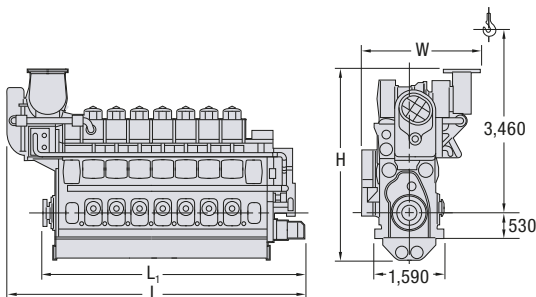
Minimum centreline distance for twin engine installation: 2,500 mm²⁾

Speed 720 r/min for generator drive/constant speed operation only

Fixed pitch propeller: 450 kW/cyl, 750 r/min

¹⁾ Related to 100% actual engine load

²⁾ Please contact MAN Diesel & Turbo for the precise information about the centreline distance for two engines with the same cylinder number standing near each other



Project
Guide



MAN V28/33D STC

Tier II Tier III EPA Tier 2

Tier III with SCR

Bore: 280 mm, Stroke: 330 mm

| | | | Load profile 'Navy' |
|--------------------|-------------|-------|---------------------|
| Speed | r/min | 1000 | 1032 |
| mep | bar | 26.9 | 28.6 |
| Rated power output | - ICN (MCR) | kW | - ICFN kW |
| 12V28/33D STC | | 5,460 | 6,000 |
| 16V28/33D STC | | 7,280 | 8,000 |
| 20V28/33D STC | | 9,100 | 10,000 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|----------------------|--|-------------|
| ICFN fuel stop power | - | 194.0 g/kWh |
| MCR 100% | 188.0 g/kWh (193.0 g/kWh ¹⁾) | 189.0 g/kWh |
| MCR 85% | 183.0 g/kWh (189.5 g/kWh ¹⁾) | 194.5 g/kWh |

Specific lube oil consumption²⁾: 0.4 g/kWh for nominal output 455 kW/cyl.

Engine type specific reference charge air temperature before cylinder 40 °C

Figures on theoretical propeller curve for distillates according to ISO 8217 DMA, with all attached pumps

Dimensions

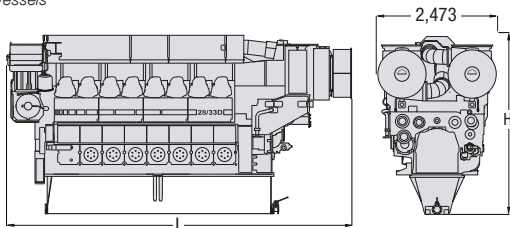
| Cyl. No. | | 12 | 16 | 20 |
|-----------------|----|-------|-------|-------|
| L | mm | 6,217 | 7,137 | 8,057 |
| H ³⁾ | mm | 3,417 | 3,417 | 3,417 |
| H ⁴⁾ | mm | 3,683 | 3,683 | 3,683 |
| Dry mass * | t | 36.3 | 43.5 | 52.3 |

¹⁾ Engine is EPA Tier 2 compliant²⁾ Related to 100% actual engine load³⁾ With low oilsump⁴⁾ With deep oilsump

Weight and performance parameters refer to engine with flywheel, TC silencer, attached pumps, oil filters and lube oil cooler

* Tolerance: 5%

V28/33D STC as marine main engine to be applied for multi-engine plants only in class-approved vessels

Project
Guide

Bore: 280 mm, Stroke: 320 mm

| | | |
|------------|-------|-------|
| Speed | r/min | 775 |
| mep | bar | 19.3 |
| | | kW |
| 6L28/32A | | 1,470 |
| 7L28/32A * | | 1,715 |
| 8L28/32A | | 1,960 |
| 9L28/32A | | 2,205 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|-------------|-----------|-----------|
| MCR | 100% | 85% |
| L28/32A | 194 g/kWh | 192 g/kWh |
| L28/32A FPP | 194 g/kWh | 192 g/kWh |

Specific lube oil consumption 1.0 g/kWh

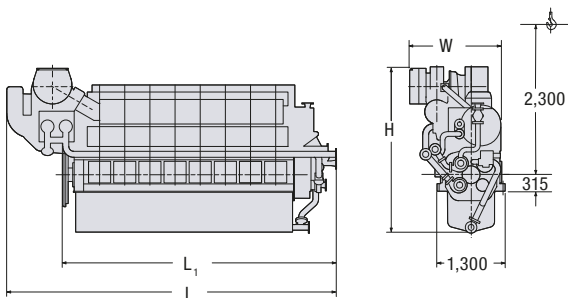
Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|-------|-------|
| L | mm | 5,330 | 5,810 | 6,290 | 6,770 |
| L ₁ | mm | 4,340 | 4,750 | 5,230 | 5,780 |
| W | mm | 1,732 | 1,732 | 1,732 | 1,844 |
| H | mm | 3,186 | 3,186 | 3,186 | 3,242 |
| Dry mass | t | 18.0 | 20.5 | 23.0 | 25.5 |

Minimum centreline distance for twin-engine installation: 2,000 mm

* Not available for fixed pitch propeller (FPP)



Bore: 270 mm, Stroke: 380 mm

| | | | |
|---------|-------|-------|----------------|
| Speed | r/min | 800 | 800 (MDO*/MGO) |
| mep | bar | 23.5 | 25.2 |
| | | kW | kW |
| 6L27/38 | | 2,040 | 2,190 |
| 7L27/38 | | 2,380 | 2,555 |
| 8L27/38 | | 2,720 | 2,920 |
| 9L27/38 | | 3,060 | 3,285 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | | | |
|------------|-----------|-----------|-----------|-----------|
| MCR | 100% | | 85% | |
| kW | 340 kW | 365 kW | 340 kW | 365 kW |
| L27/38 | 188 g/kWh | 191 g/kWh | 185 g/kWh | 186 g/kWh |
| L27/38 FPP | 187 g/kWh | 191 g/kWh | 181 g/kWh | 185 g/kWh |

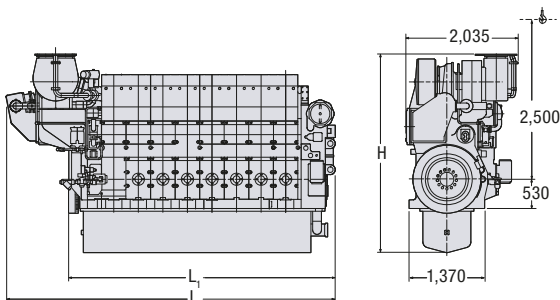
Specific lube oil consumption 0.8 g/kWh

Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| | | | | | |
|----------------|----|-------|-------|-------|-------|
| Cyl. No. | | 6 | 7 | 8 | 9 |
| L | mm | 5,070 | 5,515 | 5,960 | 6,405 |
| L ₁ | mm | 3,962 | 4,407 | 4,852 | 5,263 |
| H | mm | 3,555 | 3,687 | 3,687 | 3,687 |
| Dry mass | t | 29.0 | 32.5 | 36.0 | 39.5 |

Minimum centreline distance for twin engine installation: 2,500 mm

* MDO viscosity must not exceed 6 mm²/s = cSt at 40 °C.

Tier III with SCR
Bore: 225 mm, Stroke: 300 mm

| | | |
|----------|-------|-------|
| Speed | r/min | 900 |
| mep | bar | 17.1 |
| | | kW |
| 6L23/30A | | 960 |
| 8L23/30A | | 1,280 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|-------------|-----------|-----------|
| MCR | 100% | 85% |
| L23/30A | 194 g/kWh | 193 g/kWh |
| L23/30A FPP | 194 g/kWh | 193 g/kWh |

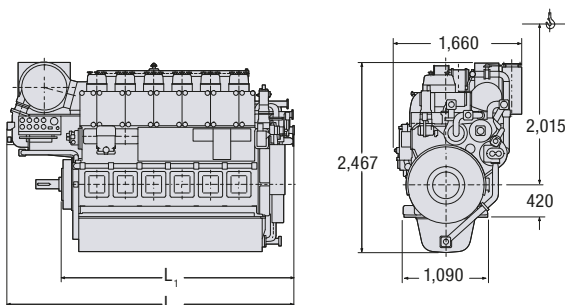
Specific lube oil consumption 1.0 g/kWh

Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| | | | |
|----------------|----|-------|-------|
| Cyl. No. | | 6 | 8 |
| L | mm | 3,737 | 4,477 |
| L ₁ | mm | 3,062 | 3,802 |
| Dry mass | t | 11.0 | 13.5 |

Minimum centreline distance for twin engine installation: 1,900 mm



Bore: 210 mm, Stroke: 310 mm

| | | |
|---------|-------|-------|
| Speed | r/min | 1000 |
| mep | bar | 24.0 |
| | | kW |
| 6L21/31 | | 1,290 |
| 7L21/31 | | 1,505 |
| 8L21/31 | | 1,720 |
| 9L21/31 | | 1,935 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

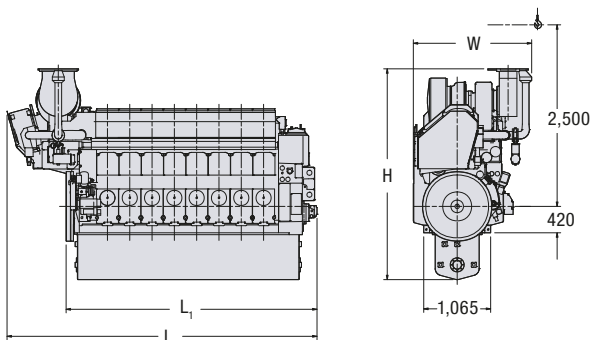
| | | |
|--------|-----------|-----------|
| MCR | 100% | 85% |
| L21/31 | 195 g/kWh | 192 g/kWh |

Specific lube oil consumption 0.8 g/kWh

Engine type specific reference charge air temperature before cylinder 40 °C

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------------|----|-------|-------|-------|-------|
| L | mm | 4,544 | 4,899 | 5,254 | 5,609 |
| L ₁ | mm | 3,424 | 3,779 | 4,134 | 4,489 |
| H | mm | 3,113 | 3,267 | 3,267 | 3,267 |
| W | mm | 1,695 | 1,695 | 1,820 | 1,820 |
| Dry mass | t | 16.0 | 17.5 | 19.0 | 20.5 |

Minimum centreline distance for twin engine installation: 2,400 mm



Increasing the competitiveness of its products, MAN Diesel & Turbo has developed into a leading think tank and owner of the relevant key technologies driving the economic and ecological performance of its products.

Bore: 185 mm, Stroke: 196 mm

| Engine Model | Rating Definition | kW | rpm | SFOC at 100% MCR | SFOC at 75% MCR |
|--------------|-------------------------|-------|-------|------------------|-----------------|
| 12VP185TM | B: Unrestricted Marine | 2,000 | 1,765 | 208 g/kWh | 202 g/kWh |
| 12VP185TM | A2: Unrestricted Marine | 2,300 | 1,860 | 211 g/kWh | 203 g/kWh |
| 12VP185TM | A1: Limited Time | 2,720 | 1,950 | 216 g/kWh | 205 g/kWh |
| 18VP185TM | B: Unrestricted Marine | 3,000 | 1,765 | 208 g/kWh | 202 g/kWh |
| 18VP185TM | A2: Unrestricted Marine | 3,500 | 1,860 | 211 g/kWh | 203 g/kWh |
| 18VP185TM | A1: Limited Time | 4,000 | 1,950 | 216 g/kWh | 205 g/kWh |

Specific fuel oil consumption according to ISO3046-1:2002 based on a lower calorific value of fuel of 42,700 kJ/kg with all driven lube oil, HT and LT water pumps attached, fulfilling IMO Tier II emissions limitations of +5% SFOC tolerance. 45°C ambient 32°C sea water.

Rating definitions:

A1 Rating

For fast patrol craft where the rated power is only required for approximately 15% of the operating profile.

A2 Rating

For fast patrol or displacement craft where 90% to 100% of rated power is likely to be used for 70% of the operating profile.

B Rating

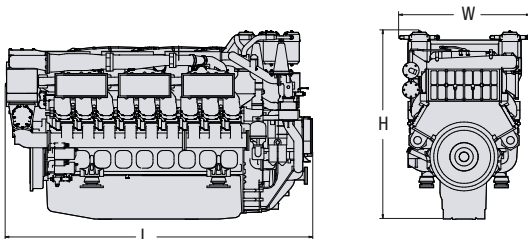
Typically for longer range displacement vessels where 70% to 100% of the rated power is likely to be used for >70% of the operating profile.

Dimensions

| | | | |
|-----------|----|-------|-------|
| Cyl. No. | | 12 | 18 |
| L | mm | 3,200 | 4,039 |
| H | mm | 2,312 | 2,447 |
| W | mm | 1,692 | 1,692 |
| Dry mass* | t | 7.8 | 11.1 |

* Approximately

Engine dry weight includes the engine mounted sea water heat exchanger and oil cooler. The dimensions given are for guidance only.



Bore: 175 mm, Stroke: 215 mm

| Engine Model | Rating Definition | kW | rpm | SFOC at 100% MCR | SFOC at 75% MCR |
|--------------|-------------------|-------|-------|------------------|-----------------|
| 12V175D-MH | Heavy Duty | 1,740 | 1,800 | - | - |
| 12V175D-MM | Medium Duty | 2,220 | 1,900 | 199 g/kWh | 203 g/kWh |

For multi-engine arrangement only.

SFOC figures for distillates according to ISO 8217 DMA, with attached lube oil, HT and LT-cooling water pumps and engine specification fulfilling IMO Tier II emission limitations.

Rating definitions:

Marine Heavy Duty

- Recommended for vessels with an annual operating time of up to 5,000 hours
- Typical applications include, but are not limited to, work boats, offshore vessels and ferries
- Average load: up to 85%

Marine Medium Duty

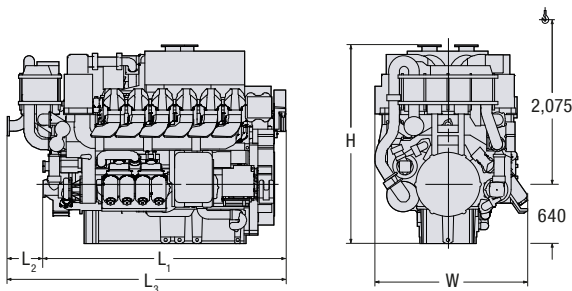
- Recommended for vessels with an annual operating time of up to 3,000 hours
- Typical applications include, but are not limited to, work boats, offshore vessels, patrol boats and yachts
- Average load: up to 65%

Dimensions

| | | |
|----------------|----|-------|
| L ₁ | mm | 2,678 |
| L ₂ | mm | 334 |
| L ₃ | mm | 3,012 |
| H | mm | 2,115 |
| W | mm | 1,633 |
| Dry weight* | t | 8.5 |

* Approximately

Engine dry weight does not include optional sea water cooler and may vary due to various configurations. The dimensions given are for guidance only.





MAN Four-Stroke Marine GenSets



MAN Four-Stroke Marine GenSets

MAN Four-Stroke Marine GenSets – All Emission Requirements

Besides focus on power density and fuel economy, MAN Diesel & Turbo is committed to a steady reduction of the environmental impact of our engines.

IMO Tier II

MAN Diesel & Turbo has decreased NO_x emissions significantly by applying well-proven methods that ensure a cleaner and more efficient combustion process. Our four-stroke propulsion engines are IMO Tier II compliant by internal engine measures alone.

IMO Tier III

For operation in emission control areas (ECA), MAN Diesel & Turbo has developed a comprehensive range of selective catalytic reduction (SCR) systems that provides a tremendous reduction in NO_x levels surpassing IMO Tier III requirements.

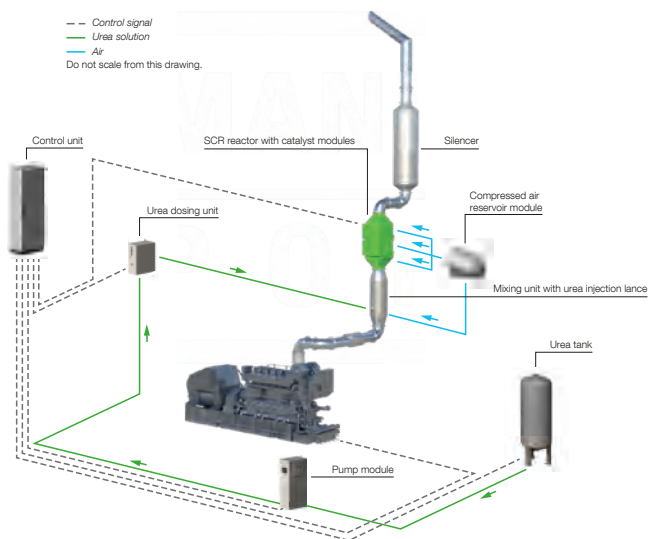
MAN Diesel & Turbo is the first manufacturer to successfully produce and offer IMO Tier III compliant four-stroke marine engines based on a fully modular SCR kit covering our entire four-stroke engine portfolio.

In 2014 MAN Diesel & Turbo was awarded the first IMO Tier III EIAPP certificate together with the classification society DNV-GL.

MAN Four-Stroke Marine GenSets

MAN Diesel & Turbo's standard SCR system is available in fourteen different sizes covering our entire portfolio of four-stroke engines. Customised SCR systems are offered on demand.

MAN has developed a complete range of SCR systems that work perfectly with our engines for maximum system efficiency. The intelligent exhaust gas temperature control enables significant savings in fuel consumption as compared to third party supplier systems. MAN SCR systems work with MGO, MDO and HFO with up to 3.5% sulphur.



MAN GenSet plant with complete SCR system

MAN Four-Stroke Marine GenSets

100% MCR PTO-solutions for L21/31 and L27/38 GenSets

Optimised for both new and existing ship designs



PTO on alternator – external pump



Pump on alternator – common base frame



PTO on front end – external pump (new feature)



Pump on front end – common base frame (new feature)

MAN Four-Stroke Marine GenSets

Fuel oil saving for small bore GenSet (part load optimised)

GenSets can be delivered with improved fuel oil consumption at low load and part load. The penalty will be higher SFOC at high load. The part-load optimised engine complies with the IMO Tier II limit.

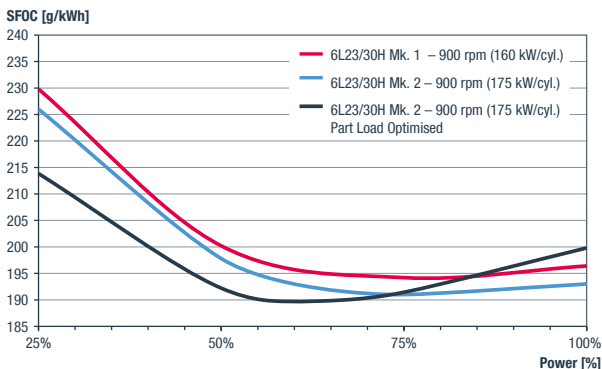
The new tuning method, referred to as part-load optimisation, optimises the engine performance at approx. 60-65% MCR, as this is often the load range in which the GenSet is operating, but it can also be customised to other specific operating conditions.

With part load optimisation, fuel oil savings of up to 12 g/kWh can be obtained, depending on the engine type/model and load point.

Traditionally, GenSets are optimised at 85% MCR, because the power management system will engage additional GenSets when more power is needed.

With part-load optimisation, there is a fuel oil penalty when the load exceeds approx. 80% MCR, but this has no practical consequence as the GenSet rarely exceeds 85% MCR.

This is illustrated in the figure below. For further information, please contact MAN Diesel & Turbo.



Based on Project Guide figures for IMO Tier II engines – 60Hz:

ISO reference condition, HFO/MDO, without pumps, tolerance +5% (not included)

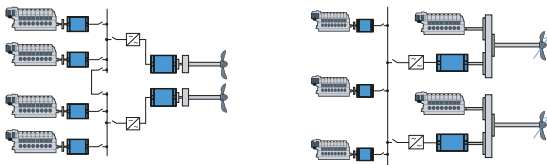
MAN Four-Stroke Marine GenSets

Diesel-Electric and Hybrid Propulsion Power Trains (HyProp ECO)

MAN Diesel & Turbo offers a full range of diesel-electric and hybrid propulsion power trains. Our solutions are designed and optimised to meet the highest efficiencies of a complete propulsion plant system covering the complete operational profile of the vessel. Our propulsion systems provide a well-balanced and tailor-made solution with emphasis on flexibility and performance.

Our comprehensive propulsion packages include the complete array of required components from GenSets to propulsors, including switchboards, variable speed drives and propulsion motors. Full diesel-electric propulsion power trains as well as hybrid systems ensure the optimal technical and economical solution while maximising power demand flexibility.

With HyProp ECO, a new hybrid propulsion system has been developed combining the best propulsion performance with low investment costs.



High-efficient and customised power trains for diesel-electric and hybrid propulsion applications



HyProp ECO: Hybrid propulsion system

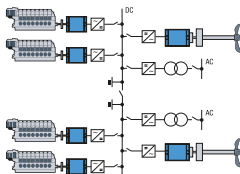
MAN Four-Stroke Marine GenSets

Energy Saving Electric Propulsion (EPROX)

Recent developments in diesel-electric propulsion have resulted in electric systems where engines can operate at variable speed. The "classic" constant speed operation of GenSets is no longer a constraint. Utilising an enlarged engine operation map with a speed range of 60% to 100% paves the way to a high potential in fuel oil savings. Each speed set point of the engines can be adjusted independently in order to achieve a minimum fuel oil consumption according to the system load. The electric system using DC distribution enables a decoupled operation of the engines, propulsion drives, and other consumers of energy.

Another major advantage is the possible integration of energy storage sources, like batteries. They can reduce the transient loads on the engines and improve the dynamic response of the propulsion system. Fast load application is removed from the engines and load peaks are shaved. Also, emission free propulsion can be realized when running on the batteries. In addition, the energy storage sources will have a positive effect on engine maintenance.

MAN Diesel & Turbo offers this advanced package solution in close cooperation with leading E-suppliers.



EPROX energy-saving diesel electric propulsion plant



EPROX propulsion solution on anchor handling tug supply vessel

MAN Four-Stroke Marine GenSets

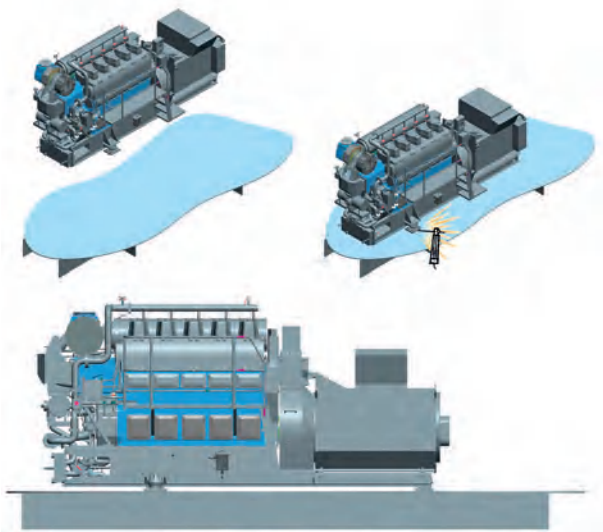
MAN L23/30H Monocoque GenSet – Continued development

The monocoque GenSet includes several updates of the tried and tested L23/30H engine, which are focused on weight reduction, vibration optimisation and simplified installation.

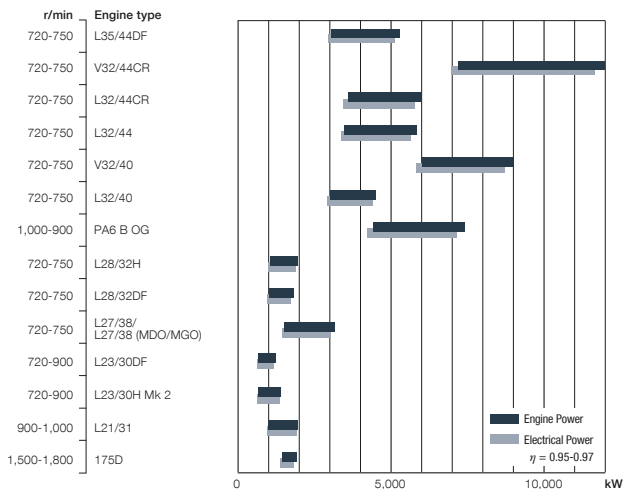
The most significant update is that the alternator is now a load-bearing component, with a 'top brace' connection to the engine. This enables up to 63% weight reduction of the base frame, which again results in weight reduction of up to 13% of the GenSet and a lower vibration level.

The three and four point 'deck-level' supports significantly simplify the GenSet installation process. This design is installed on a flat deck, which is a major reduction of the vessels foundation structure. Furthermore, applying only three conicals makes the GenSets self-leveling.

The monocoque GenSet application is available for all variants of the L23/30H engine.



MAN Four-Stroke Marine GenSets



GenSets

GenSets can be applied as auxiliary GenSets, GenSets for diesel-electric propulsion or for offshore applications.

Project specific demands can be clarified at an early project stage.

Tier III GenSets

Four-stroke GenSets are Tier III compatible when a downstream SCR is added to clean the exhaust gas on a Tier II engine. The additional SCR will only have an impact on SFOC if the backpressure is increased.

MAN Diesel & Turbo has been building auxiliary engines since 1929.

More than 20,000 GenSets, both from own production and from licensees, have been delivered over the years. Ever since, these engines have set the benchmark for the whole industry as an example of reliability and user friendliness.



Bore: 350 mm, Stroke: 440 mm

| Speed | r/min | 750 | | 720 | |
|------------|-------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 6L35/44DF | | 3,180 | 3,069 | 3,060 | 2,953 |
| 7L35/44DF | | 3,710 | 3,580 | 3,570 | 3,445 |
| 8L35/44DF | | 4,240 | 4,092 | 4,080 | 3,937 |
| 9L35/44DF | | 4,770 | 4,603 | 4,590 | 4,429 |
| 10L35/44DF | | 5,300 | 5,115 | 5,100 | 4,922 |

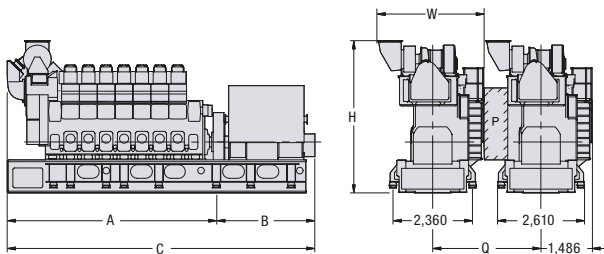
Dimensions***

| Cyl. No. | | 6 | 7 | 8 | 9 | 10 |
|------------|----|--------|--------|--------|--------|--------|
| A | mm | 6,270 | 6,900 | 7,480 | 8,110 | 8,690 |
| B** | mm | 3,900 | 4,100 | 4,400 | 4,600 | 4,800 |
| C** | mm | 10,170 | 11,000 | 11,880 | 12,710 | 13,490 |
| W | mm | 2,958 | 3,108 | 3,108 | 3,108 | 3,108 |
| H | mm | 4,631 | 4,867 | 4,867 | 4,867 | 4,867 |
| Dry mass** | t | 85 | 94 | 103 | 110 | 118 |

* Based on nominal generator efficiencies of 96.5%

** Depending on alternator applied

*** Dimensions are not finally fixed



P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~3,400 mm (with gallery)

MAN V32/44CR

Tier II Tier III EPA Tier 2

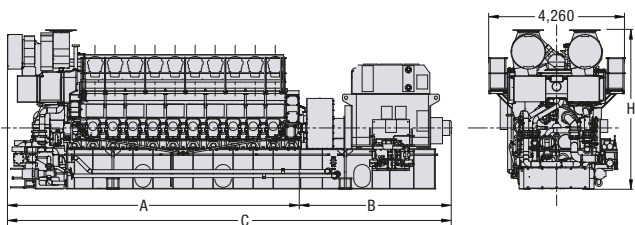
Tier III with SCR

Bore: 320 mm, Stroke: 440 mm

| | | | | | |
|--------------------------|-------|---------|-----------------------|---------|-----------------------|
| Speed | r/min | 750 | | 720 | |
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW ¹⁾ | Eng. kW | Gen. kW ¹⁾ |
| 12V32/44CR | | 7.200 | 6.984 | 7.200 | 6.984 |
| 14V32/44CR ²⁾ | | 8.120 | 7.876 | 8.120 | 7.876 |
| 16V32/44CR | | 9,600 | 9,312 | 9,600 | 9,312 |
| 20V32/44CR | | 12,000 | 11,640 | 12,000 | 11,640 |

Dimensions

| | | | | | |
|----------|----|--------|--------|--------|--------|
| Cyl. No. | | 12 | 14 | 16 | 20 |
| A | mm | 5,382 | 6,012 | 6,642 | 7,902 |
| B | mm | 4,201 | 4,201 | 4,201 | 4,201 |
| C | mm | 11,338 | 11,968 | 12,598 | 13,858 |
| H | mm | 5,014 | 5,014 | 5,014 | 5,014 |
| Dry mass | t | 117 | 131 | 144 | 172 |

¹⁾ Based on nominal generator efficiencies of 97%²⁾ 580 kW/cyl

Tier III with SCR

Bore: 320 mm, Stroke: 440 mm

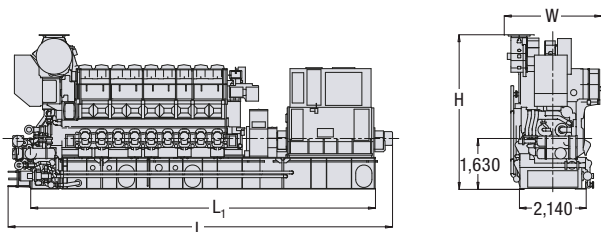
| Speed | r/min | 750 | | 720 | |
|-------------------------|-------|---------|-----------------------|---------|-----------------------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW ¹⁾ | Eng. kW | Gen. kW ¹⁾ |
| 6L32/44CR | | 3,600 | 3,474 | 3,600 | 3,474 |
| 7L32/44CR ²⁾ | | 4,060 | 3,918 | 4,060 | 3,918 |
| 8L32/44CR | | 4,800 | 4,632 | 4,800 | 4,632 |
| 9L32/44CR | | 5,400 | 5,211 | 5,400 | 5,211 |
| 10L32/44CR | | 6,000 | 5,790 | 6,000 | 5,790 |

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 | 10 |
|----------------|----|--------|--------|--------|--------|--------|
| L | mm | 10,738 | 11,268 | 11,798 | 12,328 | 12,858 |
| L ₁ | mm | 10,150 | 10,693 | 11,236 | 11,779 | 12,309 |
| W | mm | 2,490 | 2,490 | 2,573 | 2,573 | 2,573 |
| H | mm | 4,768 | 4,768 | 4,955 | 4,955 | 4,955 |
| Dry mass | t | 71 | 78 | 84 | 91 | 97 |

¹⁾ Based on nominal generator efficiencies of 96.5%

²⁾ 580 kW/cyl



Free passage between the engines, width 600 mm and height 2,000 mm

Minimum distance between centre of engines: ~2,835 mm (without gallery) ~3,220 mm (with gallery)



With optimised fuel consumption at part load and high power density, MAN Diesel & Turbo designed GenSets for container vessels represent a new industry benchmark.

Exclusively for auxiliary GenSet operation. High power density and space saving GenSet with conventional injection and optimised SFOC for part-load operation.

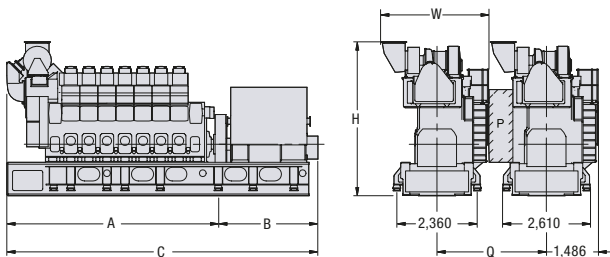
Bore: 320 mm, Stroke: 440 mm

| Speed | r/min | 750 | | 720 | |
|-----------|-------|---------|-----------------------|---------|-----------------------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW ¹⁾ | Eng. kW | Gen. kW ¹⁾ |
| 6L32/44 | | 3,498 | 3,375 | 3,498 | 3,375 |
| 8L32/44 | | 4,664 | 4,500 | 4,664 | 4,500 |
| 9L32/44 | | 5,247 | 5,063 | 5,247 | 5,063 |
| 10L32/44 | | 5,830 | 5,625 | 5,830 | 5,625 |

Dimensions

| Cyl. No. | | 6 | 8 | 9 | 10 |
|----------|----|--------|--------|--------|--------|
| A | mm | 6,470 | 7,531 | 8,061 | 8,590 |
| B | mm | 3,990 | 4,229 | 4,529 | 4,530 |
| C | mm | 10,460 | 11,760 | 12,590 | 13,120 |
| W | mm | 2,845 | 3,054 | 3,105 | 3,105 |
| H | mm | 4,701 | 4,887 | 4,887 | 4,887 |
| Dry mass | t | 82 | 98 | 107 | 113 |

¹⁾ Based on nominal generator efficiencies of 96.5%



P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~2,835 mm (with gallery)



MAN V32/40

Tier II Tier III

Tier III with SCR

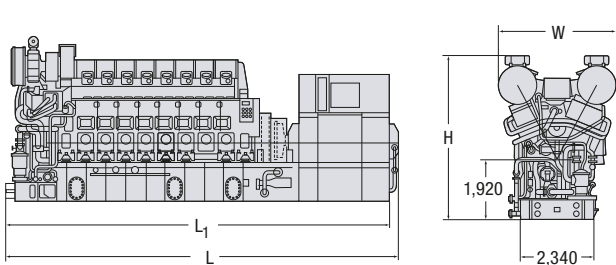
Bore: 320 mm, Stroke: 400 mm

| | | | | | |
|-----------|-------|---------|----------|---------|----------|
| Speed | r/min | 750 | | 720 | |
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 12V32/40 | | 6,000 | 5,820 | 6,000 | 5,820 |
| 14V32/40 | | 7,000 | 6,790 | 7,000 | 6,790 |
| 16V32/40 | | 8,000 | 7,760 | 8,000 | 7,760 |
| 18V32/40 | | 9,000 | 8,730 | 9,000 | 8,730 |

Dimensions

| | | | | | |
|----------------|----|--------|--------|--------|--------|
| Cyl. No. | | 12 | 14 | 16 | 18 |
| L | mm | 11,045 | 11,710 | 12,555 | 13,185 |
| L ₁ | mm | 10,450 | 11,115 | 11,950 | 12,580 |
| W | mm | 3,365 | 3,365 | 3,730 | 3,730 |
| H | mm | 4,850 | 4,850 | 5,245 | 5,245 |
| Dry mass | t | 101 | 113 | 126 | 138 |

* Based on nominal generator efficiencies of 97%



Tier III with SCR

Bore: 320 mm, Stroke: 400 mm

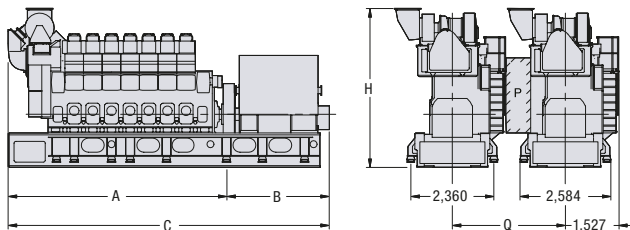
| Speed | r/min | 750 | | 720 | |
|-----------|-------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 6L32/40 | | 3,000 | 2,895 | 3,000 | 2,895 |
| 7L32/40 | | 3,500 | 3,380 | 3,500 | 3,380 |
| 8L32/40 | | 4,000 | 3,860 | 4,000 | 3,860 |
| 9L32/40 | | 4,500 | 4,345 | 4,500 | 4,345 |

Dimensions

| Cyl. No. | | 6 | 7 | 8 | 9 |
|----------|----|-------|--------|--------|--------|
| A | mm | 6,340 | 6,870 | 7,400 | 7,930 |
| B | mm | 3,415 | 3,415 | 3,635 | 3,635 |
| C | mm | 9,755 | 10,285 | 11,035 | 11,565 |
| H | mm | 4,622 | 4,622 | 4,840 | 4,840 |
| Dry Mass | t | 75.0 | 79.0 | 87.0 | 91.0 |

* Based on nominal generator efficiencies of 96.5%

GenSet also available with L32/40CR engine



Free passage between the engines, width 600 mm and height 2,000 mm

Minimum distance between centre of engines: ~2,835 mm (without gallery) ~3,220 mm (with gallery)

Bore 280 mm, Stroke 330 mm

| | | | | | |
|-----------|-------|---------|----------|---------|----------|
| Speed | r/min | 1,000 | | 900 | |
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 12PA6 B | | 4,440 | 4,307 | 4,200 | 4,074 |
| 16PA6 B | | 5,920 | 5,742 | 5,600 | 5,432 |
| 18PA6 B | | 6,660 | 6,460 | 6,300 | 6,111 |
| 20PA6 B | | 7,400 | 7,178 | 7,000 | 6,790 |

Dimensions**

| | | | | | |
|-------------|----|-------|--------|--------|--------|
| Cyl. No. | | 12 | 16 | 18 | 20 |
| A | mm | 4,370 | 4,727 | 4,732 | 4,770 |
| B | mm | 4,600 | 5,637 | 6,097 | 6,557 |
| C | mm | 9,287 | 10,583 | 11,048 | 11,547 |
| H | mm | 3,695 | 3,695 | 3,695 | 3,695 |
| E | mm | 2,670 | 2,670 | 2,670 | 2,670 |
| Dry mass*** | t | 60 | 72 | 80 | 85 |

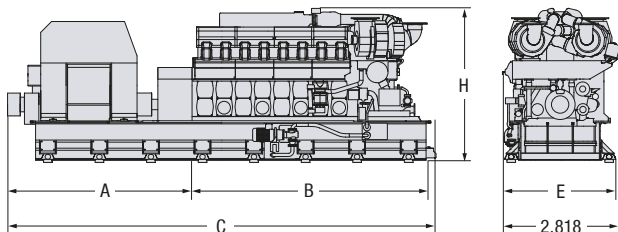
* Nominal generator efficiencies: 97%

** Dimensions are based on operation under inclination up to 25 degrees in any direction

***Incl. 5% tolerance, weight may vary due to different configurations

Engine fuel: Distillate according to ISO 8217 DMA and DMZ

Permissible overload of 10% for 1 hour every other 12 hours of operation



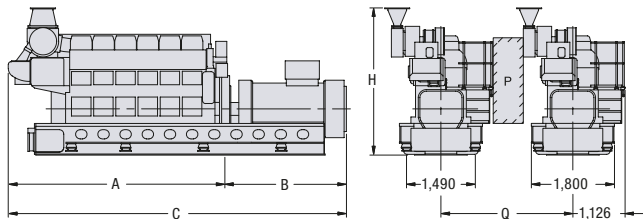
Bore: 280 mm, Stroke: 320 mm

| Speed | r/min | 750 | | 720 | |
|-----------|-------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L28/32H | | 1,100 | 1,045 | 1,050 | 1,000 |
| 6L28/32H | | 1,320 | 1,255 | 1,260 | 1,200 |
| 7L28/32H | | 1,540 | 1,465 | 1,470 | 1,400 |
| 8L28/32H | | 1,760 | 1,670 | 1,680 | 1,600 |
| 9L28/32H | | 1,980 | 1,880 | 1,890 | 1,800 |

Dimensions

| Cyl. No. | | 5 | 6 | 7 | 8 | 9 |
|----------|----|-------|-------|-------|-------|-------|
| A | mm | 4,279 | 4,759 | 5,499 | 5,979 | 6,199 |
| B | mm | 2,400 | 2,510 | 2,680 | 2,770 | 2,690 |
| C | mm | 6,679 | 7,269 | 8,179 | 8,749 | 8,889 |
| H | mm | 3,184 | 3,184 | 3,374 | 3,374 | 3,534 |
| Dry Mass | t | 32.6 | 36.3 | 39.4 | 40.7 | 47.1 |

* Based on nominal generator efficiencies of 95%



P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~2,655 mm (without gallery) ~2,850 mm (with gallery)



MAN L28/32DF

Tier II Tier III

Tier III with SCR

Bore: 280 mm, Stroke: 320 mm

| Speed | r/min | 750 | | 720 | |
|-----------|-------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L28/32DF | | 1,000 | 950 | 1,000 | 950 |
| 6L28/32DF | | 1,200 | 1,140 | 1,200 | 1,140 |
| 7L28/32DF | | 1,400 | 1,330 | 1,400 | 1,330 |
| 8L28/32DF | | 1,600 | 1,520 | 1,600 | 1,520 |
| 9L28/32DF | | 1,800 | 1,710 | 1,800 | 1,710 |

Dimensions

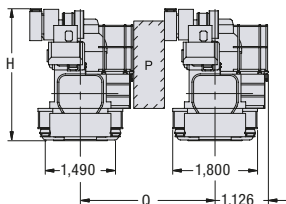
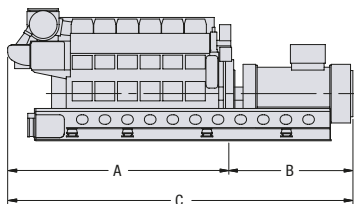
| Cyl. No. | | 5 | 6 | 7 | 8 | 9 |
|----------|----|-------|-------|-------|-------|-------|
| A | mm | 4,321 | 4,801 | 5,281 | 5,761 | 6,241 |
| B | mm | 2,400 | 2,510 | 2,680 | 2,770 | 2,690 |
| C | mm | 6,721 | 7,311 | 7,961 | 8,531 | 8,931 |
| H | mm | 2,835 | 3,009 | 3,009 | 3,009 | 3,009 |
| Dry Mass | t | 32.6 | 36.3 | 39.4 | 40.7 | 47.1 |

* Based on nominal generator efficiencies of 95%

Gas / fuel ratio:

■ at load: 20-100% 93 / 7 (Tier II)

■ at load: 20-100% 99 / 1 (Tier III)

Gas methane number ≥ 80 

P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~2,655 mm (without gallery) ~2,850 mm (with gallery)

Project
Guide

Bore: 270 mm, Stroke: 380 mm

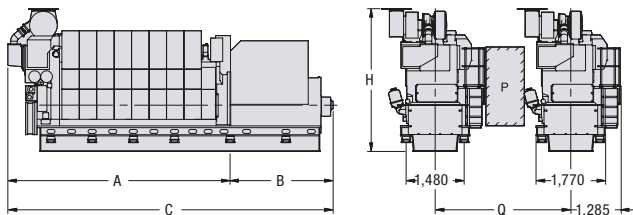
| Speed | r/min | 750/720 | | 750/720 (MDO**/MGO) | |
|-----------|-------|-------------|--------------|---------------------|----------|
| Frequency | Hz | 50/60 | | 50/60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L27/38 | | 1,600/1,500 | 1,536/ 1,440 | - | - |
| 6L27/38 | | 1,980 | 1,900 | 2,100 | 2,016 |
| 7L27/38 | | 2,310 | 2,218 | 2,450 | 2,352 |
| 8L27/38 | | 2,640 | 2,534 | 2,800 | 2,688 |
| 9L27/38 | | 2,970 | 2,851 | 3,150 | 3,024 |

Dimensions

| Cyl. No. | | 5 | 6 | 7 | 8 | 9 |
|----------|----|-------|-------|-------|-------|-------|
| A | mm | 4,346 | 4,791 | 5,236 | 5,681 | 6,126 |
| B | mm | 2,486 | 2,766 | 2,766 | 2,986 | 2,986 |
| C | mm | 6,832 | 7,557 | 8,002 | 8,667 | 9,112 |
| H | mm | 3,712 | 3,712 | 3,899 | 3,899 | 3,899 |
| Dry Mass | t | 40.0 | 44.5 | 50.4 | 58.2 | 64.7 |

* Based on nominal generator efficiencies of 96%

** MDO viscosity must not exceed 6 mm²/s = cSt @ 40 °C



P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~2,900 mm (without gallery) ~3,100 mm (with gallery).



MAN L23/30H Mk 2

Tier II Tier III

Tier III with SCR

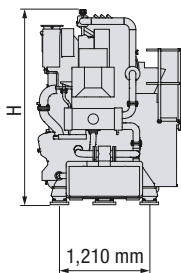
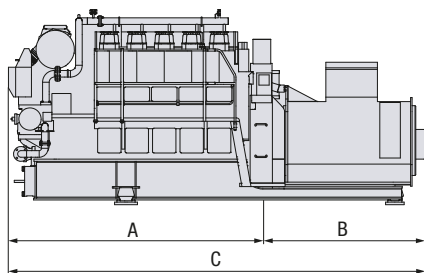
Bore: 225 mm, Stroke: 300 mm

| Speed | r/min | 750 | | 720 | | 900 | |
|--------------|-------|---------|----------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L23/30H ECR | | 525 | 500 | 525 | 500 | - | - |
| 5L23/30H | | 675/740 | 641/703 | 650/710 | 618/675 | - | - |
| 6L23/30H | | 888 | 844 | 852 | 809 | 1,050 | 998 |
| 7L23/30H | | 1,036 | 984 | 994 | 944 | 1,225 | 1,164 |
| 8L23/30H | | 1,184 | 1,125 | 1,136 | 1,079 | 1,400 | 1,330 |

Dimensions

| Cyl. No. | | 5 | 6 | 6 | 7 | 7 | 8 | 8 |
|----------|-------|---------|---------|-------|---------|-------|---------|-------|
| | r/min | 720/750 | 720/750 | 900 | 720/750 | 900 | 720/750 | 900 |
| A | mm | 3,415 | 3,785 | 3,785 | 4,155 | 4,276 | 4,525 | 4,896 |
| B | mm | 2,130 | 2,130 | 2,130 | 2,130 | 2,130 | 2,130 | 2,130 |
| C | mm | 5,545 | 5,915 | 5,915 | 6,285 | 6,406 | 6,655 | 7,025 |
| H | mm | 2,625 | 2,625 | 2,625 | 2,625 | 2,625 | 2,625 | 2,625 |
| Dry Mass | t | 16.8 | 18.3 | 18.3 | 20.1 | 20.1 | 21.4 | 21.4 |

* Based on nominal generator efficiencies of 95%



Free passage between the engines, width 600 mm and height 2,000 mm

Minimum distance between centre of engines: ~2,250 mm (without gallery) ~2,600 mm (with gallery)



Tier III with SCR
Bore: 225 mm, Stroke: 300 mm

| Speed | r/min | 750 | | 720 | | 900 | |
|-----------|-------|---------|----------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L23/30DF | | 625 | 590 | 625 | 590 | - | - |
| 6L23/30DF | | 750 | 710 | 750 | 710 | 900 | 855 |
| 7L23/30DF | | 875 | 830 | 875 | 830 | 1,050 | 995 |
| 8L23/30DF | | 1,000 | 950 | 1,000 | 950 | 1,200 | 1,140 |

Dimensions

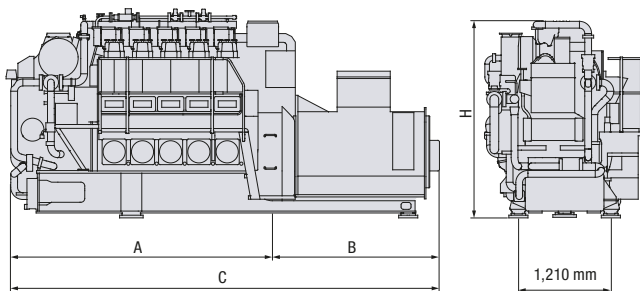
| Cyl. No. | | 5 | 6 | 6 | 7 | 7 | 8 | 8 |
|----------|-------|---------|---------|-------|---------|-------|---------|-------|
| | r/min | 720/750 | 720/750 | 900 | 720/750 | 900 | 720/750 | 900 |
| A | mm | 3,469 | 3,839 | 3,839 | 4,209 | 4,276 | 4,579 | 4,896 |
| B | mm | 2,202 | 2,252 | 2,252 | 2,302 | 2,302 | 2,352 | 2,352 |
| C | mm | 5,671 | 6,091 | 6,091 | 6,511 | 6,578 | 6,931 | 7,241 |
| H | mm | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 | 2,749 |
| Dry Mass | t | 17.3 | 19.0 | 19.2 | 21.4 | 21.4 | 23.3 | 23.4 |

* Based on nominal generator efficiencies of 95%

Gas / fuel ratio:

▪ at load: 20-100% 99 / 1 (Tier III)

Gas methane number ≥ 80



Free passage between the engines, width 600 mm and height 2,000 mm

Minimum distance between centre of engines: ~2,250 mm (without gallery) ~2,600 mm (with gallery)

Project
Guide



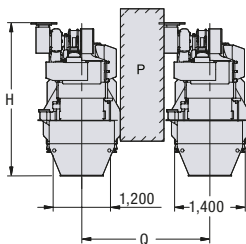
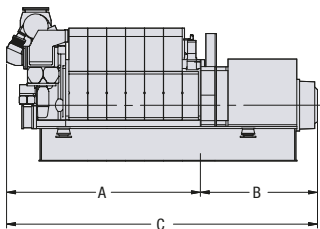
Bore: 210 mm, Stroke: 310 mm

| | | | | | |
|-----------|-------|---------|----------|---------|----------|
| Speed | r/min | 1,000 | | 900 | |
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 5L21/31 | | 1,000 | 950 | 1,000 | 950 |
| 6L21/31 | | 1,320 | 1,254 | 1,320 | 1,254 |
| 7L21/31 | | 1,540 | 1,463 | 1,540 | 1,463 |
| 8L21/31 | | 1,760 | 1,672 | 1,760 | 1,672 |
| 9L21/31 | | 1,980 | 1,881 | 1,980 | 1,881 |

Dimensions

| | | | | | | |
|----------|----|-------|-------|-------|-------|-------|
| Cyl. No. | | 5 | 6 | 7 | 8 | 9 |
| A | mm | 3,959 | 4,314 | 4,669 | 5,572 | 5,927 |
| B | mm | 1,870 | 2,000 | 1,970 | 2,110 | 2,135 |
| C | mm | 5,829 | 6,314 | 6,639 | 7,682 | 8,062 |
| H | mm | 3,183 | 3,183 | 3,289 | 3,289 | 3,289 |
| Dry Mass | t | 22.5 | 26.0 | 29.5 | 33.0 | 36.5 |

* Based on nominal generator efficiencies of 95%



P Free passage between the engines, width 600 mm and height 2,000 mm

Q Minimum distance between centre of engines: ~2,400 mm (without gallery) ~2,600 mm (with gallery).



Tier III with SCR
Bore: 175 mm, Stroke: 215 mm

| Engine Model | Rating Definition | kWm | kWe* | rpm (freq.) | SFOC at 100% MCR | SFOC at 75% MCR |
|--------------|-------------------|-------|-------|---------------|------------------|-----------------|
| 12V175D-MEM | Diesel-Electric | 1,440 | 1,376 | 1,500 (50 Hz) | 192 | 197 |
| | Medium Duty | 1,800 | 1,720 | 1,800 (60 Hz) | 195 | 203 |
| 12V175D-MEL | Diesel-Electric | 1,620 | 1,548 | 1,500 (50 Hz) | 191 | 194 |
| | Light Duty | 1,920 | 1,834 | 1,800 (60 Hz) | 195 | 201 |
| 12V175D-MA | Auxiliary Duty | 1,620 | 1,548 | 1,500 (50 Hz) | 191 | 194 |
| | | 1,920 | 1,834 | 1,800 (60 Hz) | 195 | 201 |

* 3-phase, 0.8 p.f., assumes alternator efficiency of 95.5%.

SFOC figures related to mechanical output and for distillates according to ISO 8217 DMA, with attached lube oil, HT and LT-cooling water pumps and engine specification fulfilling IMO Tier II emission limitations

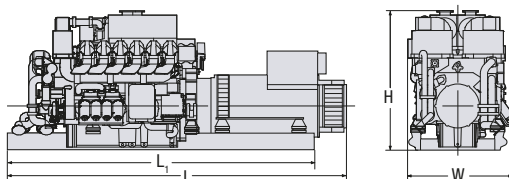
Rating definitions:

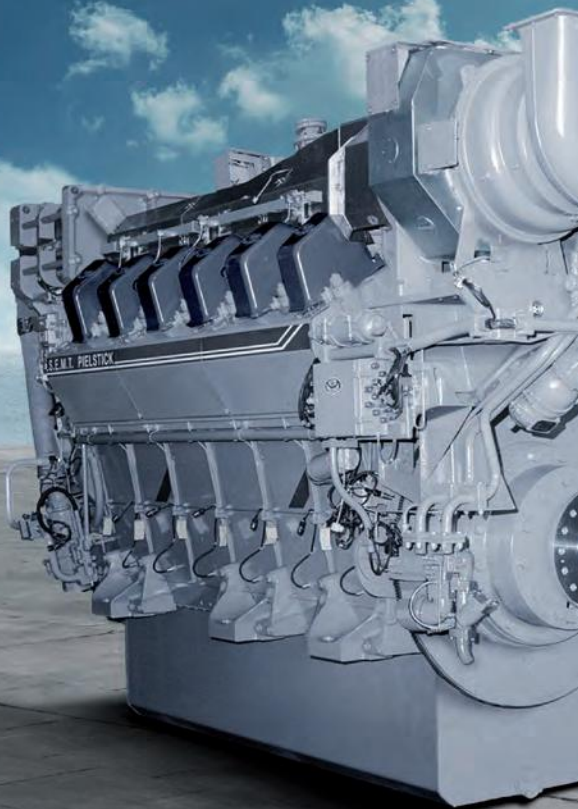
| | |
|------------------------------------|--|
| Marine Diesel-Electric Medium Duty | <ul style="list-style-type: none"> For continuous power generation with variable load aboard vessels for diesel-electric drives Typical applications include, but are not limited to navy, offshore vessels and ferries Average load: up to 75% |
| Marine Diesel-Electric Light Duty | <ul style="list-style-type: none"> For continuous power generation with variable load aboard vessels for diesel-electric drives Typical applications include, but are not limited to navy, offshore vessels and yachts Average load: up to 50% |
| Marine Auxiliary | <ul style="list-style-type: none"> For continuous power generation with variable load aboard vessels for auxiliary use Average load: up to 50% |

Dimensions

| | | |
|----------------|----|-------|
| L ₁ | mm | 5,350 |
| L | mm | 5,530 |
| W | mm | 1,641 |
| H | mm | 2,365 |
| Dry weight | t | 15.95 |

GenSet dimensions and weight shown are for guidance only. Details may vary due to different configurations.





S.E.M.T. Pielstick Four-Stroke

Mechanical and Diesel
Electric Propulsion Engines



S.E.M.T. Pielstick PA6 B STC

Tier II Tier III

Tier III with SCR

Bore: 280 mm, Stroke: 330 mm

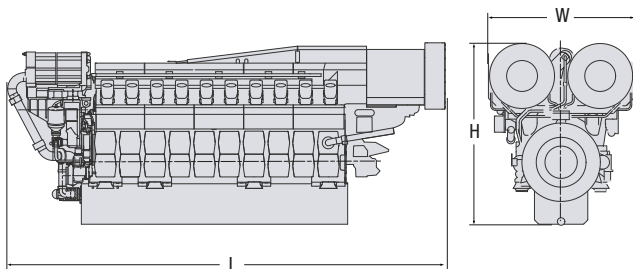
| | | |
|-------------|-------|-------|
| Speed | r/min | 1,050 |
| mep | bar | 22.8 |
| | | kW* |
| 12PA6 B STC | | 4,860 |
| 16PA6 B STC | | 6,480 |
| 20PA6 B STC | | 8,100 |

Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|-----------|------|-----|
| MCR | 100% | 85% |
| PA6 B STC | -1) | -1) |

Dimensions

| | | | | |
|----------|----|-------|-------|-------|
| Cyl. No. | | 12 | 16 | 20 |
| L | mm | 5,830 | 6,780 | 7,960 |
| W | mm | 2,340 | 2,340 | 2,640 |
| H | mm | 3,124 | 3,124 | 3,166 |
| Dry mass | t | 31 | 37 | 43 |

*Engine fuel: distillate according to ISO 8217 DMA**Engine rating: engine rating according to ISO 3046 conditions*** 110% load for one in six operating hours on navy vessels, with approval according to HSWR from DNV, available on special request**1) SFOC values are project specific. Please contact MAN Diesel & Turbo for further information.*

GenSet for diesel electric propulsion.

Bore 280 mm, Stroke 330 mm

| Speed | r/min | 1,000 | | 900 | |
|-----------|-------|---------|----------|---------|----------|
| Frequency | Hz | 50 | | 60 | |
| | | Eng. kW | Gen. kW* | Eng. kW | Gen. kW* |
| 12PA6 B | | 4,440 | 4,307 | 4,200 | 4,074 |
| 16PA6 B | | 5,920 | 5,742 | 5,600 | 5,432 |
| 18PA6 B | | 6,660 | 6,460 | 6,300 | 6,111 |
| 20PA6 B | | 7,400 | 7,178 | 7,000 | 6,790 |

Dimensions**

| Cyl. No. | | 12 | 16 | 18 | 20 |
|-------------|----|-------|--------|--------|--------|
| A | mm | 4,370 | 4,727 | 4,732 | 4,770 |
| B | mm | 4,600 | 5,637 | 6,097 | 6,557 |
| C | mm | 9,287 | 10,583 | 11,048 | 11,547 |
| H | mm | 3,695 | 3,695 | 3,695 | 3,695 |
| E | mm | 2,670 | 2,670 | 2,670 | 2,670 |
| Dry mass*** | t | 60 | 72 | 80 | 85 |

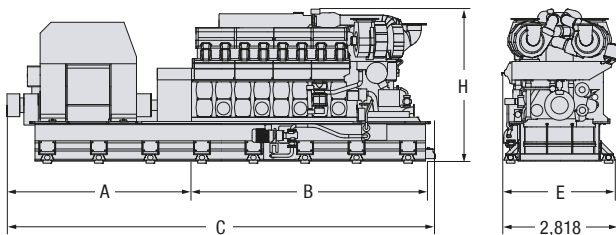
* Nominal generator efficiencies: 97%

** Dimensions are based on operation under inclination up to 25 degrees in any direction

***Incl. 5% tolerance, weight may vary due to different configurations

Engine fuel: Distillate according to ISO 8217 DMA and DMZ

Permissible overload of 10% for 1 hour every other 12 hours of operation



S.E.M.T. Pielstick PC2.6 B

Tier II Tier III

Tier III with SCR

Bore: 400 mm, Stroke: 500 mm

| | | |
|-----------|-------|--------|
| Speed | r/min | 600 |
| mep | bar | 23.9 |
| | | kW |
| 12PC2.6 B | | 9,000 |
| 14PC2.6 B | | 10,500 |
| 16PC2.6 B | | 12,000 |

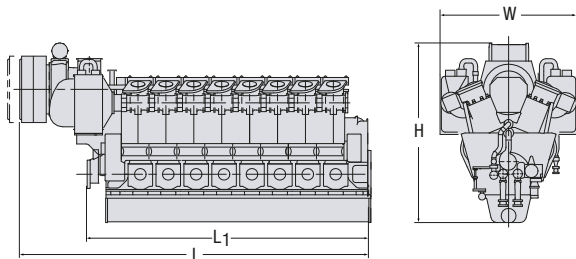
Specific Fuel Oil Consumption (SFOC) to ISO conditions

| | | |
|---------|------|-----|
| MCR | 100% | 85% |
| PC2.6 B | -1) | -1) |

Dimensions

| Cyl. No. | | 12 | 14 | 16 |
|----------------|----|-------|-------|--------|
| L | mm | 9,100 | 9,840 | 10,580 |
| L ₁ | mm | 5,960 | 6,700 | 7,440 |
| W | mm | 3,780 | 3,780 | 3,780 |
| H | mm | 4,800 | 4,800 | 4,800 |
| Dry mass | t | 94 | 104 | 114 |

¹⁾ SFOC values are project specific. Please contact MAN Diesel & Turbo for further information.







MAN Four-Stroke Propulsion Systems





MAN Alpha Kappel propeller – four-bladed CP with fairing cone for rudder bulb

The MAN Alpha FPP portfolio covers:

- power range of 4-40 MW per shaft
- blade configurations for 3, 4, 5 and 6-bladed propellers
- propellers with integrated shaft line and stern tube solutions
- a wide range of stern tube lube and sealing systems
 - oil, water, biodegradable oils.

The MAN Alpha FPPs are characterised by the following benefits:

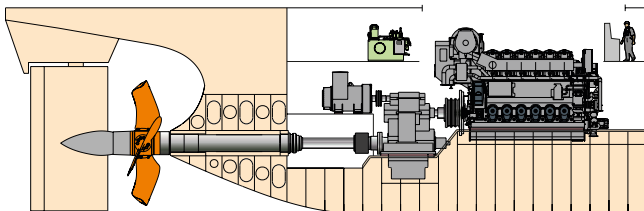
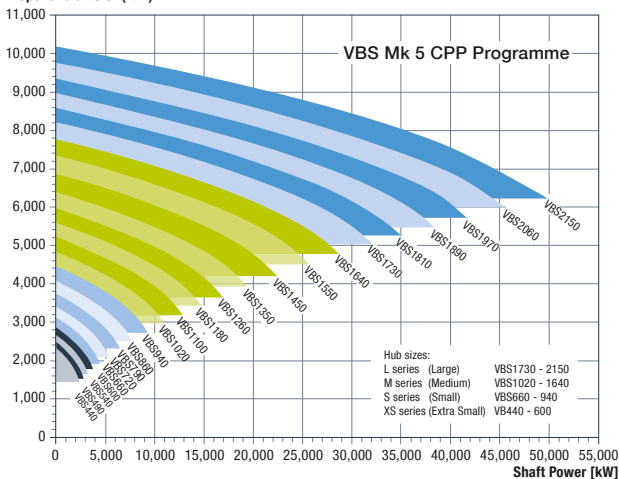
- High-efficient hydrodynamically optimised blade profiles
 - Kappel designs available
- High reliability: robust approach with ample mechanical design margins
- High-efficient aft ship integration with rudder, rudder bulb, ducts, etc.
- Layouts for complete propulsion systems
- Plant calculations with upfront consideration to torsional vibration calculation (TVC), alignment and control systems.

MAN Four-Stroke Propulsion Systems

MAN Alpha Controllable Pitch Propeller

- As standard Mk 5 versions are 4-bladed – optionally 3- and 5-bladed propellers are available on request
- The figures stated after VBS indicate the propeller hub diameter
- Standard blade/hub materials are Ni-Al-bronze, stainless steel is optional
- The propellers are available up to the highest ice classes. However the below standard programme, is based on 'no ice'.

Propeller diameter (mm)



Four-stroke propulsion system installation – complete powertrain with propeller and aft ship equipment

MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|-----------------|--------|-------------------------|---------|------------------|---------|---------|------------|---------|-------------------|----------------------------------|
| L51/60DF | | | | | | | | | | |
| 6 | 6,900 | 162 | 4,400 | 1,100 | 851 | 920 | | | | |
| 6 | 6,900 | 133 | 5,000 | 1,180 | 914 | 989 | | | | |
| 6 | 6,900 | 103 | 5,850 | 1,350 | 1,037 | 1,096 | | | | |
| 7 | 8,050 | 160 | 4,550 | 1,180 | 914 | 989 | | | | |
| 7 | 8,050 | 133 | 5,150 | 1,260 | 975 | 1,036 | | | | |
| 7 | 8,050 | 104 | 6,000 | 1,450 | 1,114 | 1,148 | | | | |
| 8 | 9,200 | 157 | 4,700 | 1,180 | 914 | 989 | | | | |
| 8 | 9,200 | 132 | 5,300 | 1,350 | 1,037 | 1,096 | | | | |
| 8 | 9,200 | 103 | 6,200 | 1,450 | 1,114 | 1,148 | | | | |
| 9 | 10,350 | 155 | 4,850 | 1,260 | 975 | 1,036 | | | | |
| 9 | 10,350 | 131 | 5,450 | 1,350 | 1,037 | 1,096 | | | | |
| 9 | 10,350 | 102 | 6,400 | 1,550 | 1,175 | 1,213 | | | | |

V48/60CR

| | | | | | | | | | | |
|----|--------|-----|-------|-------|-------|-------|-------|-------|------|------|
| 12 | 14,400 | 160 | 4,950 | 1,350 | 1,037 | 1,096 | 1,800 | 2,620 | 19.9 | 26.7 |
| 12 | 14,400 | 130 | 5,600 | 1,450 | 1,114 | 1,163 | 1,850 | 2,770 | 27.0 | 33.2 |
| 12 | 14,400 | 100 | 6,600 | 1,640 | 1,260 | 1,256 | 1,900 | 3,140 | 42.9 | 42.2 |
| 14 | 16,800 | 160 | 5,100 | 1,450 | 1,114 | 1,163 | 1,850 | 2,775 | 23.5 | 31.7 |
| 14 | 16,800 | 130 | 5,850 | 1,550 | 1,187 | 1,208 | 1,900 | 2,905 | 31.9 | 38.1 |
| 14 | 16,800 | 100 | 6,850 | 1,730 | 1,330 | 1,307 | 1,950 | 3,355 | 48.2 | 48.5 |
| 16 | 19,200 | 160 | 5,260 | 1,450 | 1,114 | 1,163 | 1,850 | 2,805 | 26.8 | 32.9 |
| 16 | 19,200 | 130 | 6,050 | 1,640 | 1,260 | 1,256 | 1,950 | 3,155 | 37.1 | 43.9 |
| 16 | 19,200 | 100 | 7,100 | 1,730 | 1,330 | 1,367 | 2,000 | 3,455 | 57.8 | 56.3 |
| 18 | 21,600 | 160 | 5,400 | 1,550 | 1,187 | 1,213 | 1,900 | 2,905 | 30.9 | 37.3 |
| 18 | 21,600 | 130 | 6,200 | 1,640 | 1,260 | 1,266 | 1,950 | 3,155 | 37.4 | 45.5 |
| 18 | 21,600 | 100 | 7,300 | 1,810 | 1,390 | 1,420 | 2,000 | 3,655 | 68.3 | 61.4 |

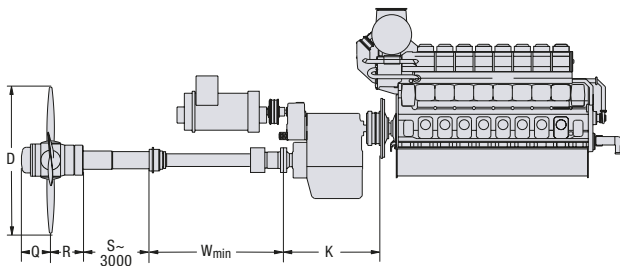
L48/60CR

| | | | | | | | | | | |
|---|--------|-----|-------|-------|-------|-------|-------|--|--|------|
| 6 | 7,200 | 172 | 4,250 | 1,100 | 851 | 970 | 1,700 | | | 19.1 |
| 6 | 7,200 | 143 | 4,800 | 1,180 | 914 | 989 | 1,700 | | | 23.0 |
| 6 | 7,200 | 112 | 5,600 | 1,350 | 1,037 | 1,096 | 1,700 | | | 29.9 |
| 7 | 8,400 | 169 | 4,400 | 1,100 | 851 | 995 | 1,700 | | | 21.4 |
| 7 | 8,400 | 141 | 5,000 | 1,260 | 975 | 1,036 | 1,700 | | | 26.4 |
| 7 | 8,400 | 110 | 5,850 | 1,350 | 1,037 | 1,096 | 1,750 | | | 32.3 |
| 8 | 9,600 | 166 | 4,550 | 1,180 | 914 | 989 | 1,700 | | | 24.2 |
| 8 | 9,600 | 139 | 5,150 | 1,260 | 975 | 1,036 | 1,700 | | | 28.2 |
| 8 | 9,600 | 110 | 6,000 | 1,450 | 1,114 | 1,148 | 1,800 | | | 37.9 |
| 9 | 10,800 | 163 | 4,700 | 1,260 | 975 | 1,036 | 1,700 | | | 27.2 |
| 9 | 10,800 | 137 | 5,300 | 1,350 | 1,037 | 1,096 | 1,800 | | | 33.2 |
| 9 | 10,800 | 108 | 6,200 | 1,450 | 1,114 | 1,163 | 1,800 | | | 40.2 |

MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|-----------------|-------|-------------------------|---------|------------------|---------|---------|------------|---------|-------------------|----------------------------------|
| L35/44DF | | | | | | | | | | |
| 6 | 3,180 | 208 | 3,300 | 790 | 600 | 692 | 1,400 | | | 6.4 |
| 6 | 3,180 | 167 | 3,800 | 940 | 714 | 886 | 1,530 | | | 8.7 |
| 6 | 3,180 | 130 | 4,400 | 1,020 | 775 | 896 | 1,530 | | | 10.9 |
| 7 | 3,710 | 198 | 3,500 | 860 | 653 | 750 | 1,530 | | | 7.9 |
| 7 | 3,710 | 161 | 4,000 | 940 | 714 | 886 | 1,530 | | | 9.5 |
| 7 | 3,710 | 128 | 4,600 | 1,100 | 836 | 1,001 | 1,560 | | | 12.7 |
| 8 | 4,240 | 197 | 3,600 | 860 | 653 | 750 | 1,530 | | | 8.4 |
| 8 | 4,240 | 165 | 4,050 | 940 | 714 | 886 | 1,530 | | | 10.0 |
| 8 | 4,240 | 127 | 4,750 | 1,100 | 836 | 1,001 | 1,560 | | | 13.6 |
| 9 | 4,770 | 202 | 3,600 | 940 | 714 | 886 | 1,530 | | | 9.3 |
| 9 | 4,770 | 167 | 4,100 | 1,020 | 775 | 896 | 1,560 | | | 11.9 |
| 9 | 4,770 | 130 | 4,800 | 1,100 | 836 | 1,001 | 1,630 | | | 14.7 |
| 10 | 5,300 | 199 | 3,700 | 940 | 714 | 886 | 1,560 | | | 10.2 |
| 10 | 5,300 | 166 | 4,200 | 1,020 | 775 | 896 | 1,560 | | | 12.5 |
| 10 | 5,300 | 126 | 5,000 | 1,180 | 897 | 1,004 | 1,630 | | | 16.8 |

¹⁾ Smin and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube



MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|-----------------|--------|-------------------------|---------|------------------|---------|---------|------------|---------|-------------------|----------------------------------|
| V32/44CR | | | | | | | | | | |
| 12 | 7,200 | 207 | 3,800 | 1,020 | 795 | 879 | 1,650 | | | 14.4 |
| 12 | 7,200 | 167 | 4,400 | 1,100 | 851 | 920 | 1,700 | | | 17.4 |
| 12 | 7,200 | 128 | 5,250 | 1,260 | 975 | 1,036 | 1,700 | | | 22.9 |
| 14 | 8,120 | 202 | 3,950 | 1,020 | 795 | 879 | 1,650 | | | 15.2 |
| 14 | 8,120 | 164 | 4,550 | 1,180 | 914 | 989 | 1,700 | | | 19.7 |
| 14 | 8,120 | 127 | 5,400 | 1,260 | 975 | 1,036 | 1,700 | | | 24.4 |
| 16 | 9,600 | 205 | 4,050 | 1,100 | 851 | 945 | 1,700 | | | 18.1 |
| 16 | 9,600 | 165 | 4,650 | 1,180 | 914 | 989 | 1,700 | | | 21.8 |
| 16 | 9,600 | 127 | 5,550 | 1,350 | 1,037 | 1,096 | 1,750 | | | 28.2 |
| 18 | 10,800 | 205 | 4,150 | 1,180 | 914 | 989 | 1,700 | | | 20.2 |
| 18 | 10,800 | 164 | 4,750 | 1,260 | 975 | 1,036 | 1,700 | | | 24.2 |
| 18 | 10,800 | 126 | 5,700 | 1,450 | 1,114 | 1,148 | 1,800 | | | 32.7 |
| 20 | 12,000 | 204 | 4,250 | 1,180 | 914 | 989 | 1,700 | | | 21.2 |
| 20 | 12,000 | 163 | 4,850 | 1,260 | 975 | 1,036 | 1,750 | | | 25.8 |
| 20 | 12,000 | 124 | 5,850 | 1,450 | 1,114 | 1,163 | 1,800 | | | 34.7 |

L32/44CR

| | | | | | | | | | | |
|----|-------|-----|-------|-------|-----|-------|-------|--|--|------|
| 6 | 3,600 | 206 | 3,350 | 860 | 653 | 750 | 1,400 | | | 8.9 |
| 6 | 3,600 | 170 | 3,800 | 940 | 714 | 886 | 1,520 | | | 10.4 |
| 6 | 3,600 | 130 | 4,450 | 1,020 | 775 | 896 | 1,520 | | | 12.4 |
| 7 | 4,060 | 202 | 3,500 | 860 | 653 | 750 | 1,520 | | | 9.7 |
| 7 | 4,060 | 168 | 3,950 | 940 | 714 | 886 | 1,520 | | | 11.2 |
| 7 | 4,060 | 131 | 4,600 | 1,100 | 836 | 1,001 | 1,550 | | | 14.3 |
| 8 | 4,800 | 199 | 3,600 | 940 | 714 | 886 | 1,520 | | | 10.9 |
| 8 | 4,800 | 167 | 4,050 | 1,020 | 775 | 896 | 1,520 | | | 12.5 |
| 8 | 4,800 | 129 | 4,750 | 1,100 | 836 | 1,001 | 1,630 | | | 16.2 |
| 9 | 5,400 | 200 | 3,650 | 940 | 714 | 886 | 1,520 | | | 11.3 |
| 9 | 5,400 | 166 | 4,150 | 1,020 | 775 | 896 | 1,550 | | | 13.6 |
| 9 | 5,400 | 128 | 4,900 | 1,180 | 897 | 1,004 | 1,630 | | | 17.9 |
| 10 | 6,000 | 201 | 3,700 | 940 | 714 | 886 | 1,550 | | | 12.3 |
| 10 | 6,000 | 164 | 4,250 | 1,020 | 775 | 896 | 1,630 | | | 15.1 |
| 10 | 6,000 | 128 | 5,000 | 1,180 | 897 | 1,004 | 1,650 | | | 18.9 |

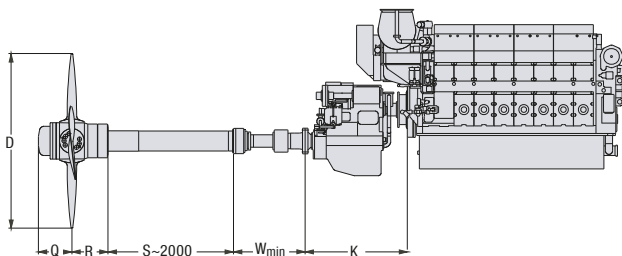
¹⁾ Smin and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube

MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|---------------|-------|----------------------|---------|------------------|---------|---------|------------|---------|-------------------|-------------------------------|
| V32/40 | | | | | | | | | | |
| 12 | 6,000 | 187 | 3,950 | 1,020 | 775 | 896 | 1,560 | | | 15.2 |
| 12 | 6,000 | 159 | 4,400 | 1,100 | 836 | 970 | 1,630 | | | 18.3 |
| 12 | 6,000 | 128 | 5,050 | 1,180 | 914 | 989 | 1,700 | | | 22.6 |
| 14 | 7,000 | 183 | 4,100 | 1,020 | 775 | 901 | 1,630 | | | 17.1 |
| 14 | 7,000 | 158 | 4,550 | 1,100 | 836 | 970 | 1,650 | | | 19.8 |
| 14 | 7,000 | 127 | 5,250 | 1,260 | 975 | 1,036 | 1,700 | | | 26.1 |
| 16 | 8,000 | 183 | 4,200 | 1,100 | 836 | 970 | 1,650 | | | 19.3 |
| 16 | 8,000 | 155 | 4,700 | 1,180 | 914 | 989 | 1,700 | | | 23.6 |
| 16 | 8,000 | 126 | 5,400 | 1,260 | 975 | 1,036 | 1,700 | | | 27.8 |
| 18 | 9,000 | 181 | 4,300 | 1,100 | 836 | 995 | 1,700 | | | 21.0 |
| 18 | 9,000 | 153 | 4,850 | 1,260 | 975 | 1,036 | 1,700 | | | 26.2 |
| 18 | 9,000 | 123 | 5,600 | 1,350 | 1,037 | 1,096 | 1,740 | | | 31.6 |

| | | | | | | | | | | |
|---------------|-------|-----|-------|-------|-----|-------|-------|--|--|------|
| L32/40 | | | | | | | | | | |
| 6 | 3,000 | 205 | 3,300 | 790 | 639 | 692 | 1,400 | | | 8.8 |
| 6 | 3,000 | 171 | 3,700 | 860 | 653 | 745 | 1,400 | | | 9.9 |
| 6 | 3,000 | 137 | 4,200 | 940 | 714 | 886 | 1,520 | | | 12.0 |
| 7 | 3,500 | 199 | 3,450 | 860 | 653 | 745 | 1,400 | | | 9.8 |
| 7 | 3,500 | 168 | 3,850 | 940 | 714 | 886 | 1,520 | | | 11.8 |
| 7 | 3,500 | 134 | 4,400 | 1,020 | 775 | 896 | 1,520 | | | 13.9 |
| 8 | 4,000 | 198 | 3,550 | 860 | 653 | 745 | 1,400 | | | 10.3 |
| 8 | 4,000 | 165 | 4,000 | 940 | 714 | 906 | 1,520 | | | 12.5 |
| 8 | 4,000 | 133 | 4,550 | 1,100 | 836 | 1,001 | 1,560 | | | 16.3 |
| 9 | 4,500 | 195 | 3,650 | 940 | 714 | 906 | 1,520 | | | 12.2 |
| 9 | 4,500 | 164 | 4,100 | 1,020 | 775 | 896 | 1,520 | | | 14.1 |
| 9 | 4,500 | 134 | 4,650 | 1,100 | 836 | 1,006 | 1,560 | | | 17.1 |

¹⁾ Smin and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube



MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|--------------------|--------|-------------------------|---------|------------------|---------|---------|------------|---------|-------------------|----------------------------------|
| V28/33D STC | | | | | | | | | | |
| 12 | 6,000 | 187 | 3,700 | 940 | 735 | 828 | 1,600 | | | 10.9 |
| 12 | 6,000 | 155 | 4,000 | 1,020 | 795 | 879 | 1,650 | | | 13.1 |
| 12 | 6,000 | 140 | 4,300 | 1,100 | 851 | 920 | 1,650 | | | 14.5 |
| 16 | 8,000 | 211 | 3,700 | 1,020 | 795 | 879 | 1,650 | | | 13.1 |
| 16 | 8,000 | 184 | 4,000 | 1,100 | 851 | 920 | 1,650 | | | 14.7 |
| 16 | 8,000 | 159 | 4,300 | 1,100 | 851 | 945 | 1,700 | | | 16.2 |
| 20 | 10,000 | 228 | 3,700 | 1,100 | 851 | 920 | 1,650 | | | 14.6 |
| 20 | 10,000 | 199 | 4,000 | 1,100 | 851 | 945 | 1,700 | | | 16.3 |
| 20 | 10,000 | 176 | 4,300 | 1,180 | 914 | 989 | 1,700 | | | 18.3 |

¹⁾ Smin and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube

L27/38

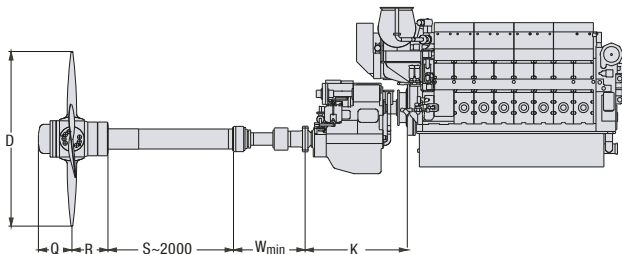
| | | | | | | | | | | |
|---|-------|-----|-------|-----|-----|-----|-------|--|--|------|
| 6 | 2,040 | 258 | 2,650 | 660 | 501 | 631 | 1,320 | | | 4.9 |
| 6 | 2,040 | 218 | 2,950 | 720 | 547 | 650 | 1,350 | | | 5.7 |
| 6 | 2,040 | 191 | 3,200 | 790 | 639 | 692 | 1,350 | | | 6.6 |
| 6 | 2,040 | 163 | 3,500 | 790 | 639 | 692 | 1,350 | | | 7.0 |
| 6 | 2,040 | 152 | 3,650 | 860 | 653 | 745 | 1,350 | | | 7.8 |
| 7 | 2,380 | 247 | 2,800 | 720 | 547 | 513 | 1,350 | | | 5.7 |
| 7 | 2,380 | 211 | 3,100 | 720 | 547 | 513 | 1,350 | | | 6.1 |
| 7 | 2,380 | 186 | 3,350 | 790 | 639 | 692 | 1,350 | | | 7.0 |
| 7 | 2,380 | 161 | 3,650 | 860 | 653 | 745 | 1,400 | | | 8.1 |
| 7 | 2,380 | 150 | 3,800 | 860 | 653 | 745 | 1,400 | | | 8.4 |
| 8 | 2,720 | 242 | 2,900 | 720 | 547 | 513 | 1,350 | | | 6.1 |
| 8 | 2,720 | 209 | 3,200 | 790 | 639 | 692 | 1,350 | | | 6.9 |
| 8 | 2,720 | 186 | 3,450 | 790 | 639 | 692 | 1,400 | | | 7.5 |
| 8 | 2,720 | 173 | 3,600 | 860 | 653 | 745 | 1,400 | | | 8.3 |
| 8 | 2,720 | 147 | 3,950 | 940 | 714 | 886 | 1,400 | | | 9.7 |
| 9 | 3,060 | 243 | 2,950 | 720 | 547 | 513 | 1,350 | | | 6.3 |
| 9 | 3,060 | 206 | 3,300 | 790 | 639 | 692 | 1,400 | | | 7.5 |
| 9 | 3,060 | 184 | 3,550 | 860 | 653 | 745 | 1,400 | | | 8.5 |
| 9 | 3,060 | 172 | 3,700 | 860 | 653 | 745 | 1,400 | | | 8.7 |
| 9 | 3,060 | 147 | 4,050 | 940 | 714 | 886 | 1,530 | | | 10.5 |

¹⁾ Smin and propeller mass are based on 4,000 mm propeller shaft and 2,000 mm stern tube for 21/31, 27/38 and 6,000 mm propeller shaft and 3,000 mm stem tube for the other types

MAN Standard Package Examples

| Cyl. | kW | Prop. speed r/min | D mm | Hub VBS mm | Q mm | R mm | Wmin mm | K mm | Gear mass t | Prop. mass t ¹⁾ |
|---------------|-------|-------------------------|---------|------------------|---------|---------|------------|---------|-------------------|----------------------------------|
| L21/31 | | | | | | | | | | |
| 6 | 1,290 | 274 | 2,350 | 600 | 456 | 566 | 1,320 | | | 3.8 |
| 6 | 1,290 | 232 | 2,600 | 600 | 456 | 566 | 1,320 | | | 4.1 |
| 6 | 1,290 | 205 | 2,800 | 660 | 501 | 631 | 1,320 | | | 4.4 |
| 6 | 1,290 | 181 | 3,000 | 660 | 501 | 631 | 1,320 | | | 4.7 |
| 7 | 1,505 | 260 | 2,500 | 600 | 456 | 566 | 1,320 | | | 4.1 |
| 7 | 1,505 | 223 | 2,750 | 660 | 501 | 631 | 1,320 | | | 4.6 |
| 7 | 1,505 | 198 | 2,950 | 660 | 501 | 631 | 1,320 | | | 4.8 |
| 7 | 1,505 | 176 | 3,150 | 720 | 547 | 650 | 1,320 | | | 5.4 |
| 8 | 1,720 | 261 | 2,550 | 600 | 456 | 581 | 1,320 | | | 4.4 |
| 8 | 1,720 | 219 | 2,850 | 660 | 501 | 631 | 1,320 | | | 4.8 |
| 8 | 1,720 | 196 | 3,050 | 720 | 547 | 650 | 1,320 | | | 5.1 |
| 8 | 1,720 | 176 | 3,250 | 720 | 547 | 650 | 1,350 | | | 5.6 |
| 9 | 1,935 | 262 | 2,600 | 660 | 501 | 631 | 1,320 | | | 4.7 |
| 9 | 1,935 | 221 | 2,900 | 720 | 547 | 650 | 1,320 | | | 5.4 |
| 9 | 1,935 | 199 | 3,100 | 720 | 547 | 650 | 1,350 | | | 5.9 |
| 9 | 1,935 | 188 | 3,200 | 720 | 547 | 650 | 1,350 | | | 6.0 |

¹⁾ Smin and propeller mass are based on 4,000 mm propeller shaft and 2,000 mm stern tube for 21/31, 27/38 and 6,000 mm propeller shaft and 3,000 mm stem tube for the other types

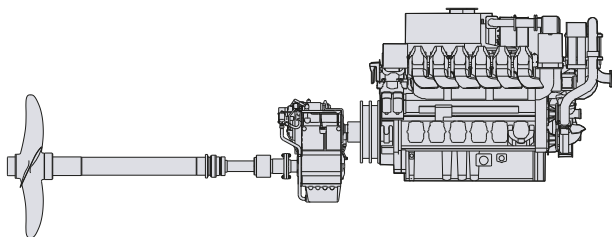


MAN Alpha FPP solutions for MAN 175D

| Engine rating ¹⁾ | Engine power | Engine speed | Propeller speed | Propeller diameter | Propeller 4-bladed | Shaft diameter | Design speed |
|-----------------------------|--------------|--------------|-----------------|--------------------|--------------------|----------------|--------------|
| 12V175D | kW | r/min | r/min | mm | type | mm | knots |
| MH | 1,740 | 1,800 | 884 | 1,300 | FPP | 175 | 25 |
| MH | 1,740 | 1,800 | 702 | 1,400 | FPP | 175 | 25 |
| MH | 1,740 | 1,800 | 620 | 1,450 | FPP | 175 | 25 |
| MH | 1,740 | 1,800 | 523 | 1,600 | FPP | 175 | 25 |
| MH | 1,740 | 1,800 | 450 | 1,750 | FPP | 175 | 20 |
| MH | 1,740 | 1,800 | 400 | 1,850 | FPP | 205 | 20 |
| MH | 1,740 | 1,800 | 360 | 2,000 | FPP | 205 | 20 |
| MH | 1,740 | 1,800 | 331 | 2,100 | FPP | 205 | 20 |
| MH | 1,740 | 1,800 | 302 | 2,250 | FPP | 205 | 15 |
| MH | 1,740 | 1,800 | 288 | 2,300 | FPP | 205 | 15 |
| MH | 1,740 | 1,800 | 261 | 2,450 | FPP | 225 | 15 |
| MH | 1,740 | 1,800 | 247 | 2,500 | FPP | 225 | 15 |
| | | | | | | | |
| MM | 2,220 | 1,900 | 741 | 1,300 | FPP | 175 | 25 |
| MM | 2,220 | 1,900 | 654 | 1,450 | FPP | 175 | 25 |
| MM | 2,220 | 1,900 | 552 | 1,550 | FPP | 205 | 25 |
| MM | 2,220 | 1,900 | 475 | 1,750 | FPP | 205 | 20 |
| MM | 2,220 | 1,900 | 422 | 1,850 | FPP | 205 | 20 |
| MM | 2,220 | 1,900 | 380 | 2,000 | FPP | 205 | 20 |
| MM | 2,220 | 1,900 | 350 | 2,100 | FPP | 205 | 20 |
| MM | 2,220 | 1,900 | 319 | 2,200 | FPP | 225 | 15 |
| MM | 2,220 | 1,900 | 304 | 2,250 | FPP | 225 | 15 |
| MM | 2,220 | 1,900 | 275 | 2,500 | FPP | 225 | 15 |

¹⁾ Engine rating designations: MH = Marine 'Heavy Duty' and MM = Marine 'Medium Duty'

Propellers for the MAN 12V175D engines are optimized for a diesel-mechanical twin screw vessel operating at 85% engine rating. The standard propeller programme is dimensioned according to Lloyd's Register No Ice.

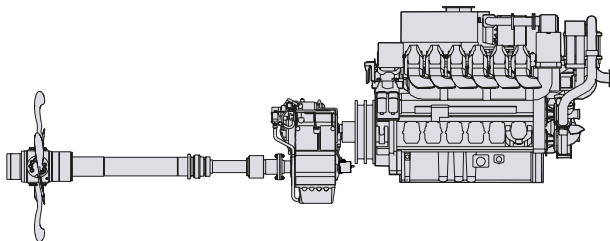


MAN Alpha CPP solutions for MAN 175D

| Engine rating ¹⁾ | Engine power | Engine speed | Propeller speed | Propeller diameter | Propeller hub diam. | Shaft diameter | Design speed |
|-----------------------------|--------------|--------------|-----------------|--------------------|---------------------|----------------|--------------|
| 12V175D | kW | r/min | r/min | mm | mm | mm | knots |
| MH | 1,740 | 1,800 | 884 | 1,250 | 440 | 175 | 25 |
| MH | 1,740 | 1,800 | 702 | 1,350 | 440 | 175 | 25 |
| MH | 1,740 | 1,800 | 620 | 1,450 | 440 | 175 | 25 |
| MH | 1,740 | 1,800 | 523 | 1,600 | 490 | 175 | 25 |
| MH | 1,740 | 1,800 | 450 | 1,750 | 490 | 175 | 20 |
| MH | 1,740 | 1,800 | 400 | 1,850 | 490 | 205 | 20 |
| MH | 1,740 | 1,800 | 360 | 2,000 | 540 | 205 | 20 |
| MH | 1,740 | 1,800 | 331 | 2,100 | 540 | 205 | 20 |
| MH | 1,740 | 1,800 | 302 | 2,200 | 540 | 205 | 15 |
| MH | 1,740 | 1,800 | 288 | 2,300 | 600 | 205 | 15 |
| MH | 1,740 | 1,800 | 261 | 2,450 | 600 | 225 | 15 |
| MH | 1,740 | 1,800 | 247 | 2,500 | 600 | 225 | 15 |
| | | | | | | | |
| MM | 2,220 | 1,900 | 741 | 1,350 | 440 | 175 | 25 |
| MM | 2,220 | 1,900 | 654 | 1,450 | 440 | 175 | 25 |
| MM | 2,220 | 1,900 | 552 | 1,550 | 490 | 205 | 25 |
| MM | 2,220 | 1,900 | 475 | 1,750 | 490 | 205 | 20 |
| MM | 2,220 | 1,900 | 422 | 1,850 | 540 | 205 | 20 |
| MM | 2,220 | 1,900 | 380 | 2,000 | 540 | 205 | 20 |
| MM | 2,220 | 1,900 | 350 | 2,100 | 600 | 205 | 20 |
| MM | 2,220 | 1,900 | 319 | 2,250 | 600 | 225 | 15 |
| MM | 2,220 | 1,900 | 304 | 2,300 | 600 | 225 | 15 |
| MM | 2,220 | 1,900 | 275 | 2,500 | 660 | 225 | 15 |

¹⁾ Engine rating designations: MH = Marine 'Heavy Duty' and MM = Marine 'Medium Duty'

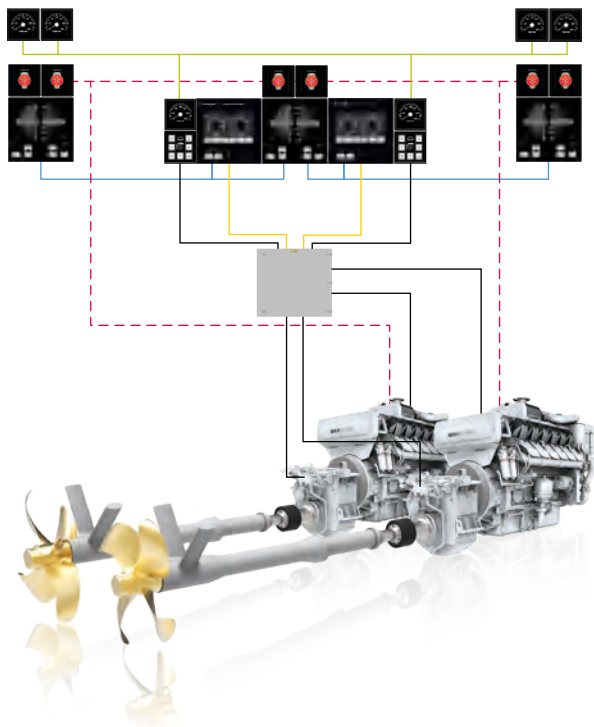
Propellers for the MAN 12V175D engines are optimized for a diesel-mechanical twin screw vessel operating at 85% engine rating. The standard propeller programme is dimensioned according to Lloyd's Register No Ice.



MAN Four-Stroke Propulsion Systems

Alphatronic 3000 Propulsion Control System

A high number of various FPP and CPP propulsion package applications are controlled by the Alphatronic 3000 system – customised for combinations of MAN medium and high speed engines in a wide range of diesel-mechanical, hybrid or diesel-electric propulsion setups.



Simple system architecture for a straightforward twin MAN 175D FPP plant.

Alphatronic 3000 at your finger tips: Safe and accurate propulsion control all the way – from the navigator's finger tips to the propeller tips. Any manoeuvring order given is translated into electrical speed setting-, pitch- or clutch signals, governing the hydraulic servo circuits of the gearbox and propeller system. Swift and reliable vessel manoeuvres are ensured due to quick and stable system response.





MAN Turbochargers and Exhaust Gas Systems



MAN Turbochargers and Exhaust Gas Systems

MAN Diesel & Turbo has a long and successful track record in the development of exhaust gas turbochargers for low, medium and high-speed diesel and gas engines. Drawing on its unrivalled expertise in the design and manufacture of this crucial engine component, MAN Diesel & Turbo can offer you world-leading technology that helps you maximise the efficiency of your operations.

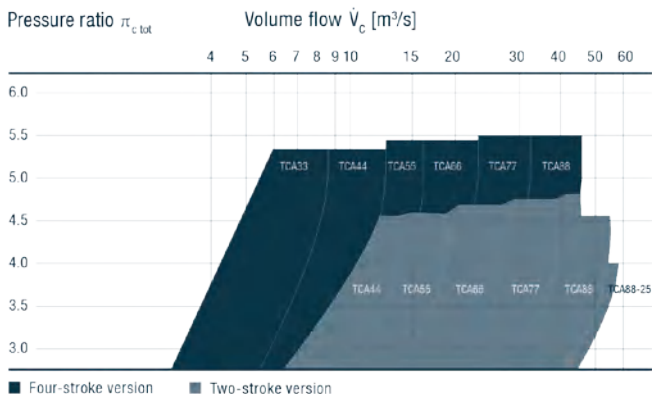
MAN turbochargers are designed to deliver peak performance throughout their working lives – in some of the harshest conditions encountered anywhere in the world. This is achieved by combining three elements: simplicity, flexibility and reliability. For example, we develop and build our turbochargers to make installation, operation, servicing and maintenance as easy and efficient as possible. This reduces your initial capital investment and results in lower lifecycle costs.

Applications

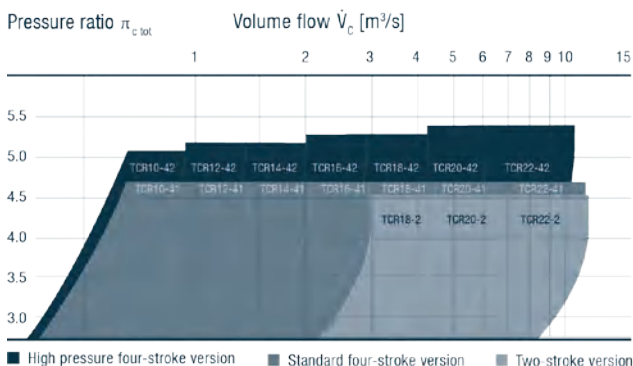
- Marine propulsion
- Marine gensets
- Power generation
- Excavators
- Mining
- Off-road vehicles
- Locomotives
- Industrial
- Offshore

MAN Turbochargers and Exhaust Gas Systems

TCA application range



TCR application range



MAN TCA Series

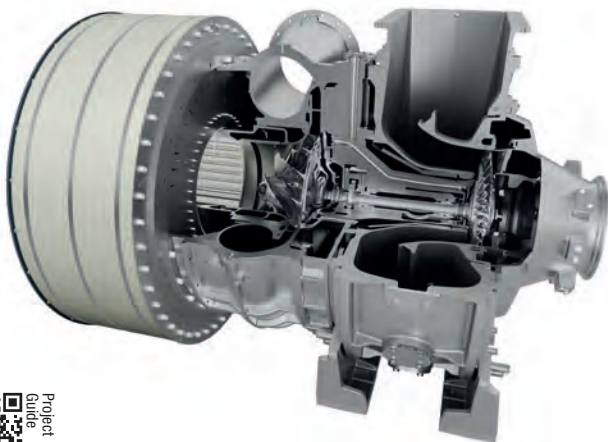
Technical data

| | |
|----------------------------|--|
| Turbine type | Axial flow turbine |
| Max. permissible temp. | 500 °C two-stroke / 650 °C four-stroke |
| Pressure ratio | up to 5.5 |
| Suitable for HFO, MDO, gas | |

Turbocharger programme

| Type | Max. supercharged engine output kW | | Max. permissible | Mass kg |
|-------|---------------------------------------|------------------|---------------------|------------|
| | Two-stroke | Four-stroke | Speed | |
| | le* = 8.0 kg/kWh | le* = 6.5 kg/kWh | rpm | |
| TCA33 | - | 5,400 | 27,800 | 1,370 |
| TCA44 | 7,000 | 7,900 | 22,500 | 1,950 |
| TCA55 | 9,600 | 10,400 | 20,000 | 3,200 |
| TCA66 | 13,700 | 14,800 | 16,900 | 5,300 |
| TCA77 | 19,400 | 21,000 | 14,200 | 8,330 |
| TCA88 | 30,000 | 30,000 | 12,000 | 14,000 |

* Specific air consumption



Project
Guide

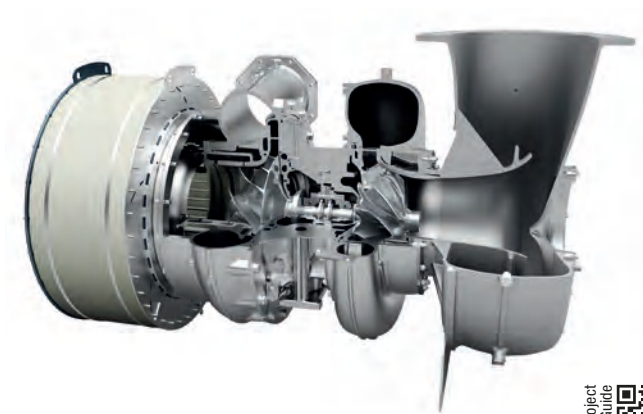
Technical data

| | |
|----------------------------|---------------------|
| Turbine type | Radial flow turbine |
| Max. permissible temp. | 650 °C |
| Pressure ratio | up to 5.4 |
| Suitable for HFO, MDO, gas | |

Turbocharger programme

| Type | Max. supercharged engine output kW | | Max. permissible | Mass kg |
|-------|------------------------------------|---------------------------------|------------------|------------|
| | Two-stroke le* = 7.0 kg/kWh | Four-stroke le* = 6.5 kg/kWh | Speed rpm | |
| TCR10 | - | 600 | 85,000 | 50 |
| TCR12 | - | 880 | 70,900 | 100 |
| TCR14 | - | 1,300 | 58,700 | 110 |
| TCR16 | - | 1,850 | 48,800 | 180 |
| TCR18 | 2,700 | 2,750 | 40,300 | 300 |
| TCR20 | 4,000 | 4,000 | 33,400 | 500 |
| TCR22 | 7,000 | 6,850 | 25,600 | 1,050 |

* Specific air consumption



Project
Guide





MAN turbocharger technology enables exceptional flexibility when striving to find the perfect blend of performance and energy efficiency.

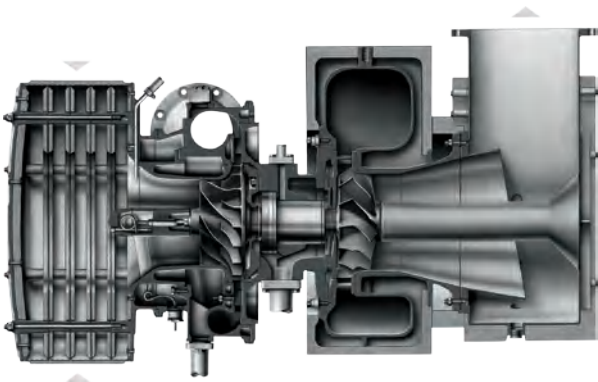
Technical data

| | |
|----------------------------|----------------------|
| Turbine type | Radial flow turbine |
| Max. permissible temp. | 650 °C (opt. 720 °C) |
| Pressure ratio | up to 4.5 |
| Suitable for HFO, MDO, gas | |

Turbocharger programme

| Type | Max. supercharged engine output kW | Max. permissible speed rpm | Mass kg |
|--------|------------------------------------|----------------------------|---------|
| NR12/S | 670 | 75,000 | 155 |
| NR14/S | 950 | 64,000 | 190 |
| NR17/S | 1,350 | 52,600 | 260 |
| NR20/S | 1,870 | 44,700 | 350 |
| NR24/S | 2,690 | 37,300 | 505 |
| NR29/S | 3,820 | 31,300 | 780 |
| NR34/S | 5,400 | 26,300 | 1,450 |

Specific air consumption $l_e = 7 \text{ kg/kWh}$



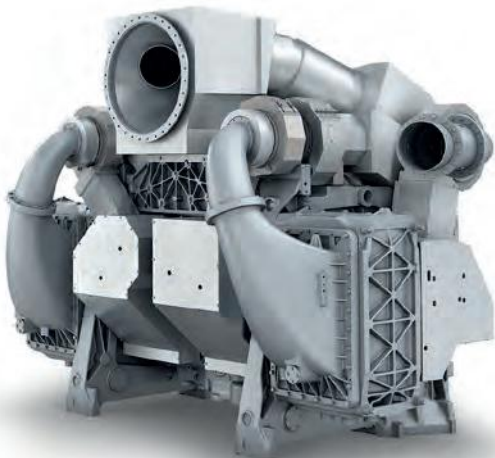
Project
Guide



MAN ECOCHARGE

MAN ECOCHARGE two-stage turbocharging is suitable for high and medium-speed engines of all fuel types and for application in all engine power ranges. Extremely high efficiencies and pressure ratios enable increased power density and improved key engine parameters. For example, it is possible to use a smaller engine for the same required power output or to achieve lower NO_x emissions and lower specific fuel oil consumptions (SFOC).

As a compact two-stage unit, the MAN ECOCHARGE delivers outstanding turbocharging efficiency. A variety of product types and sizes are available, ensuring the perfect turbocharger-to-engine-fit. MAN ECOCHARGE always consists of a clever combination of high and low-pressure turbochargers. While MAN TCX has been specifically designed for high-pressure applications, MAN TCA and MAN TCR round up the package as low-pressure turbochargers.



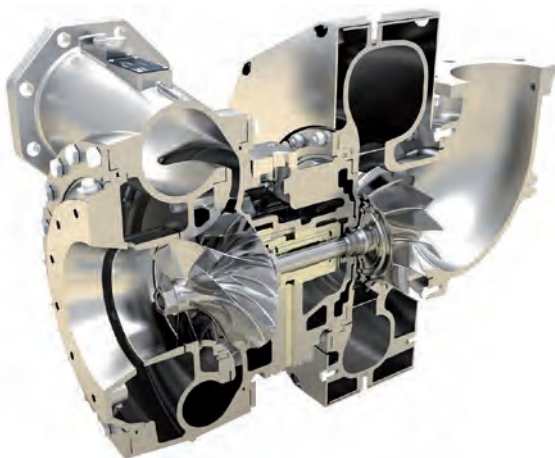
Technical data

| | |
|-----------------------------|--------------------|
| Turbine type | Mixed flow turbine |
| Max. permissible temp. | 650 °C |
| Pressure ratio (two stages) | up to 10.5 |
| Suitable for HFO, MDO, gas | |

TCX turbocharger programme

| Type | Max. engine output* | Max. permissible speed | Mass kg |
|-------|---------------------|------------------------|---------|
| | kW | rpm | |
| TCX17 | 8,500 | 40,980 | 470 |
| TCX19 | 11,900 | 34,550 | 785 |
| TCX21 | 16,900 | 29,000 | 1,325 |
| TCX23 | 23,900 | 24,390 | 2,230 |

* $l_e = 6 \text{ kg/kWh}$; $p_{HPCin} = 3 \text{ bar}$; $THPCin = 45 \text{ °C}$



Project
Guide



MAN ETB

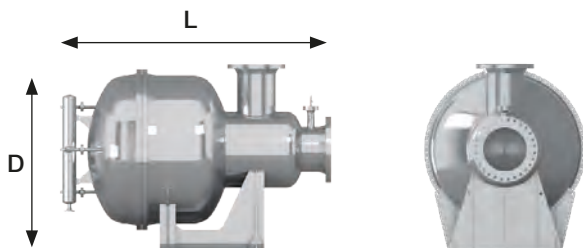
The EGR blower MAN ETB is suitable for exhaust gas recirculation (EGR) engines of all fuel types in all application ranges. Specifically designed for EGR systems, the MAN ETB's active control plays an important role in enabling these systems to reach IMO Tier III emission standards. The required EGR operating conditions are achieved by using a high-speed electric motor directly coupled to the compressor wheel and controlled by a frequency converter.

The MAN ETB features a highly efficient blower wheel, optimised for low-pressure ratios. The materials used are designed to withstand corrosive agents. High blower availability and variable speed operation ensure IMO Tier III compliance in emission controlled areas (ECAs).





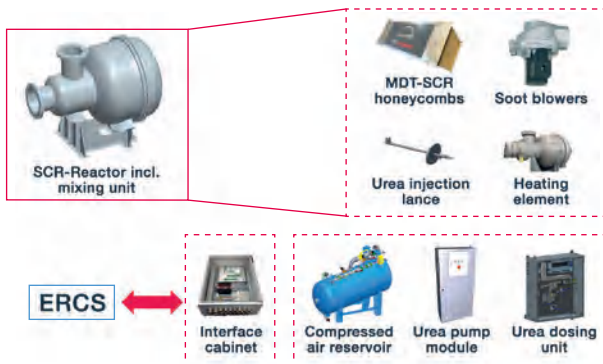
MAN SCR-HP



Product Range

| Cluster | Reactor Diameter (D) | < 0.1% Sulphur Reactor Length (L) | < 3.5% Sulphur Reactor Length (L) | Exhaust massflow |
|---------|----------------------|--------------------------------------|--------------------------------------|------------------|
| - | (mm) | (mm) | (mm) | (t/h) |
| 1 | 1,900 | 3,500 | 4,500 | 28 |
| 2 | 2,300 | 3,800 | 4,800 | 28 - 45 |
| 3 | 2,800 | 4,000 | 5,000 | 45 - 69 |
| 4 | 3,100 | 4,200 | 5,200 | 69 - 86 |
| 5 | 3,800 | 4,800 | 5,800 | 86 - 131 |
| 6 | 4,500 | 5,400 | 6,400 | 131 - 188 |

Preliminary clustering on exhaust mass flow basis. Final clustering depends on specific engine data, which must be confirmed by MAN Diesel & Turbo.



Scope of supply of MAN SCR-HP is illustrated. Piping and connection of SCR to the engine to be done by shipyard.

MAN SCR-HP

The MAN SCR-HP is a small and compact NO_x emission reduction system. The compact design allows for easy integration, and the few frame sizes will cover the entire two-stroke portfolio up to 25 MW per SCR reactor.

The integrated mixing unit reduces the overall length and volume. The specific honeycombs ensure a compact design.

The MAN SCR-HP can be mounted in all positions and is capable of running on all fuels.

Auxiliary components like the urea injection lance, urea dosing unit and urea pump module are from MAN's well-proven SCR-LP system.



SCR-HP system

Please note that MAN SCR-HP has passed the two-stroke provisional approval test on testbed and will after successful service test obtain full approval. Accordingly, MAN SCR-HP is ready for service test and appliance.



MAN PrimeServ



MAN | PrimeServ

Service with Passion

MAN Diesel & Turbo is offering a strong after sales service with a clear performance commitment, qualified and reliable experts and tailor-made solutions – all combined in our global service brand MAN PrimeServ.

Our approach is simple, yet effective: Premium service performed with passion meeting **every customer's needs**. We take the best people, qualify them professionally, listen to our customers, and provide optimum flexibility and reliability in the services we offer.

We provide our customers with outstanding services, we apply the three MAN PrimeServ key-concepts in everything we do: Customer Proximity, Solution Orientation and Technical Competence.

Customer Proximity

MAN PrimeServ provides excellent global support through a worldwide network of service facilities. Our local presence ensures the best possible customer proximity. Our aim is to consistently meet and exceed your expectations. Whenever you require spares, technical expertise or qualified repair assistance, feel free to contact your nearest MAN PrimeServ partner.

Solution Orientation

For more than one hundred years, MAN PrimeServ has been a reliable partner for service solutions. We offer tailor-made service and first class technical support for every customer – 365 days a year, 24 hours per day. Your requirements are the benchmark for our activities. Furthermore, we are committed to qualify our customers in the best way possible, so that the equipment and installations we supply can be operated and maintained in the most efficient and safest way.

Technical Competence

Our global network consists of highly-skilled experts using state-of-the-art technology. Performance according to the highest safety and quality standards has caused our technology-leadership as OEM.

Our unique efficiency in service and technical competence shows that we know how to keep our products reliable and productive.

Environment

Environmental protection plays a crucial role to us – as it does for our customers. Our engineers develop technologies to reduce emissions and are working on new ways to increase the efficiency of your installations. MAN PrimeServ provides integral solutions to encounter and embrace complex regulations. We sharply focus on fulfilling all emission standards. Integration comes into play when existing engines need to be retrofitted to modern and clean dual fuel engines.

MAN | PrimeServ

MAN Diesel & Turbo provides dual-fuel retrofit solutions based on the latest state-of-the-art technology.

Our Heritage Brands

MAN PrimeServ is our brand label for high quality after sales support for the complete product portfolio of MAN Diesel & Turbo. Through refinements to our products and repair techniques, we ensure and build on our technological leadership and technical expertise as an original equipment manufacturer (OEM) for the brands united under MAN Diesel & Turbo. Our aim is to consistently meet and exceed your expectations with innovative solutions tailored to your needs. We are the OEM for all MAN Diesel & Turbo brands and heritage brands such as:

- Burmeister & Wain (B&W)
- Mirrlees
- Paxman
- Ruston
- Pielstick
- Alpha Diesel
- Holeby GenSets

MAN | PrimeServ HOMEPAGE**MAN | PrimeServ LOCATION FINDER**



Contacts



Headquarters

Germany

*Four-stroke Propulsion Engines,
Propulsion Systems and Exhaust
Gas Turbochargers:*

MAN Diesel & Turbo SE

Stadtbackstrasse 1
D-86153 Augsburg
Tel.: +49 821 322 0
Fax: +49 821 322 3382
info-aug@mandieselturbo.com
www.dieselturbo.man.eu

Germany

*Turbomachine development, pro-
duction and maintenance*

MAN Diesel & Turbo SE

Steinbrinkstraße 1
D-46145 Oberhausen
Tel.: +49 208 692 1
turbomachinery@mandieselturbo.com

Denmark

*Two-stroke Engines and Marine
GenSets:*

MAN Diesel & Turbo

Teglholmegade 41
DK-2450 Copenhagen SV
Tel.: +45 3385 1100
Fax: +45 3385 1030
info-cph@mandieselturbo.com

*Propellers, Aft Ship and
Propulsion Control Systems:*

MAN Diesel & Turbo

Niels Juels Vej 15
DK-9900 Frederikshavn
Tel.: +45 9620 4100
Fax: +45 9620 4030
info-frh@mandieselturbo.com

Czech Republic

Exhaust Gas Turbochargers:

PBS Turbo s.r.o.

Velká Bíteš
Vlkovská 279
CZ-595 01 Velká Bíteš
Tel.: +420 566 822 201
Fax: +420 566 822 272
pbst_sales@pbsvb.cz

France

*Four-stroke Propulsion Engines,
Propulsion Systems and Marine
GenSets:*

MAN Diesel & Turbo France SAS

Avenue de Chatonay Porte n° 7
BP 427
F-44615 Saint-Nazaire
Tel.: +33 2 40 90 65 00
Fax: +33 2 40 90 65 89
info-fr@mandieselturbo.com

*Four-stroke Propulsion Engines,
Propulsion Systems and Marine
GenSets:*

MAN Diesel & Turbo France SAS

Bât Luminis
91 Rue Jean Jaurès
92800 Puteaux
Tel.: +33 1 48 17 63 00
Fax: +33 1 48 17 63 49
info-fr@mandieselturbo.com

United Kingdom

*Highspeed Engines (Original Brands of:
Mirrlees Blackstone; Ruston and Paxman):*

MAN Diesel & Turbo UK Ltd.

1 Mirrlees Drive,
Hazel Grove
UK-Stockport, SK7 5BP
Tel.: +44 161 419 3105
Fax: +44 161 426 4596
primeserv-uk@mandieselturbo.com

Switzerland

*Turbomachine development,
production and maintenance*

Diesel & Turbo Schweiz AG

Hardstraße 319

8005 Zürich

Tel. +41 44 278 20 71

Fax: +41 44 278 22 61

info-zur@mandieselturbo.com

Worldwide Offices

Argentina

MAN Diesel & Turbo Argentina S.A.

Mariano Moreno 4476
CP B1605BOH - Munro,
Prov. Buenos Aires,
Tel.: +54 11 5236 6006/07
Fax: +54 11 5353 0279
guillermo.lemo@ar.man.eu

Australia

MAN Diesel & Turbo Australia Pty., Ltd.

396, Lane Cove Road
North Ryde NSW 2113
Sydney
Tel.: +61 2 8874 0700
Fax: +61 2 9889 5337
jeffrey.moloney@au.man.eu

Bangladesh

MAN Diesel & Turbo Bangladesh Ltd.

Crystal Palace, 9th Floor
SE (D) 22, Road 140
Gulshan South Avenue, Gulshan-1
Dhaka-1212
Tel.: +880 96 12112211
atif.siddique@bd.man.eu

Belgium

MAN Diesel & Turbo Benelux N.V.

Noorderlaan 181
2030 Antwerpen
Tel.: +32 3 543 8500
Fax: +32 3 541 7508
dirk.willems@man.eu

Brazil

MAN Diesel & Turbo Brasil Ltda.

General José Cristino, 31
São Cristóvão
BR-20921-400 Rio de Janeiro, RJ
Tel.: +55 21 3506 2151
Fax: +55 21 3506 2150
gerson.sonego@br.man.eu

Bulgaria

MAN Diesel & Turbo Bulgaria EOOD

7 Al. Dyakovich, Floor 5, Office 1
9000 Varna
Tel.: +359 52 33 59 60
valentin.yankov@man.eu

Canada

MAN Diesel & Turbo Canada Ltd.

708-1111 West Hastings Street
Vancouver, British Columbia Y6E 3T5
Tel.: +1 905 842 2020
Fax: +1 604 684 1132
christian.h.mueller@ca.man.eu

Chile

MAN Diesel & Turbo Chile Ltda.

Parcela 291
- sector Placilla de Peñuelas
Ruta 68 - Km. 98
Valparaíso
Tel.: +56 32 235 1500
gabriel.guevera@cl.man.eu

China

MAN Diesel & Turbo Shanghai Logistics Co.; Ltd.

Zhangjiang Hi-Tech Park, East Area,
No 279 Ren Qing Road
Heqing - Pudong
201201 Shanghai
Tel.: +86 21 3891 9600
Fax: +86 21 5897 6552
jeffrey.ang@cn.man.eu

China

MAN Diesel & Turbo Shanghai Co. Ltd.

Branch Office Dalian
Rm1806
Pearl River International Building
No.99 Xinkai Rd
Dalian 116011
Tel.: +86 411 3967 6780
Fax: +86 411 3967 6700
yan.guiwang@cn.man.eu

Worldwide Offices

China**MAN Diesel & Turbo
Shanghai Co. Ltd.**

Branch Office Zhejiang
Liuhe Putuo, Zhoushan,
Zhejiang 316131

Tel: +86 0580 6189 520

Fax: +86 0580 6189 520

peter.zhang@cn.man.eu

China**MAN Diesel & Turbo
Shanghai Co. Ltd.**

Branch Office Guangzhou
No. 828 Mao Gang Road,
Huangpu District
Guangzhou 510700

Tel.: +86 20 3238 7997

Fax: +86 20 3238 7997

jane.tan@hk.man.eu

Colombia**MAN Diesel & Turbo
Colombia**

Branch Office of Chile
Av. Cra. 7 No. 127-48, Oficina 1009
Centro Empresarial 128
Bogotá D.C.

Tel.: +57 312 432 5521

gabriel.guevara@co.man.eu

Cyprus**MAN Diesel & Turbo
Cyprus**

Office 403, Taitou Court
2M Koutsofta Str.
3031 Limassol

Tel.: +357 25 342 379/746/082

Fax: +357 25 746 083

hans.odgaard@man.eu

Ecuador**MAN Diesel & Turbo
Ecuador**

Branch office of Chile
Edificio Ambar, Piso 10 Oficina 1002
Av. Portugal E10-77 y República del
Salvador

Quito

Tel.: +593 233 31344

carlos.solano@ec.man.eu

France**MAN Diesel & Turbo France SAS**

Luminis

91, rue Jean Jaurés

92800 Puteaux

olivier.condemine@man.eu

Germany**MAN Diesel & Turbo SE**

Representative Office

Roßweg 6

20457 Hamburg

Tel.: +49 40 7409 360

Fax: +49 40 7409 366

ruediger.schmidt@man.eu

Greece**MAN Diesel & Turbo
Hellas Ltd.**

Akti Miaouli 89

185 38 Piraeus

Tel.: +30 210 45 87 900

Fax: +30 210 45 87 928/29

dionissis.christodouloupoulos@man.eu

Guatemala**MAN Diesel & Turbo
Guatemala Ltda.**

6a. avenida 1-36 Zona 14

Edificio Plaza Los Arcos Of. 4B

Guatemala City, C.A.

Tel.: +502 2368 2744

Fax: +502 2366 2836

abner.aguilar@gt.man.eu

Worldwide Offices

Hong Kong

MAN Diesel & Turbo Hong Kong Ltd.

5/F, No. 1-7, Sai Tso Wan Road
Tsing Yi Island, N.T.
Hong Kong SAR
Tel.: +852 2527 1368
Fax: +852 2861 2594
jeffrey.ang@cn.man.eu

India

MAN Diesel & Turbo India Private Ltd.

402, 4th Floor, Building No. 2
Star Hub, Sahar Road
Andheri (E), Mumbai - 400159
Tel.: +91 265 3016 400
umesh.upadhye@in.man.eu

India

MAN Diesel & Turbo India Private Ltd.

Branch Office Aurangabad
E-73, MIDC Waluj 431 136
Aurangabad
Maharashtra
Tel.: +91 240 2566 700
Fax: +91 240 2554 621
umesh.upadhye@in.man.eu

India

MAN Diesel & Turbo India Private Ltd.

Branch Office New Delhi
407, DLF Tower-B
Jasola
New Delhi-110025
Tel.: +919 5604 32555
sandeep.chowdhury@in.man.eu

Italy

MAN Diesel & Turbo s.r.l.

Via dei Pescatori - Porto Antico
16129 Genova (GE)
Tel.: +39 010 209 1637
Fax: +39 010 251 6588
marco.colombo@man.eu

Japan

MAN Diesel & Turbo Japan Ltd.

PMO Nihonbashi-Odemmma Bldg. 5F
6-8 Nihonbashi-Odemmma-cho,
Chuo-ku
Tokyo 103-0011
Tel.: +81 3 6667 2461
kimihiko.sugiura@jp.man.eu

Malaysia

MAN Diesel & Turbo Malaysia Sdn Bhd

Branch office of Singapore
Suite 3.01, 3rd Floor Kenanga
International
Jalan Sultan Ismail
50250 Kuala Lumpur, Malaysia
Tel.: + 603 2162 0410
Fax: + 603 2162 0411
ernst.geyer@my.man.eu

Mexico

MAN Diesel & Turbo Mexico

Sierra Candela #111
Floor 4 int. 414-415
Col Lomas de Chapultepec
CP. 11000 Mexico, D.F.
Tel.: +52 1 55 1333 1906
jaime.zubillaga@mx.man.eu

Netherlands

MAN Diesel & Turbo Benelux B.V.

Schiekade 36
3125 KJ Schiedam (Port of Rotterdam)
Tel.: +31 10 272 4500
Fax: +31 10 437 6115
dirk.willems@man.eu

Worldwide Offices

New Zealand**MAN Diesel & Turbo
New Zealand Ltd.**

Naval Dockyard PO Box 32-061
Queens Parade, Devonport
Auckland 0744
Tel.: +61 2 8874 0701
Fax: +61 2 9889 5337
jeffrey.moloney@au.man.eu

Norway**MAN Diesel & Turbo
Norge A/S**

Haakon VII's gate 1
0161 Oslo
Tel.: +47 2201 7190
Fax: +47 2283 2416
mikaël.adler@man.eu

Pakistan**MAN Diesel & Turbo Operations
Pakistan,**

Private Limited
6-Km Raiwind Road
Lahore-55150
Tel.: +92 42 3533 0091 3
Fax: +92 42 3533 0094
imran.ghani@mandiesel.com.pk

Panama**MAN Diesel & Turbo
Panama Enterprises Inc**

Calle Arturo del Valle,
Final Local 0-02
Urb. La Loceria
Tel.: +507 236 1594
Fax: +507 236 8229
oscar.martinez@man.eu

Peru**MAN Diesel & Turbo
Peru S.A.C.**

Centro Empresarial Burgos
Av. Enrique Palacios 335, oficina 604
Miraflores, Lima 18
Tel.: +51 1 6284756
carlos.constante@pe.man.eu

Philippines**MAN Diesel & Turbo
Philippines Inc.**

Km. 17, West Service Road
Cervantes Compound Brgy.
Marcelo Green
South Superhighway
Paranaque City, 1700
Tel.: +63 2 776 3369/3347
Fax: +63 2 776 3384
sebastien.marchand@man.eu

Poland**MAN Diesel & Turbo
Poland Sp. z o.o.**

ul. Lubowidzka 43
80-174 Gdansk
Tel.: +48 58 325 33 90
Mob: +48 502 536 800
andrzej.krupa@man.eu

Portugal**MAN Diesel & Turbo
Portugal, Unipessoal, Lda.**

Avenida do Rio Tejo, lote 3
Parque Industrial Sapeç Bay
2910-440 Setúbal
Tel.: +351 265 799 500
Fax: +351 265 751 460
antonio.penaforte@man.eu

Qatar**MAN Diesel & Turbo
Qatar LLC**

P.O Box 153
23rd floor, Al Jazeera Tower, West Bay
State of Doha, Qatar
Tel.: +974 4015 9150
oleb.nielsen.a@man.eu

Worldwide Offices

Russia

MAN Diesel & Turbo Russia Ltd.

Preobrazhenskaya square 8,
block A, 13 floor
107061 Moscow
Tel.: +7 495 258 36 70
Fax: +7 495 258 36 71
goetz.kassing@man.eu

Russia

MAN Diesel & Turbo Russia Ltd.

Branch Office St. Petersburg
Vozdukhoplavatel'naya dom 19
196084 St. Petersburg
Tel.: +7 812 449 2655
Fax: +7 812 449 2645
alexander.danilenko@man.eu

Saudi Arabia

MAN Diesel & Turbo Saudi Arabia LLC

Madina Road,
Al Thinayyan Building
P.O.Box: 55990
Jeddah 21544
Tel.: +966 2 639 4346
Fax: +966 2 639 5482
abdullah.kuzkaya@man.eu

Senegal

MAN Diesel & Turbo Senegal SARL

Bd de la République, 2eme étage
Cabinet Génî & Kébé
Dakar-47
Tel.: +221 33 867 79 77
abdou.fofana@man.eu

Singapore

MAN Diesel & Turbo Singapore Pte. Ltd.

29 Tuas Avenue 2
Singapore 639460
Tel.: +65 6349 1600
Fax: +65 6862 1409
olaf.gunia@sg.man.eu

South Africa

MAN Diesel & Turbo South Africa (Pty) Ltd.

14 North Reef Road,
Elandsfontein, 1406
PostNet Suite 233, Private Bag X19
Gardenview, 2047
Tel.: +27 11 842 0700
Fax: +27 86 506 8878
robin.watson@za-man.co.za

South Africa

MAN Diesel & Turbo South Africa (Pty) Ltd.

Branch Office Durban
14 Hopson Avenue
Glenwood 3630
Durban
Tel.: +27 31 301 2999
Fax: +27 31 201 0854
derick.swanepoel@za.man.eu

South Africa

MAN Diesel & Turbo South Africa (Pty) Ltd.

Branch Office Cape Town
1 Table Bay Industrial Park, Milner St.
Paarden Eiland 7405
Cape Town
Tel.: +27 21 514 3360
Fax: +27 21 510 0174
norman.hall@za.man.eu

South Korea

MAN Diesel & Turbo Korea Ltd.

54, Noksansandan 261-ro 74beon-gil,
GangSeo-Gu,
Busan 46754
Tel.: +82 51 635 6644
Fax: +82 51 635 4004
tommyr.rasmussen@man.eu

Spain**MAN Diesel & Turbo
Espana, S.A.U.**

Calle Pedro Teixeira 8, 10th floor
28020 Madrid
Tel.: +34 91 411 1413
Fax: +34 91 411 7276
pablo.montes@man.eu

Spain**MAN Diesel & Turbo
Canarias, S.L.**

Branch Office Gran Canaria
Muelle Reina Sofia s/n
Puerto de Las Palmas
Las Palmas de Gran Canaria
35008
Tel.: +34928 935 959
Fax: +34928 494 199
pablo.montes@man.eu

Sri Lanka**MAN Diesel & Turbo
Lanka (Pvt) Ltd.**

No. 57/8, Sir Ernest De Silva Mawatha
Colombo 00700
Tel.: +94 11 2678930
Fax: +94 11 2678810
karthik.nithiyanandam@man.eu

Sweden**MAN Diesel & Turbo
Sverige AB**

Importgatan 15F
422 46 Hisings Backa
Tel.: +46 31 176 295
Fax: +46 31 131 564
mikael.adler@man.eu

Taiwan**MAN Diesel & Turbo
Singapore Pte. Ltd.**

Branch Office Taipei
8F-1, No. 15, Sec. 2, Tiding Blvd.
Nei-Hu District, Taipei 11493
Tel.: +886 2 8752 4043
Fax: +886 2 8752 4053
lance.phang@tw.man.eu

Turkey**MAN Diesel ve Turbo
Satis Servis Limited Sirketi**

(Hizmetleri Limited Sirketi)
Orhanli Deri Org. Yan San
Sitesi YB-25
34956 Tuzla – Istanbul
Tel.: +90 4444 5 626
Fax: +90 216 591 0854
timur.iyi@man.eu

Turkey**MAN Diesel ve Turbo
Satis Servis Limited Sirketi**

Akaretler Mahallesi,
Süleyman Seba Cd. No 48
BJK Plaza A-Blok D.38
34357 Besiktas - Istanbul
Tel.: +90 4444 5 626
Fax: +90 212 296 5506
timur.iyi@man.eu

United Arab Emirates**MAN Diesel & Turbo
Middle East LLC**

Jumeira Beach road
at Dry docks World Dubai
P.O. BOX 57091
Dubai, U.A.E
Tel.: +971 4 345 40 45
Fax: +971 4 345 40 48
patrice.mauger@ae.man.eu

United Kingdom**MAN Diesel & Turbo UK Ltd.**

Hythe Hill
Colchester
Essex, CO1 2HW
Tel.: +44 1206 795 151
Fax: +44 1206 794 325
adam.green@man.eu

Worldwide Offices

United Kingdom

MAN Diesel & Turbo UK Ltd.

Branch Office Redhill
Betchworth House
57-65 Station Road
Redhill
Surrey, RH 1 1 DL
Tel.: +44 1737 779 429
Fax: +44 1737 781 299
richard.guest@man.eu

USA

MAN Diesel & Turbo North America Inc.

Branch Office Ft. Lauderdale
551 S.W. 13th Terrace
Pompano Beach, FL 33069
Tel.: +1 954 960 6700
Fax: +1 954 782 5426
angel.colon-perez@us.man.eu

USA

MAN Diesel & Turbo North America Inc.

Branch Office Houston
1600A Brittmoore Road
Houston, TX 77043
Tel.: +1 832 209 3400
Fax: +1 713 939 0105
anthony.ruegger@us.man.eu

Vietnam

MAN Diesel & Turbo Singapore Pte. Ltd.

Branch Office Hanoi
Unit 9, Second Floor,
International Central
17 Ngo Quyen, Hoan Kiem
Hanoi
Tel.: +84 4 3936 9728
Fax: +84 4 3936 9727
hoanghai.tran@man.eu

Symbols used:

- T: MAN Diesel & Turbo Two-stroke licence
 F: MAN Diesel & Turbo Four-stroke licence
 FS: MAN Diesel & Turbo Four-stroke SEMT Pielstick licence
 TC: MAN Diesel & Turbo Turbocharger licence

China, The People's Republic of**CNPC Jichai Power Equipment Company (F)**

Tel.: +86 (531) 8742 2692
 Fax: +86 (531) 8742 3189
 xuchuanguo@cnpc.com.cn

CSSC Marine Power Co., Ltd. (T, F)

Tel.: +86 (511) 845 11 273
 Fax: +86 (511) 845 10 033
 cssc-cmp@cssc-cmp.cn

CSSC-MES Diesel Co., Ltd. (T)

Tel.: +86 (21) 6118 6666
 Fax: +86 (21) 6118 8088
 +86 (21) 6118 6655
 market@shcmd.com.cn

Dalian Marine Diesel Co. Ltd. (T)

Tel.: +86 (411) 8441 7273
 Fax: +86 (411) 8441 7499
 dmd@online.in.cn

FHI Fushun Zhongxing Heavy Industry Co., Ltd. (F)

Tel.: +86 (24) 576 42451
 Fax: +86 (24) 576 43930
 gzkang@hanmachine.com

Hefei Rong An Power Machinery Co., Ltd. (T, F)

Tel.: +86 (551) 87 88888-9977
 Fax: +86 (551) 87 88888-1001

Henan Diesel Engine Industry Co., Ltd. (F)

Tel.: +86 (379) 6407 6724
 Fax: +86 (379) 6422 5395
 cys@hnd.com.cn

Hudong Heavy Machinery Co., Ltd. (T, F, FS)

Tel.: +86 (21) 51 31 00 00
 +86 (21) 58 71 30 07
 Fax: +86 (21) 58 46 20 23
 hhm@hhm.com.cn

List of Licensees

China, The People's Republic of

Jing Jiang Dakai Heavy Machinery Co., Ltd. (T)

Tel : +86 (523) 8235 5998

Fax: +86 (523) 8235 5955

Qingdaohaixi Marine Diesel Co., Ltd. (T)

Tel.: +86 (532) 8670 8080

Fax: +86 (532) 8670 8080-788

sales@qmdltd.com.cn

Shaanxi Diesel Engine Heavy Industry Co., Ltd. (F, FS)

Tel.: +86 (29) 3831 3596

+86 (29) 3831 4380

Fax: +86 (29) 3831 4626

sxd408@sxdinfo.com.cn

Shanghai Qiyao Engine Co., Ltd. (SQE) (F, TC)

Tel.: +86 (21) 3131 0648

Fax: +86 (21) 3131 0150

sqe-tech@csic711.com

Weichai Heavy Machinery Co., Ltd. (F)

Tel.: +86 (536) 209 8105

Fax: +86 (536) 209 8138

julidj@weichai.com

Yichang Marine Diesel Engine Co., Ltd. (T)

Tel.: +86 (717) 646 86 89

Fax: +86 (717) 646 91 52

market@ymd.com.cn

Yuchai Marine Power Co. Ltd. (T)

Tel: + 86 756 5888600

Fax: + 86 756 5888985

sales@ycmp.com.cn

Croatia

Adriadiesel d. d. (F)

Tel.: +385 (47) 843 370

Fax: +385 (47) 434 380

adriadiesel@adriadiesel.hr

Brodosplit – Diesel Engine Factory d.o.o. (T, F)

Tel.: +385 (21) 382 863

Fax: +385 (21) 382 323

strobrod@brodost.tel.hr

Croatia**Uljanik Strojogradnja d.d. (T)**

Tel.: +385 (52) 373 309

Fax: +385 (52) 373 821

diesel@uljanik.hr

Czech Republic**PBS Turbo s.r.o. (TC)**

Tel.: +420 (566) 822 201

Fax: +420 (566) 822 272

India**MAN Diesel & Turbo India Ltd. (F)**

Tel.: +91 (240) 2566 700

Fax: +91 (240) 2554 621

Japan**Hitachi Zosen Corporation (T)**

Tel: +81 (3) 6404 0141

de-info@hitachizosen.co.jp

JFE Engineering Corporation (FS)

Tel: +81 (45) 505 7914

hoshino-minoru@jfe-eng.co.jp

Kawasaki Heavy Industries Ltd. (T, F, TC, FS)

Tel: +81 (3) 3435 2313

hashimoto_h@khi.co.jp / takano_hi@khi.co.jp

*Kawasaki Sub-licensee:***The Hanshin Diesel Works Ltd. (T)**

Tel: +81 (78) 332 2081

overseas-section@hanshin-dw.co.jp

Mitsubishi Heavy Industries, Ltd. (F)

Tel: +81 (42) 763 1594

gmmp383621b10g04@mhiet.mhi.co.jp

Mitsui Engineering & Shipbuilding Co., Ltd. (T, TC)

Tel: +81 (3) 3544 3475

meseba99@mu.mes.co.jp

List of Licensees

Japan

Mitsui Sub-Licensee:

Makita Corporation (T)

Tel: +81 (87) 821 5501

webmaster@makita-corp.com

Mitsui Sub-Licensee:

Diesel United, Ltd. (T)

Tel: +81 (3) 3257 8222

info@du.ih.co.jp / saburo_aiso@du.ih.co.jp

Niigata Power Systems Co., td. (FS)

Tel: +81 (3) 4366 1200 / +81 (3) 4366 1203

webmaster1@niigata-power.com / naofumi_murakami@niigata-power.com

Diesel United, Ltd. (FS)

Tel: +81(3)3257-8222

info@du.ih.co.jp / saburo_aiso@du.ih.co.jp

Poland

H. Cegielski - Poznan S.A. (T)

Tel.: +48 (61) 831 1958

Fax: +48 (61) 831 1391

H. Cegielski - Fabryka Silników (F)

Agregatowych i Trakcyjnych Sp z o.o.

Tel.: +48 (61) 831 1941

Fax: +48 (61) 831 1757

South Korea

Doosan Engine Co., Ltd. (T, F, FS)

Tel.: +82 (55) 260 6154

Fax: +82 (55) 260 6381

sangsoo1.lee@doosan.com

Hyundai Heavy Industries Co., Ltd. (T)

Engine & Machinery Division

Tel.: +82 (52) 202 7281

Fax: +82 (52) 202 7300

enginesales@hhi.co.kr

STX Engine Co., Ltd. (F, T)

Tel.: +82 (55) 280 0568

Fax: +82 (55) 280 0539

sowy@onestx.com

List of Licensees**South Korea****STX Heavy Industries Co., Ltd. (T)**

Tel.: +82 (55) 280 0609

Fax: +82 (55) 278 9500

sangeui.kim@onestx.com

STX Heavy Industries Co., Ltd. (TC)

Tel.: +82 (55) 280 0715

Fax: +82 (55) 282 1938

hsk@onestx.com

Spain**Navantia S.A. (F)**

Fábrica De Motores Cartagena

Tel.: +34 (968) 128 200

Fax: +34 (968) 500 902

navantia@navantia.es

USA**Fairbanks Morse Engine (F, FS)**

Tel.: +1 (608) 364 8119

Fax: +1 (608) 364 8444

patrick.bussie@fairbanksmorse.com

Notes

[illegible]

[illegible]

[illegible]

Copyright 2017 © MAN Diesel & Turbo, branch of MAN Diesel & Turbo SE, Germany, registered with the Danish Commerce and Companies Agency under CVR Nr.: 31611792, (herein referred to as "MAN Diesel & Turbo").

This document is the product and property of MAN Diesel & Turbo and is protected by applicable copyright laws.
Subject to modification in the interest of technical progress.
Reproduction permitted provided source is given.
4510-0016-01web Oct 2017