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.
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We offer a range of technologies and services designed to enhance the sustainability of your ships. Our portfolio of especially developed solutions helps you lower emissions, increase efficiency and make operation more flexible and reliable.

www.man-es.com
For more information please consult our website.
MAN B&W two-stroke propulsion engines
MAN Energy Solutions 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 also includes these concepts as described below (full designation, see page 19):

5G70ME-C10.5-GI-GBP

- Tier III technology (EGRBP, EGRTC, HPSCR, LPSCR, W)
  No designation = Tier II
- Fuel injection concept (GI, GA, GiE, LGI, LGIM)
  No designation = MDO/HFO

Tier III technologies and fuel injection concepts are explained in detail on page 12 (ME-GI, ME-LGI and ME-GA dual fuel engines) and page 14 (Tier III technologies).

ME-C engines

The electronic control of the ME-C engines includes flexible control of the cylinder processes, i.e. fuel injection timing and actuation of exhaust valves, starting valves, and cylinder lubrication.
ME-B engines
ME-B engines use electronically controlled pressure boosters for the fuel injection whereas actuation of the exhaust valves is camshaft operated, but with electronically controlled variable closing timing.

CEAS and turbocharger selection (TCS)
CEAS (computerized engine application system) and TCS applications cover all engine variants including available dual fuel and Tier III technology options. These applications provide basic and essential data for the design and dimensioning of a ship’s engine room (CEAS) and for the applicable turbochargers (TCS).


Latest update engine programme: → marine-engine-programme
CEAS and TCS: → ceas-engine-calculations/turbocharger-selection

In CEAS and TCS, all engines in this programme 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 it is 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
**G45ME-C9.7 available with increased speed**

The G45ME-C9.7 is specified with the L₁ speed and power indicated below:

<table>
<thead>
<tr>
<th>Engine</th>
<th>L₁ speed [rpm]</th>
<th>L₁ power/cyl. [kW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>G45ME-C9.7</td>
<td>111</td>
<td>1,390</td>
</tr>
<tr>
<td>G45ME-C9.7 with increased speed*</td>
<td>120</td>
<td>1,505</td>
</tr>
</tbody>
</table>

* Variant with increased speed and unchanged L₁ MEP (21 bar) available on request for 5- and 6-cylinder.

**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 NOₓ 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

**Tolerances**

The energy efficiency design index (EEDI) has led to increased focus on part-load SFOC. Therefore, MAN Energy Solutions offers the option to select 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.
When choosing an SFOC guarantee at or below 100%, the tolerances, adjustment and calibration at 100% will affect an engine running at the lower SFOC guarantee load point. This includes tolerances on measuring 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 14.

**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.

There are exceptions to this rule, S40ME-C9.5 and S35ME-C9.7 are now standard high-efficiency applications offering all Tier II standard tunings and all Tier III options requiring a high-efficiency turbocharger.

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

**Fuel consumption and optimisation possibilities for Tier II engines**

Various optimisation possibilities for improved part-load and low-load SFOC are available for 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 or the HPT (high-pressure tuning) method available for ME-C engines.
EPT (engine process tuning) is available for G95ME-C10.5, G80ME-C10.5 and G60ME-C10.5. EPT uses engine control process parameters to improve part- or low-load SFOC.

This engine programme introduces the G95ME-C10.6 with SEQ (sequential tuning) method. This includes sequential fuel injection and turbocharging application similar to the EGRTC Tier III technology. This will be available in the low-load version.

The tuning methods mentioned are available for all SMCR points, but cannot be combined.

In cases where part-load or low-load EGB tuning is applied, and a higher steam production is needed, the EEC (economiser energy control) solution offers additional automatic control of the EGB.

Forcing an EGB open at loads where the EGB is normally closed results in a higher exhaust gas temperature, but with an SFOC penalty. However, the total fuel consumption (engine and oil-fired boiler) will be improved.

Higher steam production can also be obtained for EPT tuned engines by adding an EGB. The EGB must be closed above 90% engine load, but can be opened below 90% to obtain higher exhaust temperature resulting in increased steam production.

Calculations with EEC are made on request.

**ME-GI, ME-LGI and ME-GA dual fuel engines**

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

**ME-GA**

The ME-GA engine is the latest addition to our dual fuel portfolio. Methane is admitted during the compression stroke in the Otto cycle process, which allows for a lower supply pressure compared to ME-GI engines. This is especially interesting for vessels with large amounts of boil-off gas and can reduce the investment costs for fuel compressors substantially.

The ME-GA engine is Tier III compliant in dual fuel mode and EGR ensures that it is also Tier III compliant in fuel oil mode.
The first engines introduced are G60 and G70ME-C10.5-GA-EGRBP. Figures for these engines are included in this engine programme (see pages 92-113).

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Fuel designation</th>
<th>LCV [kJ/kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane</td>
<td>GI / GA</td>
<td>50,000</td>
</tr>
<tr>
<td>Ethane</td>
<td>GIE</td>
<td>47,500</td>
</tr>
<tr>
<td>Methanol</td>
<td>LGIM</td>
<td>19,900</td>
</tr>
<tr>
<td>LPG*</td>
<td>LGIP</td>
<td>46,000</td>
</tr>
</tbody>
</table>

*LPG is a mixture of liquid propane and butane.

In this engine programme, GI figures are included for engines where GI is applicable. Examples of figures for GIE, LGIP and LGIM are included for a selection of engines (see page 92).

**Pilot oil energy fraction**

In dual fuel mode, the pilot oil energy fraction amounts to 1.5% for GI (0.5% for G70ME-C10/9.5-GI and 5.0% for S35ME-C9.7-GI), 3.0% for GIE and LGIP, and 5% for LGIM in L₁ rating. For actual pilot oil energy fractions, refer to individual engine pages and CEAS.

<table>
<thead>
<tr>
<th>Fuel designation</th>
<th>Available pilot oil fraction in %</th>
<th>Compatible pilot fuel oil types</th>
</tr>
</thead>
<tbody>
<tr>
<td>GI</td>
<td>0.50 1.50 5.00</td>
<td>MDO &amp; HFO (&lt;0.5% S)</td>
</tr>
<tr>
<td>GIE</td>
<td>3.00</td>
<td>MDO &amp; HFO (&lt;0.5% S)</td>
</tr>
<tr>
<td>LGIP</td>
<td>3.00</td>
<td>MDO &amp; HFO (&lt;0.5% S)</td>
</tr>
<tr>
<td>LGIM</td>
<td>5.00</td>
<td>MDO &amp; HFO (&lt;0.5% S)</td>
</tr>
<tr>
<td>GA</td>
<td>0.45 0.50</td>
<td>MDO &amp; HFO (&lt;0.5% S)</td>
</tr>
</tbody>
</table>

G95/90/80/70ME-C10.5-GI have a gas tuning, called “dual fuel gas optimised”, with improved gas consumption in dual fuel mode. All other ME-GI engines have a “dual fuel standard” gas tuning. Both gas tunings apply to both Tier II and all Tier III technologies.

The following fuel consumption figures are shown in the tables for dual fuel engines:
- dual fuel mode with distribution of specific gas consumption (SGC) and specific pilot oil consumption (SPOC)
- fuel oil mode
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, see page 10.

Heat rate is defined as follows (example for methane as dual fuel): Heat rate (kJ/kWh) = SGC (g/kWh) × 50 kJ/g + SPOC (g/kWh) × 42.7 kJ/g.

The CEAS report will specify the distribution between SGC and SPOC as well as the heat rate over the load range.

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

**Greenhouse gas emissions**

IMO has developed the EEDI (energy efficiency design index) with CO₂ as the only greenhouse gas (GHG) emission accounted for. However, IMO is preparing regulation on other GHGs than CO₂. Especially methane is in focus, as it is a very strong GHG and, accordingly, IMO is preparing to introduce legislation on methane slip with short notice as a first measure. In its effort to facilitate decarbonisation in the shipping industry, MAN Energy Solutions will, for the complete two-stroke engine programme, be able to guarantee a methane slip of 0.2 g/kWh with a tolerance of +/-0.1 g/kWh for ME-GI engines.

Additionally, MAN Energy Solutions provides methane slip figures for part-load engine operation, please refer to CEAS.

**Tier III technologies**

To ensure compliance with IMO Tier III regulations, a Tier III NOₓ reduction technology must be selected. The preferred technology depends on market demands, engine size, other requirements, and operational pattern.

The Emission Project Guide provides more detailed descriptions of these technologies at:
www.man-es.com → marine → products → planning-tools-and-downloads → project-guides → two-stroke
All Tier III engines have at least two operating modes:
- Tier III mode fulfilling the IMO Tier III regulations
- Tier II mode fulfilling the IMO Tier II regulations

Tier III technologies are designed for either low-sulphur fuels (<0.1%) or high-sulphur fuels (>0.5% and <3.5%) in Tier III operation. In Tier II operation, the engine is in all cases capable of using fuels with a high sulphur content. The fuel sulphur content must be selected when the engine is ordered, as it impacts the engine design. Fuel consumption guarantees can be given for engines for both Tier II and Tier III modes.

**EGR**
Two EGR-matching concepts are available depending on engine bore:
- **EGRTC:** T/C cut-out matching for ME-C engines with bores ≥ 80 cm and more than one turbocharger applied
- **EGRBP:** Bypass matching for ME-C engines with bores ≤ 70 cm and one high efficiency turbocharger applied.

EGR operation is also possible for dual fuel engines, except GIE.

**EcoEGR**
EcoEGR is an SFOC-optimised version of the EGRBP system available on all ME-C engines with high-efficiency turbochargers. Compared to the standard EGRBP system, the EcoEGR engines operate with 10–15% recirculation in Tier II mode and with slightly increased recirculation in Tier III mode. For EcoEGR engines running on low-sulphur fuels (<0.5 %S), considerable overall savings are obtained. For high-sulphur fuels, the overall benefits must be calculated on a case-to-case basis.

EcoEGR operation is also possible for dual fuel engines, except GIE and engines with gas-optimised tuning.

**SCR**
Two SCR concepts are available:
- **HPSCR:** High-pressure SCR with reactor installed upstream the turbocharger(s)
- **LPSCR:** Low-pressure SCR with reactor installed downstream the turbocharger(s)

SCR operation applies to ME-C and ME-B engines, including dual fuel engine types. For some large-bore engines (bore ≥ 90 cm) with a high cylinder number, HPSCR is only available on special request. The SCR system must be supplied by an approved supplier.
**W (water in methanol)**

The 2020 engine programme introduced a new Tier III technology where a considerable amount of water is added to the methanol before injection on the ME-LGI engine with methanol (LGIM). This addition of water makes the engine Tier III compliant. As an example, figures are included for the G50ME-C9.6-LGIM-W engine (see page 110). Project data can be provided on request.

**ME-GA**

As mentioned on page 12, the ME-GA engine is Tier III compliant in dual fuel mode, and equipped with EGR, it is also Tier III compliant in fuel oil mode. Project data can be provided on request.

**Application of high-sulphur fuels and SO\(_x\) scrubbers**

All two-stroke engines in the MAN Energy Solutions marine engine programme are compatible with SO\(_x\) scrubbers.

A SO\(_x\) scrubber installation will increase the backpressure, thereby affecting engine performance. Accordingly, it is required that a SO\(_x\) scrubber installation does not increase the backpressure by more than 30 mbar at SMCR.

**Fuels**

From 1 January 2020, the global sulphur content for marine fuels must not exceed 0.5%. To ensure compliant operation, one of the following methods must be selected:

- Use a compliant fuel:
  - Global: max. 0.5% sulphur
  - ECA: max. 0.1% sulphur
- Use methane, ethane, methanol or LPG together with a compliant pilot fuel.
- Use a high-sulphur fuel in combination with a SO\(_x\) scrubber to obtain an exhaust gas SO\(_x\) level equivalent to operation on a compliant fuel.

The fuel specification must be selected at engine order as it impacts the engine design.

Fuels with a viscosity below 700 cSt at 50°C can be used.
Waste heat recovery systems

Waste heat recovery systems (WHRS) are available on request for both Tier II and Tier III engines with high-efficiency turbochargers. Contact MAN Energy Solutions for further information.

Power take off systems

Power take off (PTO) systems are available on request for both Tier II and Tier III engines with high-efficiency turbochargers. PTO systems operate in the margin between the light propeller curve and the load limits of the engine. The magnitude of PTO power permitted is as such influenced by the propeller light running margin applied for the specific project. The specific load of the engine permitted for design, including power for propulsion and PTO power, as a function of speed, is governed by the PTO layout limit.

For further information on the PTO layout limit as well as the availability and integration of PTOs, please contact MAN Energy Solutions. For RENK PTO solutions, see page 20.

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 lubricating mode for MAN B&W two-stroke engines that involves lube dosing proportional to the engine load and to the sulphur content in the fuel being burned.

Our general strategy is:
- Use low-BN oil for low-sulphur fuels
- Use high-BN oil for high-sulphur fuels

Dosage:
- Low-sulphur fuels: min. 0.6 g/kWh
- High-sulphur fuels: typically 0.3 g/kWh × %S for a 100 BN oil

**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 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 Energy Solutions’ recommended basic and optional executions are specified.

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

**Engine dimensions**

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

$L_{\text{min}}$  Minimum length of engine  
A  Cylinder distance  
B  Bedplate width  
B1  Bedplate width at foot flange  
B2  Bedplate width at top flange  
C  Crankshaft to underside of foot flange
H1  Normal height lifting procedure
H2  Reduced height lifting procedure
H3  Reduced height lifting procedure with MAN B&W double-jib crane
H4  Normal height lifting procedure with MAN B&W double-jib crane

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

5G70ME-C10.5-GI-EGRBP

- **Tier III technology**
  - (blank)  Tier II only
  - EGRBP  EGR with bypass matching
  - EGRTC  EGR with TC cut-out matching
  - HPSCR  High-pressure SCR
  - LPSCR  Low-pressure SCR
  - W  Water in methanol

- **Fuel injection concept**
  - (blank)  Fuel oil only
  - GI/GA  Gas injection/gas admission methane
  - GIE  Gas injection ethane
  - LGIM  Liquid gas injection methanol
  - LGIP  Liquid gas injection LPG

- **Dot (.) number**
- **Mark number**

- **Engine concept**
  - ME-C  Electronically controlled
  - ME-B  Exhaust valve controlled by camshaft

- **Diameter of cylinder bore in cm**
- **Stroke/bore ratio**
  - G  ‘Green’ ultra long stroke
  - S  Super long stroke
- **Number of cylinders**
**RENK power take-off systems**

RENK power take-off (PTO) systems are scalable solutions that can be used with two-stroke engines. They enable fuel savings and CO₂ emission reductions and improve the EEDI index.

The systems can either be operated in parallel, with one or more gensets for peak loads, or as individual sources of power. Furthermore, the maintenance costs of auxiliary generators are reduced thanks to fewer operating hours.

**Integrated front-end power system**

The integrated front-end power system (IFPS) consists of a front-end mounted PTO system on a two-stroke engine. It features a single-stage gearbox, one or multiple generators with associated frequency converters, and the transformers for the connection to the ship’s grid. The gearbox design is flat and the generator length is short, i.e. <1,600 mm, which typically equals two frames on a ship. The system can deliver from 500 to 2,000 kW power.

For a specific ship project, the decision on whether or not an IFPS PTO solution is suitable must be made on the basis of an analysis of the torsional vibrations and the selected propeller, shafting system, and main engine.
MARHY® system
The Maritime Hybrid Drive (MARHY) is a stand-alone PTO/PTI/PTH-system with a power range of 500 to 10,000 kW. It is a hybrid system consisting of well-proven standard components such as a tunnel gear unit, a propeller shaft clutch, and standard electronics components. The MARHY system provides redundancy for single-screw vessels with the power take-home (PTH) solution, ensuring the vessel manoeuvrability if the main engine malfunctions, or can be used for boosting of the engine power utilising the power take-in (PTI) solution. MARHY is a modularised system and it is also available without a propeller shaft clutch.
MAN B&W G95ME-C10.6

**Cyl.** | **L₁ kW** | **Stroke:** 3,460 mm/L₁ MEP: 21.0 bar
---|---|---
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**

**MAN B&W G95ME-C10.6**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low-load SEQ</strong></td>
<td>50%</td>
<td>151.5</td>
<td>155.5</td>
</tr>
</tbody>
</table>

**MAN B&W G95ME-C10.6-EGRTC**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Tier II mode</strong></th>
<th><strong>Tier III mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opt. load range</strong></td>
<td>50%</td>
<td>151.5</td>
</tr>
<tr>
<td><strong>Low-load SEQ</strong></td>
<td>75%</td>
<td>155.5</td>
</tr>
<tr>
<td><strong>100%</strong></td>
<td>164.5</td>
<td>162.0</td>
</tr>
</tbody>
</table>

**MAN B&W G95ME-C10.6-HPSCR**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Tier II mode</strong></th>
<th><strong>Tier III mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opt. load range</strong></td>
<td>50%</td>
<td>151.5</td>
</tr>
<tr>
<td><strong>Low-load SEQ</strong></td>
<td>75%</td>
<td>155.5</td>
</tr>
<tr>
<td><strong>100%</strong></td>
<td>164.5</td>
<td>161.0</td>
</tr>
</tbody>
</table>

**MAN B&W G95ME-C10.6-LPSCR**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Tier II mode</strong></th>
<th><strong>Tier III mode</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Opt. load range</strong></td>
<td>50%</td>
<td>151.5</td>
</tr>
<tr>
<td><strong>Low-load SEQ</strong></td>
<td>75%</td>
<td>155.5</td>
</tr>
<tr>
<td><strong>100%</strong></td>
<td>164.5</td>
<td>162.0</td>
</tr>
</tbody>
</table>

* Available on request for HPSCR.

Note: Dual fuel figures similar to G95ME-C10.5
### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,574</td>
<td>5,380</td>
<td>2,060</td>
<td>16,100</td>
</tr>
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</table>

#### Cyl. distance:

<table>
<thead>
<tr>
<th></th>
<th>5-9 cyl.</th>
<th>10 cyl.</th>
<th>11 cyl.</th>
<th>12 cyl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,574</td>
<td>1-6: 1,574</td>
<td>1-6: 1,574</td>
<td>1-6: 1,574</td>
</tr>
<tr>
<td>mm</td>
<td>7-10: 1,670</td>
<td>7-11: 1,670</td>
<td>7-12: 1,670</td>
<td></td>
</tr>
</tbody>
</table>

#### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lmin</td>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11,468</td>
<td>13,042</td>
<td>14,616</td>
<td>16,190</td>
<td>17,804</td>
<td>19,779</td>
<td>21,489</td>
</tr>
</tbody>
</table>

#### Dry mass

| Tier II | t   | 1,005 | 1,206 | 1,407 | 1,608 | 1,760 | 1,912 | 2,180 | 2,378 |

#### Tier III (added)

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>29</td>
<td>29</td>
<td>31</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>HPSCR</td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPSCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MAN B&W G95ME-C10.5

**Cyl.** | **L₁ kW** | **Stroke:** 3,460 mm/L₁, **MEP:** 21.0 bar
---|---|---
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**

**MAN B&W G95ME-C10.5**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>158.5</td>
<td>157.5</td>
<td>162.0</td>
</tr>
<tr>
<td>Part-load EPT</td>
<td>156.5</td>
<td>156.0</td>
<td>164.5</td>
</tr>
<tr>
<td>Low-load EPT</td>
<td>154.5</td>
<td>157.0</td>
<td>164.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

**MAN B&W G95ME-C10.5-GI (gas optimised)**

**L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]**

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>126.9+3.9/157.5</td>
<td>126.9+2.9/160.5</td>
<td>133.7+2.4/165.0</td>
</tr>
<tr>
<td>Gas optimised</td>
<td>126.9+3.9/157.5</td>
<td>126.9+2.9/160.5</td>
<td>133.7+2.4/165.0</td>
</tr>
</tbody>
</table>
### Tier III

**MAN B&W G95ME-C10.5**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>34,350</td>
</tr>
<tr>
<td>6</td>
<td>41,220</td>
</tr>
<tr>
<td>7</td>
<td>48,090</td>
</tr>
<tr>
<td>8</td>
<td>54,960</td>
</tr>
<tr>
<td>9*</td>
<td>61,830</td>
</tr>
<tr>
<td>10*</td>
<td>68,700</td>
</tr>
<tr>
<td>11*</td>
<td>75,570</td>
</tr>
<tr>
<td>12*</td>
<td>82,440</td>
</tr>
</tbody>
</table>

*Available on request for HPSCR.*

**Fuel oil**

**MAN B&W G95ME-C10.5-EGRTC**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>154.5</td>
<td>157.0</td>
<td>164.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>160.6</td>
<td>161.5</td>
<td>166.0</td>
</tr>
</tbody>
</table>

**MAN B&W G95ME-C10.5-HPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>154.5</td>
<td>157.0</td>
<td>164.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>156.0</td>
<td>158.0</td>
<td>165.0</td>
</tr>
</tbody>
</table>

**MAN B&W G95ME-C10.5-LPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>154.5</td>
<td>157.0</td>
<td>164.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>156.5</td>
<td>158.0</td>
<td>165.5</td>
</tr>
</tbody>
</table>

*Available on request for HPSCR.*
## MAN B&W G95ME-C10.5

**Stroke:** 3,460 mm/L, **MEP:** 21.0 bar

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 3,460 mm/L, MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>34,350</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>41,220</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>48,090</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>54,960</td>
<td></td>
</tr>
<tr>
<td>9*</td>
<td>61,830</td>
<td></td>
</tr>
<tr>
<td>10*</td>
<td>68,700</td>
<td></td>
</tr>
<tr>
<td>11*</td>
<td>75,570</td>
<td></td>
</tr>
<tr>
<td>12*</td>
<td>82,440</td>
<td></td>
</tr>
</tbody>
</table>

**GI (Methane)**

### MAN B&W G95ME-C10.5-GI-EGRTC (gas optimised)

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>125.2+3.9/157.5</td>
<td>126.9+2.9/160.5</td>
<td>133.7+2.4/165.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>131.2+3.9/158.5</td>
<td>132.0+2.9/158.5</td>
<td>135.4+2.4/162.0</td>
</tr>
</tbody>
</table>

### MAN B&W G95ME-C10.5-GI-HPSCR (gas optimised)

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>126.9+3.9/157.5</td>
<td>126.9+2.9/160.5</td>
<td>134.6+2.4/166.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>128.6+3.9/155.5</td>
<td>130.3+2.9/156.5</td>
<td>134.6+2.4/161.0</td>
</tr>
</tbody>
</table>

### MAN B&W G95ME-C10.5-GI-LPSCR (gas optimised)

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>126.9+3.9/157.5</td>
<td>126.9+2.9/160.5</td>
<td>134.6+2.4/166.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>128.6+3.9/155.5</td>
<td>132.0+2.9/158.5</td>
<td>135.4+2.4/162.0</td>
</tr>
</tbody>
</table>

* Available on request for HPSCR.
### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,574</td>
<td>5,380</td>
<td>2,060</td>
<td>16,100</td>
</tr>
</tbody>
</table>

#### Cyl. distance:

<table>
<thead>
<tr>
<th></th>
<th>5-9 cyl.</th>
<th>10 cyl.</th>
<th>11 cyl.</th>
<th>12 cyl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,574</td>
<td>1-6: 1,574</td>
<td>1-6: 1,574</td>
<td>1-6: 1,574</td>
</tr>
<tr>
<td>mm</td>
<td>7-10: 1,670</td>
<td>7-11: 1,670</td>
<td>7-12: 1,670</td>
<td></td>
</tr>
</tbody>
</table>

#### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>(L_{\text{min}})</td>
<td>11,468</td>
<td>13,042</td>
<td>14,616</td>
<td>16,190</td>
<td>17,804</td>
<td>19,779</td>
<td>21,489</td>
<td>23,159</td>
</tr>
</tbody>
</table>

#### Dry mass:

<table>
<thead>
<tr>
<th>Tier</th>
<th>t</th>
<th>1,005</th>
<th>1,206</th>
<th>1,407</th>
<th>1,608</th>
<th>1,760</th>
<th>1,912</th>
<th>2,180</th>
<th>2,378</th>
</tr>
</thead>
</table>

#### Tier III (added):

<table>
<thead>
<tr>
<th></th>
<th>EGR</th>
<th>HPSCR</th>
<th>LPSCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>13</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>14</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>15</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>31</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>t</td>
<td>33</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Dual fuel (added):

<table>
<thead>
<tr>
<th></th>
<th>GI</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td></td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

---

**MAN B&W G95ME-C10.5**

**Tier II**

**Tier III (added)**

- **EGR**
- **HPSCR**
- **LPSCR**

**Dual fuel (added)**

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

Cyl. | L₁ 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

**Fuel oil**

**MAN B&W G90ME-C10.5**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opt. load range</td>
</tr>
<tr>
<td>High-load</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Part-load EGB</td>
</tr>
<tr>
<td>Low-load EGB</td>
</tr>
</tbody>
</table>

**GI (Methane)**

**MAN B&W G90ME-C10.5-GI (gas optimised)**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Gas optimised</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
## Tier III

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>( L_1 ) kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>31,200</td>
</tr>
<tr>
<td>6</td>
<td>37,440</td>
</tr>
<tr>
<td>7</td>
<td>43,680</td>
</tr>
<tr>
<td>8</td>
<td>49,920</td>
</tr>
<tr>
<td>9</td>
<td>56,160</td>
</tr>
<tr>
<td>10*</td>
<td>62,400</td>
</tr>
<tr>
<td>11*</td>
<td>68,640</td>
</tr>
<tr>
<td>12*</td>
<td>74,880</td>
</tr>
</tbody>
</table>

**MAN B&W G90ME-C10.5**

**Fuel oil**

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

\[ L_1 \text{ SFOC} [\text{g/kWh}] \]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>163.5</td>
<td>163.5</td>
<td>169.0</td>
</tr>
</tbody>
</table>

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

\[ L_1 \text{ SFOC} [\text{g/kWh}] \]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>159.0</td>
<td>161.0</td>
<td>168.0</td>
</tr>
</tbody>
</table>

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

\[ L_1 \text{ SFOC} [\text{g/kWh}] \]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
</tbody>
</table>

* Available on request for HPSCR.
MAN B&W G90ME-C10.5

**MAN B&W G90ME-C10.5-GI-EGRTC (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>127.7+3.9/160.5</td>
<td>129.4+3.0/163.5</td>
<td>136.2+2.5/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>133.7+3.9/161.5</td>
<td>134.5+3.0/161.5</td>
<td>137.9+2.5/165.0</td>
</tr>
</tbody>
</table>

**MAN B&W G90ME-C10.5-GI-HPSCR (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>129.4+3.9/160.5</td>
<td>129.4+3.0/163.5</td>
<td>137.1+2.5/169.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>131.1+3.9/158.5</td>
<td>132.8+3.0/159.5</td>
<td>137.1+2.5/164.0</td>
</tr>
</tbody>
</table>

**MAN B&W G90ME-C10.5-GI-LPSCR (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>129.4+3.9/160.5</td>
<td>129.4+3.0/163.5</td>
<td>137.1+2.5/169.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>131.1+3.9/158.5</td>
<td>134.5+3.0/161.5</td>
<td>137.9+2.5/165.0</td>
</tr>
</tbody>
</table>

* Available on request for HPSCR.

---

**Cyl.**  | **L₁ kW**  | **Stroke:** 3,260 mm/L₁  | **MEP:** 21.5 bar
---|---|---|---
5 | 31,200 | | |
6 | 37,440 | | |
7 | 43,680 | | |
8 | 49,920 | | |
9 | 56,160 | | |
10* | 62,400 | | |
11* | 68,640 | | |
12* | 74,880 | | |
MAN B&W G90ME-C10.5

Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,490</td>
<td>5,110</td>
<td>5,034</td>
<td>1,885</td>
<td>14,425</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cylinders:</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&lt;sub&gt;min&lt;/sub&gt; (mm)</td>
<td>10,740</td>
<td>12,040</td>
<td>12,855</td>
<td>14,345*</td>
<td>15,835*</td>
<td>18,040</td>
<td>19,530</td>
<td>21,020</td>
</tr>
</tbody>
</table>

Dry mass

| Tier II | 791 | 949 | 1,107 | 1,265 | 1,423 | 1,581 | 1,739 | 1,897 |

Tier III (added)

| EGR | t | 17 | 17 | 17 | 18 | 18 | 20 | 20 | 20 |
| HPSCR | t | - | - | - | - | - | - | - | - |
| LPSCR | t | - | - | - | - | - | - | - | - |

Dual fuel (added)

| GI | t | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

* 8-9-cylinder engines can be ordered with either divided or undivided crankshaft. Data is given for undivided crankshaft.
## MAN B&W G80ME-C10.6

**Cyl.** | **L₁ kW** | Stroke: 3,720 mm/L₁ MEP: 21.0 bar
---|---|---
6 | 28,260 |
7 | 32,970 |
8 | 37,680 |
9 | 42,390 |

### Fuel oil

**MAN B&W G80ME-C10.6**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td>158.5</td>
<td>157.0</td>
<td>161.0</td>
</tr>
<tr>
<td><strong>Low-load EGB</strong></td>
<td></td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
</tbody>
</table>

**MAN B&W G80ME-C10.6-EGRTC**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td></td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td></td>
<td>156.5</td>
<td>156.0</td>
<td>162.0</td>
</tr>
</tbody>
</table>

**MAN B&W G80ME-C10.6-HPSCR**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td></td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td></td>
<td>154.5</td>
<td>155.0</td>
<td>165.5</td>
</tr>
</tbody>
</table>

**MAN B&W G80ME-C10.6-LPSCR**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td></td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td></td>
<td>157.0</td>
<td>156.5</td>
<td>165.5</td>
</tr>
</tbody>
</table>
### Specifications

**Dimensions:**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,400</td>
<td>5,018</td>
<td>5,254</td>
<td>1,960</td>
<td>-</td>
</tr>
</tbody>
</table>

**Cylinders:**

<table>
<thead>
<tr>
<th>L_{min}</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>11,509</td>
</tr>
<tr>
<td>7</td>
<td>12,135</td>
</tr>
<tr>
<td>8</td>
<td>13,535</td>
</tr>
<tr>
<td>9</td>
<td>14,935</td>
</tr>
</tbody>
</table>

**Dry mass**

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Tier III (added)**

<table>
<thead>
<tr>
<th></th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR</td>
<td>-</td>
</tr>
<tr>
<td>HPSCR</td>
<td>-</td>
</tr>
<tr>
<td>LPSCR</td>
<td>-</td>
</tr>
</tbody>
</table>
MAN B&W G80ME-C10.5

**Cyl.** | **L₁ kW** | **Stroke:** 3,720 mm/L₁ | **MEP:** 21.0 bar
---|---|---|---
6 | 28,260 | | |
7 | 32,970 | | |
8 | 37,680 | | |
9 | 42,390 | | |

**Fuel oil**

**MAN B&W G80ME-C10.5**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>160.5</td>
<td>159.5</td>
<td>164.0</td>
</tr>
<tr>
<td>Part-load EPT</td>
<td>158.5</td>
<td>158.0</td>
<td>166.5</td>
</tr>
<tr>
<td>Low-load EPT</td>
<td>156.5</td>
<td>159.0</td>
<td>166.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

**MAN B&W G80ME-C10.5-GI (gas optimised)**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>128.6+3.9/159.5</td>
<td>128.5+3.0/162.5</td>
<td>135.4+2.5/167.0</td>
</tr>
<tr>
<td>Gas optimised</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tier III

MAN B&W G80ME-C10.5

Stroke: 3,720 mm/L, MEP: 21.0 bar

Cyl. | L₁ kW
---|---
6  | 28,260
7  | 32,970
8  | 37,680
9  | 42,390

Fuel oil

MAN B&W G80ME-C10.5-EGRTC

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
---|---|---|---|
Tier II mode | 156.5 | 159.0 | 166.0 |
Tier III mode | 162.5 | 162.5 | 168.0 |

MAN B&W G80ME-C10.5-HPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
---|---|---|---|
Tier II mode | 156.5 | 159.0 | 166.5 |
Tier III mode | 158.0 | 160.0 | 167.0 |

MAN B&W G80ME-C10.5-LPSCR

L₁ SFOC [g/kWh]

| | 50% | 75% | 100% |
---|---|---|---|
Tier II mode | 156.5 | 159.0 | 166.5 |
Tier III mode | 157.5 | 160.0 | 167.5 |
MAN B&W G80ME-C10.5

**GI (Methane)**

**MAN B&W G80ME-C10.5-GI-EGRTC (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>Tier II mode</th>
<th>Tier III mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>126.9+3.9/159.5</td>
<td>128.5+3.0/162.5</td>
</tr>
<tr>
<td></td>
<td>132.9+3.9/160.5</td>
<td>133.7+3.0/160.5</td>
</tr>
</tbody>
</table>

**MAN B&W G80ME-C10.5-GI-HPSCR (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>Tier II mode</th>
<th>Tier III mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>128.6+3.9/159.5</td>
<td>128.5+3.0/162.5</td>
</tr>
<tr>
<td></td>
<td>130.3+3.9/157.5</td>
<td>132.0+3.0/158.5</td>
</tr>
</tbody>
</table>

**MAN B&W G80ME-C10.5-GI-LPSCR (gas optimised)**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>Tier II mode</th>
<th>Tier III mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>128.6+3.9/159.5</td>
<td>128.5+3.0/162.5</td>
</tr>
<tr>
<td></td>
<td>130.3+3.9/157.5</td>
<td>133.7+3.0/160.5</td>
</tr>
</tbody>
</table>
## Specifications

### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,400</td>
<td>5,018</td>
<td>5,254</td>
<td>1,960</td>
<td>15,750</td>
</tr>
</tbody>
</table>

### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&lt;sub&gt;min&lt;/sub&gt; mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Dry mass

| Tier II | t  | 864 | 1,008 | 1,153 | 1,297 |

### Tier III (added)

<table>
<thead>
<tr>
<th></th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR t</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>5</th>
<th>5</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSCR t</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPSCR t</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dual fuel (added)

<table>
<thead>
<tr>
<th></th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>GI t</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MAN B&W G70ME-C10.5

Cyl. | L₁ kW
--- | ---
5 | 15,500
6 | 18,600

Stroke: 3,256 mm/L₁ MEP: 19.0 bar

Fuel oil

MAN B&W G70ME-C10.5

L₁ SFOC [g/kWh]

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>160.5</td>
<td>158.5</td>
<td>163.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td>158.5</td>
<td>157.0</td>
<td>165.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>156.5</td>
<td>158.0</td>
<td>165.5</td>
</tr>
</tbody>
</table>

GI (Methane)

MAN B&W G70ME-C10.5-GI (gas optimised)

L₁ dual fuel mode (SGC+SPOC (0.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas optimised</td>
<td>130.8+1.3/159.5</td>
<td>129.4+1.0/161.5</td>
<td>135.9+0.8/166.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12
### MAN B&W G70ME-C10.5

**Cyl.** | **L₁ kW** | **Stroke:** 3,256 mm/L₁ **MEP:** 19.0 bar
---|---|---
5 | 15,500 | 
6 | 18,600 | 

### Fuel oil

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

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
<td><strong>75%</strong></td>
</tr>
<tr>
<td>Tier II mode</td>
<td>156.5</td>
<td>158.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>163.5</td>
<td>162.5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
<td><strong>75%</strong></td>
</tr>
<tr>
<td>Tier II mode</td>
<td>156.5</td>
<td>158.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>158.0</td>
<td>159.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
<td><strong>75%</strong></td>
</tr>
<tr>
<td>Tier II mode</td>
<td>156.5</td>
<td>158.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>157.5</td>
<td>159.0</td>
</tr>
</tbody>
</table>
MAN B&W G70ME-C10.5

Cyl. | L1 kW
---|---
5 | 15,500
6 | 18,600

**Stroke:** 3,256 mm/L1 MEP: 19.0 bar

---

**GI (Methane)**

**MAN B&W G70ME-C10.5-GI-EGRBP (gas optimised)**

<table>
<thead>
<tr>
<th>L1 dual fuel mode (SGC+SPOC (0.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>130.8+1.3/159.5</td>
<td>129.4+1.0/161.5</td>
<td>137.6+0.8/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>136.8+1.3/162.5</td>
<td>136.2+1.0/161.5</td>
<td>139.4+0.8/165.0</td>
</tr>
</tbody>
</table>

**MAN B&W G70ME-C10.5-GI-HPSCR (gas optimised)**

<table>
<thead>
<tr>
<th>L1 dual fuel mode (SGC+SPOC (0.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>130.8+1.3/159.5</td>
<td>129.4+1.0/161.5</td>
<td>136.8+0.8/167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>132.5+1.3/157.5</td>
<td>132.8+1.0/157.5</td>
<td>136.8+0.8/162.0</td>
</tr>
</tbody>
</table>

**MAN B&W G70ME-C10.5-GI-LPSCR (gas optimised)**

<table>
<thead>
<tr>
<th>L1 dual fuel mode (SGC+SPOC (0.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>130.8+1.3/159.5</td>
<td>129.4+1.0/161.5</td>
<td>136.8+0.8/167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>132.5+1.3/157.5</td>
<td>134.5+1.0/159.5</td>
<td>137.6+0.8/163.0</td>
</tr>
</tbody>
</table>

**Note:** Also available for GIE and LGIP, except GIE and EGR, see pages 12-15.
## Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,044</td>
<td>4,470</td>
<td>4,628</td>
<td>1,750</td>
<td>13,625</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cylinders:</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{min} mm</td>
<td>7,399</td>
<td>8,443</td>
</tr>
</tbody>
</table>

### Dry mass

| Tier II | t | 526 | 592 |

### Tier III (added)

| EGR | t | 9 | 9 |
| HPSCR | t | 3 | 3 |
| LPSCR | t | - | - |

### Dual fuel (added)

| GI | t | 5 | 6 |
**MAN B&W G70ME-C9.5**

**Cyl.** | **L₁ kW**
---|---
5 | 18,200
6 | 21,840
7 | 25,480
8 | 29,120

**Tier II**

*Stroke: 3,256 mm/L₁, MEP: 21.0 bar*

**Fuel oil**

**MAN B&W G70ME-C9.5**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td>165.5</td>
<td>163.0</td>
<td>167.0</td>
<td></td>
</tr>
<tr>
<td><strong>Part-load EGB</strong></td>
<td>162.5</td>
<td>161.5</td>
<td>168.5</td>
<td></td>
</tr>
<tr>
<td><strong>Low-load EGB</strong></td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
<td></td>
</tr>
</tbody>
</table>

**GI (Methane)**

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

<table>
<thead>
<tr>
<th><strong>L₁ dual fuel mode (SGC+SPOC (0.5%))/fuel oil mode (SFOC) [g/kWh]</strong></th>
<th><strong>Gas tuned</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td>136.8+1.3/165.5</td>
<td>135.0+1.0/163.0</td>
<td>141.0+0.8/167.0</td>
<td></td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12.
MAN B&W G70ME-C9.5

Cyl. | L₁ kW
--- | ---
5  | 18,200
6  | 21,840
7  | 25,480
8  | 29,120

Stroke: 3,256 mm/L₁ MEP: 21.0 bar

Fuel oil

MAN B&W G70ME-C9.5-EGRBP

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>160.5</td>
<td>162.5</td>
<td>169.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>168.5</td>
<td>167.0</td>
<td>172.0</td>
</tr>
</tbody>
</table>

MAN B&W G70ME-C9.5-HPSCR

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>162.0</td>
<td>163.5</td>
<td>169.0</td>
</tr>
</tbody>
</table>

MAN B&W G70ME-C9.5-LPSCR

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>161.5</td>
<td>163.5</td>
<td>169.5</td>
</tr>
</tbody>
</table>
### MAN B&W G70ME-C9.5

**Cyl.** | **L₁ kW** | Stroke: 3,256 mm/L₁ MEP: 21.0 bar
---|---|---
5 | 18,200 |  
6 | 21,840 |  
7 | 25,480 |  
8 | 29,120 |  

**GI (Methane)**

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

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>135.9+1.3/160.5</td>
<td>138.0+1.0/162.5</td>
<td>143.6+0.8/169.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>142.8+1.3/168.5</td>
<td>141.8+1.0/167.0</td>
<td>146.2+0.8/172.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>135.9+1.3/160.5</td>
<td>138.0+1.0/162.5</td>
<td>143.2+0.8/168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.2+1.3/162.0</td>
<td>138.9+1.0/163.5</td>
<td>143.6+0.8/169.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>135.9+1.3/160.5</td>
<td>138.0+1.0/162.5</td>
<td>143.2+0.8/168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>136.8+1.3/161.5</td>
<td>138.9+1.0/163.5</td>
<td>144.0+0.8/169.5</td>
</tr>
</tbody>
</table>

*Note: Also available for GIE and LGIP, except GIE and EGR, see pages 12-15*
## MAN B&W G70ME-C9.5

### Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel oil (mm)</td>
<td>1,260</td>
<td>4,760</td>
<td>4,900</td>
<td>1,750</td>
<td>14,225</td>
</tr>
<tr>
<td>GI (mm)</td>
<td>1,260</td>
<td>4,760</td>
<td>4,900</td>
<td>1,750</td>
<td>14,225</td>
</tr>
</tbody>
</table>

### Cylinders

<table>
<thead>
<tr>
<th>Cylinders</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&lt;sub&gt;min&lt;/sub&gt; (mm)</td>
<td>8,486</td>
<td>9,596</td>
<td>10,856</td>
<td>12,116</td>
</tr>
</tbody>
</table>

### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>585</td>
<td>665</td>
</tr>
</tbody>
</table>

### Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
<th>14</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSCR</td>
<td>t</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>LPSCR</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Dual fuel (added)

| GI | t | 5 | 6 | 7 | 8 |

![Diagram of the engine dimensions](image-url)
MAN B&W S70ME-C10.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>17,150</td>
</tr>
<tr>
<td>6</td>
<td>20,580</td>
</tr>
<tr>
<td>7</td>
<td>24,010</td>
</tr>
<tr>
<td>8</td>
<td>27,440</td>
</tr>
</tbody>
</table>

**Stroke:** 2,800 mm/L₁, **MEP:** 21.0 bar

**Fuel oil**

**MAN B&W S70ME-C10.5**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>164.5</td>
<td>162.0</td>
<td>166.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td></td>
<td>161.5</td>
<td>160.5</td>
<td>167.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td></td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

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

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>133.7+4.0/164.5</td>
<td>132.4+3.0/162.0</td>
<td>138.8+2.5/166.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12
### Tier III MAN B&W S70ME-C10.5

**Cyl.** | **L₁ kW**
---|---
5 | 17,150
6 | 20,580
7 | 24,010
8 | 27,440

*Stroke: 2,800 mm/L₁, MEP: 21.0 bar*

#### Fuel oil

**MAN B&W S70ME-C10.5-EGRBP**

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td>159.5</td>
<td>161.5</td>
<td>168.0</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>167.5</td>
<td>166.0</td>
<td>171.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>161.0</td>
<td>162.5</td>
<td>168.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tier II mode</strong></td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
</tr>
</tbody>
</table>
MAN B&W S70ME-C10.5

**MAN B&W S70ME-C10.5-GI-EGRBP**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>141.3+2.5/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>139.7+4.0/167.5</td>
<td>139.3+3.0/166.0</td>
<td>143.9+2.5/171.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>134.1+4.0/161.0</td>
<td>136.3+3.0/162.5</td>
<td>141.3+2.5/168.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>133.7+4.0/160.5</td>
<td>136.3+3.0/162.5</td>
<td>141.8+2.5/168.5</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 12-15
### Specifications

**Dimensions:**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,098</td>
<td>4,012</td>
<td>4,150</td>
<td>1,520</td>
<td>12,675</td>
</tr>
</tbody>
</table>

**Cylinders:**

<table>
<thead>
<tr>
<th>CYL.</th>
<th>L&lt;sub&gt;min&lt;/sub&gt; mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7,581</td>
</tr>
<tr>
<td>6</td>
<td>8,679</td>
</tr>
<tr>
<td>7</td>
<td>9,777</td>
</tr>
<tr>
<td>8</td>
<td>10,875</td>
</tr>
</tbody>
</table>

**Dry mass**

<table>
<thead>
<tr>
<th>Tier</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II</td>
<td>465 503 541 579</td>
</tr>
</tbody>
</table>

**Tier III (added)**

- EGR: 9, 9, 12, 12
- HPSCR: -
- LPSCR: -

**Dual fuel (added)**

<table>
<thead>
<tr>
<th>GI</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6 7 8</td>
</tr>
</tbody>
</table>
MAN B&W S65ME-C8.6

Cyl. L₁ kW Stroke: 2,730 mm/L₁ MEP: 19.0 bar
5 13,650
6 16,380
7 19,110
8 21,840

Fuel oil

MAN B&W S65ME-C8.6

L₁ SFOC [g/kWh]

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>164.5</td>
<td>161.5</td>
<td>165.5</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td>161.5</td>
<td>160.0</td>
<td>167.0</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>159.5</td>
<td>161.0</td>
<td>167.0</td>
</tr>
</tbody>
</table>

GI (Methane)

MAN B&W S65ME-C8.6-GI

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>133.6+3.9/164.5</td>
<td>132.0+3.0/161.5</td>
<td>138.4+2.5/165.5</td>
</tr>
</tbody>
</table>
MAN B&W S65ME-C8.6

**Cyl.** | **L₁ kW** | **Stroke:** 2,730 mm/L₁ **MEP:** 19.0 bar
---|---|---
5 | 13,650 |
6 | 16,380 |
7 | 19,110 |
8 | 21,840 |

### Fuel oil

**MAN B&W S65ME-C8.6-EGRBP**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>167.5</td>
<td>165.5</td>
<td>170.5</td>
</tr>
</tbody>
</table>

**MAN B&W S65ME-C8.6-HPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.0</td>
<td>167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>161.0</td>
<td>162.0</td>
<td>167.5</td>
</tr>
</tbody>
</table>

**MAN B&W S65ME-C8.6-LPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.0</td>
<td>167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>160.5</td>
<td>162.0</td>
<td>168.0</td>
</tr>
</tbody>
</table>
**MAN B&W S65ME-C8.6**

**GI (Methane)**

**MAN B&W S65ME-C8.6-GI-EGRBP**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+3.9/159.5</td>
<td>135.0+3.0/161.0</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>139.6+3.9/167.5</td>
<td>138.9+3.0/165.5</td>
<td>143.5+2.5/170.5</td>
</tr>
</tbody>
</table>

**MAN B&W S65ME-C8.6-GI-HPSCR**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
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<td>135.0+3.0/161.0</td>
<td>140.5+2.5/167.0</td>
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<tr>
<td>Tier III mode</td>
<td>134.0+3.9/161.0</td>
<td>135.9+3.0/162.0</td>
<td>140.9+2.5/167.5</td>
</tr>
</tbody>
</table>

**MAN B&W S65ME-C8.6-GI-LPSCR**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>132.8+3.9/159.5</td>
<td>135.0+3.0/161.0</td>
<td>140.5+2.5/167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>133.6+3.9/160.5</td>
<td>135.9+3.0/162.0</td>
<td>141.4+2.5/168.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,730 mm/L₁ MEP: 19.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>13,650</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>16,380</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>19,110</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>21,840</td>
<td></td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,084</td>
<td>4,124</td>
<td>4,170</td>
<td>1,410</td>
<td>11,950</td>
<td>11,225</td>
<td>11,025</td>
</tr>
</tbody>
</table>

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

### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>366</td>
</tr>
</tbody>
</table>

### Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSCR</td>
<td>t</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>LPSCR</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Dual fuel (added)

<table>
<thead>
<tr>
<th>GI</th>
<th>t</th>
<th>5</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
</table>
MAN B&W G60ME-C10.5

**Cyl.** | **L₁ kW** | **Stroke:** 2,790 mm/L₁ | **MEP:** 21.0 bar
---|---|---|---
5 | 14,200 | | |
6 | 17,040 | | |
7 | 19,880 | | |
8 | 22,720 | | |

**Fuel oil**

**MAN B&W G60ME-C10.5**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td>161.5</td>
<td>160.5</td>
<td>165.0</td>
</tr>
<tr>
<td><strong>Part-load EPT</strong></td>
<td></td>
<td>159.5</td>
<td>159.0</td>
<td>167.5</td>
</tr>
<tr>
<td><strong>Low-load EPT</strong></td>
<td></td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

**MAN B&W G60ME-C10.5-GI**

<table>
<thead>
<tr>
<th><strong>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</strong></th>
<th><strong>Gas tuned</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td>131.1+3.9/161.5</td>
<td>131.2+3.0/160.5</td>
<td>137.9+2.5/165.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12
### Tier III

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L(_1) kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>14,200</td>
</tr>
<tr>
<td>6</td>
<td>17,040</td>
</tr>
<tr>
<td>7</td>
<td>19,880</td>
</tr>
<tr>
<td>8</td>
<td>22,720</td>
</tr>
</tbody>
</table>

**MAN B&W G60ME-C10.5**

- **Stroke:** 2,790 mm/L, **MEP:** 21.0 bar

#### Fuel oil

**MAN B&W G60ME-C10.5-EBRG**

<table>
<thead>
<tr>
<th>L(_1) SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>164.5</td>
<td>164.5</td>
<td>170.0</td>
</tr>
</tbody>
</table>

**MAN B&W G60ME-C10.5-HPSCR**

<table>
<thead>
<tr>
<th>L(_1) SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>159.0</td>
<td>161.0</td>
<td>168.0</td>
</tr>
</tbody>
</table>

**MAN B&W G60ME-C10.5-LPSCR**

<table>
<thead>
<tr>
<th>L(_1) SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
</tbody>
</table>
MAN B&W G60ME-C10.5

Cyl. | L₁ kW | Stroke: 2,790 mm/L₁ MEP: 21.0 bar
---|---|---
5 | 14,200 |
6 | 17,040 |
7 | 19,880 |
8 | 22,720 |

GI (Methane)

MAN B&W G60ME-C10.5-GI-EGRBP

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>131.1+3.9/157.5</td>
<td>134.2+3.0/160.0</td>
<td>141.4+2.5/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.1+3.9/164.5</td>
<td>138.0+3.0/164.5</td>
<td>143.1+2.5/170.0</td>
</tr>
</tbody>
</table>

MAN B&W G60ME-C10.5-GI-HPSCR

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>131.1+3.9/157.5</td>
<td>134.2+3.0/160.0</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>132.4+3.9/159.0</td>
<td>135.0+3.0/161.0</td>
<td>141.4+2.5/168.0</td>
</tr>
</tbody>
</table>

MAN B&W G60ME-C10.5-GI-LPSCR

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>131.1+3.9/157.5</td>
<td>134.2+3.0/160.0</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>132.0+3.9/158.5</td>
<td>135.0+3.0/161.0</td>
<td>141.8+2.5/168.5</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 12-15
## Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,080</td>
<td>4,090</td>
<td>4,220</td>
<td>1,500</td>
<td>12,175</td>
<td>11,975</td>
</tr>
</tbody>
</table>

### Cylinders:

<table>
<thead>
<tr>
<th>L&lt;sub&gt;min&lt;/sub&gt;</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II</td>
<td>7,390</td>
</tr>
<tr>
<td>Tier III (added)</td>
<td>8,470</td>
</tr>
<tr>
<td></td>
<td>9,550</td>
</tr>
<tr>
<td></td>
<td>10,630</td>
</tr>
</tbody>
</table>

### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>399</td>
<td>444</td>
</tr>
<tr>
<td>497</td>
<td>549</td>
</tr>
</tbody>
</table>

### Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>28</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HPSLR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LPSCR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Dual fuel (added)

<table>
<thead>
<tr>
<th>GI</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

![Diagram of the engine dimensions]
MAN B&W S60ME-C10.6

**Fuel oil**

**MAN B&W S60ME-C10.6**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12,450</td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
</tr>
<tr>
<td>8</td>
<td>19,920</td>
</tr>
</tbody>
</table>

*Stroke: 2,400 mm/L₁, MEP: 21.0 bar*

**MAN B&W S60ME-C10.6**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>157.5</td>
<td>156.0</td>
<td>160.0</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>153.5</td>
<td>154.0</td>
<td>164.0</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C10.6-EGRBP**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>153.5</td>
<td>154.0</td>
<td>165.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>156.5</td>
<td>156.0</td>
<td>165.0</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C10.6-HPSCR**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>153.5</td>
<td>154.0</td>
<td>164.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>153.5</td>
<td>154.0</td>
<td>164.5</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C10.6-LPSCR**

**L₁ SFOC [g/kWh]**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>153.5</td>
<td>154.0</td>
<td>164.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>156.0</td>
<td>155.5</td>
<td>164.5</td>
</tr>
</tbody>
</table>
### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>940</td>
<td>3,420</td>
<td>3,550</td>
<td>1,300</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>L&lt;sub&gt;min&lt;/sub&gt;</th>
<th>6,502</th>
<th>7,442</th>
<th>8,382</th>
<th>9,322</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
</table>

#### Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPSCR</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>LPSCR</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
MAN B&W S60ME-C10.5

**Cyl.** | **L₁ kW** | **Stroke:** 2,400 mm/L₁ **MEP:** 21.0 bar
---|---|---
5 | 12,450 | 
6 | 14,940 | 
7 | 17,430 | 
8 | 19,920 | 

**Fuel oil**

**MAN B&W S60ME-C10.5**

<table>
<thead>
<tr>
<th><strong>L₁ SFOC [g/kWh]</strong></th>
<th><strong>Opt. load range</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td>164.5</td>
<td>162.0</td>
<td>166.0</td>
</tr>
<tr>
<td><strong>Part-load EGB</strong></td>
<td></td>
<td>161.5</td>
<td>160.5</td>
<td>167.5</td>
</tr>
<tr>
<td><strong>Low-load EGB</strong></td>
<td></td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

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

<table>
<thead>
<tr>
<th><strong>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</strong></th>
<th><strong>Gas tuned</strong></th>
<th><strong>50%</strong></th>
<th><strong>75%</strong></th>
<th><strong>100%</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td>133.7+4.0/164.5</td>
<td>132.4+3.0/162.0</td>
<td>138.8+2.5/166.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12
Tier III

MAN B&W S60ME-C10.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12,450</td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
</tr>
<tr>
<td>8</td>
<td>19,920</td>
</tr>
</tbody>
</table>

**Stroke:** 2,400 mm/L₁, **MEP:** 21.0 bar

---

**Fuel oil**

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

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.5</td>
<td>168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>167.5</td>
<td>166.0</td>
<td>171.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>161.0</td>
<td>162.5</td>
<td>168.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>161.5</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
</tr>
</tbody>
</table>
## MAN B&W S60ME-C10.5

### Stroke: 2,400 mm/L, MEP: 21.0 bar

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12,450</td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
</tr>
<tr>
<td>8</td>
<td>19,920</td>
</tr>
</tbody>
</table>

### GI (Methane)

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>141.3+2.5/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>139.7+4.0/167.5</td>
<td>139.3+3.0/166.0</td>
<td>143.9+2.5/171.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>134.1+4.0/161.0</td>
<td>136.3+3.0/162.5</td>
<td>141.3+2.5/168.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.4+3.0/161.5</td>
<td>140.9+2.5/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>133.7+4.0/160.5</td>
<td>136.3+3.0/162.5</td>
<td>141.8+2.5/168.5</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 12-15

---

**Note:**

- **Cyl. kW:** 84-105
- **Stroke:** 2,400 mm/L
- **MEP:** 21.0 bar

---

**DIAGRAM:**

- L1 kW/cyl: 2,000, 1,500
- r/min: 84, 105, 120, 135
- L3: 1,880
- L4: 1,600
### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel oil</td>
<td>mm</td>
<td>940</td>
<td>3,420</td>
<td>3,550</td>
<td>1,300</td>
<td>10,500</td>
<td>9,775</td>
</tr>
<tr>
<td>Gl</td>
<td>mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.500</td>
<td>10.025</td>
</tr>
</tbody>
</table>

#### Cylinders:

<table>
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<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{min}</td>
<td>mm</td>
<td>6,502</td>
<td>7,442</td>
<td>8,382</td>
</tr>
</tbody>
</table>

#### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>303</td>
</tr>
</tbody>
</table>

#### Tier III (added)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR</td>
<td>t</td>
<td>12</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>HPSCR</td>
<td>t</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>LPSCR</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Dual fuel (added)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gl</td>
<td>t</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
MAN B&W G50ME-C9.6

### Fuel oil

#### MAN B&W G50ME-C9.6

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L(_1) kW</th>
<th>Stroke: 2,500 mm/L(_1) MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,600</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10,320</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12,040</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>13,760</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>15,480</td>
<td></td>
</tr>
</tbody>
</table>

#### MAN B&W G50ME-C9.6

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>L(_1) SFOC [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>163.5</td>
</tr>
<tr>
<td>75%</td>
<td>162.5</td>
</tr>
<tr>
<td>100%</td>
<td>167.0</td>
</tr>
</tbody>
</table>

**High-load**

| Part-load EGB   | 161.5                |
|                 | 161.0                |
|                 | 169.5                |

**Low-load EGB**

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>L(_1) dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>132.8+4.0/163.5</td>
</tr>
</tbody>
</table>

**Note:** Also available for GIE, LGIM and LGIP, see page 12
Tier III

MAN B&W G50ME-C9.6

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,600</td>
</tr>
<tr>
<td>6</td>
<td>10,320</td>
</tr>
<tr>
<td>7</td>
<td>12,040</td>
</tr>
<tr>
<td>8</td>
<td>13,760</td>
</tr>
<tr>
<td>9</td>
<td>15,480</td>
</tr>
</tbody>
</table>

Stroke: 2,500 mm/L₁, MEP: 21.0 bar

Fuel oil

MAN B&W G50ME-C9.6-EGRBP

L₁ SFOC [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>162.0</td>
<td>170.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>166.5</td>
<td>166.5</td>
<td>172.0</td>
</tr>
</tbody>
</table>

MAN B&W G50ME-C9.6-HPSCR

L₁ SFOC [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>162.0</td>
<td>169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>161.0</td>
<td>163.0</td>
<td>170.0</td>
</tr>
</tbody>
</table>

MAN B&W G50ME-C9.6-LPSCR

L₁ SFOC [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>159.5</td>
<td>162.0</td>
<td>169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>160.5</td>
<td>163.0</td>
<td>170.5</td>
</tr>
</tbody>
</table>
MAN B&W G50ME-C9.6

**GI (Methane)**

**MAN B&W G50ME-C9.6-GI-EGRBMP**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.8+3.0/162.0</td>
<td>143.0+2.5/170.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>138.8+4.0/166.5</td>
<td>139.7+3.0/166.5</td>
<td>144.7+2.5/172.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.8+3.0/162.0</td>
<td>142.6+2.5/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>134.1+4.0/161.0</td>
<td>136.7+3.0/163.0</td>
<td>143.0+2.5/170.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>132.8+4.0/159.5</td>
<td>135.8+3.0/162.0</td>
<td>142.6+2.5/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>133.7+4.0/160.5</td>
<td>136.7+3.0/163.0</td>
<td>143.5+2.5/170.5</td>
</tr>
</tbody>
</table>

Note: Also available for GIE, LGIM and LGIP, except GIE and EGR, see pages 12-15
Specifications

Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>872</td>
<td>3,776</td>
<td>3,652</td>
<td>1,205</td>
<td>10,775</td>
<td>10,075</td>
<td>9,825</td>
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</tbody>
</table>

Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&lt;sub&gt;min&lt;/sub&gt; (mm)</td>
<td>5,748</td>
<td>6,620</td>
<td>7,492</td>
<td>8,364</td>
<td>9,236</td>
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</table>

Dry mass

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>211</td>
<td>246</td>
<td>276</td>
</tr>
<tr>
<td></td>
<td>311</td>
<td>346</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
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</tbody>
</table>

EGR

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>12</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>13</td>
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<td>5</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>13</td>
<td>6</td>
</tr>
</tbody>
</table>

HPSCR

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

LPSCR

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GI

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
MAN B&W S50ME-C10.6

Cyl. | L₁ kW
--- | ---
5 | 9,500
6 | 11,400
7 | 13,300
8 | 15,200
9 | 17,100

**Stoke:** 2,214 mm/L₁ **MEP:** 21.0 bar

**Fuel oil**

**MAN B&W S50ME-C10.6**

<table>
<thead>
<tr>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>158.5</td>
<td>157.0</td>
<td>161.0</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
</tbody>
</table>

**MAN B&W S50ME-C10.6-EGRBP**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier III mode</td>
<td>157.5</td>
<td>157.0</td>
<td>166.0</td>
</tr>
</tbody>
</table>

**MAN B&W S50ME-C10.6-HPSCR**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier III mode</td>
<td>154.5</td>
<td>155.0</td>
<td>165.0</td>
</tr>
</tbody>
</table>

**MAN B&W S50ME-C10.6-LPSCR**

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier III mode</td>
<td>157</td>
<td>156.5</td>
<td>165.5</td>
</tr>
</tbody>
</table>
Specifications

Dimensions:

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<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>875</td>
<td>3,350</td>
<td>3,290</td>
<td>1,190</td>
<td>-</td>
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<td>-</td>
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Cylinders:

<table>
<thead>
<tr>
<th>L&lt;sub&gt;min&lt;/sub&gt;</th>
<th>mm</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5,747</td>
<td>6,622</td>
<td>7,497</td>
<td>8,372</td>
<td>9,247</td>
</tr>
</tbody>
</table>

Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>226</td>
</tr>
<tr>
<td></td>
<td>262</td>
</tr>
<tr>
<td></td>
<td>293</td>
</tr>
<tr>
<td></td>
<td>324</td>
</tr>
</tbody>
</table>

Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HPSCR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LPSCR</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
## MAN B&W S50ME-C9.7

### Cyl. L₁ kW

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,900</td>
</tr>
<tr>
<td>6</td>
<td>10,680</td>
</tr>
<tr>
<td>7</td>
<td>12,460</td>
</tr>
<tr>
<td>8</td>
<td>14,240</td>
</tr>
<tr>
<td>9</td>
<td>16,020</td>
</tr>
</tbody>
</table>

**Stroke:** 2,214 mm/L₁, **MEP:** 21.0 bar

### Fuel oil

**MAN B&W S50ME-C9.7**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>161.5</td>
<td>160.5</td>
<td>165.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td></td>
<td>159.5</td>
<td>159.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td></td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
</tbody>
</table>

### GI (Methane)

**MAN B&W S50ME-C9.7-GI**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>131.1+3.9/161.5</td>
<td>131.2+3.0/160.5</td>
<td>137.9+2.5/165.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE and LGIP, see page 12
### Tier III

**MAN B&W S50ME-C9.7**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
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</tr>
<tr>
<td>6</td>
<td>10,680</td>
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<td>7</td>
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</tr>
<tr>
<td>8</td>
<td>14,240</td>
</tr>
<tr>
<td>9</td>
<td>16,020</td>
</tr>
</tbody>
</table>

**Stroke:** 2,214 mm / **L₁ MEP:** 21.0 bar

---

**Fuel oil**

**MAN B&W S50ME-C9.7-EGRBP**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>164.5</td>
<td>164.5</td>
<td>170.0</td>
</tr>
</tbody>
</table>

**MAN B&W S50ME-C9.7-HPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>159.0</td>
<td>161.0</td>
<td>168.0</td>
</tr>
</tbody>
</table>

**MAN B&W S50ME-C9.7-LPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>157.5</td>
<td>160.0</td>
<td>167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
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</table>
**MAN B&W S50ME-C9.7**

**GI (Methane)**

MAN B&W S50ME-C9.7-GI-EGRBP

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,214 mm/L₁ MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,900</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10,680</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12,460</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>14,240</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>16,020</td>
<td></td>
</tr>
</tbody>
</table>

**L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]**

<table>
<thead>
<tr>
<th>Mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>131.1+3.9/157.5</td>
<td>134.2+3.0/160.0</td>
<td>141.4+2.5/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.1+3.9/164.5</td>
<td>138.0+3.0/164.5</td>
<td>143.1+2.5/170.0</td>
</tr>
</tbody>
</table>

MAN B&W S50ME-C9.7-GI-HPSCR

| L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh] |
|----------------------------------|------------------|------------------|------------------|
| **Tier II mode**                 | 131.1+3.9/157.5  | 134.2+3.0/160.0  | 140.9+2.5/167.5  |
| **Tier III mode**                | 132.4+3.9/159.0  | 135.0+3.0/161.0  | 141.4+2.5/168.0  |

MAN B&W S50ME-C9.7-GI-LPSCR

| L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh] |
|----------------------------------|------------------|------------------|------------------|
| **Tier II mode**                 | 131.1+3.9/157.5  | 134.2+3.0/160.0  | 140.9+2.5/167.5  |
| **Tier III mode**                | 132.0+3.9/158.5  | 135.0+3.0/161.0  | 141.8+2.5/168.5  |

Note: Also available for GIE and LGIP, except GIE and EGR, see pages 12-15
## Specifications

### Dimensions:

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<th>C</th>
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<th>H3</th>
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<tr>
<td>mm</td>
<td>875</td>
<td>3,350</td>
<td>3,290</td>
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### Cylinders:

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<th>9</th>
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<tr>
<td>L&lt;sub&gt;min&lt;/sub&gt; mm</td>
<td>5,747</td>
<td>6,622</td>
<td>7,497</td>
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### Dry mass

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<tr>
<td>t</td>
<td>193</td>
<td>223</td>
<td>259</td>
<td>289</td>
<td>320</td>
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### Tier III (added)

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<tr>
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<table>
<thead>
<tr>
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<th>HPSCR t</th>
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<tbody>
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<td></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>LPSCR t</th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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### Dual fuel (added)

<table>
<thead>
<tr>
<th></th>
<th>GI t</th>
<th></th>
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<th></th>
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</tr>
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<tbody>
<tr>
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<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
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</tbody>
</table>
### MAN B&W S50ME-C8.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,000 mm/L₁ MEP: 20.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,300</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>9,960</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>11,620</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>13,280</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>14,940</td>
<td></td>
</tr>
</tbody>
</table>

**Fuel oil**

**MAN B&W S50ME-C8.5**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opt. load range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>168.5</td>
<td>166.0</td>
<td>170.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td>165.5</td>
<td>164.5</td>
<td>171.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>163.5</td>
<td>165.5</td>
<td>171.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

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

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>137.0+4.1/168.5</td>
<td>135.8+3.1/166.0</td>
<td>142.1+2.6/170.0</td>
</tr>
</tbody>
</table>

Note: Also available for GIE, see page 12
### Tier III

**MAN B&W S50ME-C8.5**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L\textsubscript{1} kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,300</td>
</tr>
<tr>
<td>6</td>
<td>9,960</td>
</tr>
<tr>
<td>7</td>
<td>11,620</td>
</tr>
<tr>
<td>8</td>
<td>13,280</td>
</tr>
<tr>
<td>9</td>
<td>14,940</td>
</tr>
</tbody>
</table>

**Stroke**: 2,000 mm/L1 MEP: 20.0 bar

### Fuel oil

**MAN B&W S50ME-C8.5-EGRBP**

<table>
<thead>
<tr>
<th>L\textsubscript{1} SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>163.5</td>
<td>165.5</td>
<td>172.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>171.5</td>
<td>170.0</td>
<td>175.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>L\textsubscript{1} SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>163.5</td>
<td>165.5</td>
<td>171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>165.0</td>
<td>166.5</td>
<td>172.0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>L\textsubscript{1} SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>163.5</td>
<td>165.5</td>
<td>171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>164.5</td>
<td>166.5</td>
<td>172.5</td>
</tr>
</tbody>
</table>
**MAN B&W S50ME-C8.5**

**Gi (Methane)**

**MAN B&W S50ME-C8.5-GI-EGRBp**

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.7+2.6/172.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>143.0+4.1/171.5</td>
<td>142.6+3.1/170.0</td>
<td>147.3+2.6/175.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.3+2.6/171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.5+4.1/165.0</td>
<td>139.6+3.1/166.5</td>
<td>144.7+2.6/172.0</td>
</tr>
</tbody>
</table>

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

L₁ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.3+2.6/171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.0+4.1/164.5</td>
<td>139.6+3.1/166.5</td>
<td>145.1+2.6/172.5</td>
</tr>
</tbody>
</table>

Note: Also available for GiE, except GiE and EGR, see pages 12-14.

---

**Cyl.** | **L₁ kW** | **Kw/cyl.** | **Stroke:** 2,000 mm/L₁ | **MEP:** 20.0 bar
---|---|---|---|---|
5 | 8,300 | | | |
6 | 9,960 | | | |
7 | 11,620 | | | |
8 | 13,280 | | | |
9 | 14,940 | | | |
MAN B&W S50ME-C8.5

Specifications

Dimensions:

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<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
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<tr>
<td>mm</td>
<td>850</td>
<td>3,150</td>
<td>1,085</td>
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<td>8,500</td>
<td>8,250</td>
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Cylinders:

<table>
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<tr>
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<th>7</th>
<th>8</th>
<th>9</th>
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<tr>
<td>L_{min}</td>
<td>5,542</td>
<td>6,392</td>
<td>7,242</td>
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Dry mass

<table>
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<tr>
<th>Tier II</th>
<th>t</th>
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<tr>
<td></td>
<td>180</td>
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<tr>
<td></td>
<td>210</td>
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<td>240</td>
</tr>
<tr>
<td></td>
<td>270</td>
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<td></td>
<td>295</td>
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Tier III (added)

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<td>13</td>
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<table>
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<table>
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Dual fuel (added)

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<tbody>
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### MAN B&W S46ME-C8.6

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 1,932 mm/L₁ MEP: 20.0 bar</th>
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<tr>
<td>6</td>
<td>8,340</td>
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<td>7</td>
<td>9,730</td>
<td></td>
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<tr>
<td>8</td>
<td>11,120</td>
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#### Fuel oil – Tier II

**MAN B&W S46ME-C8.6**

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<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>165.5</td>
<td>163.0</td>
<td>167.0</td>
</tr>
<tr>
<td></td>
<td>Part-load EGB</td>
<td>162.5</td>
<td>161.5</td>
<td>168.5</td>
</tr>
<tr>
<td></td>
<td>Low-load EGB</td>
<td>160.5</td>
<td>162.5</td>
<td>168.5</td>
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</table>

#### Fuel oil – Tier III

**MAN B&W S46ME-C8.6-EGRBP**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Tier III mode</td>
<td>168.5</td>
<td>167.0</td>
<td>172.0</td>
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**MAN B&W S46ME-C8.6-HPSCR**

<table>
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<th>L₁ SFOC [g/kWh]</th>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tier III mode</td>
<td>162.0</td>
<td>163.5</td>
<td>169.0</td>
</tr>
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**MAN B&W S46ME-C8.6-LPSCR**

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<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tier III mode</td>
<td>161.5</td>
<td>163.5</td>
<td>169.5</td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>782</td>
<td>2,924</td>
<td>986</td>
<td>8,725</td>
<td>8,175</td>
<td>7,925</td>
</tr>
</tbody>
</table>

| Cylinders: | 5     | 6     | 7     | 8     |
| L\text{min} mm | 5,100 | 5,882 | 6,664 | 7,446 |

### Dry mass

| Tier II | t | 150 | 168 | 191 | 211 |

### Tier III (added)

| EGR | t  | 12  | 12  | 12  | 12  |
| HPSCR | t | 3   | 3   | 4   | 5   |
| LPSCR | t | -   | -   | -   | -   |

---

![Engine Diagram]
MAN B&W G45ME-C9.7

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6,950</td>
</tr>
<tr>
<td>6</td>
<td>8,340</td>
</tr>
<tr>
<td>7</td>
<td>9,730</td>
</tr>
<tr>
<td>8</td>
<td>11,120</td>
</tr>
</tbody>
</table>

**Fuel oil – Tier II**

**MAN B&W G45ME-C9.7**

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opt. load range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>MAN B&amp;W G45ME-C9.7</td>
<td>162.5</td>
<td>161.5</td>
<td>166.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td>MAN B&amp;W G45ME-C9.7</td>
<td>160.5</td>
<td>160.0</td>
<td>168.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td>MAN B&amp;W G45ME-C9.7</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
</tbody>
</table>

**Fuel oil – Tier III**

**MAN B&W G45ME-C9.7-EGRBP**

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>MAN B&amp;W G45ME-C9.7-EGRBP</td>
<td>158.5</td>
<td>161.0</td>
<td>169.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>MAN B&amp;W G45ME-C9.7-EGRBP</td>
<td>165.5</td>
<td>165.5</td>
<td>171.0</td>
</tr>
</tbody>
</table>

**MAN B&W G45ME-C9.7-HPSCR**

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>MAN B&amp;W G45ME-C9.7-HPSCR</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>MAN B&amp;W G45ME-C9.7-HPSCR</td>
<td>160.0</td>
<td>162.0</td>
<td>169.0</td>
</tr>
</tbody>
</table>

**MAN B&W G45ME-C9.7-LPSCR**

<table>
<thead>
<tr>
<th></th>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>MAN B&amp;W G45ME-C9.7-LPSCR</td>
<td>158.5</td>
<td>161.0</td>
<td>168.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>MAN B&amp;W G45ME-C9.7-LPSCR</td>
<td>159.5</td>
<td>162.0</td>
<td>169.5</td>
</tr>
</tbody>
</table>

Note: Also available on request with extended layout for 5 and 6 cylinders.
Specifications

**Dimensions:**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>784</td>
<td>3,350</td>
<td>3,260</td>
<td>1,169</td>
<td>9,725</td>
<td>9,525</td>
<td>9,250</td>
</tr>
</tbody>
</table>

**Cylinders:**

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>L(_{\text{min}}) mm</td>
<td>5,200</td>
<td>5,984</td>
<td>6,768</td>
<td>7,552</td>
</tr>
</tbody>
</table>

**Dry mass**

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>209</td>
</tr>
<tr>
<td></td>
<td>238</td>
</tr>
</tbody>
</table>

**Tier III (added)**

<table>
<thead>
<tr>
<th></th>
<th>12</th>
<th>12</th>
<th>12</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR t</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPSCR t</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>LPSCR t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
## MAN B&W G45ME-C9.5-GI

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,250 mm/L₁ MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6,950</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8,340</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>9,730</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>11,120</td>
<td></td>
</tr>
</tbody>
</table>

### GI (Methane) – Tier II

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

$L₁$ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>137.0+4.1/168.5</td>
<td>135.8+3.1/166.0</td>
<td>142.1+2.6/170.0</td>
</tr>
</tbody>
</table>

### GI (Methane) – Tier III

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

$L₁$ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.7+2.6/172.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>143.0+4.1/171.5</td>
<td>142.6+3.1/170.0</td>
<td>147.3+2.6/175.0</td>
</tr>
</tbody>
</table>

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

$L₁$ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.3+2.6/171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.5+4.1/165.0</td>
<td>139.6+3.1/166.5</td>
<td>144.7+2.6/172.0</td>
</tr>
</tbody>
</table>

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

$L₁$ dual fuel mode (SGC+SPOC (1.5%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>136.2+4.1/163.5</td>
<td>138.8+3.1/165.5</td>
<td>144.3+2.6/171.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>137.0+4.1/164.5</td>
<td>139.6+3.1/166.5</td>
<td>145.1+2.6/172.5</td>
</tr>
</tbody>
</table>
**Specifications**

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>784</td>
<td>3,350</td>
<td>3,260</td>
<td>1,169</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Cylinders: | 5 | 6 | 7 | 8 |
| L\(_{\text{min}}\) mm | 5,200 | 5,984 | 6,768 | 7,552 |

**Dry mass**

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>163</td>
</tr>
<tr>
<td>B1</td>
<td>183</td>
</tr>
<tr>
<td>B2</td>
<td>206</td>
</tr>
<tr>
<td>C</td>
<td>234</td>
</tr>
</tbody>
</table>

| Tier III (added) | 12 | 12 | 12 | 12 |
| EGR t           | 3  | 3  | 4  | 5  |
| HPSCR t         | -  | -  | -  | -  |
| LPSCR t         | -  | -  | -  | -  |

| Dual fuel (added) | 4 | 4 | 5 | 5 |
| GI t             | 4 | 4 | 5 | 5 |

---

**Diagram**

[Diagram of MAN B&W G45ME-C9.5-GI specifications]
MAN Energy Solutions
MAN B&W two-stroke propulsion engines

MAN B&W S40ME-C9.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L1 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5,675</td>
</tr>
<tr>
<td>6</td>
<td>6,810</td>
</tr>
<tr>
<td>7</td>
<td>7,945</td>
</tr>
<tr>
<td>8</td>
<td>9,080</td>
</tr>
<tr>
<td>9</td>
<td>10,215</td>
</tr>
</tbody>
</table>

Stroke: 1,770 mm/L1, MEP: 21.0 bar

Fuel oil – Tier II

MAN B&W S40ME-C9.5

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>172.5</td>
<td>170.0</td>
<td>174.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td></td>
<td>169.5</td>
<td>168.5</td>
<td>175.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td></td>
<td>167.5</td>
<td>169.5</td>
<td>175.5</td>
</tr>
</tbody>
</table>

Fuel oil – Tier III

MAN B&W S40ME-C9.5-EGRBP

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>167.5</td>
<td>169.5</td>
<td>176.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>175.5</td>
<td>174.0</td>
<td>179.0</td>
</tr>
</tbody>
</table>

MAN B&W S40ME-C9.5-HPSCR

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>167.5</td>
<td>169.5</td>
<td>175.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>169.0</td>
<td>170.5</td>
<td>176.0</td>
</tr>
</tbody>
</table>

MAN B&W S40ME-C9.5-LPSCR

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>167.5</td>
<td>169.5</td>
<td>175.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>168.5</td>
<td>170.5</td>
<td>176.5</td>
</tr>
</tbody>
</table>

Note: All fuel consumption figures are based on engine driven HPS.
## Specifications

### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>700</td>
<td>2,650</td>
<td>2,610</td>
<td>950</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{min} mm</td>
<td>4,642</td>
<td>5,342</td>
<td>6,042</td>
<td>6,742</td>
<td>7,442</td>
</tr>
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</table>

### Dry mass

<table>
<thead>
<tr>
<th>Tier II</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>126</td>
</tr>
<tr>
<td>142</td>
<td>157</td>
</tr>
<tr>
<td>189</td>
<td></td>
</tr>
</tbody>
</table>

### Tier III (added)

<table>
<thead>
<tr>
<th></th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>10</th>
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<tbody>
<tr>
<td>EGR t</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>HPSCR t</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>LPSCR t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### MAN B&W S35ME-C9.7

Cyl. | L₁ kW | Stroke: 1,550 mm/L₁ MEP: 21.0 bar
--- | --- | ---
5  | 4,350 |
6  | 5,220 |
7  | 6,090 |
8  | 6,960 |

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁ kW</td>
<td>4,350</td>
<td>5,220</td>
<td>6,090</td>
<td>6,960</td>
</tr>
</tbody>
</table>

**Fuel oil**

**MAN B&W S35ME-C9.7**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td></td>
<td>169.5</td>
<td>167.0</td>
<td>171.0</td>
</tr>
<tr>
<td>Part-load EGB</td>
<td></td>
<td>166.5</td>
<td>165.5</td>
<td>172.5</td>
</tr>
<tr>
<td>Low-load EGB</td>
<td></td>
<td>164.5</td>
<td>166.5</td>
<td>172.5</td>
</tr>
</tbody>
</table>

**GI (Methane)**

**MAN B&W S35ME-C9.7-GI**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>129.8+13.6/169.5</td>
<td>130.5+10.4/167.0</td>
<td>137.9+8.6/171.0</td>
</tr>
</tbody>
</table>

Note: Also available for LGIP, see page 12

Note: All fuel consumption figures are based on engine driven HPS.
MAN B&W S35ME-C9.7

**Tier III**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4,350</td>
</tr>
<tr>
<td>6</td>
<td>5,220</td>
</tr>
<tr>
<td>7</td>
<td>6,090</td>
</tr>
<tr>
<td>8</td>
<td>6,960</td>
</tr>
</tbody>
</table>

**Stroke:** 1,550 mm/L₁, **MEP:** 21.0 bar

---

**Fuel oil**

**MAN B&W S35ME-C9.7-EGRBP**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>164.5</td>
<td>166.5</td>
<td>173.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>172.5</td>
<td>171.0</td>
<td>176.0</td>
</tr>
</tbody>
</table>

**MAN B&W S35ME-C9.7-HPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>164.5</td>
<td>166.5</td>
<td>172.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>166.0</td>
<td>167.5</td>
<td>173.0</td>
</tr>
</tbody>
</table>

**MAN B&W S35ME-C9.7-LPSCR**

<table>
<thead>
<tr>
<th>L₁ SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>164.5</td>
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</tr>
<tr>
<td>Tier III mode</td>
<td>165.5</td>
<td>167.5</td>
<td>173.5</td>
</tr>
</tbody>
</table>

Note: All fuel consumption figures are based on engine driven HPS.
**MAN B&W S35ME-C9.7**

**Cyl.** | **L₁ kW**
---|---
5 | 4,350
6 | 5,220
7 | 6,090
8 | 6,960

**Stroke:** 1,550 mm | **L₁ MEP:** 21.0 bar

---

**GI (Methane)**

**MAN B&W S35ME-C9.7-GI-EGRBP**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>128.9+13.6/164.5</td>
<td>133.5+10.4/166.5</td>
<td>140.4+8.6/173.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>135.7+13.6/172.5</td>
<td>137.3+10.4/171.0</td>
<td>143.0+8.6/176.0</td>
</tr>
</tbody>
</table>

**MAN B&W S35ME-C9.7-GI-HPSCR**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>128.9+13.6/164.5</td>
<td>133.5+10.4/166.5</td>
<td>140.0+8.6/172.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>130.2+13.6/166.0</td>
<td>134.3+10.4/167.5</td>
<td>140.4+8.6/173.0</td>
</tr>
</tbody>
</table>

**MAN B&W S35ME-C9.7-GI-LPSCR**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>128.9+13.6/164.5</td>
<td>133.5+10.4/166.5</td>
<td>140.0+8.6/172.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>129.8+13.6/165.5</td>
<td>134.3+10.4/167.5</td>
<td>140.9+8.6/173.5</td>
</tr>
</tbody>
</table>

**Note:** Also available for LGIP, see page 12

**Note:** All fuel consumption figures are based on engine driven HPS.
## MAN B&W S35ME-C9.7

### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
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<tbody>
<tr>
<td>mm</td>
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<td>2,288</td>
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#### Cylinders:

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<tbody>
<tr>
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<td>4,080</td>
<td>4,692</td>
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#### Dry mass

<table>
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<th>t</th>
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<td>77</td>
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#### Tier III (added)

<table>
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<tr>
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<th>8</th>
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<th>8</th>
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<td>EGR</td>
<td>2</td>
<td>2</td>
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</tr>
<tr>
<td>HPSCR</td>
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<td>-</td>
<td>-</td>
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</tbody>
</table>

#### Dual fuel (added)

<table>
<thead>
<tr>
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<th>3</th>
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<td>GI</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>LGIP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
MAN B&W S30ME-B9.5

Cyl. | L1 kW | Stroke: 1,328 mm/L1 MEP: 21.0 bar
---|---|---
5 | 3,200 | Tier II Fuel oil
6 | 3,840 |
7 | 4,480 |
8 | 5,120 |

Tier II Fuel oil

MAN B&W S30ME-B9.5

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>Opt. load range</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>175.5</td>
<td>173.0</td>
<td>176.0</td>
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</tr>
</tbody>
</table>

Tier III fuel oil

MAN B&W S30ME-B9.5-HPSCR

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>175.5</td>
<td>173.0</td>
<td>176.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>177.0</td>
<td>174.0</td>
<td>176.5</td>
</tr>
</tbody>
</table>

MAN B&W S30ME-B9.5-LPSCR

<table>
<thead>
<tr>
<th>L1 SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>175.5</td>
<td>173.0</td>
<td>176.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>176.0</td>
<td>173.5</td>
<td>176.5</td>
</tr>
</tbody>
</table>

Note: If EGR is the preferred Tier III technology, MAN Energy Solutions must be contacted.
## Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A (mm)</th>
<th>B1 (mm)</th>
<th>B2 (mm)</th>
<th>C (mm)</th>
<th>H1 (mm)</th>
<th>H2 (mm)</th>
<th>H3 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II</td>
<td>538</td>
<td>1,980</td>
<td>2,020</td>
<td>712</td>
<td>6,025</td>
<td>5,950</td>
<td>5,625</td>
</tr>
<tr>
<td>Tier III (added)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Cylinders:

<table>
<thead>
<tr>
<th>( L_{\text{min}} ) (mm)</th>
<th>5 ( \text{Lmin} ) mm</th>
<th>6 ( \text{Lmin} ) mm</th>
<th>7 ( \text{Lmin} ) mm</th>
<th>8 ( \text{Lmin} ) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry mass</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tier II</td>
<td>( t ) 61</td>
<td>( t ) 69</td>
<td>( t ) 77</td>
<td>( t ) 86</td>
</tr>
<tr>
<td>HPSCR</td>
<td>( t ) 1</td>
<td>( t ) 2</td>
<td>( t ) 2</td>
<td>( t ) 2</td>
</tr>
<tr>
<td>LPSCR</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

![Diagram of MAN B&W S30ME-B9.5 engine](image-url)
MAN B&W two-stroke propulsion engines
Alternative fuels
Tier II and Tier III
**MAN B&W G70ME-C10.5-GA**

**Cyl.** | L₁ kW | Stroke: 3,256 mm/L₁ MEP: 17.4 bar
--- | --- | ---
5 | 14,150 |  
6 | 16,980 |  

**GA (Methane)**

**MAN B&W G70ME-C10.5-GA-EGRBP**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode equivalent SFOC (heat-rate)/fuel oil mode SFOC [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier III mode</td>
<td>162.0 (6,918)/171.9</td>
<td>161.0 (6,876)/171.0</td>
<td>166.0 (7,088)/179.0</td>
</tr>
<tr>
<td>Tier II mode</td>
<td>162.0 (6,918)/170.1</td>
<td>161.0 (6,876)/169.2</td>
<td>166.0 (7,088)/177.1</td>
</tr>
</tbody>
</table>
### Specifications

#### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,044</td>
<td>4,470</td>
<td>4,628</td>
<td>1,750</td>
<td>13,800</td>
</tr>
</tbody>
</table>

#### Cylinders:

- **Tier II**: 5
- **Tier III (added)**: 6

<table>
<thead>
<tr>
<th>L_{\text{min}}</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7,549</td>
</tr>
</tbody>
</table>

#### Dry mass

<table>
<thead>
<tr>
<th>Tier</th>
<th>t</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II</td>
<td>526</td>
<td>592</td>
<td></td>
</tr>
</tbody>
</table>

#### Tier III (added)

<table>
<thead>
<tr>
<th>EGR</th>
<th>t</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

#### Dual fuel (added)

<table>
<thead>
<tr>
<th>GA</th>
<th>t</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
**MAN B&W G60ME-C10.5-GA**

**Cyl.** | **L₁ kW**
---|---
5 | 10,400
6 | 12,480
7 | 14,560
8 | 16,640

*Stroke: 2,790 mm/L₁, MEP: 17.4 bar*

**GA (Methane)**

**MAN B&W G60ME-C10.5-GA-EGRBP**

<table>
<thead>
<tr>
<th></th>
<th>Tier III mode</th>
<th>Tier II mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50%</td>
<td>75%</td>
</tr>
<tr>
<td><strong>L₁ dual fuel mode SFOC</strong></td>
<td>(heat-rate)</td>
<td>(heat-rate)</td>
</tr>
<tr>
<td>L₁, g/kWh</td>
<td>(6,917)/172.1</td>
<td>(6,877)/171.2</td>
</tr>
<tr>
<td>L₂, g/kWh</td>
<td>(6,917)/170.3</td>
<td>(6,877)/169.4</td>
</tr>
</tbody>
</table>

---

**MAN Energy Solutions**

**MAN B&W two-stroke propulsion engines**
### Specifications

<table>
<thead>
<tr>
<th>Dimensions:</th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,080</td>
<td>4,090</td>
<td>4,220</td>
<td>1,500</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Cylinders: | | | | | | | |
| L<sub>min</sub> mm | 5 | 6 | 7 | 8 |
| 7,378 | 8,458 | 9,538 | 10,618 |

### Dry mass

| Tier II | t | 399 | 444 | 497 | 549 |

| Tier III (added) | | | | | |
| EGR | t | - | - | - | - |

### Dual fuel (added)

| GA | t | 5 | 5 | 6 | 7 |
MAN B&W G60ME-C10.5

Cyl. | L₁ kW
----|------
5   | 14,200
6   | 17,040
7   | 19,880
8   | 22,720

**Stroke:** 2,790 mm/L₁, **MEP:** 21.0 bar

**GIE (Ethane)**

**MAN B&W G60ME-C10.5-GIE**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>140.8+7.9/164.5</td>
<td>143.5+6.0/160.0</td>
<td>148.4+5.0/165.0</td>
</tr>
<tr>
<td>High-load</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LGIP (LPG)**

**MAN B&W G60ME-C10.5-LGIP**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>145.4+7.9/161.5</td>
<td>148.2+6.0/160.5</td>
<td>153.2+5.0/165.0</td>
</tr>
<tr>
<td>High-load</td>
<td></td>
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</table>
MAN B&W G60ME-C10.5

**Tier III**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>$L_1$ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>14,200</td>
</tr>
<tr>
<td>6</td>
<td>17,040</td>
</tr>
<tr>
<td>7</td>
<td>19,880</td>
</tr>
<tr>
<td>8</td>
<td>22,720</td>
</tr>
</tbody>
</table>

*Stroke: 2,790 mm/L, MEP: 21.0 bar*

---

**GIE (Ethane)**

**MAN B&W G60ME-C10.5-GIE-HPSCR**

$L_1$ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>137.2+7.9/157.5</td>
<td>143.0+6.0/160.0</td>
<td>150.6+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>138.6+7.9/159.0</td>
<td>143.9+6.0/161.0</td>
<td>151.1+5.0/168.0</td>
</tr>
</tbody>
</table>

**MAN B&W G60ME-C10.5-GIE-LPSCR**

$L_1$ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>137.2+7.9/157.5</td>
<td>143.0+6.0/160.0</td>
<td>150.6+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>138.1+7.9/158.5</td>
<td>143.9+6.0/161.0</td>
<td>151.5+5.0/168.5</td>
</tr>
</tbody>
</table>
### MAN B&W G60ME-C10.5

**Cyl.** | **L₁ kW** |
---|---|
5 | 14,200 |
6 | 17,040 |
7 | 19,880 |
8 | 22,720 |

**Stroke:** 2,790 mm/L₁, **MEP:** 21.0 bar

---

### LGIP (LPG)

**MAN B&W G60ME-C10.5-LGIP-EGRBP**

<table>
<thead>
<tr>
<th>L₁</th>
<th>dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
</tr>
<tr>
<td><strong>Tier II mode</strong></td>
<td>138.9+7.9/157.5</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>145.4+7.9/164.5</td>
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**MAN B&W G60ME-C10.5-LGIP-HPSCR**

<table>
<thead>
<tr>
<th>L₁</th>
<th>dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
</tr>
<tr>
<td><strong>Tier II mode</strong></td>
<td>138.9+7.9/157.5</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>140.3+7.9/159.0</td>
</tr>
</tbody>
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**MAN B&W G60ME-C10.5-LGIP-LPSCR**

<table>
<thead>
<tr>
<th>L₁</th>
<th>dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>50%</strong></td>
</tr>
<tr>
<td><strong>Tier II mode</strong></td>
<td>138.9+7.9/157.5</td>
</tr>
<tr>
<td><strong>Tier III mode</strong></td>
<td>139.8+7.9/158.5</td>
</tr>
</tbody>
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### Specifications

#### Dimensions:

<table>
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<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H4</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1,080</td>
<td>4,090</td>
<td>4,220</td>
<td>1,500</td>
<td>12,175</td>
<td>11,975</td>
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#### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III</th>
</tr>
</thead>
<tbody>
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<td>8,470</td>
</tr>
</tbody>
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#### Dry mass

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<th>444</th>
<th>497</th>
<th>549</th>
</tr>
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</table>

#### Tier III (added)

<table>
<thead>
<tr>
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<th>t</th>
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</thead>
<tbody>
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<td>EGR</td>
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<td>24</td>
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<tr>
<td>HPSCR</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>LPSCR</td>
<td>t</td>
<td>t</td>
</tr>
</tbody>
</table>

#### Dual fuel (added)

<table>
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<tbody>
<tr>
<td>GI</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>LGIP</td>
<td>5</td>
<td>5</td>
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</table>
### MAN B&W S60ME-C10.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,400 mm/L₁ MEP: 21.0 bar</th>
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<tbody>
<tr>
<td>5</td>
<td>12,450</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
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<td>8</td>
<td>19,920</td>
<td></td>
</tr>
</tbody>
</table>

---

#### GIE (Ethane)

**MAN B&W S60ME-C10.5-GIE**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>50%</td>
<td>75%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>143.5+7.9/164.5</td>
<td>144.8+6.0/162.0</td>
<td>149.2+5.0/166.0</td>
<td></td>
</tr>
</tbody>
</table>

#### LGIP (LPG)

**MAN B&W S60ME-C10.5-LGIP**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td>50%</td>
<td>75%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>145.4+7.9/164.5</td>
<td>144.9+6.0/162.0</td>
<td>149.5+5.0/166.0</td>
<td></td>
</tr>
</tbody>
</table>
 Tier III

MAN B&W S60ME-C10.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L1 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12,450</td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
</tr>
<tr>
<td>8</td>
<td>19,920</td>
</tr>
</tbody>
</table>

**Stroke:** 2,400 mm/L1 **MEP:** 21.0 bar

GIE (Ethane)

**MAN B&W S60ME-C10.5-GIE-HPSCR**

L1 dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>139.0+7.9/159.5</td>
<td>144.3+6.0/161.5</td>
<td>150.6+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>140.3+7.9/161.0</td>
<td>145.2+6.0/162.5</td>
<td>151.0+5.0/168.0</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C10.5-GIE-LPSCR**

L1 dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>139.0+7.9/159.5</td>
<td>144.3+6.0/161.5</td>
<td>150.6+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>139.9+7.9/160.5</td>
<td>145.2+6.0/162.5</td>
<td>151.5+5.0/168.5</td>
</tr>
</tbody>
</table>
MAN B&W S60ME-C10.5

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12,450</td>
</tr>
<tr>
<td>6</td>
<td>14,940</td>
</tr>
<tr>
<td>7</td>
<td>17,430</td>
</tr>
<tr>
<td>8</td>
<td>19,920</td>
</tr>
</tbody>
</table>

**LGIP (LPG)**

**MAN B&W S60ME-C10.5-LGIP-EGRBP**

L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>140.7+7.9/159.5</td>
<td>144.4+6.0/161.5</td>
<td>151.3+5.0/168.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>148.1+7.9/167.5</td>
<td>148.6+6.0/166.0</td>
<td>154.1+5.0/171.0</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C10.5-LGIP-HPSCR**

L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>140.7+7.9/159.5</td>
<td>144.4+6.0/161.5</td>
<td>150.9+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>142.1+7.9/161.0</td>
<td>145.3+6.0/162.5</td>
<td>151.3+5.0/168.0</td>
</tr>
</tbody>
</table>

**MAN B&W S60ME-C9.10-LGIP-LPSCR**

L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>140.7+7.9/159.5</td>
<td>144.4+6.0/161.5</td>
<td>150.9+5.0/167.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>141.6+7.9/160.5</td>
<td>145.3+6.0/162.5</td>
<td>151.8+5.0/168.5</td>
</tr>
</tbody>
</table>
## Specifications

### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel oil mm</td>
<td>940</td>
<td>3,440</td>
<td>3,520</td>
<td>1,300</td>
<td>10,500</td>
<td>10,175</td>
<td>10,525</td>
</tr>
<tr>
<td>GI mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.500</td>
<td>10.025</td>
<td>10.375</td>
</tr>
<tr>
<td>LGIP mm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.500</td>
<td>10.175</td>
<td>10.525</td>
</tr>
</tbody>
</table>

### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lmin mm</td>
<td>6,440</td>
<td>7,380</td>
<td>8,320</td>
<td>9,260</td>
</tr>
</tbody>
</table>

### Dry mass

| Tier II | t    | 293  | 332  | 369  | 425  |

### Tier III (added)

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EGR t</td>
<td>12</td>
<td>12</td>
<td>21</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>HPSCR t</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>LPSCR t</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Dual fuel (added)

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GI t</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>LGIP t</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
### MAN B&W G50ME-C9.6

#### Cyl. L₁ kW
5  8,600
6  10,320
7  12,040
8  13,760
9  15,480

**Stroke:** 2,500 mm/L₁  **MEP:** 21.0 bar

---

#### GIE (Ethane)

**MAN B&W G50ME-C9.6-GIE**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas tuned</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>142.6+7.9/163.5</td>
<td>145.2+6.0/162.5</td>
<td>150.1+5.0/167.0</td>
<td></td>
</tr>
</tbody>
</table>

#### LGIM (Methanol)

**MAN B&W G50ME-C9.6-LGIM**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas tuned</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>322.4+13.3/163.5</td>
<td>327.2+10.1/162.5</td>
<td>340.4+8.4/167.0</td>
<td></td>
</tr>
</tbody>
</table>

#### LGIP (LPG)

**MAN B&W G50ME-C9.6-LGIP**

<table>
<thead>
<tr>
<th>L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]</th>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High-load</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas tuned</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>144.4+7.9/163.5</td>
<td>145.3+6.0/162.5</td>
<td>150.4+5.0/167.0</td>
<td></td>
</tr>
</tbody>
</table>
Cyl. | L1 kW | Stroke: 2,500 mm/L1 MEP: 21.0 bar
---|---|---
5 | 8,600 |
6 | 10,320 |
7 | 12,040 |
8 | 13,760 |
9 | 15,480 |

GIE (Ethane)

**MAN B&W G50ME-C9.6-GIE-HPSCR**

L1 dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>139.0+7.9/159.5</td>
<td>144.8+6.0/162.0</td>
<td>152.4+5.0/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>140.3+7.9/161.0</td>
<td>145.7+6.0/163.0</td>
<td>152.8+5.0/170.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-GIE-LPSCR**

L1 dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>139.0+7.9/159.5</td>
<td>144.8+6.0/162.0</td>
<td>152.4+5.0/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>139.9+7.9/160.5</td>
<td>145.7+6.0/163.0</td>
<td>153.3+5.0/170.5</td>
</tr>
</tbody>
</table>
**MAN B&W G50ME-C9.6**

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 2,500 mm/L₁ MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,600</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10,320</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12,040</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>13,760</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>15,480</td>
<td></td>
</tr>
</tbody>
</table>

**LGIP (LPG)**

**MAN B&W G50ME-C9.6-LGIP**

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tuned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-load</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>140.3+7.9/161.0</td>
<td>145.7+6.0/163.0</td>
<td>152.8+5.0/170.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-LGIP-EGRBP**

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>140.7+7.9/159.5</td>
<td>144.9+6.0/162.0</td>
<td>153.2+5.0/170.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>147.2+7.9/166.5</td>
<td>149.1+6.0/166.5</td>
<td>155.0+5.0/172.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-LGIP-HPSCR**

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>140.7+7.9/159.5</td>
<td>144.9+6.0/162.0</td>
<td>152.7+5.0/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>142.1+7.9/161.0</td>
<td>145.8+6.0/163.0</td>
<td>153.2+5.0/170.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-LGIP-LPSCR**

<table>
<thead>
<tr>
<th></th>
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<th>75%</th>
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</tr>
</thead>
<tbody>
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<td>Tier III mode</td>
<td>141.6+7.9/160.5</td>
<td>145.8+6.0/163.0</td>
<td>153.6+5.0/170.5</td>
</tr>
</tbody>
</table>
**Tier III**

**MAN B&W G50ME-C9.6**

Stroke: 2,500 mm/L1, MEP: 21.0 bar

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L1 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>8,600</td>
</tr>
<tr>
<td>6</td>
<td>10,320</td>
</tr>
<tr>
<td>7</td>
<td>12,040</td>
</tr>
<tr>
<td>8</td>
<td>13,760</td>
</tr>
<tr>
<td>9</td>
<td>15,480</td>
</tr>
</tbody>
</table>

---

**LGIM (Methanol)**

**MAN B&W G50ME-C9.6-LGIM-EGRBP**

L1 dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>313.8+13.3/159.5</td>
<td>326.1+10.1/162.0</td>
<td>346.9+8.4/170.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>328.8+13.3/166.5</td>
<td>335.8+10.1/166.6</td>
<td>351.1+8.4/172.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-LGIM-HPSCR**

L1 dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>313.8+13.3/159.5</td>
<td>326.1+10.1/162.0</td>
<td>345.8+8.4/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>317.0+13.3/161.0</td>
<td>328.3+10.1/163.0</td>
<td>346.9+8.4/170.0</td>
</tr>
</tbody>
</table>

**MAN B&W G50ME-C9.6-LGIM-LPSCR**

L1 dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>313.8+13.3/159.5</td>
<td>326.1+10.1/162.0</td>
<td>345.8+8.4/169.5</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>316.0+13.3/160.5</td>
<td>328.3+10.1/163.0</td>
<td>347.9+8.4/170.5</td>
</tr>
</tbody>
</table>
MAN B&W G50ME-C9.6

Cyl. | L₁ kW | Stroke: 2,500 mm/L₁ MEP: 21.0 bar
---|-------|---
5  | 8,600 |
6  | 10,320|
7  | 12,040|
8  | 13,760|
9  | 15,480|

LGIM-W (Water in methanol)

MAN B&W G50ME-C9.6-LGIM-W

L₁ dual fuel mode (SGC+SPOC (5.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th></th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier II mode</td>
<td>322.4+13.3/163.5</td>
<td>327.2+10.1/162.5</td>
<td>340.4+8.4/167.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>329.3+13.3/-</td>
<td>334.3+10.1/-</td>
<td>347.6+8.4/-</td>
</tr>
</tbody>
</table>

Note: Tier III operation in fuel oil mode available on request.
Specifications

Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>872</td>
<td>3,776</td>
<td>3,652</td>
<td>1,205</td>
<td>10,775</td>
<td>10,075</td>
<td>9,825</td>
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Cylinders:

<table>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<tbody>
<tr>
<td>L(_{\text{min}}) mm</td>
<td>5,748</td>
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Dry mass

<table>
<thead>
<tr>
<th></th>
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<th>Tier III (added)</th>
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<tbody>
<tr>
<td>t</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td></td>
<td>246</td>
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<td>311</td>
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<td></td>
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EGR

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<th>13</th>
<th>13</th>
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HPSCR

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<tr>
<th></th>
<th>4</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>6</th>
</tr>
</thead>
</table>

LPSCR

<p>| | | | | | |</p>
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<tr>
<th></th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
<th>-</th>
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</thead>
</table>

Dual fuel (added)

GIE

<table>
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<th>5</th>
<th>6</th>
<th>6</th>
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</table>

LGIM

<table>
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<tr>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</table>

LGIM-W*

<table>
<thead>
<tr>
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<th>7</th>
<th>7</th>
<th>8</th>
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<th>10</th>
</tr>
</thead>
</table>

LGIP

<table>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</table>

* Tier III compliance
MAN B&W S35ME-C9.7

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>L₁ kW</th>
<th>Stroke: 1,550 mm/L₁ MEP: 21.0 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4,350</td>
<td></td>
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<tr>
<td>6</td>
<td>5,220</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6,090</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6,960</td>
<td></td>
</tr>
</tbody>
</table>

Tier II LGIP (LPG)

**MAN B&W S35ME-C9.7-LGIP**

L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Gas tuned</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-load</td>
<td>149.8+8.1/169.5</td>
<td>149.4+6.2/167.0</td>
<td>154.0+5.1/171.0</td>
</tr>
</tbody>
</table>

Tier III LGIP (LPG)

**MAN B&W S35ME-C9.7-LGIP-HPSCR**

L₁ dual fuel mode (SGC+SPOC (3.0%))/fuel oil mode (SFOC) [g/kWh]

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>145.1+8.1/164.5</td>
<td>148.9+6.2/166.5</td>
<td>155.8+5.1/173.0</td>
</tr>
<tr>
<td>Tier III mode</td>
<td>152.6+8.1/172.5</td>
<td>153.1+6.2/171.0</td>
<td>158.6+5.1/176.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tier II mode</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier III mode</td>
<td>146.5+8.1/166.0</td>
<td>149.8+6.2/167.5</td>
<td>155.8+5.1/173.0</td>
</tr>
</tbody>
</table>

Note: All fuel consumption figures are based on engine driven HPS.
## Specifications

### Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>612</td>
<td>2,300</td>
<td>2,288</td>
<td>830</td>
<td>7,025</td>
<td>6,675</td>
<td>6,275</td>
</tr>
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</table>

### Cylinders:

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>L\text{_min}</td>
<td>4,430</td>
<td>4,990</td>
<td>5,602</td>
<td>6,275</td>
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</tbody>
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### Dry mass

<table>
<thead>
<tr>
<th></th>
<th>Tier II</th>
<th>Tier III (added)</th>
<th>Dual fuel (added)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>77</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>87</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>98</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>108</td>
<td>8</td>
<td>-</td>
</tr>
</tbody>
</table>

### Tier III (added)

- **EGR**: t 8 8 8 8 8
- **HPSCR**: t 2 2 3 3
- **LPSCR**: t - - - -

### Dual fuel (added)

- **GIE**: t - - - -
- **LGIP**: t 5 5 6 6
- **LGIM**: t 5 5 6 6

---

**Diagram:**

[Diagram showing the dimensions and components of the engine.]
MAN B&W two-stroke propulsion systems
MAN Alpha

Propeller Programme – FPP and CPP

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 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 standard programme is based on ‘no ice’.
Standard programme

Two-stroke propulsion system installation – complete powertrain with propeller and aft ship equipment.
### MAN B&W standard package examples

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D 1) mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>Prop. mass t 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>18,200</td>
<td>83</td>
<td>8,100</td>
<td>1,890</td>
<td>1,436</td>
<td>1,496</td>
<td>3,700</td>
<td>90.0</td>
</tr>
<tr>
<td>6</td>
<td>21,840</td>
<td>83</td>
<td>8,450</td>
<td>2,060</td>
<td>1,565</td>
<td>1,593</td>
<td>3,700</td>
<td>93.5</td>
</tr>
<tr>
<td>7</td>
<td>25,480</td>
<td>83</td>
<td>8,750</td>
<td>2,150</td>
<td>1,634</td>
<td>1,645</td>
<td>3,700</td>
<td>102.0</td>
</tr>
<tr>
<td>8</td>
<td>29,120</td>
<td>83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D(^1) mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>Prop. mass t(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G50ME-C9.6/-GI</td>
<td>5</td>
<td>8,600</td>
<td>100</td>
<td>6,150</td>
<td>1,450</td>
<td>1,102</td>
<td>1,174</td>
<td>3,100</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>10,320</td>
<td>100</td>
<td>6,450</td>
<td>1,550</td>
<td>1,178</td>
<td>1,231</td>
<td>3,100</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>12,040</td>
<td>100</td>
<td>6,650</td>
<td>1,550</td>
<td>1,178</td>
<td>1,231</td>
<td>3,100</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>13,760</td>
<td>100</td>
<td>6,850</td>
<td>1,640</td>
<td>1,246</td>
<td>1,287</td>
<td>2,900</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>15,480</td>
<td>100</td>
<td>7,050</td>
<td>1,730</td>
<td>1,315</td>
<td>1,339</td>
<td>3,100</td>
</tr>
<tr>
<td>S50ME-C9.7/-GI</td>
<td>5</td>
<td>8,900</td>
<td>117</td>
<td>5,650</td>
<td>1,350</td>
<td>1,037</td>
<td>1,096</td>
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<tr>
<td></td>
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<td>10,680</td>
<td>117</td>
<td>5,850</td>
<td>1,450</td>
<td>1,114</td>
<td>1,148</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
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<td>117</td>
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<td>1,114</td>
<td>1,148</td>
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<tr>
<td></td>
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<td>9</td>
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<td>1,640</td>
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<td>S50ME-C8.5/-GI</td>
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<td>1,175</td>
<td>1,248</td>
<td>2,690</td>
</tr>
</tbody>
</table>

\(^1\) 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

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D 1) mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>Prop. mass t 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G45ME-C9.7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6,950</td>
<td>111</td>
<td>5,650</td>
<td>1,350</td>
<td>1,026</td>
<td>1,109</td>
<td>2,700</td>
<td>28.8</td>
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<tr>
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<td>8,340</td>
<td>111</td>
<td>5,900</td>
<td>1,350</td>
<td>1,026</td>
<td>1,109</td>
<td>2,700</td>
<td>30.6</td>
</tr>
<tr>
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<td>9,730</td>
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<td>1,102</td>
<td>1,197</td>
<td>2,700</td>
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<tr>
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<td>111</td>
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<td>37.6</td>
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<td>1,100</td>
<td>885</td>
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<td>146</td>
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<td>1,180</td>
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<td>2,500</td>
<td>24.6</td>
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<tr>
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<td>7,945</td>
<td>146</td>
<td>4,950</td>
<td>1,180</td>
<td>957</td>
<td>1,025</td>
<td>2,500</td>
<td>26.0</td>
</tr>
<tr>
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<td>9,080</td>
<td>146</td>
<td>5,050</td>
<td>1,260</td>
<td>975</td>
<td>1,081</td>
<td>2,500</td>
<td>29.8</td>
</tr>
<tr>
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<td>10,215</td>
<td>146</td>
<td>5,550</td>
<td>1,350</td>
<td>1,026</td>
<td>1,140</td>
<td>2,700</td>
<td>34.4</td>
</tr>
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<td>S35ME-C9.7/-GI</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
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<td>167</td>
<td>4,050</td>
<td>940</td>
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<td>920</td>
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<td>16.3</td>
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<td>920</td>
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<td>16.9</td>
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<tr>
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<td>6,090</td>
<td>167</td>
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<td>1,100</td>
<td>885</td>
<td>946</td>
<td>2,500</td>
<td>19.4</td>
</tr>
<tr>
<td>8</td>
<td>6,960</td>
<td>167</td>
<td>4,450</td>
<td>1,100</td>
<td>885</td>
<td>946</td>
<td>2,500</td>
<td>20.4</td>
</tr>
<tr>
<td>S30ME-B9.5/-GI</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>5</td>
<td>3,200</td>
<td>195</td>
<td>3,500</td>
<td>860</td>
<td>653</td>
<td>750</td>
<td>2,350</td>
<td>10.5</td>
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<tr>
<td>6</td>
<td>3,840</td>
<td>195</td>
<td>3,600</td>
<td>860</td>
<td>653</td>
<td>750</td>
<td>2,350</td>
<td>11.0</td>
</tr>
<tr>
<td>7</td>
<td>4,480</td>
<td>195</td>
<td>3,700</td>
<td>940</td>
<td>714</td>
<td>886</td>
<td>2,350</td>
<td>12.3</td>
</tr>
<tr>
<td>8</td>
<td>5,120</td>
<td>195</td>
<td>3,800</td>
<td>940</td>
<td>714</td>
<td>886</td>
<td>2,350</td>
<td>13.0</td>
</tr>
</tbody>
</table>

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
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 four-stroke propulsion engines
MAN four-stroke propulsion engines – all emission requirements

Besides focus on power density and fuel economy, MAN Energy Solutions 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 Energy Solutions has significantly decreased NO\textsubscript{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 Energy Solutions has developed a comprehensive range of selective catalytic reduction (SCR) systems that tremendously reduce NO\textsubscript{x} levels surpassing IMO Tier III requirements.

MAN Energy Solutions 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 Energy Solutions was awarded the first IMO Tier III EIAPP certificate together with the classification society DNV-GL.

MAN Energy Solutions’ 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 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 SCR system
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 Energy Solutions with your project specific request.

**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 (optional) 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 by the 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 DMA, DMZ, and DMB, and on residual fuels (HFO) up to 700 cSt (in compliance with ISO-F-RMK 700).

**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.

With the MAN 175D, MAN Energy Solutions is presenting a new power pack setting future standards in the high-speed diesel engine market. The MAN 175D, developed especially for use in the shipping industry, is part of a product initiative aimed at providing MAN customers with a product portfolio that covers every power requirement, from high-speed diesel engines to low-speed diesel engines.

**Sequential turbocharging (STC)**

The MAN Energy Solutions 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 Energy Solutions 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 exhaust gas 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 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 Energy Solutions can deliver well-adapted solutions. The optimised combustion chamber ensures very low fuel consumption in both operational modes.

**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 Energy Solutions 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 Energy Solutions 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.

### MAN Cryo LNG standard packages (example sizes)

<table>
<thead>
<tr>
<th>Geometrical volume m³</th>
<th>Net filling volume (95%) m³</th>
<th>Outer diameter m</th>
<th>Tank length (without TCS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>73</td>
<td>3.6</td>
<td>10.9</td>
</tr>
<tr>
<td>100</td>
<td>95</td>
<td>3.6</td>
<td>13.9</td>
</tr>
<tr>
<td>124</td>
<td>118</td>
<td>3.6</td>
<td>16.9</td>
</tr>
<tr>
<td>142</td>
<td>135</td>
<td>4.2</td>
<td>14.0</td>
</tr>
<tr>
<td>175</td>
<td>167</td>
<td>4.2</td>
<td>17.0</td>
</tr>
<tr>
<td>209</td>
<td>199</td>
<td>4.2</td>
<td>20.0</td>
</tr>
<tr>
<td>249</td>
<td>237</td>
<td>5.3</td>
<td>16.4</td>
</tr>
<tr>
<td>300</td>
<td>285</td>
<td>5.3</td>
<td>19.4</td>
</tr>
<tr>
<td>352</td>
<td>335</td>
<td>5.3</td>
<td>22.4</td>
</tr>
<tr>
<td>385</td>
<td>366</td>
<td>6.0</td>
<td>19.8</td>
</tr>
<tr>
<td>450</td>
<td>428</td>
<td>6.0</td>
<td>22.5</td>
</tr>
<tr>
<td>516</td>
<td>491</td>
<td>6.0</td>
<td>25.8</td>
</tr>
<tr>
<td>600</td>
<td>570</td>
<td>6.9</td>
<td>23.2</td>
</tr>
</tbody>
</table>
Engine power

Engine brake power is stated in kW.

Ratings are given according to ISO 3046-1.

According to ISO 15550, the power figures in the tables are valid within a range of ±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 commercial medium speed propulsion engines the power is defined according ICN¹ definition (ISO 3046-1:2002: ISO standard power).

For all navy medium speed propulsion applications the engine rated power is stated as ICFN (ISO standard Continuous Fuel stop Net power), derived from standard ISO 3046-1:2002. It means the engine is capable to deliver power continuously during a period of time corresponding to the application. The engine is operated at stated speed and reference ambient conditions as stated above, while the fuel amount is limited and the fuel stop power cannot be exceeded. The engine rated power is delivered between the maintenance intervals as defined. The ICFN¹ engine power rating description corresponds to 100% engine power output and cannot be exceeded.

Exemplary load profile type:

<table>
<thead>
<tr>
<th>Time [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50 kW/cyl.</td>
</tr>
<tr>
<td>100</td>
</tr>
<tr>
<td>70</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>10</td>
</tr>
</tbody>
</table>

V28/33D STC Navy (ICFN), 500kW/cyl. = 100% engine output
Typical use: fast yachts, corvettes, frigates and OPV

¹ I = Power ISO 3046. C = continuous power output. F = fuel stop power. N = net
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 NOx 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). For engines with conventional fuel injection, SFOC figures are based on DMB-grade fuel oil (ISO 8217). For further details, please refer to our engine specific project guides available from MAN Energy Solutions.

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.
Weights and dimensions

For marine main engines, the weights stated refer to engines without a flywheel.

All weights given are without lube oil and cooling water.

For auxiliary engines (GenSets), weights refer to the unit (including alternator). The weight of the GenSet may vary depending on the alternator make.

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

- Appendix 'technical key feature' (e.g. CR, STC, TS)
- Appendix 'fuel' for others than HFO (e.g. DF, D, G)
- Stroke in cm
- Bore in cm
- L or V version
- Number of cylinders
### MAN four-stroke propulsion engines programme

<table>
<thead>
<tr>
<th>r/min</th>
<th>Engine type</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-514</td>
<td>L51/60DF V51/60DF</td>
</tr>
<tr>
<td>500-514</td>
<td>L48/60CR V48/60CR</td>
</tr>
<tr>
<td>720-750</td>
<td>L35/44DF</td>
</tr>
<tr>
<td>720-750</td>
<td>L32/44CR V32/44CR</td>
</tr>
<tr>
<td>720-750</td>
<td>L32/40 V32/40</td>
</tr>
<tr>
<td>1,000-1,032</td>
<td>V28/33D STC</td>
</tr>
<tr>
<td>800</td>
<td>L27/38 L27/38 (MDO/MGO)</td>
</tr>
<tr>
<td>1,000</td>
<td>L21/31</td>
</tr>
<tr>
<td>1,600-2,000</td>
<td>175D</td>
</tr>
</tbody>
</table>
MAN V51/60DF
High efficiency variant

**Bore**: 510 mm, **Stroke**: 600 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>mep bar</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>514</td>
<td>20.0</td>
<td>12,600</td>
<td>16,800</td>
</tr>
<tr>
<td>500</td>
<td>20.6</td>
<td>12,600</td>
<td>16,800</td>
</tr>
</tbody>
</table>

**Tier III in gas mode**

- **MAN V51/60DF**
  - **Bore**: 510 mm, **Stroke**: 600 mm
  - **Speed**: 514 r/min, **mep**: 20.0 bar
  - **kW**: 12,600
- **14V51/60DF**
  - **Bore**: 510 mm, **Stroke**: 600 mm
  - **Speed**: 514 r/min, **mep**: 20.0 bar
  - **kW**: 14,700
- **16V51/60DF**
  - **Bore**: 510 mm, **Stroke**: 600 mm
  - **Speed**: 514 r/min, **mep**: 20.0 bar
  - **kW**: 16,800

**LHV of fuel gas ≥ 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 at ISO conditions

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific fuel oil consumption 1)</td>
<td>178.5 g/kWh (43 °C) 4)</td>
<td>176.0 g/kWh (43 °C) 4)</td>
</tr>
<tr>
<td>Heat rate 2)</td>
<td>7,150 kJ/kWh (43 °C) 4)</td>
<td>7,150 kJ/kWh (45 °C) 4)</td>
</tr>
</tbody>
</table>

1) Liquid fuel operation
2) Gas operation (including pilot fuel, cetan no ≥ 50), gas fuel: methane no. ≥ 80
3) Related to 100% actual engine load
4) Engine type specific reference charge air temperature before cylinder

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>14</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>L mm</td>
<td>10,254</td>
<td>11,254</td>
<td>12,254</td>
</tr>
<tr>
<td>L₁ mm</td>
<td>9,088</td>
<td>10,088</td>
<td>11,088</td>
</tr>
<tr>
<td>Dry mass t</td>
<td>187</td>
<td>213</td>
<td>240</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 4,800 mm
**MAN L51/60DF**

High efficiency variant

**Bore:** 510 mm, **Stroke:** 600 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>mep bar</td>
<td>20.0</td>
<td>20.6</td>
</tr>
<tr>
<td>kW</td>
<td>6,300</td>
<td>6,300</td>
</tr>
<tr>
<td>6L51/60DF</td>
<td>6,300</td>
<td>6,300</td>
</tr>
<tr>
<td>7L51/60DF</td>
<td>7,350</td>
<td>7,350</td>
</tr>
<tr>
<td>8L51/60DF</td>
<td>8,400</td>
<td>8,400</td>
</tr>
<tr>
<td>9L51/60DF</td>
<td>9,450</td>
<td>9,450</td>
</tr>
</tbody>
</table>

LHV of fuel gas ≥ 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 at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>Specific fuel oil consumption¹</th>
<th>178.5 g/kWh (43°C)⁵</th>
<th>176.0 g/kWh (43°C)⁶</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>Heat rate²</td>
<td>7,150 kJ/kWh (43°C)⁵</td>
<td>7,150 kJ/kWh (45°C)⁶</td>
</tr>
</tbody>
</table>

Specific lube oil consumption³: 0.38 g/kWh for nominal output 1,050 kW/cyl.

¹ Liquid fuel operation
² Gas operation (including pilot fuel), gas fuel: methane no. ≥ 80
³ Related to 100% actual engine load
⁴ Engine type specific reference charge air temperature before cylinder

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>mm</td>
<td>8,494</td>
<td>9,314</td>
<td>10,134</td>
</tr>
<tr>
<td>L₁</td>
<td>mm</td>
<td>7,455</td>
<td>8,275</td>
<td>9,095</td>
</tr>
<tr>
<td>W</td>
<td>mm</td>
<td>3,165</td>
<td>3,165</td>
<td>3,165</td>
</tr>
<tr>
<td>Dry mass</td>
<td>t</td>
<td>106</td>
<td>119</td>
<td>135</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 3,200 mm
**MAN V51/60DF**

High power variant

**Bore:** 510 mm, **Stroke:** 600 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>mep bar</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>514</td>
<td>21.9</td>
<td>13,800</td>
<td>13,800</td>
</tr>
<tr>
<td>500</td>
<td>22.5</td>
<td>16,100</td>
<td>16,100</td>
</tr>
</tbody>
</table>

**Tier III in gas mode**

LHV of fuel gas ≥ 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 at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>100% Specific fuel oil consumption</th>
<th>85% Specific fuel oil consumption</th>
<th>Heat rate 1)</th>
<th>85% Heat rate 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>186.5 g/kWh (43 °C) 2)</td>
<td>182.5 g/kWh (43 °C) 2)</td>
<td>7,400 kJ/kWh (50 °C) 3)</td>
<td>7,400 kJ/kWh (50 °C) 3)</td>
</tr>
</tbody>
</table>

1) Liquid fuel operation
2) Gas operation (including pilot fuel, cetan no ≥ 50 ), gas fuel: methane no. ≥ 80
3) Related to 100% actual engine load
4) Engine type specific reference charge air temperature before cylinder

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>14</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (mm)</td>
<td>10,254</td>
<td>11,254</td>
<td>12,254</td>
</tr>
<tr>
<td>L₁ (mm)</td>
<td>9,088</td>
<td>10,088</td>
<td>11,088</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>187</td>
<td>213</td>
<td>240</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 4,800 mm
**MAN L51/60DF**

High power variant

**Tier III in gas mode**

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L (mm)</th>
<th>L₁ (mm)</th>
<th>W (mm)</th>
<th>Dry mass (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>8,494</td>
<td>7,455</td>
<td>3,165</td>
<td>106</td>
</tr>
<tr>
<td>7</td>
<td>9,314</td>
<td>8,275</td>
<td>3,165</td>
<td>119</td>
</tr>
<tr>
<td>8</td>
<td>10,134</td>
<td>9,095</td>
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<td>135</td>
</tr>
<tr>
<td>9</td>
<td>11,160</td>
<td>9,915</td>
<td>3,283</td>
<td>148</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 3,200 mm

### Specific fuel oil consumption (SFOC) and Heat rate at ISO conditions

**MCR**

100% | 85%

<table>
<thead>
<tr>
<th>Specific fuel oil consumption</th>
<th>186.5 g/kWh (43 °C)⁴</th>
<th>182.5 g/kWh (43 °C)⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat rate⁵(6L51/60DF)</td>
<td>7,440 kJ/kWh (50 °C)⁴</td>
<td>7,420 kJ/kWh (50 °C)⁴</td>
</tr>
<tr>
<td>Heat rate⁶(7L-9L51/60DF)</td>
<td>7,420 kJ/kWh (50 °C)⁴</td>
<td>7,420 kJ/kWh (50 °C)⁴</td>
</tr>
</tbody>
</table>

Specific lube oil consumption⁷: 0.35 g/kWh for nominal output 1,150 kW/cyl.

### Bore: 510 mm, Stroke: 600 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>mep bar</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>514</td>
<td>21.9</td>
<td>6,900</td>
<td>6,900</td>
</tr>
<tr>
<td>500</td>
<td>22.5</td>
<td>8,050</td>
<td>8,050</td>
</tr>
<tr>
<td>9,200</td>
<td>9,200</td>
<td>10,350</td>
<td>10,350</td>
</tr>
</tbody>
</table>

LHV of fuel gas ≥ 28,000 kJ/Nm³
(Nm³ corresponds to one cubic meter of gas at 0 °C and 1.013 bar)

- **Bore:** 510 mm, **Stroke:** 600 mm
- **Speed:** 514 r/min, **mep:** 21.9 bar
- **Power:** 6,900 kW, 8,050 kW, 9,200 kW, 10,350 kW

**Related to 100% actual engine load**

- **Engine type specific reference charge air temperature before cylinder**

### Liquid fuel operation

1) Liquid fuel operation
2) Gas operation (including pilot fuel, cetan no ≥ 50), gas fuel: methane no. ≥ 80
3) Related to 100% actual engine load
4) Engine type specific reference charge air temperature before cylinder

![Diagram of engine dimensions]
MAN V48/60CR

Bore: 480 mm, Stroke: 600 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>mep bar</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>514</td>
<td>25.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>26.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tier III with SCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V48/60CR</td>
</tr>
<tr>
<td>14V48/60CR</td>
</tr>
<tr>
<td>16V48/60CR</td>
</tr>
</tbody>
</table>

Specific fuel oil consumption (SFOC) at ISO conditions

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>V48/60CR</td>
<td>182 g/kWh</td>
<td>173.5 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption:\[1)\]: 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

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>14</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>L mm</td>
<td>10,790</td>
<td>11,790</td>
<td>13,140</td>
</tr>
<tr>
<td>L₁ mm</td>
<td>9,088</td>
<td>10,088</td>
<td>11,088</td>
</tr>
<tr>
<td>Dry mass t</td>
<td>189</td>
<td>213</td>
<td>240</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 4,800 mm
## MAN L48/60CR

### Tier III with SCR

**Bore:** 480 mm, **Stroke:** 600 mm

| Speed r/min | 514 | 500 |
| mep bar     | 25.8 | 26.5 |
| kW          |     |     |

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L48/60CR</td>
<td>7,200</td>
<td>7,200</td>
</tr>
<tr>
<td>7L48/60CR</td>
<td>8,400</td>
<td>8,400</td>
</tr>
<tr>
<td>8L48/60CR</td>
<td>9,600</td>
<td>9,600</td>
</tr>
<tr>
<td>9L48/60CR</td>
<td>10,800</td>
<td>10,800</td>
</tr>
</tbody>
</table>

### Specific fuel oil consumption (SFOC) at ISO conditions

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L48/60CR</td>
<td>184.0 g/kWh</td>
<td>175.5 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption: 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

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (mm)</td>
<td>8,760</td>
<td>9,580</td>
<td>10,540</td>
<td>11,360</td>
</tr>
<tr>
<td>L1 (mm)</td>
<td>7,455</td>
<td>8,275</td>
<td>9,095</td>
<td>9,915</td>
</tr>
<tr>
<td>W (mm)</td>
<td>3,165</td>
<td>3,165</td>
<td>3,280</td>
<td>3,280</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>106</td>
<td>119</td>
<td>135</td>
<td>148</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 3,200 mm

![Engine Diagram](attachment:engine_diagram.png)
**Tier III in gas mode**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L (mm)</th>
<th>L₁ (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>Dry mass (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6,485</td>
<td>5,265</td>
<td>2,539</td>
<td>4,163</td>
<td>43.1</td>
</tr>
<tr>
<td>7</td>
<td>7,015</td>
<td>5,877</td>
<td>2,678</td>
<td>4,369</td>
<td>48.2</td>
</tr>
<tr>
<td>8</td>
<td>7,545</td>
<td>6,407</td>
<td>2,678</td>
<td>4,369</td>
<td>53.3</td>
</tr>
<tr>
<td>9</td>
<td>8,075</td>
<td>6,937</td>
<td>2,678</td>
<td>4,369</td>
<td>57.6</td>
</tr>
<tr>
<td>10</td>
<td>8,605</td>
<td>7,556</td>
<td>2,678</td>
<td>4,369</td>
<td>62.3</td>
</tr>
</tbody>
</table>

**Dimensions**

- **Bore:** 350 mm, **Stroke:** 440 mm
- **Speed r/min:** 750, **mep bar:** 20.0
- **kW:** 3,180, **kW:** 20.1
- **6L35/44DF:** 3,180, **7L35/44DF:** 3,710, **8L35/44DF:** 4,240, **9L35/44DF:** 4,770, **10L35/44DF:** 5,300

**LHV of fuel gas ≥ 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 at ISO conditions**

<table>
<thead>
<tr>
<th>Specific fuel oil consumption</th>
<th>6L</th>
<th>7L-10L</th>
<th>MCR 100%</th>
<th>MCR 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific fuel oil consumption</td>
<td>179.5 g/kWh</td>
<td>178.5 g/kWh</td>
<td>175.5 g/kWh</td>
<td>175.5 g/kWh</td>
</tr>
<tr>
<td>Heat rate</td>
<td>7,410 kJ/kWh</td>
<td>7,440 kJ/kWh</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Engine type specific reference charge air temperature before cylinder 40 °C**

- **1)** Liquid fuel operation
- **2)** Gas operation (including pilot fuel, cetan no ≥ 50), gas fuel: methane no. ≥ 80
- **3)** Related to 100% actual engine load

**Minimum centreline distance for twin engine installation:** 2,500 mm

- **L₁** includes built-on lube oil automatic filter, fuel oil filter and electronic equipment
- **Speed 720 r/min for generator drive only**
### MAN V32/44CR

**Bore:** 320 mm, **Stroke:** 440 mm

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L (mm)</th>
<th>L₁ (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>Dry mass (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7,195</td>
<td>5,795</td>
<td>3,100</td>
<td>4,039</td>
<td>70</td>
</tr>
<tr>
<td>14</td>
<td>7,970</td>
<td>6,425</td>
<td>3,100</td>
<td>4,262</td>
<td>79</td>
</tr>
<tr>
<td>16</td>
<td>8,600</td>
<td>7,055</td>
<td>3,100</td>
<td>4,262</td>
<td>87</td>
</tr>
<tr>
<td>18</td>
<td>9,230</td>
<td>7,685</td>
<td>3,100</td>
<td>4,262</td>
<td>96</td>
</tr>
<tr>
<td>20</td>
<td>9,860</td>
<td>8,315</td>
<td>3,100</td>
<td>4,262</td>
<td>104</td>
</tr>
</tbody>
</table>

**Dimensions**

Minimum centreline distance for twin engine installation: 4,000 mm

- Speed 720 r/min for generator drive/constant speed operation only
- 580 kW/cyl.
- **18V32/44CR** available rigidly mounted only
- Related to 100% actual engine load
- 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

**Specific fuel oil consumption (SFOC) at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>V32/44CR</td>
<td>176.0 g/kWh</td>
<td>172.0 g/kWh</td>
</tr>
<tr>
<td>14V32/44CR</td>
<td>176.5 g/kWh</td>
<td>173.0 g/kWh</td>
</tr>
<tr>
<td>V32/44CR FPP</td>
<td>176.5 g/kWh</td>
<td>172.5 g/kWh</td>
</tr>
<tr>
<td>14V32/44CR FPP</td>
<td>177.5 g/kWh</td>
<td>174.0 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption³: 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
**MAN L32/44CR**

**Bore:** 320 mm, **Stroke:** 440 mm

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L (mm)</th>
<th>L₁ (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>Dry mass (t)</th>
<th>Speed (r/min)</th>
<th>mep (mbar)</th>
<th>kW (MCR)</th>
<th>kW (100%)</th>
<th>kW (85%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L32/44CR</td>
<td>6,312</td>
<td>5,265</td>
<td>2,174</td>
<td>4,163</td>
<td>39.5</td>
<td>750</td>
<td>27.1</td>
<td>3,600</td>
<td>3,600</td>
<td></td>
</tr>
<tr>
<td>7L32/44CR</td>
<td>6,924</td>
<td>5,877</td>
<td>2,359</td>
<td>4,369</td>
<td>44.5</td>
<td>720</td>
<td>28.3</td>
<td>4,060</td>
<td>4,060</td>
<td></td>
</tr>
<tr>
<td>8L32/44CR</td>
<td>7,454</td>
<td>6,407</td>
<td>2,359</td>
<td>4,369</td>
<td>49.5</td>
<td>275</td>
<td></td>
<td>4,800</td>
<td>4,800</td>
<td></td>
</tr>
<tr>
<td>9L32/44CR</td>
<td>7,984</td>
<td>6,937</td>
<td>2,359</td>
<td>4,369</td>
<td>53.5</td>
<td></td>
<td></td>
<td>5,400</td>
<td>5,400</td>
<td></td>
</tr>
<tr>
<td>10L32/44CR</td>
<td>8,603</td>
<td>7,556</td>
<td>2,359</td>
<td>4,369</td>
<td>58.0</td>
<td></td>
<td></td>
<td>6,000</td>
<td>6,000</td>
<td></td>
</tr>
</tbody>
</table>

**Specific fuel oil consumption (SFOC) at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>MCR</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L32/44CR</td>
<td>176.0 g/kWh</td>
<td>172.0 g/kWh</td>
<td></td>
</tr>
<tr>
<td>7L32/44CR</td>
<td>176.5 g/kWh</td>
<td>173.0 g/kWh</td>
<td></td>
</tr>
<tr>
<td>L32/44CR FPP</td>
<td>176.5 g/kWh</td>
<td>172.5 g/kWh</td>
<td></td>
</tr>
<tr>
<td>7L32/44CR FPP</td>
<td>177.5 g/kWh</td>
<td>174.0 g/kWh</td>
<td></td>
</tr>
</tbody>
</table>

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

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

Wet oil sump available upon request
MAN V32/40

**Bore:** 320 mm, **Stroke:** 400 mm

<table>
<thead>
<tr>
<th></th>
<th>Speed r/min</th>
<th>mep bar</th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V32/40</td>
<td>750</td>
<td>24.9</td>
<td>6,000</td>
<td>6,000</td>
</tr>
<tr>
<td>14V32/40</td>
<td>720</td>
<td>25.9</td>
<td>7,000</td>
<td>7,000</td>
</tr>
<tr>
<td>16V32/40</td>
<td>720</td>
<td>25.9</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>18V32/40</td>
<td>720</td>
<td>25.9</td>
<td>9,000</td>
<td>9,000</td>
</tr>
</tbody>
</table>

**Specific fuel oil consumption (SFOC) at ISO conditions**

<table>
<thead>
<tr>
<th></th>
<th>MCR 100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>V32/40</td>
<td>184 g/kWh</td>
<td>182 g/kWh</td>
</tr>
<tr>
<td>V32/40 FPP</td>
<td>187 g/kWh</td>
<td>183 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption*: 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**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>L mm</td>
<td>6,915</td>
<td>7,545</td>
<td>8,365</td>
<td>8,995</td>
</tr>
<tr>
<td>L₁ mm</td>
<td>5,890</td>
<td>6,520</td>
<td>7,150</td>
<td>7,780</td>
</tr>
<tr>
<td>W mm</td>
<td>3,140</td>
<td>3,140</td>
<td>3,730</td>
<td>3,730</td>
</tr>
<tr>
<td>H mm</td>
<td>4,100</td>
<td>4,100</td>
<td>4,420</td>
<td>4,420</td>
</tr>
<tr>
<td>Dry mass t</td>
<td>61</td>
<td>68</td>
<td>77</td>
<td>85</td>
</tr>
</tbody>
</table>

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

* Related to 100% actual engine load
## Tier III with SCR

**MAN L32/40**

**Bore:** 320 mm, **Stroke:** 400 mm

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>mm</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
<td>5,940</td>
<td>6,470</td>
<td>7,000</td>
<td>7,530</td>
</tr>
<tr>
<td>L₁</td>
<td></td>
<td>5,140</td>
<td>5,670</td>
<td>6,195</td>
<td>6,725</td>
</tr>
<tr>
<td>W</td>
<td></td>
<td>2,630</td>
<td>2,630</td>
<td>2,715</td>
<td>2,715</td>
</tr>
<tr>
<td>H</td>
<td></td>
<td>4,010</td>
<td>4,010</td>
<td>4,490</td>
<td>4,490</td>
</tr>
<tr>
<td>Dry mass</td>
<td>t</td>
<td>38</td>
<td>42</td>
<td>47</td>
<td>51</td>
</tr>
</tbody>
</table>

**Speed r/min**

<table>
<thead>
<tr>
<th></th>
<th>750</th>
<th>720</th>
</tr>
</thead>
<tbody>
<tr>
<td>mep bar</td>
<td>24.9</td>
<td>25.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>kW</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L32/40</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>7L32/40</td>
<td>3,500</td>
<td>3,500</td>
</tr>
<tr>
<td>8L32/40</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>9L32/40</td>
<td>4,500</td>
<td>4,500</td>
</tr>
</tbody>
</table>

**Specific fuel oil consumption (SFOC) at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L32/40</td>
<td>186 g/kWh</td>
<td>183 g/kWh</td>
</tr>
<tr>
<td>L32/40 FPP</td>
<td>189 g/kWh</td>
<td>184 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption*: 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

**Fixed pitch propeller:** 450 kW/cyl., 750 r/min

Minimum centreline distance for twin engine installation: 2,500 mm. Please contact MAN Energy Solutions for the precise information about the centreline distance for two engines with the same cylinder number standing near each other.

Speed 720 r/min for generator drive/constant speed operation only.

Related to 100% actual engine load

---

1) Related to 100% actual engine load
**MAN V28/33D STC**

**Bore:** 280 mm, **Stroke:** 330 mm

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (mm)</td>
<td>6,207</td>
<td>7,127</td>
<td>8,047</td>
</tr>
<tr>
<td>H&lt;sup&gt;2)&lt;/sup&gt; (mm)</td>
<td>3,417</td>
<td>3,417</td>
<td>3,417</td>
</tr>
<tr>
<td>H&lt;sup&gt;3)&lt;/sup&gt; (mm)</td>
<td>3,682</td>
<td>3,682</td>
<td>3,682</td>
</tr>
<tr>
<td>Dry mass&lt;sup&gt;4)&lt;/sup&gt; (t)</td>
<td>36.1</td>
<td>43.6</td>
<td>51.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>100%</th>
<th>85%</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V28/33D STC</td>
<td>189.0</td>
<td>186.0</td>
<td>194.0</td>
<td>188.5</td>
</tr>
<tr>
<td>16V28/33D STC</td>
<td>188.0</td>
<td>183.5</td>
<td>192.0</td>
<td>186.5</td>
</tr>
<tr>
<td>20V28/33D STC</td>
<td>188.0</td>
<td>183.5</td>
<td>192.0</td>
<td>186.5</td>
</tr>
</tbody>
</table>

Specific fuel oil consumption (SFOC) at ISO conditions

Specific lube oil consumption<sup>3)</sup>: 0.4 g/kWh for nominal output 455 kW/cyl., 0.36 g/kWh for nominal output 500 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**

Weight and performance parameters refer to engine with flywheel, TC silencer, attached pumps, oil filters and lube oil cooler.

V28/33D STC as marine main engine to be applied for multi-engine plants only in class-approved vessels.

---

1) Related to 100% actual engine load
2) With low oilsump
3) With deep oilsump
4) Tolerance: 5%
## MAN L27/38

**Bore:** 270 mm, **Stroke:** 380 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>800</th>
<th>800 (MDO(^0)/MGO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mep bar kW</td>
<td>23.5</td>
<td>25.2</td>
</tr>
<tr>
<td>6L27/38</td>
<td>2,040</td>
<td>2,190</td>
</tr>
<tr>
<td>7L27/38</td>
<td>2,380</td>
<td>2,555</td>
</tr>
<tr>
<td>8L27/38</td>
<td>2,720</td>
<td>2,920</td>
</tr>
<tr>
<td>9L27/38</td>
<td>3,060</td>
<td>3,285</td>
</tr>
</tbody>
</table>

### Specific fuel oil consumption (SFOC) at ISO conditions

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L27/38 CPP</td>
<td>340 kW</td>
<td>365 kW</td>
</tr>
<tr>
<td></td>
<td>188 g/kWh</td>
<td>191 g/kWh</td>
</tr>
<tr>
<td>L27/38 FPP</td>
<td>187 g/kWh</td>
<td>191 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption 0.8 g/kWh

Engine type specific reference charge air temperature before cylinder 40 °C

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L mm</td>
<td>5,070</td>
<td>5,515</td>
<td>5,960</td>
<td>6,405</td>
</tr>
<tr>
<td>L(_1) mm</td>
<td>3,962</td>
<td>4,407</td>
<td>4,852</td>
<td>5,263</td>
</tr>
<tr>
<td>H mm</td>
<td>3,555</td>
<td>3,687</td>
<td>3,687</td>
<td>3,687</td>
</tr>
<tr>
<td>Dry mass t</td>
<td>29.0</td>
<td>32.5</td>
<td>36.0</td>
<td>39.5</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 2,500 mm

\(\) MDO viscosity must not exceed 6 mm\(^2\)/s = cSt at 40 °C.
**MAN L21/31**

**Bore:** 210 mm, **Stroke:** 310 mm

<table>
<thead>
<tr>
<th>Speed</th>
<th>r/min</th>
<th>mep</th>
<th>bar</th>
<th>kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L21/31</td>
<td>1,290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7L21/31</td>
<td>1,505</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8L21/31</td>
<td>1,720</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9L21/31</td>
<td>1,935</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Specific fuel oil consumption (SFOC) at ISO conditions**

<table>
<thead>
<tr>
<th>MCR</th>
<th>100%</th>
<th>85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L21/31 CPP</td>
<td>192 g/kWh</td>
<td>190 g/kWh</td>
</tr>
<tr>
<td>L21/31 FPP</td>
<td>192 g/kWh</td>
<td>190 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption 0.4-0.8 g/kWh

Engine type specific reference charge air temperature before cylinder 40 °C

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (mm)</td>
<td>4,544</td>
<td>4,899</td>
<td>5,254</td>
<td>5,609</td>
</tr>
<tr>
<td>L₁ (mm)</td>
<td>3,424</td>
<td>3,779</td>
<td>4,134</td>
<td>4,489</td>
</tr>
<tr>
<td>H (mm)</td>
<td>3,113</td>
<td>3,267</td>
<td>3,267</td>
<td>3,267</td>
</tr>
<tr>
<td>W (mm)</td>
<td>1,695</td>
<td>1,695</td>
<td>1,820</td>
<td>1,820</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>16.0</td>
<td>17.5</td>
<td>19.0</td>
<td>20.5</td>
</tr>
</tbody>
</table>

Minimum centreline distance for twin engine installation: 2,400 mm
**Tier II Tier III**

**Tier III with SCR**

**MAN 175D**

**Bore:** 175 mm, **Stroke:** 215 mm

<table>
<thead>
<tr>
<th>Engine model</th>
<th>Rating def.</th>
<th>kW</th>
<th>rpm</th>
<th>g/kWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V175D-MH</td>
<td>Heavy Duty</td>
<td>1,499</td>
<td>1,600</td>
<td>188.0/189.0</td>
<td>100</td>
</tr>
<tr>
<td>12V175D-MH</td>
<td>Heavy Duty</td>
<td>1,499</td>
<td>1,800</td>
<td>194.5/195.5</td>
<td>100</td>
</tr>
<tr>
<td>12V175D-MH</td>
<td>Heavy Duty</td>
<td>1,740</td>
<td>1,800</td>
<td>192.5/193.5</td>
<td>85</td>
</tr>
<tr>
<td>12V175D-MM</td>
<td>Medium Duty</td>
<td>1,860</td>
<td>1,800</td>
<td>191.0/192.0</td>
<td>80</td>
</tr>
<tr>
<td>12V175D-MM</td>
<td>Medium Duty</td>
<td>2,040</td>
<td>1,800</td>
<td>190.5/191.5</td>
<td>70</td>
</tr>
<tr>
<td>12V175D-MM</td>
<td>Medium Duty</td>
<td>2,220</td>
<td>1,800</td>
<td>191.5/193.0</td>
<td>40</td>
</tr>
<tr>
<td>12V175D-MM</td>
<td>Medium Duty</td>
<td>2,220</td>
<td>1,900</td>
<td>195.0/196.0</td>
<td>65</td>
</tr>
<tr>
<td>12V175D-ML</td>
<td>Light Duty</td>
<td>2,400</td>
<td>2,000</td>
<td>197.5/198.0</td>
<td>60</td>
</tr>
<tr>
<td>12V175D-ML</td>
<td>Light Duty</td>
<td>2,580</td>
<td>2,000</td>
<td>* / -</td>
<td>60</td>
</tr>
</tbody>
</table>

* Please contact MAN Energy Solutions

For multi-engine arrangement only. Specific fuel oil consumption according to ISO 3046-1:2002 based on a lower calorific value of 42,700 kJ/kg with attached lube oil, HT and LT cooling water pumps fulfilling IMO Tier II/Tier III emission limits with 5% tolerance.

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>mm</td>
</tr>
<tr>
<td>L₂</td>
<td>mm</td>
</tr>
<tr>
<td>L₃</td>
<td>mm</td>
</tr>
<tr>
<td>H</td>
<td>mm</td>
</tr>
<tr>
<td>W</td>
<td>mm</td>
</tr>
<tr>
<td>Dry mass</td>
<td>t</td>
</tr>
</tbody>
</table>

Configuration shown: MAN 12V175D-MM without seawater cooler
**MAN 175D**

16V

**Bore:** 175 mm, **Stroke:** 215 mm

---

<table>
<thead>
<tr>
<th>Engine model</th>
<th>Rating def.</th>
<th>kw</th>
<th>rpm</th>
<th>g/kWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>16V175D-MH</td>
<td>Heavy Duty</td>
<td>2,000</td>
<td>1,600</td>
<td>191.0/192.0</td>
<td>100</td>
</tr>
<tr>
<td>16V175D-MH</td>
<td>Heavy Duty</td>
<td>2,000</td>
<td>1,800</td>
<td>197.5/198.5</td>
<td>100</td>
</tr>
<tr>
<td>16V175D-MH</td>
<td>Heavy Duty</td>
<td>2,320</td>
<td>1,800</td>
<td>195.5/196.5</td>
<td>85</td>
</tr>
<tr>
<td>16V175D-MM</td>
<td>Medium Duty</td>
<td>2,480</td>
<td>1,800</td>
<td>194.0/195.0</td>
<td>80</td>
</tr>
<tr>
<td>16V175D-MM</td>
<td>Medium Duty</td>
<td>2,720</td>
<td>1,800</td>
<td>193.5/194.5</td>
<td>70</td>
</tr>
<tr>
<td>16V175D-MM</td>
<td>Medium Duty</td>
<td>2,960</td>
<td>1,800</td>
<td>194.5/196.0</td>
<td>40</td>
</tr>
<tr>
<td>16V175D-MM</td>
<td>Medium Duty</td>
<td>2,960</td>
<td>1,900</td>
<td>198.0/199.0</td>
<td>65</td>
</tr>
<tr>
<td>16V175D-ML</td>
<td>Light Duty</td>
<td>3,200</td>
<td>2,000</td>
<td>200.5/201.0</td>
<td>60</td>
</tr>
</tbody>
</table>

For multi-engine arrangement only. Specific fuel oil consumption according to ISO 3046-1:2002 based on a lower calorific value of 42,700 kJ/kg with attached lube oil, HT and LT cooling water pumps fulfilling IMO Tier II/Tier III emission limits with 5% tolerance.

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L₁</th>
<th>mm</th>
<th>3,254</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L₂</td>
<td>mm</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>L₃</td>
<td>mm</td>
<td>3,421</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>mm</td>
<td>2,316</td>
</tr>
<tr>
<td></td>
<td>W</td>
<td>mm</td>
<td>1,661</td>
</tr>
<tr>
<td></td>
<td>Dry mass</td>
<td>t</td>
<td>10.80</td>
</tr>
</tbody>
</table>

Configuration shown: MAN 16V175D-MM without seawater cooler
MAN 175D

Bore: 175 mm, Stroke: 215 mm

### Dimensions (preliminary)

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>mm</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L₁</td>
<td>3,774</td>
<td></td>
</tr>
<tr>
<td>L₂</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>L₃</td>
<td>3,941</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>2,297</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>1,647</td>
<td></td>
</tr>
<tr>
<td>Dry mass</td>
<td>t</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Configuration shown: MAN 20V175D-MM without seawater cooler

<table>
<thead>
<tr>
<th>Engine model</th>
<th>Rating def.</th>
<th>kW</th>
<th>rpm</th>
<th>g/kWh</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20V175D-MH</td>
<td>Heavy Duty</td>
<td>2,500</td>
<td>1,600</td>
<td>189.5/190.5</td>
<td>100</td>
</tr>
<tr>
<td>20V175D-MH</td>
<td>Heavy Duty</td>
<td>2,500</td>
<td>1,800</td>
<td>196.0/197.0</td>
<td>100</td>
</tr>
<tr>
<td>20V175D-MH</td>
<td>Heavy Duty</td>
<td>2,900</td>
<td>1,800</td>
<td>194.0/195.0</td>
<td>85</td>
</tr>
<tr>
<td>20V175D-MM</td>
<td>Medium Duty</td>
<td>3,100</td>
<td>1,800</td>
<td>192.5/193.5</td>
<td>80</td>
</tr>
<tr>
<td>20V175D-MM</td>
<td>Medium Duty</td>
<td>3,400</td>
<td>1,800</td>
<td>192.0/193.0</td>
<td>70</td>
</tr>
<tr>
<td>20V175D-MM</td>
<td>Medium Duty</td>
<td>3,700</td>
<td>1,800</td>
<td>193.0/194.5</td>
<td>40</td>
</tr>
<tr>
<td>20V175D-MM</td>
<td>Medium Duty</td>
<td>3,700</td>
<td>1,900</td>
<td>196.5/197.5</td>
<td>65</td>
</tr>
<tr>
<td>20V175D-ML</td>
<td>Light Duty</td>
<td>4,000</td>
<td>2,000</td>
<td>199.0/199.5</td>
<td>60</td>
</tr>
<tr>
<td>20V175D-ML</td>
<td>Light Duty</td>
<td>4,400</td>
<td>2,000</td>
<td>199.0/-</td>
<td>60</td>
</tr>
</tbody>
</table>

For multi-engine arrangement only. Specific fuel oil consumption according to ISO 3046-1:2002 based on a lower calorific value of 42,700 kJ/kg with attached lube oil, HT and LT cooling water pumps fulfilling IMO Tier II/Tier III emission limits with 5% tolerance.
MAN four-stroke marine GenSets
MAN four-stroke marine GenSets – all emission requirements

Besides focus on power density and fuel economy, MAN Energy Solutions is committed to a steady reduction of the environmental impact of our engines.

IMO Tier II

MAN Energy Solutions has decreased NOₓ 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 Energy Solutions has developed a comprehensive range of selective catalytic reduction (SCR) systems that provides a tremendous reduction in NOₓ levels surpassing IMO Tier III requirements.

MAN Energy Solutions 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 Energy Solutions was awarded the first IMO Tier III EIAPP certificate together with the classification society DNV-GL.
MAN Energy Solutions’ 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.
100% MCR PTO-solutions for L21/31 Mk 2 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)
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 the new development of L21/31 Mk 2 together with part-load optimisation techniques, fuel oil savings of up to nearly 12 g/kWh have been obtained, depending on the engine type/model and load point.

Traditionally, GenSets are optimised at 80-85% MCR due to limitations in turbocharger matching, but this is also the load point where power management 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 Energy Solutions.

![Graph showing SFOC vs. Power for different engines and conditions](image-url)

Electric and hybrid propulsion trains (HyProp ECO)

MAN Energy Solutions offers a full range of electric and hybrid power and propulsion plants. Our solutions are designed and optimised to meet the highest efficiencies of an integrated system covering the complete operational profile of the vessel. Our propulsion systems provide a well-balanced and tailor-made solution with emphasis on increased fuel efficiency, flexibility and performance.

Our comprehensive propulsion packages include the complete array of required components from GenSets to propulsors, including switchboards, variable speed drives, propulsion motors and controls. They ensure the optimal technical and economical solution while minimising the operational costs.

The HyProp ECO introduces a system to control the power delivered by or to the shaft machine. It overcomes the constraint on constant speed propulsion machinery by utilising variable speed drives at the shaft generator/motor.

Our innovative HyProp battery system also integrates batteries which enable an optimised loading of our engines, and provide an electric spinning reserve, dynamic support of the propellers as well as peak shaving.

High-efficient and customised power trains for electric and hybrid propulsion applications
HyProp ECO
Hybrid propulsion system
Energy saving electric propulsion (EPROX-DC)

Recent developments in 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.

Another major advantage is the possible integration of energy storage systems, 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 system allows a constant and high loading of the engines, provides spinning reserve and will have a positive effect on engine maintenance.

MAN Energy Solutions offers this advanced package solution in close cooperation with our partner Aspin Kemp & Associates.
EPROX-DC propulsion solution on anchor handling tug supply vessel
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.

Monocoque GenSet
Marine fuels after 2020 (in accordance with ISO 8217)

From 1 January 2020, the global 0.5% limit for sulphur content in marine fuels enters into force. To ensure compliant operation, one of following methods must be used:

- HFO GenSet running on a compliant low-sulphur fuel oil (LSFO) in accordance with ISO 8217.
- Global: max 0.5% sulphur (VLSFO).
- ECA: max 0.1% sulphur (ULSFO).
- HFO GenSet running on a high-sulphur fuel oil (HSFO) in accordance with ISO 8217 and with a SO\textsubscript{X} scrubber for exhaust gas cleaning.
- DF GenSet running on LNG with a compliant pilot distillate fuel.

MAN GenSets have for decades been running on low-sulphur and low-viscosity fuels on small power plants on Greenland. The many years of experience have been transferred to the standard marine GenSet. To be prepared for operation on compliant fuels after 2020, the HFO GenSets will be updated with optimised fuel pumps and inlet/exhaust valve materials for low-viscosity fuels.

It is important to note that paraffinic and aromatic fuels are incompatible and should not be mixed in the same fuel tank. Notice the issued Service Letters, PrimeServ Customer Information and follow MAN guidelines.
GenSets can be applied as auxiliary GenSets, GenSets for 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.
Tier III in gas mode

Bore: 350 mm, Stroke: 440 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>Frequency Hz</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>750</td>
<td>50</td>
<td>3,180</td>
<td>3,069</td>
<td>3,060</td>
<td>2,953</td>
</tr>
<tr>
<td>720</td>
<td>60</td>
<td>3,710</td>
<td>3,580</td>
<td>3,570</td>
<td>3,445</td>
</tr>
<tr>
<td>6L35/44DF</td>
<td></td>
<td>4,240</td>
<td>4,092</td>
<td>4,080</td>
<td>3,937</td>
</tr>
<tr>
<td>7L35/44DF</td>
<td></td>
<td>4,770</td>
<td>4,603</td>
<td>4,590</td>
<td>4,429</td>
</tr>
<tr>
<td>8L35/44DF</td>
<td></td>
<td>5,300</td>
<td>5,115</td>
<td>5,100</td>
<td>4,922</td>
</tr>
<tr>
<td>9L35/44DF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10L35/44DF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>Dry mass (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6,270</td>
<td>3,900</td>
<td>10,170</td>
<td>2,958</td>
<td>4,631</td>
<td>85</td>
</tr>
<tr>
<td>7</td>
<td>6,900</td>
<td>4,100</td>
<td>11,000</td>
<td>3,108</td>
<td>4,867</td>
<td>94</td>
</tr>
<tr>
<td>8</td>
<td>7,480</td>
<td>4,400</td>
<td>11,880</td>
<td>3,108</td>
<td>4,867</td>
<td>103</td>
</tr>
<tr>
<td>9</td>
<td>8,110</td>
<td>4,600</td>
<td>12,710</td>
<td>3,108</td>
<td>4,867</td>
<td>110</td>
</tr>
<tr>
<td>10</td>
<td>8,690</td>
<td>4,800</td>
<td>13,490</td>
<td>3,108</td>
<td>4,867</td>
<td>118</td>
</tr>
</tbody>
</table>

1) Based on nominal generator efficiencies of 96.5%
2) Dimensions are not finally fixed
3) Depending on alternator applied

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

Bore: 320 mm, Stroke: 440 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>Tier II</th>
<th>Tier III</th>
</tr>
</thead>
<tbody>
<tr>
<td>750</td>
<td>720</td>
<td></td>
</tr>
<tr>
<td>Frequency Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine kW</th>
<th>Generator kW</th>
<th>Engine kW</th>
<th>Generator kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,200</td>
<td>6,984</td>
<td>7,200</td>
<td>6,984</td>
</tr>
<tr>
<td>8,120</td>
<td>7,876</td>
<td>8,120</td>
<td>7,876</td>
</tr>
<tr>
<td>9,600</td>
<td>9,312</td>
<td>9,600</td>
<td>9,312</td>
</tr>
<tr>
<td>10,800</td>
<td>10,476</td>
<td>10,800</td>
<td>10,476</td>
</tr>
<tr>
<td>12,000</td>
<td>11,640</td>
<td>12,000</td>
<td>11,640</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (mm)</td>
<td>5,382</td>
<td>6,012</td>
<td>6,642</td>
<td>7,272</td>
<td>7,902</td>
</tr>
<tr>
<td>B (mm)</td>
<td>4,201</td>
<td>4,201</td>
<td>4,201</td>
<td>4,201</td>
<td>4,201</td>
</tr>
<tr>
<td>C (mm)</td>
<td>11,338</td>
<td>11,968</td>
<td>12,598</td>
<td>13,228</td>
<td>13,858</td>
</tr>
<tr>
<td>H (mm)</td>
<td>5,014</td>
<td>5,014</td>
<td>5,014</td>
<td>5,014</td>
<td>5,014</td>
</tr>
<tr>
<td>Dry Mass (t)</td>
<td>117</td>
<td>131</td>
<td>144</td>
<td>159</td>
<td>172</td>
</tr>
</tbody>
</table>

1) Based on nominal generator efficiencies of 97%
2) 580 kW/cyl.
3) 18V32/44CR available rigidly mounted only
   Frame Auxiliary Box (FAB) available upon request
Tier III with SCR

Bore: 320 mm, Stroke: 440 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>50</th>
<th>Frequency Hz</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine kW</td>
<td>750</td>
<td>Generator kW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6L32/44CR</td>
<td>3,600</td>
<td>4,060</td>
<td>4,800</td>
<td>5,400</td>
</tr>
<tr>
<td>7L32/44CR 2)</td>
<td>4,060</td>
<td>4,800</td>
<td>5,400</td>
<td>6,000</td>
</tr>
<tr>
<td>8L32/44CR</td>
<td>4,800</td>
<td>5,211</td>
<td>5,400</td>
<td>5,790</td>
</tr>
<tr>
<td>9L32/44CR</td>
<td>5,400</td>
<td>5,790</td>
<td>6,000</td>
<td>5,790</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>10,738</td>
<td>11,268</td>
<td>11,798</td>
<td>12,328</td>
<td>12,858</td>
</tr>
<tr>
<td>L1</td>
<td>10,150</td>
<td>10,693</td>
<td>11,236</td>
<td>11,779</td>
<td>12,309</td>
</tr>
<tr>
<td>W</td>
<td>2,490</td>
<td>2,490</td>
<td>2,573</td>
<td>2,573</td>
<td>2,573</td>
</tr>
<tr>
<td>H</td>
<td>4,768</td>
<td>4,768</td>
<td>4,955</td>
<td>4,955</td>
<td>4,955</td>
</tr>
<tr>
<td>Dry mass</td>
<td>71</td>
<td>78</td>
<td>84</td>
<td>91</td>
<td>97</td>
</tr>
</tbody>
</table>

1) Based on nominal generator efficiencies of 96.5%
2) 580 kW/cyl.

Frame Auxiliary Box (FAB) available upon request

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)
MAN L32/44

Tier III with SCR

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

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>750</th>
<th>720</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Hz</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L32/44</td>
<td>3,498</td>
<td>3,375</td>
<td>3,498</td>
<td>3,375</td>
</tr>
<tr>
<td>8L32/44</td>
<td>4,664</td>
<td>4,500</td>
<td>4,664</td>
<td>4,500</td>
</tr>
<tr>
<td>9L32/44</td>
<td>5,247</td>
<td>5,063</td>
<td>5,247</td>
<td>5,063</td>
</tr>
<tr>
<td>10L32/44</td>
<td>5,830</td>
<td>5,625</td>
<td>5,830</td>
<td>5,625</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>W (mm)</th>
<th>H (mm)</th>
<th>Dry mass t</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6,470</td>
<td>3,990</td>
<td>10,460</td>
<td>2,845</td>
<td>4,701</td>
<td>82</td>
</tr>
<tr>
<td>8</td>
<td>7,531</td>
<td>4,229</td>
<td>11,760</td>
<td>3,054</td>
<td>4,887</td>
<td>98</td>
</tr>
<tr>
<td>9</td>
<td>8,061</td>
<td>4,529</td>
<td>12,590</td>
<td>3,105</td>
<td>4,887</td>
<td>107</td>
</tr>
<tr>
<td>10</td>
<td>8,590</td>
<td>4,530</td>
<td>13,120</td>
<td>3,105</td>
<td>4,887</td>
<td>113</td>
</tr>
</tbody>
</table>

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

**Bore:** 320 mm, **Stroke:** 400 mm

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (mm)</td>
<td>11,045</td>
<td>11,710</td>
<td>12,555</td>
<td>13,185</td>
</tr>
<tr>
<td>L₁ (mm)</td>
<td>10,450</td>
<td>11,115</td>
<td>11,950</td>
<td>12,580</td>
</tr>
<tr>
<td>W (mm)</td>
<td>3,365</td>
<td>3,365</td>
<td>3,730</td>
<td>3,730</td>
</tr>
<tr>
<td>H (mm)</td>
<td>4,850</td>
<td>4,850</td>
<td>5,245</td>
<td>5,245</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>101</td>
<td>113</td>
<td>126</td>
<td>138</td>
</tr>
</tbody>
</table>

### Dimensions

**Eng. kW**

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V32/40</td>
<td>6,000</td>
<td>5,820</td>
<td>6,000</td>
<td>5,820</td>
</tr>
<tr>
<td>14V32/40</td>
<td>7,000</td>
<td>6,790</td>
<td>7,000</td>
<td>6,790</td>
</tr>
<tr>
<td>16V32/40</td>
<td>8,000</td>
<td>7,760</td>
<td>8,000</td>
<td>7,760</td>
</tr>
<tr>
<td>18V32/40</td>
<td>9,000</td>
<td>8,730</td>
<td>9,000</td>
<td>8,730</td>
</tr>
</tbody>
</table>

**Gen. kW**

(1) Based on nominal generator efficiencies of 97%

- **Speed** r/min 750
- **Frequency** Hz 50
- **Eng. kW**
- **Gen. kW**

### Diagram

- **L**
- **L₁**
- **W**
- **H**
- **1,920**
- **2,340**
Tier III with SCR

**Bore:** 320 mm, **Stroke:** 400 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>750</th>
<th>720</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Hz</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>A mm</th>
<th>6,340</th>
<th>6,870</th>
<th>7,400</th>
<th>7,930</th>
</tr>
</thead>
<tbody>
<tr>
<td>B mm</td>
<td>3,415</td>
<td>3,415</td>
<td>3,635</td>
<td>3,635</td>
<td></td>
</tr>
<tr>
<td>C mm</td>
<td>9,755</td>
<td>10,285</td>
<td>11,035</td>
<td>11,565</td>
<td></td>
</tr>
<tr>
<td>H mm</td>
<td>4,622</td>
<td>4,622</td>
<td>4,840</td>
<td>4,840</td>
<td></td>
</tr>
</tbody>
</table>

**Dry mass t**
- 6L32/40: 75.0
- 7L32/40: 79.0
- 8L32/40: 87.0
- 9L32/40: 91.0

*Based on nominal generator efficiencies of 96.5%*

**MAN L32/40**

Bore: 320 mm, Stroke: 400 mm

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>Speed r/min</th>
<th>Frequency Hz</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L32/40</td>
<td>3,000</td>
<td>50</td>
<td>3,000</td>
<td>2,895</td>
<td>3,000</td>
<td>2,895</td>
</tr>
<tr>
<td>7L32/40</td>
<td>3,500</td>
<td>50</td>
<td>3,500</td>
<td>3,378</td>
<td>3,500</td>
<td>3,378</td>
</tr>
<tr>
<td>8L32/40</td>
<td>4,000</td>
<td>50</td>
<td>4,000</td>
<td>3,860</td>
<td>4,000</td>
<td>3,860</td>
</tr>
<tr>
<td>9L32/40</td>
<td>4,500</td>
<td>50</td>
<td>4,500</td>
<td>4,343</td>
<td>4,500</td>
<td>4,343</td>
</tr>
</tbody>
</table>

**Dimensions**

- **A**: 6,340 mm
- **B**: 3,415 mm
- **C**: 9,755 mm
- **H**: 4,622 mm

**Dry mass t**
- 6L32/40: 75.0
- 7L32/40: 79.0
- 8L32/40: 87.0
- 9L32/40: 91.0

*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 (without gallery) ~3,220 mm (with gallery)
## MAN L28/32DF

**Bore:** 280 mm, **Stroke:** 320 mm

<table>
<thead>
<tr>
<th>Speed r/min</th>
<th>750</th>
<th>720</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Hz</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td><strong>Eng. kW</strong></td>
<td><strong>Gen. kW</strong></td>
<td><strong>Eng. kW</strong></td>
</tr>
<tr>
<td>5L28/32DF</td>
<td>1,050</td>
<td>1,000</td>
</tr>
<tr>
<td>6L28/32DF</td>
<td>1,260</td>
<td>1,200</td>
</tr>
<tr>
<td>7L28/32DF</td>
<td>1,470</td>
<td>1,400</td>
</tr>
<tr>
<td>8L28/32DF</td>
<td>1,680</td>
<td>1,600</td>
</tr>
<tr>
<td>9L28/32DF</td>
<td>1,890</td>
<td>1,800</td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (mm)</td>
<td>4,321</td>
<td>4,801</td>
<td>5,281</td>
<td>5,761</td>
<td>6,241</td>
</tr>
<tr>
<td>B (mm)</td>
<td>2,400</td>
<td>2,510</td>
<td>2,680</td>
<td>2,770</td>
<td>2,690</td>
</tr>
<tr>
<td>C (mm)</td>
<td>6,721</td>
<td>7,311</td>
<td>7,961</td>
<td>8,531</td>
<td>8,931</td>
</tr>
<tr>
<td>H (mm)</td>
<td>2,835</td>
<td>3,009</td>
<td>3,009</td>
<td>3,009</td>
<td>3,009</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>32.6</td>
<td>36.3</td>
<td>39.4</td>
<td>40.7</td>
<td>47.1</td>
</tr>
</tbody>
</table>

1) Based on nominal generator efficiencies of 95%
Gas methane number ≥ 80

---

**Bore:** 280 mm, **Stroke:** 320 mm

- **A** (mm): 4,321
- **B** (mm): 2,400
- **C** (mm): 6,721
- **H** (mm): 2,835
- **Dry mass** (t): 32.6

**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)
Tier III with SCR

**MAN L27/38**

**Bore:** 270 mm, **Stroke:** 380 mm

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>H</td>
<td>Dry mass</td>
</tr>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td>t</td>
</tr>
<tr>
<td>5L27/38</td>
<td>4,346</td>
<td>2,486</td>
<td>6,832</td>
<td>3,712</td>
<td>40.0</td>
</tr>
<tr>
<td>6L27/38</td>
<td>4,791</td>
<td>2,766</td>
<td>7,557</td>
<td>3,712</td>
<td>44.5</td>
</tr>
<tr>
<td>7L27/38</td>
<td>5,236</td>
<td>2,766</td>
<td>8,002</td>
<td>3,899</td>
<td>50.4</td>
</tr>
<tr>
<td>8L27/38</td>
<td>5,681</td>
<td>2,986</td>
<td>8,667</td>
<td>3,899</td>
<td>58.2</td>
</tr>
<tr>
<td>9L27/38</td>
<td>6,126</td>
<td>2,986</td>
<td>9,112</td>
<td>3,899</td>
<td>64.7</td>
</tr>
</tbody>
</table>

**Dimensions**

- **A:** 4,346 mm  
- **B:** 2,486 mm  
- **C:** 6,832 mm  
- **H:** 3,712 mm  
- **Dry mass:** 40.0 t

1) **MDO viscosity must not exceed 6 mm²/s = cSt @ 40 °C**

2) **Based on nominal generator efficiencies of 96%**

**Speed** (r/min) & **Frequency** (Hz)

<table>
<thead>
<tr>
<th>5L27/38</th>
<th>6L27/38</th>
<th>7L27/38</th>
<th>8L27/38</th>
<th>9L27/38</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eng. kW</td>
<td>Gen. kW</td>
<td>Eng. kW</td>
<td>Gen. kW</td>
<td>Eng. kW</td>
</tr>
<tr>
<td>1,600/1,500</td>
<td>1,535/1,440</td>
<td>2,100</td>
<td>2,015</td>
<td></td>
</tr>
<tr>
<td>1,980</td>
<td>1,900</td>
<td>2,450</td>
<td>2,355</td>
<td></td>
</tr>
<tr>
<td>2,310</td>
<td>2,220</td>
<td>2,800</td>
<td>2,690</td>
<td></td>
</tr>
<tr>
<td>2,640</td>
<td>2,535</td>
<td>3,150</td>
<td>3,025</td>
<td></td>
</tr>
<tr>
<td>2,970</td>
<td>2,850</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Eng. kW** & **Gen. kW**

- **5L27/38:** 1,600/1,500
- **6L27/38:** 1,980
- **7L27/38:** 2,310
- **8L27/38:** 2,640
- **9L27/38:** 2,970

**Eng. kW** & **Gen. kW**

- **5L27/38:** 1,535/1,440
- **6L27/38:** 1,900
- **7L27/38:** 2,220
- **8L27/38:** 2,535
- **9L27/38:** 2,850

**Eng. kW** & **Gen. kW**

- **5L27/38:** 2,100
- **6L27/38:** 2,450
- **7L27/38:** 2,800
- **8L27/38:** 3,150
- **9L27/38:** 3,025

**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 3

### Dimensions (5-7 cylinder)

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>r/min</th>
<th>5L23/30H Mk 3 ECR</th>
<th>5L23/30H Mk 3</th>
<th>6L23/30H Mk 3</th>
<th>7L23/30H Mk 3</th>
<th>8L23/30H Mk 3</th>
<th>9L23/30H Mk 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Eng. kW</td>
<td>Gen. kW</td>
<td>Eng. kW</td>
<td>Gen. kW</td>
<td>Eng. kW</td>
<td>Gen. kW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>500</td>
<td>475</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>885</td>
<td>840</td>
<td>850</td>
<td>810</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,062</td>
<td>1,010</td>
<td>1,020</td>
<td>970</td>
<td>1,200</td>
<td>1,140</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,239</td>
<td>1,180</td>
<td>1,190</td>
<td>1,130</td>
<td>1,400</td>
<td>1,330</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,416</td>
<td>1,345</td>
<td>1,360</td>
<td>1,290</td>
<td>1,600</td>
<td>1,520</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,593</td>
<td>1,515</td>
<td>1,530</td>
<td>1,455</td>
<td>1,800</td>
<td>1,710</td>
</tr>
</tbody>
</table>

### Dimensions (8-9 cylinder)

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>r/min</th>
<th>8L23/30H Mk 3</th>
<th>9L23/30H Mk 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Eng. kW</td>
<td>Gen. kW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720/750</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>720/750</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>900</td>
<td>720/750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>900</td>
<td>720/750</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,489</td>
<td>4,896</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,859</td>
<td>5,266</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,352</td>
<td>2,352</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,402</td>
<td>2,402</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,841</td>
<td>7,248</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7,261</td>
<td>7,668</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,621</td>
<td>2,621</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,621</td>
<td>2,621</td>
</tr>
</tbody>
</table>

### Dry mass

- **5L23/30H Mk 3 ECR**: 16.8 t
- **5L23/30H Mk 3**: 16.8 t
- **6L23/30H Mk 3**: 18.4 t
- **7L23/30H Mk 3**: 18.6 t
- **8L23/30H Mk 3**: 20.7 t
- **9L23/30H Mk 3**: 20.7 t

### Bore and Stroke

- **Bore**: 225 mm
- **Stroke**: 300 mm

### Key Specifications

- **Speed**: 750 r/min, 720 r/min, 900 r/min
- **Frequency**: 50 Hz, 60 Hz, 60 Hz
- **Eng. kW**
  - **5L23/30H Mk 3 ECR**: -
  - **5L23/30H Mk 3**: 885
  - **6L23/30H Mk 3**: 1,062
  - **7L23/30H Mk 3**: 1,239
  - **8L23/30H Mk 3**: 1,416
  - **9L23/30H Mk 3**: 1,593
- **Gen. kW**
  - **5L23/30H Mk 3 ECR**: 500
  - **5L23/30H Mk 3**: 840
  - **6L23/30H Mk 3**: 1,010
  - **7L23/30H Mk 3**: 1,180
  - **8L23/30H Mk 3**: 1,345
  - **9L23/30H Mk 3**: 1,515

### Notes

- Based on nominal generator efficiencies of 95%
- Note: Part load optimised – available

### Free Passage and Minimum Distance

- 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)
Bore: 225 mm, Stroke: 300 mm

Speed r/min 750 720 900
Frequency Hz 50 60 60

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>r/min</th>
<th>5L23/30H Mk 2 ECR</th>
<th>5L23/30H Mk 2</th>
<th>6L23/30H Mk 2</th>
<th>7L23/30H Mk 2</th>
<th>8L23/30H Mk 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Eng. kW</td>
<td></td>
<td>Eng. kW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gen. kW</td>
<td></td>
<td>Gen. kW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>3,379</td>
<td>3,379</td>
<td>3,749</td>
<td>3,749</td>
<td>4,119</td>
<td>4,119</td>
</tr>
<tr>
<td>B</td>
<td>2,202</td>
<td>2,202</td>
<td>2,225</td>
<td>2,225</td>
<td>2,302</td>
<td>2,302</td>
</tr>
<tr>
<td>C</td>
<td>5,581</td>
<td>6,001</td>
<td>6,001</td>
<td>6,421</td>
<td>6,421</td>
<td>6,421</td>
</tr>
<tr>
<td>H</td>
<td>2,621</td>
<td>2,621</td>
<td>2,621</td>
<td>2,621</td>
<td>2,621</td>
<td>2,621</td>
</tr>
</tbody>
</table>

| Dry mass t     | 16.8  | 18.4             | 18.6          | 20.7          | 20.7          | 22.5          |

1) Based on nominal generator efficiencies of 95%

Note: Part load optimised – available

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)
### MAN L23/30DF

**Bore:** 225 mm, **Stroke:** 300 mm

<table>
<thead>
<tr>
<th>Speed</th>
<th>r/min</th>
<th>750</th>
<th>720</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Hz</td>
<td>50</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>Eng. kW</th>
<th>Gen. kW&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>Eng. kW</th>
<th>Gen. kW&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>Eng. kW</th>
<th>Gen. kW&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>5L23/30DF</td>
<td>625</td>
<td>590</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6L23/30DF</td>
<td>750</td>
<td>710</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7L23/30DF</td>
<td>875</td>
<td>830</td>
<td>1,050</td>
<td>995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8L23/30DF</td>
<td>1,000</td>
<td>950</td>
<td>1,200</td>
<td>1,140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9L23/30DF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>5</th>
<th>6</th>
<th>6</th>
<th>7</th>
<th>7</th>
<th>8</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>r/min</td>
<td>720/750</td>
<td>720/750</td>
<td>900</td>
<td>720/750</td>
<td>900</td>
<td>720/750</td>
<td>900</td>
</tr>
<tr>
<td>A (mm)</td>
<td>3,469</td>
<td>3,839</td>
<td>3,839</td>
<td>4,209</td>
<td>4,276</td>
<td>4,579</td>
<td>4,896</td>
</tr>
<tr>
<td>B (mm)</td>
<td>2,202</td>
<td>2,252</td>
<td>2,252</td>
<td>2,302</td>
<td>2,302</td>
<td>2,352</td>
<td>2,352</td>
</tr>
<tr>
<td>C (mm)</td>
<td>5,671</td>
<td>6,091</td>
<td>6,091</td>
<td>6,511</td>
<td>6,578</td>
<td>6,931</td>
<td>7,241</td>
</tr>
<tr>
<td>H (mm)</td>
<td>2,749</td>
<td>2,749</td>
<td>2,749</td>
<td>2,749</td>
<td>2,749</td>
<td>2,749</td>
<td>2,749</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>17.3</td>
<td>19.0</td>
<td>19.2</td>
<td>21.4</td>
<td>21.4</td>
<td>23.3</td>
<td>23.4</td>
</tr>
</tbody>
</table>

<sup>1)</sup> Based on nominal generator efficiencies of 95%. 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)
Tier III with SCR

**Bore:** 210 mm, **Stroke:** 310 mm

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
<th>Eng. kW</th>
<th>Gen. kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>5L21/31 Mk 2</td>
<td>1,000</td>
<td>950</td>
<td>1,000</td>
<td>950</td>
</tr>
<tr>
<td>6L21/31 Mk 2</td>
<td>1,320</td>
<td>1,255</td>
<td>1,320</td>
<td>1,255</td>
</tr>
<tr>
<td>7L21/31 Mk 2</td>
<td>1,540</td>
<td>1,465</td>
<td>1,540</td>
<td>1,465</td>
</tr>
<tr>
<td>8L21/31 Mk 2</td>
<td>1,760</td>
<td>1,675</td>
<td>1,760</td>
<td>1,675</td>
</tr>
<tr>
<td>9L21/31 Mk 2</td>
<td>1,980</td>
<td>1,880</td>
<td>1,980</td>
<td>1,880</td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. no.</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>H (mm)</th>
<th>Dry mass (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3,485</td>
<td>1,870</td>
<td>5,355</td>
<td>3,183</td>
<td>22.3</td>
</tr>
<tr>
<td>6</td>
<td>3,840</td>
<td>2,000</td>
<td>5,840</td>
<td>3,183</td>
<td>25.8</td>
</tr>
<tr>
<td>7</td>
<td>4,258</td>
<td>1,970</td>
<td>6,228</td>
<td>3,289</td>
<td>29.3</td>
</tr>
<tr>
<td>8</td>
<td>5,161</td>
<td>2,110</td>
<td>7,208</td>
<td>3,289</td>
<td>32.8</td>
</tr>
<tr>
<td>9</td>
<td>5,516</td>
<td>2,135</td>
<td>7,651</td>
<td>3,289</td>
<td>36.3</td>
</tr>
</tbody>
</table>

1) Based on nominal generator efficiencies of 95%

**Note:** Part load optimised – available

**P** Free passage between the engines, width 600 mm and height 2,000 mm

**Q** Minimum distance between centre of engines: ~2,500 mm (without gallery) ~2,700 mm (with gallery).
**MAN 175D**

12V

**Bore:** 175 mm, **Stroke:** 215 mm, **Cylinder:** 12

<table>
<thead>
<tr>
<th>Engine model</th>
<th>Rating def.</th>
<th>kWm</th>
<th>kWe&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>rpm (frequency)</th>
<th>g/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V175D-MEM</td>
<td>Electric propulsion medium duty</td>
<td>1,440</td>
<td>1,382</td>
<td>1,500 (50 Hz)</td>
<td>184/185</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,800</td>
<td>1,728</td>
<td>1,800 (60 Hz)</td>
<td>190/191</td>
</tr>
<tr>
<td>12V175D-MEL</td>
<td>Electric propulsion light duty</td>
<td>1,620</td>
<td>1,555</td>
<td>1,500 (50 Hz)</td>
<td>183/184</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,920</td>
<td>1,843</td>
<td>1,800 (60 Hz)</td>
<td>189/190</td>
</tr>
<tr>
<td>12V175D-MEV</td>
<td>Electric propulsion variable speed</td>
<td>1,860</td>
<td>1,786</td>
<td>1,080-1,800 (36-60 Hz)</td>
<td>191/192</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,040</td>
<td>1,958</td>
<td>1,080-1,800 (36-60 Hz)</td>
<td>190/191</td>
</tr>
<tr>
<td>12V175D-MA</td>
<td>Auxiliary power</td>
<td>1,620</td>
<td>1,555</td>
<td>1,500 (50 Hz)</td>
<td>183/184</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,920</td>
<td>1,843</td>
<td>1,800 (60 Hz)</td>
<td>189/190</td>
</tr>
</tbody>
</table>

<sup>1)</sup> 3-phase, 0.8 p.f., assumes alternator efficiency of 96.0%

Specific fuel oil consumption related to mechanical output acc. to ISO 3046-1:2002 based on a lower calorific value of fuel 42,700 kJ/kg with attached lube oil, HT and LT-cooling water pumps limitations with 5% tolerance.

**Rating definitions:**

- **Marine electric propulsion medium duty**
  - Average load: up to 75%
- **Marine electric propulsion light duty**
  - Average load: up to 50%
- **Marine electric propulsion, variable speed**
  - Average load: up to 75%/50%
- **Marine auxiliary**
  - Average load: up to 50%

**Dimensions**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>mm</td>
<td>5,385</td>
</tr>
<tr>
<td>L&lt;sub&gt;1&lt;/sub&gt;</td>
<td>mm</td>
<td>5,000</td>
</tr>
<tr>
<td>H</td>
<td>mm</td>
<td>2,670</td>
</tr>
<tr>
<td>W</td>
<td>mm</td>
<td>1,770</td>
</tr>
<tr>
<td>Dry weight</td>
<td>t</td>
<td>15.80</td>
</tr>
</tbody>
</table>

Weight and dimensions are preliminary. Please request installation drawing for planning purposes.
**MAN 175D**

**Bore:** 175 mm, **Stroke:** 215 mm, **Cylinder:** 16

<table>
<thead>
<tr>
<th>Engine model</th>
<th>Rating def.</th>
<th>kWm</th>
<th>kWe&lt;sup&gt;1)&lt;/sup&gt;</th>
<th>rpm (frequency)</th>
<th>g/kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>16V175D-MEM</td>
<td>Electric propulsion medium duty</td>
<td>1,920</td>
<td>1,843</td>
<td>1,500 (50 Hz)</td>
<td>187/188</td>
</tr>
<tr>
<td></td>
<td>Electric propulsion light duty</td>
<td>2,400</td>
<td>2,304</td>
<td>1,800 (60 Hz)</td>
<td>193/194</td>
</tr>
<tr>
<td>16V175D-MEL</td>
<td>Electric propulsion light duty</td>
<td>2,160</td>
<td>2,074</td>
<td>1,500 (50 Hz)</td>
<td>186/187</td>
</tr>
<tr>
<td></td>
<td>Electric propulsion variable speed</td>
<td>2,560</td>
<td>2,458</td>
<td>1,800 (60 Hz)</td>
<td>192/193</td>
</tr>
<tr>
<td>16V175D-MEV</td>
<td>Electric propulsion variable speed</td>
<td>2,480</td>
<td>2,381</td>
<td>1,080-1,800 (36-60 Hz)</td>
<td>194/195</td>
</tr>
<tr>
<td></td>
<td>Auxiliary power</td>
<td>2,720</td>
<td>2,611</td>
<td>1,080-1,800 (36-60 Hz)</td>
<td>193/194</td>
</tr>
<tr>
<td>16V175D-MA</td>
<td>Auxiliary power</td>
<td>2,400</td>
<td>2,304</td>
<td>1,800 (60 Hz)</td>
<td>193/194</td>
</tr>
</tbody>
</table>

<sup>1)</sup> 3-phase, 0.8 p.f., assumes alternator efficiency of 96.0%.
Specific fuel oil consumption related to mechanical output acc. to ISO 3046-1:2002 based on a lower calorific value of fuel 42,700 kJ/kg with attached lube oil, HT and LT-cooling water pumps limitations with 5 % tolerance.

### Rating definitions

- **Marine electric propulsion medium duty**  
  Average load: up to 75%
- **Marine electric propulsion light duty**  
  Average load: up to 50%
- **Marine electric propulsion, variable speed**  
  Average load: up to 75%/50%

### Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>mm</td>
<td>6,000</td>
</tr>
<tr>
<td>H</td>
<td>mm</td>
<td>2,850</td>
</tr>
<tr>
<td>W</td>
<td>mm</td>
<td>1,800</td>
</tr>
<tr>
<td>Dry weight</td>
<td>t</td>
<td>23</td>
</tr>
</tbody>
</table>

Weight and dimensions are preliminary. Please request installation drawing for planning purposes.
**MAN 175D**

**Bore:** 175 mm, **Stroke:** 215 mm, **Cylinder:** 20

### Engine model | Rating def. | kWm | kWe | rpm (frequency) | g/kWh
---|---|---|---|---|---
**20V175D-MEM**
Electric propulsion medium duty | 2,400 | 2,304 | 1,500 (50 Hz) | 185.5/186.5
**20V175D-MEL**
Electric propulsion light duty | 2,700 | 2,592 | 1,500 (50 Hz) | 184.5/185.5
**20V175D-MEV**
Electric propulsion variable speed | 3,100 | 2,976 | 1,080-1,800 (36-60 Hz) | 192.5/193.5

3-phase, 0.8 p.f., assumes alternator efficiency of 96.0%.
Specific fuel oil consumption related to mechanical output acc. to ISO 3046-1:2002 based on a lower calorific value of fuel 42,700 kJ/kg with attached lube oil, HT and LT-cooling water pumps limitations with 5 % tolerance.

### Rating definitions

- **Marine electric propulsion medium duty**
  - Average load: up to 75%
- **Marine electric propulsion light duty**
  - Average load: up to 50%
- **Marine electric propulsion, variable speed**
  - Average load: up to 75%/50%

### Dimensions

| L (mm) | 6,500 |
| H (mm) | 2,900 |
| W (mm) | 1,800 |
| Dry weight (t) | 27 |

Weight and dimensions are preliminary. Please request installation drawing for planning purposes.
S.E.M.T. Pielstick
four-stroke propulsion engines
S.E.M.T. Pielstick PA6 B STC

**Bore:** 280 mm, **Stroke:** 330 mm

<table>
<thead>
<tr>
<th></th>
<th>Standard engine</th>
<th>Load profile 'Navy'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed r/min</td>
<td>1,050</td>
<td>1,084</td>
</tr>
<tr>
<td>mep bar</td>
<td>22.8</td>
<td>24.3</td>
</tr>
<tr>
<td>Rated power output kW&lt;sup&gt;1)&lt;/sup&gt;</td>
<td>- ICFN kW</td>
<td>-</td>
</tr>
<tr>
<td>12PA6 B STC</td>
<td>4,860</td>
<td>5,346</td>
</tr>
<tr>
<td>16PA6 B STC</td>
<td>6,480</td>
<td>7,128</td>
</tr>
<tr>
<td>20PA6 B STC</td>
<td>8,100</td>
<td>8,910</td>
</tr>
</tbody>
</table>

**Specific fuel oil consumption (SFOC) to ISO conditions**

<table>
<thead>
<tr>
<th>Engine rating</th>
<th>ICFN stop power</th>
<th>MCR 100%</th>
<th>MCR 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load profile 'Navy'</td>
<td>212 g/kWh</td>
<td>205 g/kWh</td>
<td>193 g/kWh</td>
</tr>
</tbody>
</table>

Specific lube oil consumption<sup>1)</sup>: 0.7 g/kWh.
Figures on theoretical propeller curve for distillates according to ISO 8217 DMA, with all attached pumps.

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>L mm</td>
<td>5,830</td>
<td>6,780</td>
<td>7,960</td>
</tr>
<tr>
<td>W mm</td>
<td>2,340</td>
<td>2,340</td>
<td>2,640</td>
</tr>
<tr>
<td>H mm</td>
<td>3,124</td>
<td>3,124</td>
<td>3,166</td>
</tr>
<tr>
<td>Dry mass t</td>
<td>31</td>
<td>37</td>
<td>43</td>
</tr>
</tbody>
</table>

Engine fuel: distillate according to ISO 8217 DMA and DMZ. Capabilities with JP-5 and bio-fuel.
Shock qualification.

<sup>1)</sup> Related to 100% actual engine load.
S.E.M.T. Pielstick PA6 B

Tier III with SCR

GenSet for electric propulsion.

Bore 280 mm, Stroke 330 mm

<table>
<thead>
<tr>
<th>Speed (r/min)</th>
<th>MCR 110%</th>
<th>MCR 100%</th>
<th>MCR 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency 50 Hz</td>
<td>4,440</td>
<td>4,307</td>
<td>4,200</td>
</tr>
<tr>
<td>Frequency 60 Hz</td>
<td>5,920</td>
<td>5,742</td>
<td>5,600</td>
</tr>
<tr>
<td>12PA6 B</td>
<td>6,660</td>
<td>6,460</td>
<td>6,300</td>
</tr>
<tr>
<td>20PA6 B</td>
<td>7,400</td>
<td>7,178</td>
<td>7,000</td>
</tr>
</tbody>
</table>

Specific fuel oil consumption (SFOC) to ISO conditions

<table>
<thead>
<tr>
<th>Engine rating</th>
<th>MCR 110%</th>
<th>MCR 100%</th>
<th>MCR 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency 50 Hz</td>
<td>204 g/kWh</td>
<td>200 g/kWh</td>
<td>198 g/kWh</td>
</tr>
<tr>
<td>Frequency 60 Hz</td>
<td>204 g/kWh</td>
<td>199 g/kWh</td>
<td>197 g/kWh</td>
</tr>
</tbody>
</table>

Figures on theoretical propeller curve for distillates according to ISO 8217 DMA, with all attached pumps.

Dimensions

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>12</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (mm)</td>
<td>4,370</td>
<td>4,727</td>
<td>4,732</td>
<td>4,770</td>
</tr>
<tr>
<td>B (mm)</td>
<td>4,600</td>
<td>5,637</td>
<td>6,097</td>
<td>6,557</td>
</tr>
<tr>
<td>C (mm)</td>
<td>9,287</td>
<td>10,583</td>
<td>11,048</td>
<td>11,547</td>
</tr>
<tr>
<td>H (mm)</td>
<td>3,695</td>
<td>3,695</td>
<td>3,695</td>
<td>3,695</td>
</tr>
<tr>
<td>E (mm)</td>
<td>2,670</td>
<td>2,670</td>
<td>2,670</td>
<td>2,670</td>
</tr>
<tr>
<td>Dry mass (t)</td>
<td>60</td>
<td>72</td>
<td>80</td>
<td>85</td>
</tr>
</tbody>
</table>

1) Nominal generator efficiencies: 97%.
2) Dimensions are based on operation under inclination up to 25 degrees in any direction.
3) Incl. 5% tolerance, weight may vary due to different configurations.

Engine fuel: distillate according to ISO 8217 DMA and DMZ. Capabilities with JP-5 and bio-fuel.

Engine rating: engine suitable for 110% overload during 1 hour every 6 operating hours. Shock qualification.
S.E.M.T. Pielstick PC2.6 B

**Bore:** 400 mm, **Stroke:** 500 mm

<table>
<thead>
<tr>
<th>Speed</th>
<th>r/min</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>mep</td>
<td>bar</td>
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</tr>
<tr>
<td>Rated power output</td>
<td>kW</td>
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<tr>
<td>12PC2.6 B</td>
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</tr>
<tr>
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<tr>
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</table>

**Specific Fuel Oil Consumption (SFOC) to ISO conditions**

<table>
<thead>
<tr>
<th>Engine rating</th>
<th>MCR 100%</th>
<th>MCR 85%</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC2-6 B</td>
<td>185 g/kWh</td>
<td>179 g/kWh</td>
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</tbody>
</table>

Specific lube oil consumption\(^1\): 1.0 g/kWh
Figures on theoretical propeller curve for distillates according to ISO 8217 DMA.

**Dimensions**

<table>
<thead>
<tr>
<th>Cyl. No.</th>
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<th>14</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>mm</td>
<td>9,100</td>
<td>9,840</td>
</tr>
<tr>
<td>L₁</td>
<td>mm</td>
<td>5,960</td>
<td>6,700</td>
</tr>
<tr>
<td>W</td>
<td>mm</td>
<td>3,780</td>
<td>3,780</td>
</tr>
<tr>
<td>H</td>
<td>mm</td>
<td>4,800</td>
<td>4,800</td>
</tr>
<tr>
<td>Dry mass</td>
<td>t</td>
<td>94</td>
<td>104</td>
</tr>
</tbody>
</table>

Engine rating: engine suitable for 110% overload during 1 hour every 6 operating hours.
Engine fuel: distillate according to ISO 8217 DMA and DMZ. Capabilities with JP-5 and heavy fuel.
Shock qualification.

\(^1\) Related to 100% actual engine load.
MAN
Four-stroke propulsion systems
Propeller programme – FPP and CPP

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 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 standard programme, is based on ‘no ice’
Standard programme

Four-stroke propulsion system installation – complete powertrain with propeller and aft ship equipment.
## MAN standard package examples

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>K mm</th>
<th>V mm</th>
<th>Prop. mass t&lt;sup&gt;1)&lt;/sup&gt;</th>
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</tbody>
</table>

<sup>1)</sup> $S_{\text{min}}$ and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube
## MAN standard package examples

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>K mm</th>
<th>V mm</th>
<th>Prop. mass t&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>

<sup>1)</sup> $S_{min}$ and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube.
## MAN standard package examples

<table>
<thead>
<tr>
<th>Cyl.</th>
<th>kW</th>
<th>Prop. speed r/min</th>
<th>D mm</th>
<th>VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>K mm</th>
<th>V mm</th>
<th>Prop. mass t&lt;sup&gt;1)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
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<sup>1)</sup> $S_{min}$ and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube
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## MAN standard package examples

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<sup>)</sup> *S<sub>min</sub>* and propeller mass are based on 6,000 mm propeller shaft and 3,000 mm stern tube.
## MAN standard package examples

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<th>Cyl.</th>
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<th>Prop. speed r/min</th>
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<th>Q mm</th>
<th>R mm</th>
<th>Wmin mm</th>
<th>K mm</th>
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\(^1\) S\(_{\text{min}}\) 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

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<th>Cyl.</th>
<th>Prop. speed r/min</th>
<th>D mm</th>
<th>Hub VBS mm</th>
<th>Q mm</th>
<th>R mm</th>
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³ | 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 and CPP solutions for MAN 175D

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<th>Power [kW]</th>
<th>RPM [r/min]</th>
<th>Recommended propeller diameters [mm]</th>
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Propellers for the MAN 175D engines are optimised for a diesel-mechanical twin screw vessel operating at 85% engine rating. For engine versions and rating conditions, see the MAN four-stroke propulsion engines chapter. The standard propeller programme is dimensioned according to Lloyd’s Register No Ice.

Standard shaft diameter:
- Ø 175 mm
- Ø 205 mm
- Ø 225 mm
- Ø 245 mm
### MAN Alpha FPP and CPP solutions for MAN 175D

<table>
<thead>
<tr>
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<th>Power [kW]</th>
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| 2X16V175D   | 4,960      | 1,800       | 1,800 1,900 2,050 2,200 2,300 2,500 2,600 2,800 |
| 2X16V175D   | 5,440      | 1,800       | 1,850 1,950 2,100 2,250 2,375 2,500 2,600 2,800 |
| 2X16V175D   | 5,920      | 1,900       | 1,850 1,950 2,075 2,200 2,400 2,600 2,800 3,000 |
| 2X20V175D   | 6,800      | 1,800       | 1,950 2,100 2,200 2,400 2,600 2,800 3,000 3,200 |
| 2X20V175D   | 7,400      | 1,900       | 1,950 2,075 2,200 2,400 2,600 2,800 3,000 3,200 |
| 2X20V175D   | 8,000      | 2,000       | 1,900 2,075 2,200 2,400 2,600 2,800 3,000 3,200 |

Propellers for the MAN 175D engines are optimised for a diesel-mechanical twin screw vessel operating at 85% engine rating. For engine versions and rating conditions, see the MAN four-stroke propulsion engines chapter. The standard propeller programme is dimensioned according to Lloyd's Register No Ice.

### Standard shaft diameter:

- Ø 175 mm
- Ø 205 mm
- Ø 225 mm
- Ø 245 mm
- Ø 265 mm

### Reduction gear ratio

<table>
<thead>
<tr>
<th></th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
<th>5.5</th>
<th>6.0</th>
<th>6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x12V175D</td>
<td>2,575</td>
<td></td>
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<td></td>
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<tr>
<td>2X16V175D</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2X16V175D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2X16V175D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2X20V175D</td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
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<tr>
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<td></td>
</tr>
<tr>
<td>2X20V175D</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2X20V175D</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 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 Energy Solutions 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 Energy Solutions 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
- Construction
- Mining
- Off-road vehicles
- Locomotives
- Industrial
- Offshore
- Mechanical drives
## MAN TCT Series

### Technical data

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>Axial flow turbine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. permissible temperature</td>
<td>520 °C</td>
</tr>
<tr>
<td>Pressure ratio</td>
<td>up to 4.7</td>
</tr>
<tr>
<td>Optimised for IMO Tier III</td>
<td></td>
</tr>
</tbody>
</table>

### Supercharged engine output

<table>
<thead>
<tr>
<th>Type</th>
<th>kW</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCT40</td>
<td>9,460</td>
<td>2,500</td>
</tr>
<tr>
<td>TCT50</td>
<td>12,000</td>
<td>3,455</td>
</tr>
<tr>
<td>TCT60</td>
<td>15,120</td>
<td>4,735</td>
</tr>
<tr>
<td>TCT70</td>
<td>19,040</td>
<td>6,480</td>
</tr>
<tr>
<td>TCT80</td>
<td>24,030</td>
<td>8,890</td>
</tr>
</tbody>
</table>

Specific air consumption (le) 7.5 kg/kWh
## MAN TCA Series

### Technical data

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>Axial flow turbine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. permissible temperature</td>
<td>500 °C two-stroke / 650 °C four-stroke</td>
</tr>
<tr>
<td>Pressure ratio</td>
<td>up to 5.5</td>
</tr>
<tr>
<td>Suitable for HFO, MDO, gas</td>
<td></td>
</tr>
</tbody>
</table>

### Turbocharger programme

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. supercharged engine output kW</th>
<th>Max. permissible</th>
<th>Speed</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Two-stroke le* = 7.5 kg/kWh</td>
<td>Four-stroke le* = 6.5 kg/kWh</td>
<td>rpm</td>
<td>kg</td>
</tr>
<tr>
<td>TCA33</td>
<td>-</td>
<td>5,400</td>
<td>27,800</td>
<td>1,370</td>
</tr>
<tr>
<td>TCA44</td>
<td>7,400</td>
<td>7,900</td>
<td>22,500</td>
<td>1,950</td>
</tr>
<tr>
<td>TCA55</td>
<td>10,200</td>
<td>10,400</td>
<td>20,000</td>
<td>3,200</td>
</tr>
<tr>
<td>TCA66</td>
<td>14,600</td>
<td>14,800</td>
<td>16,900</td>
<td>5,300</td>
</tr>
<tr>
<td>TCA77</td>
<td>20,700</td>
<td>21,000</td>
<td>14,200</td>
<td>8,330</td>
</tr>
<tr>
<td>TCA88</td>
<td>32,400</td>
<td>30,000</td>
<td>12,000</td>
<td>14,000</td>
</tr>
</tbody>
</table>

* Specific air consumption
MAN TCR Series

Technical data

<table>
<thead>
<tr>
<th>Turbocharger programme</th>
<th>Max. permissible temperature</th>
<th>Max. permissible pressure ratio</th>
<th>Suitable for HFO, MDO, gas</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Turbocharger programme</th>
<th>Max. permissible speed rpm</th>
<th>Max. permissible mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCR10</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>TCR12</td>
<td>880</td>
<td>100</td>
</tr>
<tr>
<td>TCR14</td>
<td>1,300</td>
<td>110</td>
</tr>
<tr>
<td>TCR16</td>
<td>1,850</td>
<td>180</td>
</tr>
<tr>
<td>TCR18</td>
<td>2,750</td>
<td>300</td>
</tr>
<tr>
<td>TCR20</td>
<td>4,000</td>
<td>500</td>
</tr>
<tr>
<td>TCR22</td>
<td>6,850</td>
<td>1,050</td>
</tr>
</tbody>
</table>

* Specific air consumption

TCR10

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. supercharged engine output kW</th>
<th>Max. permissible speed rpm</th>
<th>Max. permissible mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>le* = 6.5 kg/kWh</td>
<td>Four-stroke</td>
<td>Speed</td>
<td>Mass</td>
</tr>
<tr>
<td>TCR10</td>
<td>600</td>
<td>85,000</td>
<td>50</td>
</tr>
<tr>
<td>TCR12</td>
<td>880</td>
<td>70,900</td>
<td>100</td>
</tr>
<tr>
<td>TCR14</td>
<td>1,300</td>
<td>58,700</td>
<td>110</td>
</tr>
<tr>
<td>TCR16</td>
<td>1,850</td>
<td>48,800</td>
<td>180</td>
</tr>
<tr>
<td>TCR18</td>
<td>2,750</td>
<td>40,300</td>
<td>300</td>
</tr>
<tr>
<td>TCR20</td>
<td>4,000</td>
<td>33,400</td>
<td>500</td>
</tr>
<tr>
<td>TCR22</td>
<td>6,850</td>
<td>25,600</td>
<td>1,050</td>
</tr>
</tbody>
</table>

* Specific air consumption
214 MAN Energy Solutions
MAN turbochargers and exhaust gas systems
MAN NR/S Series

Technical data

**Turbine type**
- Radial flow turbine

**Max. permissible temperature**
- 650 °C (opt. 720 °C)

**Pressure ratio**
- up to 4.5

**Suitable for**
- HFO, MDO, gas

**Turbocharger programme**

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. supercharged engine output kW</th>
<th>Max. permissible speed rpm</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR12/S</td>
<td>670</td>
<td>75,000</td>
<td>155</td>
</tr>
<tr>
<td>NR14/S</td>
<td>950</td>
<td>64,000</td>
<td>190</td>
</tr>
<tr>
<td>NR17/S</td>
<td>1,350</td>
<td>52,600</td>
<td>260</td>
</tr>
<tr>
<td>NR20/S</td>
<td>1,870</td>
<td>44,700</td>
<td>350</td>
</tr>
<tr>
<td>NR24/S</td>
<td>2,690</td>
<td>37,300</td>
<td>505</td>
</tr>
<tr>
<td>NR29/S</td>
<td>3,820</td>
<td>31,300</td>
<td>780</td>
</tr>
<tr>
<td>NR34/S</td>
<td>5,400</td>
<td>26,300</td>
<td>1,450</td>
</tr>
</tbody>
</table>

Specific air consumption $I_e = 7$ kg/kWh
MAN ECOCHARGE
Market leader in two-stage turbocharging

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 as well as our new MAN TCT generation series round up the package as low-pressure turbochargers.
MAN TCX Series

Technical data

<table>
<thead>
<tr>
<th>Turbine type</th>
<th>Mixed flow turbine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. permissible temperature</td>
<td>650 °C</td>
</tr>
<tr>
<td>Pressure ratio (two stages)</td>
<td>up to 10.5</td>
</tr>
<tr>
<td>Suitable for HFO, MDO, gas</td>
<td></td>
</tr>
</tbody>
</table>

TCX turbocharger programme

<table>
<thead>
<tr>
<th>Type</th>
<th>Max. engine output* kW</th>
<th>Max. permissible speed rpm</th>
<th>Mass kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCX17</td>
<td>8,500</td>
<td>40,980</td>
<td>470</td>
</tr>
<tr>
<td>TCX19</td>
<td>11,900</td>
<td>34,550</td>
<td>870</td>
</tr>
<tr>
<td>TCX21</td>
<td>16,900</td>
<td>29,000</td>
<td>1,564</td>
</tr>
<tr>
<td>TCX23</td>
<td>23,900</td>
<td>24,390</td>
<td>2,394</td>
</tr>
</tbody>
</table>

* le = 6 kg/kWh; pHPCin = 3 bar; THPCin = 45 °C
MAN ETB

MAN’s EGR Blower series – Electrical Turbo Blower (ETB)

Specifically designed for EGR systems the MAN ETB plays an important role in enabling these systems to reach IMO Tier III emission limitation. The EGR blower is a core component of MAN Energy Solutions’ high-pressure EGR system that raises the exhaust-gas pressure in order to overcome the pressure difference between exhaust gas and scavenging receiver. In addition the recirculated exhaust gas amount is controlled during the EGR operation by varying the blower speed.

The desired EGR operating conditions are achieved by using a high-speed electric motor, directly coupled to the compressor wheel and speed controlled by a frequency converter. The scope of supply consists of the ETB and one cabinet with frequency converter and sine wave filter.

The MAN ETB features a high-efficient blower wheel, optimized for the low-pressure ratios necessary for the high pressure EGR system of a two-stroke diesel engine with materials designed to withstand corrosive agents caused by Sulphur content fuels. As such MAN’s ETB is suitable for high-pressure EGR engines of all fuel types and in all application ranges.
With ETB30 and ETB40 the MAN two-stroke engine portfolio can be covered with just two frame sizes.

The maximum engine power output with one ETB depends on the EGR volume flow and the pressure difference between exhaust gas and scavenging receiver. Therefore an EGR blower selection tool will be introduced and the output will be available in CEAS soon.

For more information and blower assignment, please contact turbochargers@man-es.com.

**ETB – explicitly designed for EcoEGR**

MAN’s ETB is explicitly designed for EcoEGR applications where the blower will run continuously in both Tier III and Tier II Eco mode. This results in a compact and cost optimized design with highest availability.

In Tier II Eco mode the EGR volume flow is approx. 50% of the required volume flow in Tier III mode. To cover the operating points of both running modes MAN’s ETB features an extremely wide compressor map.

The ETB achieves benchmark efficiencies and therefore the operational costs are minimized.

For more information about EcoEGR see the section EcoEGR in the MAN B&W two-stroke propulsion engines chapter.
## Dimensions

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Reactor diameter mm</th>
<th>Reactor length &lt; 0.1% sulphur mm</th>
<th>Reactor length &lt; 3.5% sulphur mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,000</td>
<td>4,800</td>
<td>5,800</td>
</tr>
<tr>
<td>2</td>
<td>2,400</td>
<td>5,000</td>
<td>6,000</td>
</tr>
<tr>
<td>3</td>
<td>2,900</td>
<td>5,500</td>
<td>6,500</td>
</tr>
<tr>
<td>4</td>
<td>3,400</td>
<td>5,900</td>
<td>6,900</td>
</tr>
<tr>
<td>5</td>
<td>3,900</td>
<td>6,300</td>
<td>7,300</td>
</tr>
<tr>
<td>6</td>
<td>4,500</td>
<td>6,900</td>
<td>7,900</td>
</tr>
</tbody>
</table>

Illustration contains optional features
MAN SCR-HP

The MAN SCR-HP is a small and compact NO\textsubscript{x} emission reduction system. The most compact design in the market 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.
MAN PrimeServ

The service brand of MAN Energy Solutions
- Increase uptime with high-quality OEM spare parts
- Manage maintenance costs with tailor-made service agreements
- High-quality maintenance, repair and reconditioning for all major brands
- Global service network for 24/7 reliable support, technical expertise and onsite recovery
- Digital service solutions for enhanced monitoring and analytics
- Professional training with MAN PrimeServ academies and flexible e-Learning
- Optimize efficiency and sustainability with advanced retrofit and upgrade solutions
MAN Fluid Monitor

Step into a new dimension of operation & maintenance with condition monitoring

It all starts with a tiny anomaly. Something is off by just a little bit in a machine – not noticeable, even to an experienced operator. But it’s not going to go away on its own. Sooner or later, it will have consequences: performance degradation, safety hazards or even failure and downtime.

What if you could receive an alarm or a recommendation to stop your engine in real time? And then do something about it in time? To prevent serious damage?


How do you detect tiny anomalies between planned maintenances? Now you can. Now there’s MAN Fluid Monitor for lube oil.
PrimeServ Omnicare

Your one-stop service solution

For over a century, MAN PrimeServ has provided the best technical and mechanical support for all MAN engines and equipment. Now, PrimeServ Omnicare offers you the same level of care for all your equipment, no matter the brand. This one-stop service solution covers the maintenance, repair and reconditioning of engines and machinery for most major brands.

PrimeServ Omnicare gives you access to one of the largest global service networks, represented in more than 100 service centers worldwide. Our skilled field service personnel will be available to you 24/7, dedicated to keep your fleet working efficiently.
One of our biggest retrofit solutions is to convert an existing diesel engine to a dual-fuel gas engine. This enables you to switch between diesel and gas as necessary, to both reduce operational costs and take advantage of optimal fuel prices as they arise.

Using alternative fuels, such as LNG, ethane, LPG, or methanol, greatly reduces SO\textsubscript{x}, NO\textsubscript{x}, CO\textsubscript{2}, and particulate matter, enabling you to comply with global environmental regulations, secure worldwide port access, and meet your own sustainability targets.

Our dual-fuel retrofit solutions range from a straightforward conversion of the main engine to turnkey solutions that include gas systems. To ensure the process is executed seamlessly from start to finish, MAN PrimeServ covers everything from research and site survey to engineering and project management, and finally to hardware commissioning.

Our dual-fuel retrofit solutions are not limited to the main engine, and customized projects can be provided as a turnkey solution, or including gas systems in partnership with MAN Cryo.
MAN PrimeServ Academies offer courses covering the entire portfolio of MAN Energy Solutions products, both two- and four-stroke, power generation, and turbochargers. In the academies, participants are guided through theoretical lectures, and hands-on exercises covering the operation, maintenance, and troubleshooting, of the MAN Energy Solutions product portfolio. We strive to create a “real life” atmosphere such that participants can relate learning objectives to their daily working environment. That includes working on original engines, fully functioning diesel GenSets, and simulators.
Ensuring engine reliability is essential for today’s business competitiveness. Preventing un-planned downtime and detecting anomalies before a breakdown is the key to a reliable operation. Have MAN experts review your engine data to optimize engine efficiency. Our proactive service solution, PrimeServ Assist is always available.

Using secure connectivity technology, our MAN experts continuously monitor and analyze near real-time data, diagnosing anomalies and notifying on-site engineers with valuable operational and maintenance advice supported by the MAN CEON platform.

Based on your data, PrimeServ Assist secures engine availability and keeps your engine operating at peak efficiency through ad-hoc notifications and instant technical support from our MAN experts. In addition, we provide your data visualized in graphic data charts to review your engine’s performance and data history.
Headquarters

Germany
Four-stroke propulsion engines and systems, GenSets, turbochargers and exhaust gas systems
MAN Energy Solutions SE
Stadtbachstrasse 1
86153 Augsburg
Tel.: +49 821 322 0
info-aug@man-es.com

Germany
Gas-, steam turbines, compressors
MAN Energy Solutions SE
Steinbrinkstraße 1
46145 Oberhausen
Tel.: +49 208 692 1
turbomachinery@man-es.com

Denmark
Two-stroke propulsion engines and systems, GenSets
MAN Energy Solutions SE
MAN B&W
Teglholmsgade 41
2450 Copenhagen SV
Tel.: +45 3385 1100
info-cph@man-es.com

Denmark
Propellers, aft ship and propulsion control systems
MAN Energy Solutions SE
MAN Alpha
Niels Juels Vej 15
9900 Frederikshavn
Tel.: +45 9620 4100
info-frh@man-es.com

Czech Republic
Turbochargers and exhaust gas systems
PBS Turbo s.r.o.
Velká Bíteš
Vlkovská 279
595 01 Velká Bíteš
Tel.: +420 566 822 201
pbst_sales@pbsvb.cz

France
Four-stroke propulsion engines, GenSets
MAN Energy Solutions France S.A.S.
S.E.M.T. Pielstick
Avenue de Chatonay Porte n° 7
BP 427
44615 Saint-Nazaire
Tel.: +33 2 40 90 65 00
info-fr@man-es.com
Headquarters

United Kingdom
Four-stroke propulsion engines
MAN Energy Solutions UK Ltd.
Original Brands of: Mirrlees Blackstone; Ruston and Paxman
1 Mirrless Drive
Hazel Grove
Stockport
Cheshire SK7 5BP
Tel.: +44 161 483 1000
primeserv-uk@man-es.com

Switzerland
Axial-, centrifugal compressors, complete compressor packages
MAN Energy Solutions Schweiz AG
Hardstraße 319
8005 Zürich
Tel. +41 44 278 20 71
info-zur@man-es.com

Sweden
Fuel gas supply systems
MAN Energy Solutions
Sverige AB
MAN Cryo
Oljevägen 105
41878 Gothenburg
Tel.: +46 31 176295
cryo@man-es.com
International group companies

Argentina
MAN Energy Solutions Argentina S.A.
Armenia 3575
CP B1605BOH - Munro
Prov. Buenos Aires
Tel.: +54 11 5236 6006/07
guillermo.lemo@man-es.com

Australia
MAN Energy Solutions Australia Pty. Ltd.
Building 2,
202 Fairfield Road Yennora NSW 2161
Sydney
Tel.: +61 2 8874 0700
jeffrey.moloney@man-es.com

Bangladesh
MAN Energy Solutions Bangladesh Ltd.
Crystal Palace, 9th Floor
SE (D) 22, Road 140
Gulshan South Avenue, Gulshan-1
Dhaka-1212
Tel.: +880 96 12112211
atif.siddique@man-es.com

Belgium
MAN Energy Solutions N.V.
Noorderlaan 181
2030 Antwerpen
Tel.: +32 3 543 8500
dirk.willems@man-es.com

Brazil
MAN Energy Solutions Brazil E&S Ltda.
Rua Carlos Gomes, 23 – bloco 1,
Barreto, Niterói – RJ
CEP 24.110-075
Tel.: +55 21 3506 2151
jens.hueren@man-es.com

Bulgaria
MAN Energy Solutions Bulgaria EOOD
7 Al. Dyakovich, Floor 5, Office 1
9000 Varna
Tel.: +359 52 33 59 60
valentin.yankov@man-es.com

Canada
MAN Energy Solutions Canada Ltd.
1177 West Hastings Street
Suite 1930
V6E-2K3 Vancouver, BC
Tel.: +1 905 842 2020
thomas.juul@man-es.com

Chile
MAN Energy Solutions Chile Ltda.
Parcela 291
- sector Placilla de Peñuelas
Ruta 68 - Km. 98
Valparaíso
Tel.: +56 32 235 1500
gabriel.guevara@man-es.com
International group companies

**China**
MAN Energy Solutions China Co., Ltd.
Floor 8, Xinxi Building 1
No. 3576 Zaho Lou Road
Pujiang Town, Minhang District
Shanghai 201112
Tel.: +86 21 3891 9600
pan.ke@man-es.com

**Colombia**
MAN Energy Solutions Colombia
Branch Office of Chile
Av. Cra. 7 No. 127-48, Oficina 1009
Centro Empresarial 128
Bogotá D.C.
Tel.: +57 312 432 5521
juan.salguero@man-es.com

**Cyprus**
MAN Energy Solutions Cyprus
Office 403, Taitou Court
2M Koutsofta Str.
3031 Limassol
Tel.: +357 25 342 379/746/082
hans.odgaard@man-es.com

**Egypt**
MAN Energy Solutions Egypt LLC
Office G19 Katameya Heights
Business Center
Katameya New Cairo
11771 Cairo
Tel.: +20 2 20200 462
amr.tahoun@man-es.com

**Ecuador**
MAN Energy Solutions 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@man-es.com

**France**
MAN Energy Solutions France S.A.S.
Bâtiment Luminis
91, rue Jean Jaurès
92800 Puteaux
olivier.condemine@man-es.com

**Germany**
MAN Energy Solutions SE
Representative Office
Rossweg 6
20457 Hamburg
Tel.: +49 40 7409 360
ruediger.schmidt@man-es.com

**Greece**
MAN Energy Solutions Hellas E.P.E.
Akti Miaouli 89
185 38 Piraeus
Tel.: +30 210 45 87 900
dionissis.christodoulopoulos@man-es.com
International group companies

Guatemala
MAN Energy Solutions Guatemala Ltda.
6a. avenida 1-36 Zona 14
Edificio Plaza Los Arcos Of. 4B
01014 Guatemala City, C.A.
Tel.: +502 2368 2744
oscar.martinez@man-es.com

Hong Kong
MAN Energy Solutions Hong Kong Ltd.
5/F, No. 1-7, Sai Tso Wan Road
Tsing Yi Island, N.T.
Hong Kong SAR
Tel.: +852 2527 1368
mikael.adler@man-es.com

India
MAN Energy Solutions India Pvt. Ltd.
E-73, MIDC Waluj 431 136
Aurangabad - 431136
Maharashtra
Tel.: +91 240 2566 700
sandeep.chowdhury@man-es.com

Indonesia
PT MAN Energy Solutions Indonesia
Unit #17-01, 17th Floor Menara Palma
Jl. H.R. Rasuna Said,
Block X2 Kav. 6
12950 Jakarta
Tel.: +62 21 5795 7490
goetz.kassing@man-es.com

Italy
MAN Energy Solutions S.r.l.
Via Ponte Caracciolo, 1
16126 Genova
Tel.: +39 010 209 1637
pierpaolo.da-fieno@man-es.com

Japan
MAN Energy Solutions Japan Ltd.
Yokohama Blue Avenue 13F
4-4-2 Minatomirai, Nishi-ku
Yokohma 220-0012
Tel.: +81 45 227 6250
shinichi.nagata@man-es.com

Malaysia
MAN Energy Solutions Malaysia ES Sdn. Bhd
Suite 3.01, 3rd Floor Kenanga International
Jalan Sultan Ismail
50250 Kuala Lumpur, Malaysia
Tel.: +603 2162 0410
ernst.geyer@man-es.com
International group companies

Mexico
MAN Energy Solutions
Mexico S. de R.L. de C.V.
Sierra Candela 111-116, C.P. 11000
Col. Lomas de Chapultepec
Mexico, D.F.
Tel.: +52 55 4000 6104
marcos.vazquez@man-es.com

Netherlands
MAN Energy Solutions
Netherlands B.V.
Schiekade 36
3125 KJ Schiedam
(Port of Rotterdam)
Tel.: +31 10 272 4500
egbert.sprokkereef@man-es.com

New Zealand
MAN Energy Solutions
New Zealand Ltd.
Naval Dockyard PO Box 32-061
Queens Parade, Devonport
Auckland 0744
Tel.: +61 2 8874 0701
jeffrey.moloney@man-es.com

Norway
MAN Energy Solutions
Norway AS
Haakon VII’s gate 1
0161 Oslo
Tel.: +47 2201 7190
erik.dahl@man-es.com

Pakistan
MAN Energy Solutions
Pakistan Pvt. Ltd.
16-Km Raiwind Road
Lahore-55150
Tel.: +92 42 3533 0091 3
imran.ghani@man-es.com

Panama
MAN Energy Solutions
Panama Inc.
Special Economic Area Panama Pacifico
3870, Las Brujas Avenue
Arraijan, Panama
Tel.: +507 236 1594
oscar.martinez@man-es.com

Peru
MAN Energy Solutions
Peru S.A.C.
Av. Argentina 2415
Cercado de Lima, Lima 01
Tel.: +51 1 6284756
carlos.constante@man-es.com

Philippines
MAN Energy Solutions
Philippines Inc.
Km. 17, West Service Road
Cervantes Compound Brgy.
Marcelo Green
South Superhighway
Paranaque City, 1700
Tel.: +63 2 776 3369/3347
sebastien.marchand@man-es.com
International group companies

Poland
MAN Energy Solutions
Poland Sp. z o.o.
ul. Lubowidzka 43
80-174 Gdansk
Tel.: +48 58 325 33 90
Mob: +48 502 536 800
dariusz.dziedziul@man-es.com

Portugal
MAN Energy Solutions
Portugal, Unipessoal, Lda.
Avenida do Rio Tejo, lote 3
Parque Industrial Sapec Bay
2910-440 Setúbal
Tel.: +351 265 799 500
antonio.penaforte@man-es.com

Qatar
MAN Energy Solutions Qatar
Navigation L.L.C.
Ras Laffan Avenue
Zone T-45
Ras Laffan Industrial City (RLIC)
Doha
Tel.: +974 4015 9150
oleb.nielsen.a@man-es.com

Russia
MAN Energy Solutions
Russia Ltd.
Preobrazhenskaya square 8,
block A, 13 floor
107061 Moskow
Tel.: +7 495 258 36 70
alexander.danilenko@man-es.com

Saudi Arabia
MAN Energy Solutions
Saudi Arabia LLC
Madina Road,
Al Thinayyan Building
P.O.Box: 55990
Jeddah 21544
Tel.: +966 2 639 4346
abdullah.kuzkaya@man-es.com

Senegal
MAN Energy Solutions
Senegal SARL
Derrière cité Faycal
En face de la clinique du Golf
Cambérène
Dakar
Tel.: +221 33 867 79 77
abdou.fofana@man-es.com

Singapore
MAN Energy Solutions
Singapore Pte. Ltd.
29 Tuas Avenue 2
Singapore 639460
Tel.: +65 6349 1600
olaf.gunia@man-es.com
International group companies

**South Africa**

**MAN Energy Solutions South Africa (Pty) Ltd.**
14 North Reef Road, Elandsfontein, 1406
PostNet Suite 233, Private Bag X19 Gardenview, 2047
Tel.: +27 11 842 0700
chris.meyer@man-es.com

**Spain**

**MAN Energy Solutions España S.A.**
Calle Pedro Teixeira, 8-10
Edificio Iberia Mart
28020 Madrid
Tel.: +34 914 111 413
pablo.montes@man-es.com

**South Africa**

**MAN Energy Solutions South Africa (Pty) Ltd.**
Branch Office Johannesburg
123 Greenhills Road
1429, Henville, Germiston
Tel.: +27 31 301 2999
chris.meyer@man-es.com

**Spain**

**MAN Energy Solutions Canarias, S.L.**
Muelle Reina Sofia s/n
Puerto de Las Palmas
Las Palmas de Gran Canaria
35008
Tel.: +34 928 935 959
pablo.montes@man-es.com

**South Africa**

**MAN Energy Solutions 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
norman.hall@man-es.com

**Sri Lanka**

**MAN Energy Solutions Lanka (Pvt) Ltd.**
No. 57/8, Sir Ernest De Silva Mawatha
Colombo 00700
Tel.: +94 11 2678930
ruwan.dassanayake@man-es.com

**South Korea**

**MAN Energy Solutions Korea Ltd.**
51, Beombang 2-ro, Gangseo-gu Busan, South Korea 46727
Tel.: +82 51 635 6644
tommyr.rasmussen@man-es.com

**Sweden**

**MAN Energy Solutions Sverige AB**
Oljevägen 105
41878 Gothenburg
Tel.: +46 31 176 295
frank.n.jensen@man-es.com
International group companies

Taiwan
MAN Energy Solutions Taiwan Ltd.
14F-1, No. 8, Min Chuan 2nd Road
Chiennghen
80661 Kohsiung
Tel.: +886 7 537 2225
jesus.montenegro@man-es.com

Turkey
MAN Energy Solutions Servis ve Ticaret Ltd. Sti.
Esentepe Kore Sehitleri Caddesi
No:16/1 K:4 D:41
34394 Zincirlikuyu – Sisli/Istanbul
Tel.: +90 2165 819 900
timur.iyi@man-es.eu

United Arab Emirates
MAN Energy Solutions Middle East LLC
Jumeira Beach Road
At Drydocks World Dubai
P.O. Box 57091
Dubai
Tel.: +971 4 345 40 45
khalid.alzayani@man-es.com

United Kingdom
MAN Energy Solutions UK Ltd.
Hythe Hill
Colchester
Essex, CO1 2HW
Tel.: +44 1206 795 151
robert.plant@man-es.com

USA
MAN Energy Solutions North America Inc.
1600A Brittmoore Road
Houston, TX 77043
Tel.: +1 832 209 3400
mahesh.joshi@man-es.com

USA
MAN Energy Solutions North America Inc.
Branch Office Ft. Lauderdale
551 S.W. 13th Terrace
Pompano Beach, FL 33069
Tel.: +1 954 960 6700
marita.krems@man-es.com

Vietnam
MAN Energy Solutions Singapore Pte. Ltd.
Branch Office Hanoi
Unit 9, Second Floor,
International Central
17 Ngo Quyen, Hoan Kiem
Hanoi
Tel.: +84 4 3936 9728
hoanghai.tran@man-es.com
List of licensees

Symbols used:
T: MAN Energy Solutions two-stroke licence
F: MAN Energy Solutions four-stroke licence
P: MAN Energy Solutions four-stroke SEMT Pielstick licence
TC: MAN Energy Solutions turbocharger licence
FP: MAN Energy Solutions fixed pitch propeller license

China, The People’s Republic of

China Shipbuilding Industry Corporation Diesel Engine Co., Ltd. (T)
Tel: +86 532 86708080 6908

CSSC Marine Power Co., Ltd. (T, F)
Tel.: +86 (511) 845 11 273
cssc-cmp@cssc-cmp.cn

CSSC-MES Diesel Co., Ltd. (T)
Tel.: +86 (21) 6118 6666
market@shcmd.com.cn

Dalian Marine Diesel Co. Ltd. (T)
Tel.: +86 (411) 8441 7273
dmd@online.in.cn

Dalian Marine Propeller Co., Ltd (FP)
Tel.: +86 (411) 8444 2866 8103
sale@dmpp.cn

Henan Diesel Engine Industry Co., Ltd. (F)
Tel.: +86 (379) 6407 6724
cys@hnd.com.cn

Hudong Heavy Machinery Co., Ltd. (T, P)
Tel.: +86 (21) 51 31 00 00
    +86 (21) 58 71 30 07
hhm@hhm.com.cn

Qingdaohaixi Marine Diesel Co., Ltd. (T)
Tel.: +86 (532) 8670 8080
sales@qmdltd.com.cn
List of licensees

Shaanxi Diesel Engine Heavy Industry Co., Ltd. (F, P)
Tel.: +86 (29) 3831 3596
    +86 (29) 3831 4380
sxd408@sxdinfo.com.cn

Weichai Heavy Machinery Co., Ltd. (F)
Tel.: +86 (536) 209 8105
julidj@weichai.com

Yichang Marine Diesel Engine Co., Ltd. (T)
Tel.: +86 (717) 646 86 89
market@ymd.com.cn

Zhenjiang Tongzhou Propeller Co., Ltd (FP)
Tel.: +86 (511) 8198 2822
zhangjinlong@zjtp.com

Czech Republic
PBS Turbo s.r.o. (TC)
Tel.: +420 (566) 822 201

India
MAN Energy Solutions India Ltd. (F)
Tel.: +91 (240) 2566 700

Japan
Hitachi Zosen Corporation (T)
Tel: +81 (3) 6404 0141
de-info@hitachizosen.co.jp

JFE Engineering Corporation (P, F)
Tel: +81 (45) 505 7914
hoshino-minoru@jfe-eng.co.jp

Kawasaki Heavy Industries Ltd. (T, F, TC)
Tel: +81 (3) 3435 2313
hashimoto_h@khi.co.jp / takano_hi@khi.co.jp
List of licensees

Kawasaki Sub-licensee:
The Hanshin Diesel Works Ltd. (T)
Tel:  +81 (78) 332 2081
overseas-section@hanshin-dw.co.jp

Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. (F)
Tel:  +81 (42) 763 1594
gmmp383621b10g04@mhiet.mhi.co.jp

Mitsui E&S Machinery Co., Ltd. (T, TC)
Tel:  +81 (3) 3544 3475
meseba99@mu.mes.co.jp

Mitsui Sub-Licensee:
Makita Corporation (T)
Tel:  +81 (87) 821 5501
webmaster@makita-corp.com

Niigata Power Systems Co., td. (P)
Tel:  +81 (3) 4366 1200 / +81 (3) 4366 1203
webmaster1@niigata-power.com / naofumi_murakami@niigata-power.com

Saudi Arabia
Hyundai Sub-licensee:
Saudi Engines Manufacturing Company (SEMCo) (T)
Tel.:  +96 650 587 8117
abdullah.ghamdi.52@aramco.com

South Korea
HSD Engine Co., Ltd. (T, F)
Tel.:  +82 (55) 260 6154
sangsoo1.lee@hsdengine.com

Hyundai Heavy Industries Co., Ltd. (T)
Engine & Machinery Division
Tel.:  +82 (52) 202 7281
enginesales@hhi.co.kr
List of licensees

STX Engine Co., Ltd. (F, T)
Tel. +82 (55) 280 0566
C104CM2T11422@stxengine.co.kr
youngminkim@stxengine.co.kr

STX Heavy Industries Co., Ltd. (T,TC)
Tel.: +82 (55) 239 5673
stx-stxhi-enginesales@stxhi.com

Spain
Navantia S.A. (F)
Fábrica De Motores Cartagena
Tel.: +34 (968) 128 200
navantia@navantia.es

USA
Fairbanks Morse (F, P)
Tel.: +1 (608) 364 8119
patrick.bussie@fairbanksmorse.com