MAN Energy Solutions
Future in the making

MAN 45/60CR

The Game Changer
www.man-es.com/4560cr
Future in the making

MAN Energy Solutions is the world’s leading provider of large-bore diesel engines, turbomachinery, and integrated power systems. We make four-stroke and two-stroke engines for marine and stationary applications, turbochargers and propellers, gas and steam turbines, compressors and chemical reactors.

Our marine systems expertise is focused on emission reduction, complete propulsion packages, electrical propulsion, dual fuel, LNG, and digitized services.
Meet the future with confidence

Modern shipping challenges
The shipping industry faces constant demands to increase efficiency and comply with ever more stringent emissions regulations. The industry also recognizes growing public awareness of its environmental role.

New standards of efficiency
MAN Energy Solutions introduction of the MAN V45/60CR engine enables owners and operators to meet these demands and optimize their operating expenses at the same time. This latest advance in engine efficiency means that our new engine provides unrivaled levels of low fuel consumption, driving down operating costs. By increasing standardization and using modular subcomponents, the new MAN V45/60CR engine allows faster installation and easier maintenance.

Our new MAN V45/60CR represents the cutting edge of marine diesel engine technology – helping you to meet the challenges of the future, today.
A new multi-talent takes to sea

Impressing through flexibility
The new MAN V45/60CR engine is designed for a cleaner world. MAN Energy Solutions' new engine combines the proven components of its predecessor, MAN 48/60CR, such as our in-house common rail injection system, with the latest innovations in diesel engine technology. Two-stage turbocharging is one of its ground-breaking features. The MAN V45/60CR can be combined with the innovative MAN ECOMAP 2.0 technology. This offers operators a whole new dimension of unrivaled operational flexibility and completely new opportunities for best economic operation irrespective of prevailing commodity prices. Our MAN V45/60CR engine will make a major contribution to achieving the stringent energy efficiency design indices (EEDI) of the future. It goes without saying that the MAN V45/60CR also complies with the most demanding NOx regulations in combination with MAN's compact, modular MAN SCR (selective catalytic reduction) exhaust gas after-treatment system. The engine’s aesthetic and clear design ensures reduced piping and centralized interfaces to the propulsion plant environment. This results in faster and easier installation, operation, and maintenance. 

The goal of environmental friendliness is not only to design engines that keep customers at the cutting edge of technology, but also to develop solutions that are of the highest environmental standard. At MAN Energy Solutions, the challenge is to develop a new engine that meets the latest emissions requirements in diesel engines. Our new MAN V45/60CR engine is the result of our ongoing commitment to continuous innovation. The result is a balance that combines efficiency, performance, and environmental sustainability.
The DNA of excellence

MAN 45/60CR

1. Noise-reducing cylinder head covers
2. Advanced valve lever kinematics
3. Variable valve timing
4. Proven MAN common rail injection system
5. Low-friction camshaft
6. Improved cylinder head cooling
7. Weight-optimized piston
8. Integrated lube oil cooler and filter module (option)
9. Rocker arm casing with integrated HT return flow
10. Main lube oil supply integrated in crank case
11. Double-walled exhaust gas pipe with integrated insulation
12. Water jacket with integrated HT cooling water inlet and starting air pipe
13. Lightweight and robust connecting rod
14. Low-friction crankshaft
Increased efficiency
For maximum profitability

Highest power output in its class
1,300 kW per cylinder

Lowest SFOC in its class
Just 166 g/kWh

Full compliance with IMO Tier III regulations
In combination with MAN SCR

Field-proven common rail injection system
with innovative MAN ECOMAP 2.0 technology
Matching a wide range of load profiles

Centralized interfaces to plant
Less piping, easier engine room planning

High permissible backpressure
Extended use of exhaust gas after-treatment (EGA) systems

New modular generation of MAN SaCoS electronics
Decentralized and easily expandable architecture

Optimized high-temperature cooling
and lubrication circuits
Improved use of heat
### Technical data MAN 45/60CR

**General**
- Engine cycle: four-stroke
- No. of cylinders: L-engine: 6, 7, 8, 9, 10; V-engine: 12, 14
- Bore: 450 mm; Stroke: 600 mm
- Swept volume per cylinder: 95.4 l

**Fuel consumption at 85 % MCR**
- SFOC:
  - L-engine: 167 g/kWh**
  - V-engine: 166 g/kWh

**Cylinder output (MCR)**
- At 600 rpm: 1,300 kW
- Power-to-weight ratio:
  - L-engine: 15.0 – 16.7 kg/kW
  - V-engine: 12.6 – 13.1 kg/kW

**Compliance with emission regulations**
- IMO Tier II
- IMO Tier III (with MAN SCR)

**Main features**
- Turbocharging system:
  - Two-stage turbocharging system
- Engine automation and control:
  - MAN in-house safety and control system MAN SaCoS 5000
- Fuel system:
  - Advanced MAN electronic common rail injection system
- Cooling system:
  - Cylinder cooling: fresh water
  - Charge-air cooling (two-stage):
    - fresh water
  - Fuel injector cooling: fresh water
- Starting method:
  - Compressed air
- Valid fuels:
  - HFO, MDO (DMZ) and MGO (DMA, DMZ) according to ISO 8217-2012

**Optional equipment**
- MAN ECOMAP 2.0 technology – using different IMO Tier II or IMO Tier III compliant fuel/urea injection maps for minimum OPEX

### Dimensions

<table>
<thead>
<tr>
<th>Cyl. No.</th>
<th>L</th>
<th>L1</th>
<th>W</th>
<th>H</th>
<th>Dry mass</th>
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<tbody>
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<td>6,450</td>
<td>3,500</td>
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<td>130</td>
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<td>4,000</td>
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<tr>
<td>12V</td>
<td>11,330</td>
<td>10,590</td>
<td>4,970</td>
<td>5,240</td>
<td>230</td>
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<tr>
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<td>11,570</td>
<td>4,970</td>
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<td>230</td>
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</table>

*Estimated values; turbocharger configuration on coupling side*

### Output

<table>
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<tr>
<th>Speed</th>
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<th>mep</th>
<th>bar</th>
<th>kW</th>
<th>600</th>
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<td>27.3</td>
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<td>1,800</td>
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<td>11,750</td>
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<tr>
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<td>9,100</td>
<td>10,400</td>
<td>11,750</td>
<td>10,400</td>
</tr>
<tr>
<td>MAN 9L45/60CR</td>
<td>600</td>
<td>9,100</td>
<td>10,400</td>
<td>11,750</td>
<td>10,400</td>
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<tr>
<td>MAN 10L45/60CR</td>
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<td>9,100</td>
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<td>10,400</td>
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<tr>
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<td>10,400</td>
<td>11,750</td>
<td>10,400</td>
</tr>
</tbody>
</table>

*All weights and dimensions are for guidance only and apply to engines without flywheel. Minimum centerline distance for multi-engine installation: V-type engine: 5,050 mm (project-specific requirements can lead to higher values). More information available on request.*

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**Without attached pumps, tolerance of +5%.
ISO conditions 3046-1: 2002, lower calorific value (LCV) 42.7 MJ/kg, MGO (DMA, DMZ) or MDO (DMB) according to ISO 8217-2012**

**Estimated value**
MAN PrimeServ

Service with passion

MAN PrimeServ is the dedicated MAN Energy Solutions service brand. Via a network of over 100 service centers worldwide, MAN PrimeServ provides 24/7 service across the globe. Our range of services includes technical support, consulting and OEM spares, as well as maintenance, repair and comprehensive individualized service plans.

MAN PrimeServ provides
- Prompt delivery of high-demand OEM spare parts within 24 hours
- Fast, reliable and competent customer support
- Individually tailored O&M contracts
- Ongoing training and qualification of operators and maintenance staff
- Global service, 24 hours a day, 365 days a year
- Diagnosis and troubleshooting with our high-performance online service
Worldwide service

We offer retrofitting and upgrade services to bring engines and turbochargers already in service up to the very latest standards of performance and efficiency.

Using the latest digital technology, we enable you to maximize the performance and availability of your MAN equipment by accessing real-time data analysis, remote support and rapid solutions. We also offer an extensive range of training courses at MAN PrimeServ academies around the world.

Our service does not vary according to location. We know that a vessel may be built in Asia, operated in Europe for ten years and then move to Africa for the next ten years. That does not alter our focus on dedicated training, fast delivery of strategic spare parts, a comprehensive approach, or our tailored maintenance contracts.

For more information please visit www.man-es.com/primeserv