

32/44CR Engine

High Power. High Efficiency.



Engineering the Future – since 1758.

MAN Diesel & Turbo





MAN Diesel & Turbo

Delivering Powerful Efficiency

MAN Diesel & Turbo is the world's leading designer and manufacturer of low and medium speed engines, with our engines covering an estimated 50% of the power needed for all world trade. We develop two-stroke and four-stroke engines, auxiliary engines, turbochargers and propulsion packages that are manufactured both within the MAN Diesel & Turbo Group and at our licensees.

More than ever, our development focus is the environmental performance of our engines. The goal is to achieve uncompromising harmony between ecology and economy. Using our unrivaled grasp of large engine technology, we aim to make our engines progressively cleaner, more powerful and more efficient.

MAN Diesel & Turbo's 32/44 Common Rail engine family is certified to meet EPA emission requirements, allowing our US customers to take advantage of the high power output and high efficiency our engines offer. With several locations throughout the US, our team members know the market and are ready to offer local service personalized to meet each customer's needs. Each customer can be assured that their engine is specifically designed to meet stringent emissions standards without compromising on performance.

32/44CR: Engineered to Set Benchmarks

High Power Meets Low Consumption



The 32/44CR engine represents the newest technologies in the area of medium speed operated industrial sized diesel engines. By the use of electronic injection, high efficiency turbochargers, electronic hardware and variable valve timing, the 32/44CR is a combination of the most advanced large engine technologies available.

More Output at Lower Fuel Consumption

The development of the 32/44CR has benefited from many years of experience of industrial-sized diesel engine architecture along with knowledge from detailed research and developed plans. As a result, the output of the engine was substantially increased while simultaneously decreasing the fuel consumption.

Two Configurations Available

- **32/44CR— 600 kW/Cylinder:** Applicable for electric propulsion and mechanical propulsion with CPP
- **32/44CR— 510 kW/Cylinder:** Applicable for mechanical propulsion with FPP and dredger (mechanical drive). These configurations are specially adapted to the stated applications and differ in the engine configuration

Electronics

The 32/44CR is equipped with the newest generation of MAN Diesel & Turbo's engine management system. SaCoS_{one} breaks down all functions of modern engine management into one complete system. Through integration on the engine, it forms one unit with the drive assembly. SaCoS_{one} offers

- Integrated self-diagnosis functions
- Maximum reliability and availability
- Simple use and diagnosis
- Quick exchange of modules (plug in)
- Trouble-free and time-saving operation

Industries and Markets

Whatever vessel type you operate, MAN's 32/44CR engine provides high power output while optimizing efficiency. The engine is suited for a wide range of marine applications, including fishing, ATBs, anchor handlers, construction vessels, dredgers and drillships.

Fishing Industry

Modern fishing vessels require cost-efficient propulsion systems as well as tough and robust technical solutions for operation in harsh environments. The 32/44CR provides efficient propulsion and power

for factory and hotel loads. It also has the option for PTI/PTO for hybrid operation. The engine is approved for single engine diesel-mechanical propulsion and offers low fuel consumption to reduce OPEX.

Articulated Tug Barges

The unique design of an ATB requires an engine that optimizes speed and power without sacrificing efficiency. The 32/44CR is well-suited to these demands, providing the power needed to drive both the bow thruster and propulsion. Its ease of operation and low maintenance requirements work well with the smaller crew size of an ATB. Today's ATBs require greater speed, safety and power – all of which are provided by the 32/44CR.

Offshore Service Vessels

The 32/44CR offers a range of benefits for offshore vessels, including construction vessels, anchor handlers and supply vessels. A four-engine plant provides redundancy with power ranging from 19,000 –32,000 HP (14,400–24,000 kW). The patented boost injection technology is specifically designed to improve the load response of the engine. Vessels with the 32/44CR boast a higher charter rate due to lower

fuel consumption. The engine also operates well in Arctic conditions and has fewer cylinders to service compared to conventionally-fueled engines.

Drillships

Dynamic positioning needs on drillships require an engine designed to meet those requirements. The 32/44CR features excellent transient response and load pick-up, ideal for the active heave compensation needed for drillships. The engine easily adapts to low-load operation and offers a high degree of reliability and efficiency.

Dredgers

Today's dredgers require engines that balance cost, weight and power needs with increasingly strict emissions requirements. The 32/44CR optimizes dredger efficiency while producing the power needed for dredger pump operations. It offers low emissions and life-cycle costs, reducing the overall cost of ownership during the vessel's lifetime.

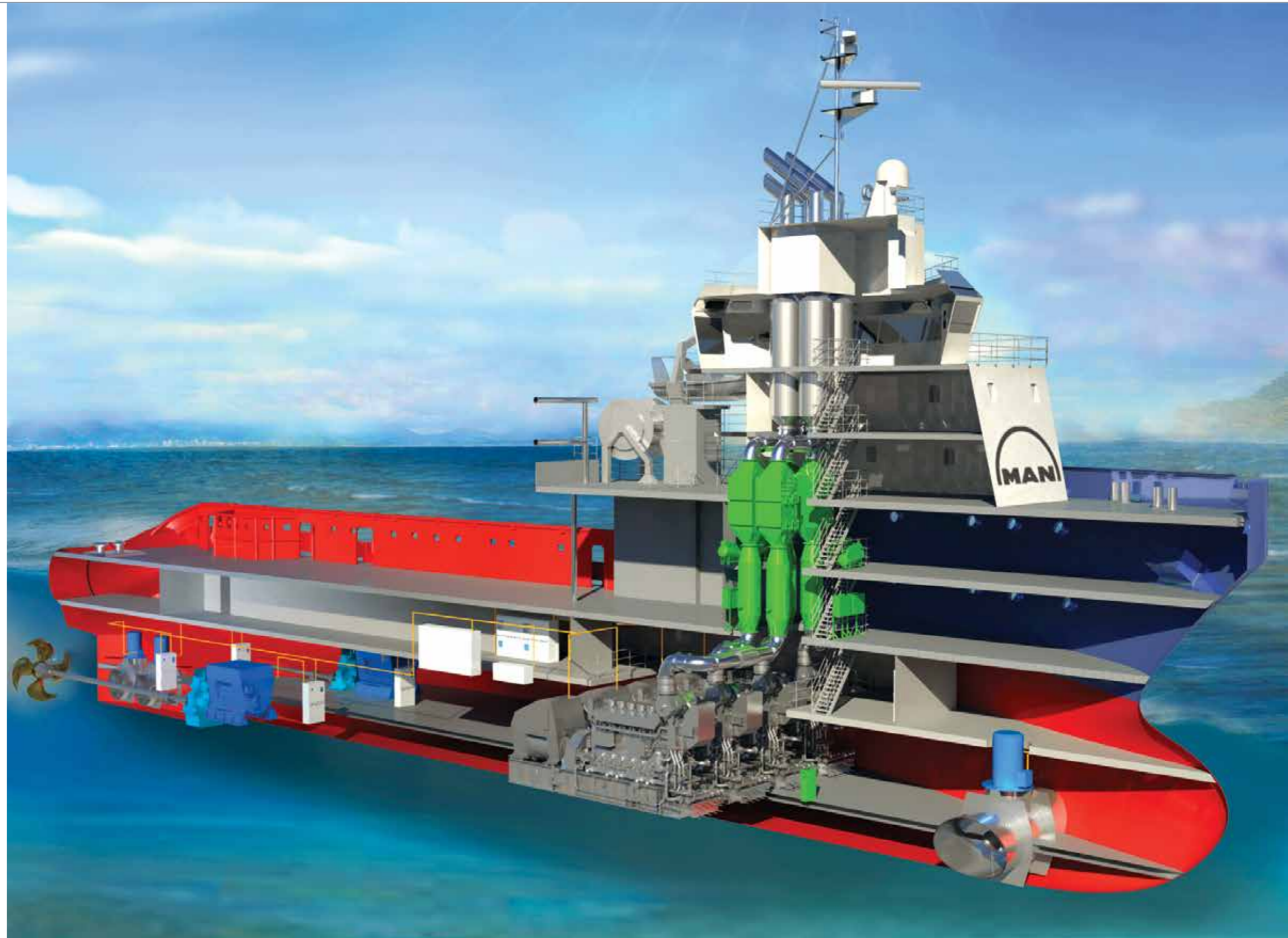
Selective Catalytic Reduction

Efficiency Without Compromise

As concerns for the environment and emissions continue to grow, MAN's 32/44CR answers a very real problem for vessel operators: how to achieve high power output while reducing emissions and improving efficiency. In order to achieve the lowest possible emissions, the engine is paired with Selective Catalytic Reduction (SCR) technology. SCR is the most tested and approved system for achieving NO_x reduction rates of up to 90%. By inducing chemical reactions in the engine's exhaust gases, harmful substances are transformed into ecologically benign products. The technology was first tested on a retrofit in 2012 and has since been redesigned to better suit the needs of marine vessels.

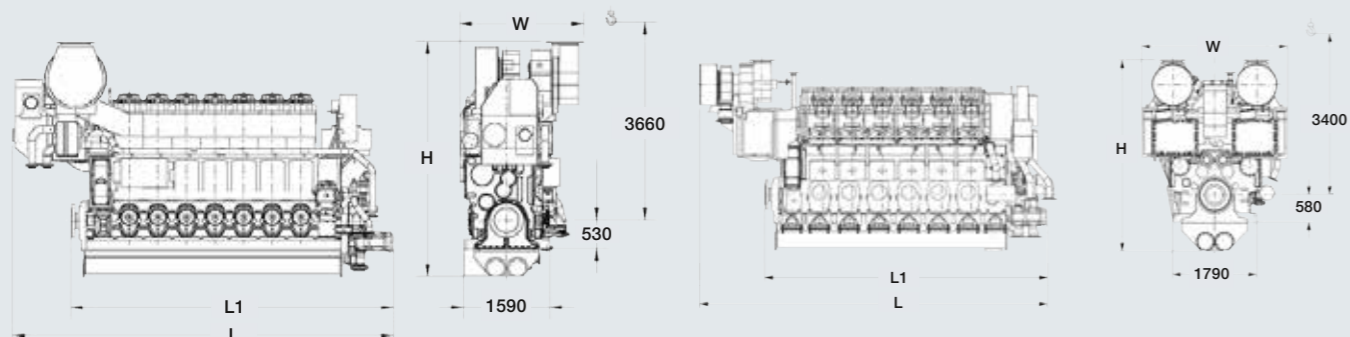
MAN's SCR system keeps urea consumption low, using technology to fine tune the amount of urea the engine needs. Extensive advance research and analysis informs the initial amounts of urea fed into the system, while an integrated NO_x analyzer is able to tweak amounts and concentrations based on the engine's needs. The system minimizes ammonia slip throughout the cycle and prevents aging effects thanks to the constant NO_x monitoring and subsequent urea adjustment.

In 2015 the 32/44 Common Rail engine family received US EPA Tier 2 certification for Category 3 engines, building the foundation for the introduction of MAN's EPA Tier 3 for Category 3 product in 2016. The certification allows US customers to benefit from the high power output and low fuel consumption of MAN's medium-speed common-rail engines.



Technical Data

Definitions, Output, Dimensions & Weight



Engine data for 32/44CR

General

- Engine cycle: Four-stroke
- Turbocharging system: Constant pressure
- No. of cylinders, In-line engine: 6, 7, 8, 9, 10
- No. of cylinders, V-engine: 12, 14, 16, 18, 20
- Bore: 320 mm
- Stroke: 440 mm
- Displacement per cylinder: 35.4 l

Cylinder output (MCR)

- At 750/720* rpm: 600 kW

7L, 14V reduced output (TC under development)

Power-to-weight ratio (MCR)

- In-line engine: 10.4–11.8 kg/kW, 7.6–8.7 kg/bhp
- V-engine: 9.3–10.4 kg/kW, 6.8–7.6 kg/bhp

Cooling

- Cylinder cooling: Cooling water
- Charge-air cooling (two-stage): Fresh water
- Fuel injector cooling: Cooling water

Starting method

- In-line and V-engine: air (turbine) starter

General performance definition for diesel engines as per ISO 30461/1-2002

ISO reference conditions

- Air temperature: 298 K (25°C)
- Air pressure: 1 bar
- Fresh water temperature upstream of charge-air cooler: 298 K (25°C)
- Relative humidity: 30%

No power reduction required

- Air temperature: ≤ 318 K (45°C)
- Air pressure: ≥ 100 kPa (1 bar)
- Cooling water temperature upstream of charge-air cooler (LT-stage) ≤ 311 K (38°C)

US EPA requirements

The engine detailed herein will comply with the emission limits referred to as US EPA Tier 2 for Category 3.

MCR = maximum continuous rating

* For generator drive only

Output L32/44CR

Speed	rpm	750	720
mep	bar	27.1 / 25.3*	28.3 / 26.4*
		kW	kW
6L32/44CR		3,600	3,600
7L32/44CR		3,920*	3,920*
8L32/44CR		4,800	4,800
9L32/44CR		5,400	5,400
10L32/44CR		6,000	6,000

Dimensions L32/44CR

Cyl. No.		6	7	8	9	10
L	mm	6,312	6,924	7,454	7,984	8,603
L ₁	mm	5,265	5,877	6,407	6,937	7,556
W	mm	2,174	2,359	2,359	2,359	2,359
H	mm	4,163	4,369	4,369	4,369	4,369
Dry Mass**	t	39.5	44.5	49.5	53.5	58.0

Minimum centerline distance for twin engine installation 2,500 mm

Speed 720 rpm for generator drive/constant speed operations only

* Different mep (7L, 14V)

**Including built-on lube oil automatic filter and electronic equipment

Fixed Pitch Propeller: 510 kW/cyl, 750 rpm

Output V32/44CR

Speed	rpm	750	720
mep	bar	27.1 / 25.3*	28.3 / 26.4*
		kW	kW
12V32/44CR		7,200	7,200
14V32/44CR		7,840*	7,840*
16V32/44CR		9,600	9,600
18V32/44CR		10,800	10,800
20V32/44CR		12,000	12,000

Dimensions V32/44CR

Cyl. No.		12	14	16	18	20
L	mm	7,195	7,970	8,600	9,230	9,860
L ₁	mm	5,795	6,425	7,055	7,685	8,315
W	mm	3,100	3,100	3,100	3,100	3,100
H	mm	4,039	4,262	4,262	4,262	4,262
Dry Mass**	t	70	79	87	96	104

Minimum centerline distance for twin engine installation 4,000 mm

Speed 720 rpm for generator drive/constant speed operations only

* Different mep (7L, 14V)

**Including built-on lube oil automatic filter and electronic equipment

Fixed Pitch Propeller: 510 kW/cyl, 750 rpm



MAN PrimeServ Service Where You Need It

Whatever sector you operate in, your expectations for your vessel are the same: thousands of hours of smooth operation with no disruptions. MAN Diesel & Turbo offers worldwide, round-the-clock service, 365 days a year under its MAN PrimeServ brand. Service centers on all continents, including several in the United States, provide local comprehensive and continuous support. We only use genuine spare parts, safeguarding the longevity of your engine.

The PrimeServ Academy in Fort Lauderdale provides world class training for our engines and turbochargers, including the 32/44CR. It's equipped with a real 32/44CR engine, all types of radial and axial turbochargers and fully functional SaCoS_{one} simulators for hands-on training. These tools will familiarize you with operating and maintaining machinery for practical, on-the-job situations. All trainings are carried out by our experienced instructors to ensure our Academy is the ideal place for efficient learning.



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