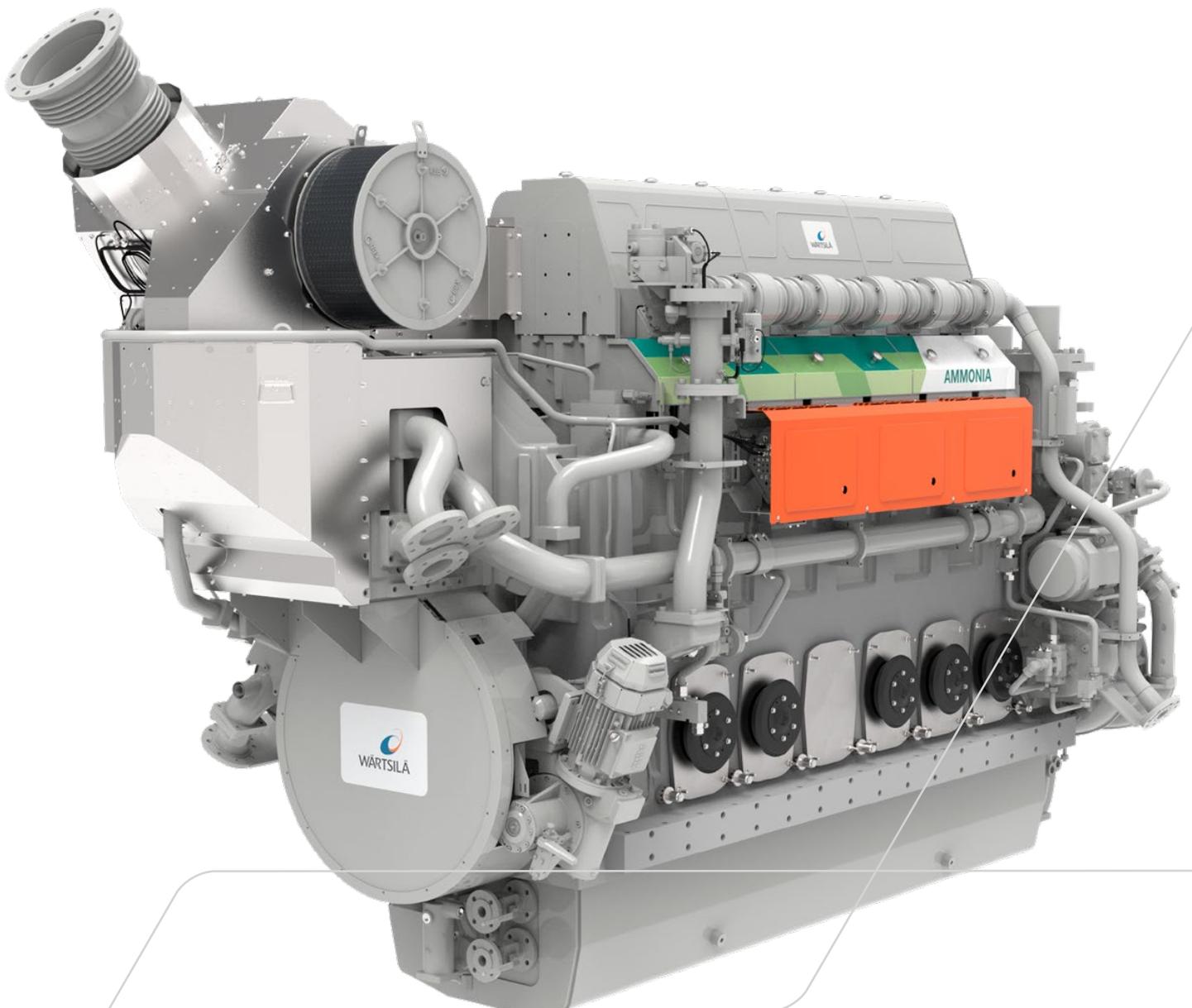


Wärtsilä 25

| The power to target net zero





The Wärtsilä 25 is a modern medium-speed 4-stroke marine engine based on the reliable and proven Wärtsilä 31 modular technology platform. The engine is available in 6–9L cylinder configurations, with a power output ranging from 1.7 to 3.4 MW. The Wärtsilä 25 offers outstanding fuel flexibility with diesel, dual-fuel LNG and ammonia versions available.

The Wärtsilä 25 is ready to run on carbon-neutral biofuels and carbon-free ammonia today and makes it easier than ever to reach beyond today's emission reduction targets. Thanks to a future-proof, upgradeable modular structure, the Wärtsilä 25 serves as an excellent diesel or dual-fuel LNG engine until the time is right for you to transition to greener fuels.

The Wärtsilä 25 provides reliable performance as both a robust main propulsion engine in mechanical, diesel-electric and hybrid installations and as a cost-efficient auxiliary engine. It is perfect for use as a main engine onboard smaller merchant vessels, fishing boats, tugs, dredgers and offshore support vessels. It is optimised for running either at constant speed or along a propeller curve according to your requirements.

Decarbonising shipping the Wärtsilä way

The maritime industry is facing increasingly tough decarbonisation targets and legislation. Ship owners and operators need engines with higher efficiency, lower emissions, increased fuel flexibility and lower operating costs. Fuel-flexible engines capable of burning cleaner future fuels allow customers to make the investments needed today with the target to reach their long-term decarbonisation targets.

The objective of the Wärtsilä 25's development has been to future-proof the engine and its fuel supply and exhaust treatment systems as one holistic solution. This means that whatever future fuel emerges as the most appropriate option for your operations, the Wärtsilä 25 will be able to use it thanks to its modular and upgradeable design.



World's first 4-stroke ammonia engine

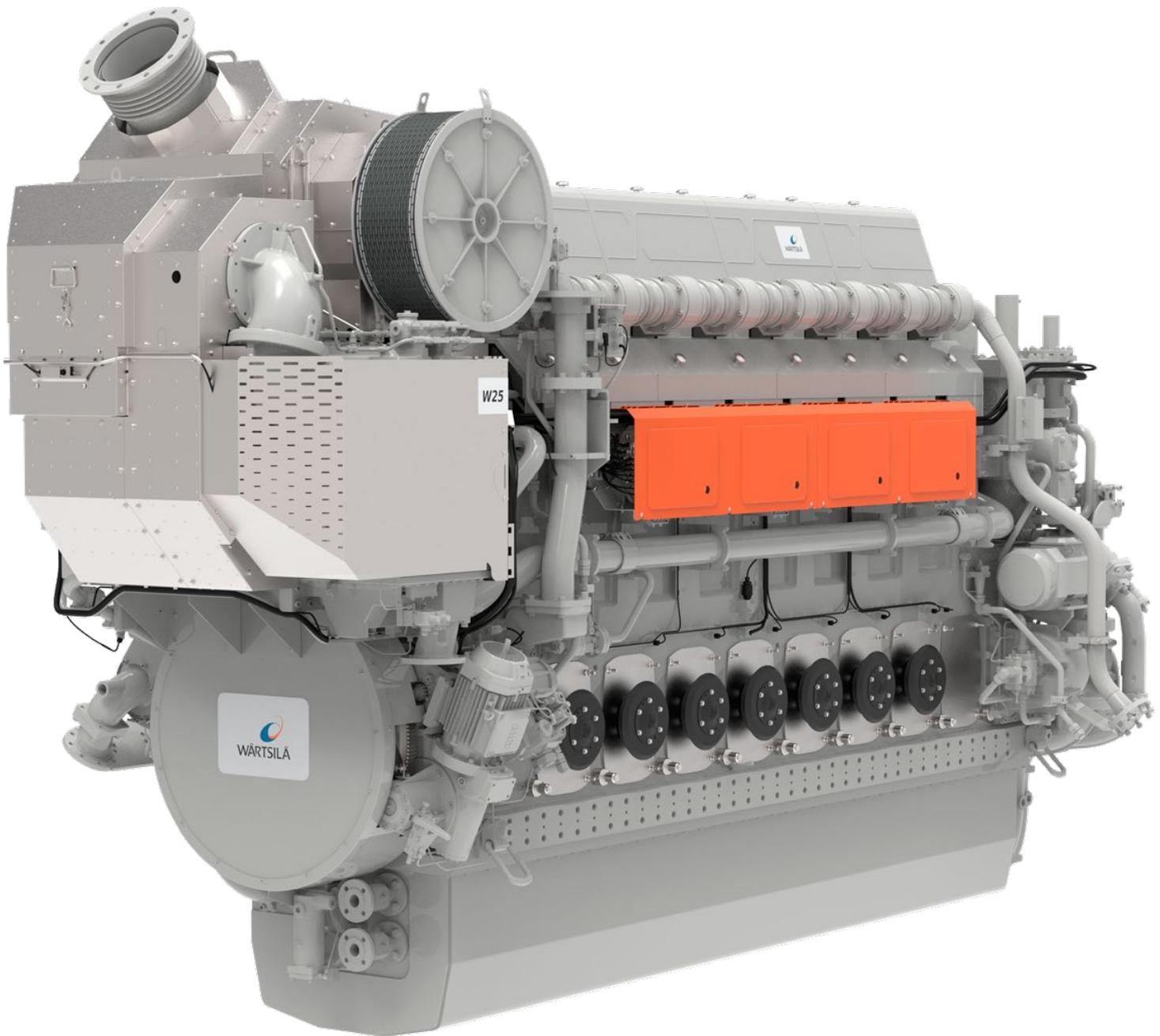
The Wärtsilä 25 Ammonia is the first commercially available medium-speed 4-stroke marine engine capable of using ammonia as fuel. Wärtsilä has applied its extensive experience with LNG-fuelled dual-fuel engines in the development of this engine, which is constructed from carefully selected materials suitable for ammonia operation. When using sustainable alternative fuels, total greenhouse gas emissions are reduced by at least 70% compared to a modern diesel engine, enabling you to meet current EU targets for 2050 and exceed the IMO target for 2040.

The Wärtsilä 25 Ammonia engine and Wärtsilä NOx Reducer system (NOR) have been developed to perform optimally in combination, enabling compliance with IMO Tier II and III emission levels. The engine is delivered together with Wärtsilä's fuel gas supply system, AmmoniaPac, and Wärtsilä NOR. These elements are engineered as one holistic solution and designed according to the highest safety standards and in compliance with classification society regulations.

Wärtsilä can deliver the full project – from feasibility studies to execution planning and implementation – for both newbuilds and retrofits. Our adaptable approach ensures the optimal engine and genset selection and the most efficient overall solution including ship electrification solutions to future-proof the vessel. For newbuilds, Wärtsilä can assess the impact of engine and genset selection on vessel design and operation as well as the financial and compliance implications.

Key benefits

- Best-in-class efficiency and emission levels
- Cost efficient, with high power output per cylinder
- Improved total cost of ownership compared to previous-generation engines, with prolonged component lifetime enabling an extended time between overhauls (TBO) of up to 32,000 hours
- Modular design enables faster, easier upgrades and conversions to alternative fuels
- Suitable for mechanical, diesel-electric and hybrid installations



Cutting-edge modularity for faster, easier future fuel adoption

The Wärtsilä 25 features a robust and highly efficient turbocharging system with a high pressure ratio. This enables unparalleled power density and efficiency across the full operating range. The fully electronic Wärtsilä common rail fuel injection system maximises efficiency and enables smoke-free operations at all loads – even in diesel mode.

The Wärtsilä 25's intrinsically modular design allows vessel owners and operators to reduce fuel consumption and emissions today while providing the readiness to run on alternative fuels when the time is right – all without compromising performance.

Lifecycle cost optimisation

The Wärtsilä 25 has been designed to operate reliably on a wide range of fuels. The engine is designed for long periods of maintenance-free operation and has a TBO of up to 32,000 hours, which matches well with the dry-docking schedule of many different vessels. This reduces downtime and operating costs and also simplifies maintenance scheduling. With data-driven dynamic maintenance planning and predictive maintenance services, as part of a Wärtsilä Lifecycle Agreement, you can further maximise vessel revenue-earning capability.

Technical features

- Common rail fuel injection – New-generation, high-pressure fuel injection technology optimises combustion and fuel-injection settings at all loads and enables smoke-free operation.
- LNG operation with minimum MN 70 without compromising performance.
- Variable valve timing – Stepless and on-off type inlet and exhaust valve timing are used to optimise the engine for each specific application.
- Fuel gas system (Wärtsilä 25DF) – The fuel gas system of the Wärtsilä 25DF shares common parts with the successful Wärtsilä 31DF, meaning ensured system validation and better spare parts availability. The system features high-accuracy pressure-balanced gas valves, and the proven port injection concept provides rapid response for dynamic load control and operational flexibility.
- Cost-efficient low pressure gas supply for ammonia, similar to LNG fuelled W25DF
- Higher power per cylinder available with two-stage turbocharging – Two-stage turbocharging further increases efficiency and reduces emissions accordingly without compromising performance.
- Enhanced combustion (Wärtsilä 25DF) – Wärtsilä's latest combustion technology, a first for the industry, reduces emissions to the same level as a pure gas (SG) engine.
- IMO Tier II and Tier III compliant with Wärtsilä NOx Reducer (NOR) depending on fuel type.



Wärtsilä 25 Diesel

Wärtsilä 25	
Cylinder bore/Piston stroke	250 mm / 340 mm
Engine speed	900 / 1000 rpm
Cylinder output	345 / 375 kw/cyl
Piston speed	10.2 / 11.3 m/s

Wärtsilä 25	
Emission standard	IMO Tier III, IMO Tier II w/o SCR
SFOC*	184 g/kWh
Fuel type	Diesel
Fuel specification	ISO 8217, fuel grades ISO-F DMX, DMA, DFA, DMZ, DFZ. Biodiesel (FAME, HVO)
Fuel oil viscosity (cSt/40°C)	6

Engine dimensions (mm) and weight (tons) **				
Engine	6L25	7L25	8L25	9L25
A	4 980	5 380	5 880	6 280
B	2 160	2 160	2 190	2 190
C	990	990	1 090	1 090
D	2 440	2 440	2 530	2 530
Weight	21.9	23.9	26.6	29.3

Genset dimensions (mm) and weight (tons) **				
Engine	6L25	7L25	8L25	9L25
A	7 960	8 730	9 390	9 820
B	2 720	2 720	2 720	2 720
C	1 360	1 360	1 360	1 360
D	2 440	2 440	2 530	2 530
Weight	38.3	44.4	48.7	51.8

Wärtsilä 25DF

Wärtsilä 25DF	
Cylinder bore/Piston stroke	250 mm / 340 mm
Engine speed	900 / 1000 rpm
Cylinder output	315 / 345 kw/cyl
Piston speed	10.2 / 11.3 m/s

Wärtsilä 25DF	
Emission standard	IMO Tier III, IMO Tier II w/o SCR
BSEC*	7560 kJ/kWh (gas mode)
SFOC*	190.6 (diesel mode)
Fuel type	Diesel, LNG
Gas fuel specification	Natural gas, Biogas, min. methane number 70
Fuel specification	ISO 8217, fuel grades ISO-F DMX, DMA, DFA, DMZ, DFZ. Biodiesel (FAME, HVO)
Fuel oil viscosity (cSt/40°C)	6

Engine dimensions (mm) and weight (tons) **				
Engine	6L25DF	7L25DF	8L25DF	9L25DF
A	4 980	5 380	5 780	6 300
B	2 120	2 120	2 120	2 120
C	990	990	1 090	1 090
D	2 490	2 490	2 490	2 600
Weight	23.2	25.3	27.8	TBA

Genset dimensions (mm) and weight (tons) **				
Engine	6L25DF	7L25DF	8L25DF	9L25DF
A	7 960	8 620	9 130	9 900
B	2 720	2 720	2 720	2 720
C	1 360	1 360	1 360	1 360
D	2 490	2 490	2 490	2 600
Weight	39.6	44.8	48.8	TBA

Wärtsilä 25 Ammonia

Wärtsilä 25 Ammonia	
Cylinder bore/Piston stroke	250 mm / 340 mm
Engine speed	900 / 1000 rpm
Cylinder output	280 / 305 kw/cyl
Piston speed	10.2 / 11.3 m/s

Wärtsilä 25 Ammonia	
Emission standard	IMO Tier III & IMO Tier II with SCR
Fuel type	Diesel, Ammonia
Fuel specification diesel	ISO 8217, fuel grades ISO-F DMX, DMA, DFA, DMZ, DFZ. Biodiesel (FAME, HVO)
Fuel oil viscosity (cSt/40°C)	6

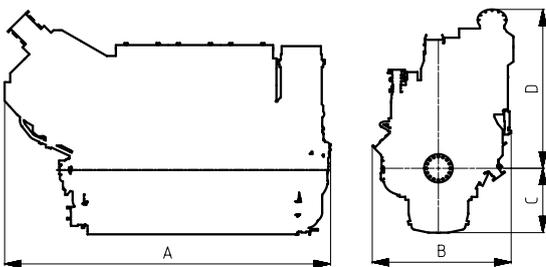
Engine dimensions (mm) and weight (tons) **				
Engine	6L25 Ammonia	7L25 Ammonia	8L25 Ammonia	9L25 Ammonia
A	4 980	5 380	5 830	6 230
B	2 315	2 315	2 350	2 350
C	990	990	1 090	1 090
D	2 440	2 440	2 530	2 530
Weight	23.2	24.9	27.4	29.7

Genset dimensions (mm) and weight (tons) **				
Engine	6L25 Ammonia	7L25 Ammonia	8L25 Ammonia	9L25 Ammonia
A	7 960	8 620	9 180	9 600
B	2 720	2 720	2 720	2 720
C	1 360	1 360	1 360	1 360
D	2 440	2 440	2 530	2 530
Weight	38.7	44.4	48.4	51.1

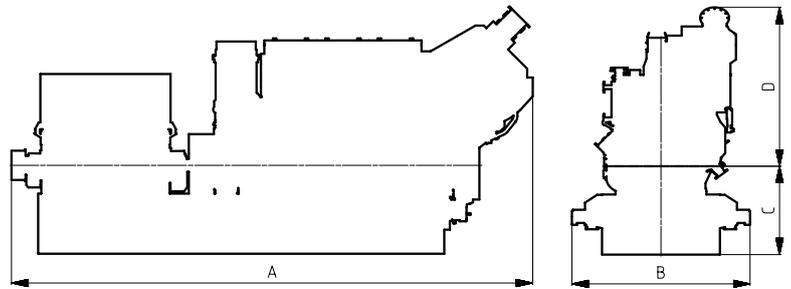
* Fuel consumption according to ISO 15550:2016. LFO lower calorific value 42 700 kJ/kg, including engine-driven pumps (one LT cooling water, one HT cooling water, one lube oil and one fuel feed pump) and 5% tolerance. BSEC at 100% load for W25DF, SFOC at 85% load for W25 Diesel.

** Indicative dry weight values for guidance only. Genset measurements can change due to final generator selection.

Wärtsilä 25 engine



Wärtsilä 25 genset



Smart fuel flexibility with sophisticated automation

The Wärtsilä 25DF features sophisticated automation to enable optimum combustion of gaseous and liquid fuels as well as fuel blends. Closed-loop combustion control with automatic combustion phasing diagnostics increases the robustness against varying fuel quality. Improved monitoring of maximum firing pressure and misfire protection increases engine safety and reliability. The engine's dynamic capability is improved with transient detection diagnostics.

In order to maximise gas operation and minimise emissions, the Wärtsilä 25DF uses cylinder-wise gas trip functionality. In

case of a disturbance, only the affected cylinder(s) will trip to diesel mode, with no impact on engine power output.

Improved usability

The calibration needs of Wärtsilä 25 engines are reduced thanks to adaptive, self-learning PID control. Modules can be replaced on the fly, which eliminates the need for separate software downloads. The Wärtsilä Expert Insight service can be used to gather critical engine data for predictive maintenance, reporting and analysis purposes. Lastly, the engine features an intuitive multi-language user interface for increased safety.

Wärtsilä Marine Power leads the industry in its journey towards a decarbonised and sustainable future.

Build your success on Wärtsilä's broad portfolio of engines, propulsion systems, hybrid technology and integrated powertrain systems. These building blocks offer you efficiency, reliability, safety and world-class environmental performance.

The offering includes performance-based agreements and lifecycle solutions as well as an unrivalled global network of maritime expertise.

www.wartsila.com/marine



Wärtsilä is a global leader in innovative technologies and lifecycle solutions for the marine and energy markets. We emphasise innovation in sustainable technology and services to help our customers continuously improve their environmental and economic performance.

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