Wärtsilä 20

Flexibility and reliability for a wide range of vessel applications

The Wärtsilä 20 engine is a compact and proven four-stroke engine with high reliability and fuel flexibility. Available in cylinder configurations from 4L to 9L and with a power output ranging from 0.7–2.0 MW, the Wärtsilä 20 provides compact power as a main propulsion engine and is exceptionally flexible for auxiliary installations.

The engine is available in diesel and dual-fuel versions. It can smoothly switch between different fuels during operation without power interruption.

Application flexibility and reliability

The Wärtsilä 20 offers outstanding flexibility, enabling it to be installed and optimised for generating sets in larger vessels and as a main engine for both mechanical and electric propulsion. The multi-fuel capability makes it an ideal choice for various vessel applications including hybrid installations. Typical installation examples include car carriers (PCTC) and merchant vessels. The compact and lightweight Wärtsilä 20 is also ideal as a mechanical drive prime mover for applications such as small cargo vessels, ferries and tugboats.

Because the Wärtsilä 20 was originally designed to operate reliably on even the poorest quality heavy fuel oil, it is exceptionally reliable when powered by lighter fuels. The engine's maintenance-friendly design provides overhaul intervals of up to 20,000 running hours while the variable inlet valve closing system enables excellent fuel economy and low emissions, especially at low engine loads. The Wärtsilä 20 has proven robustness and reliability, with over 8,000 engines delivered since its introduction in the early 1990s.

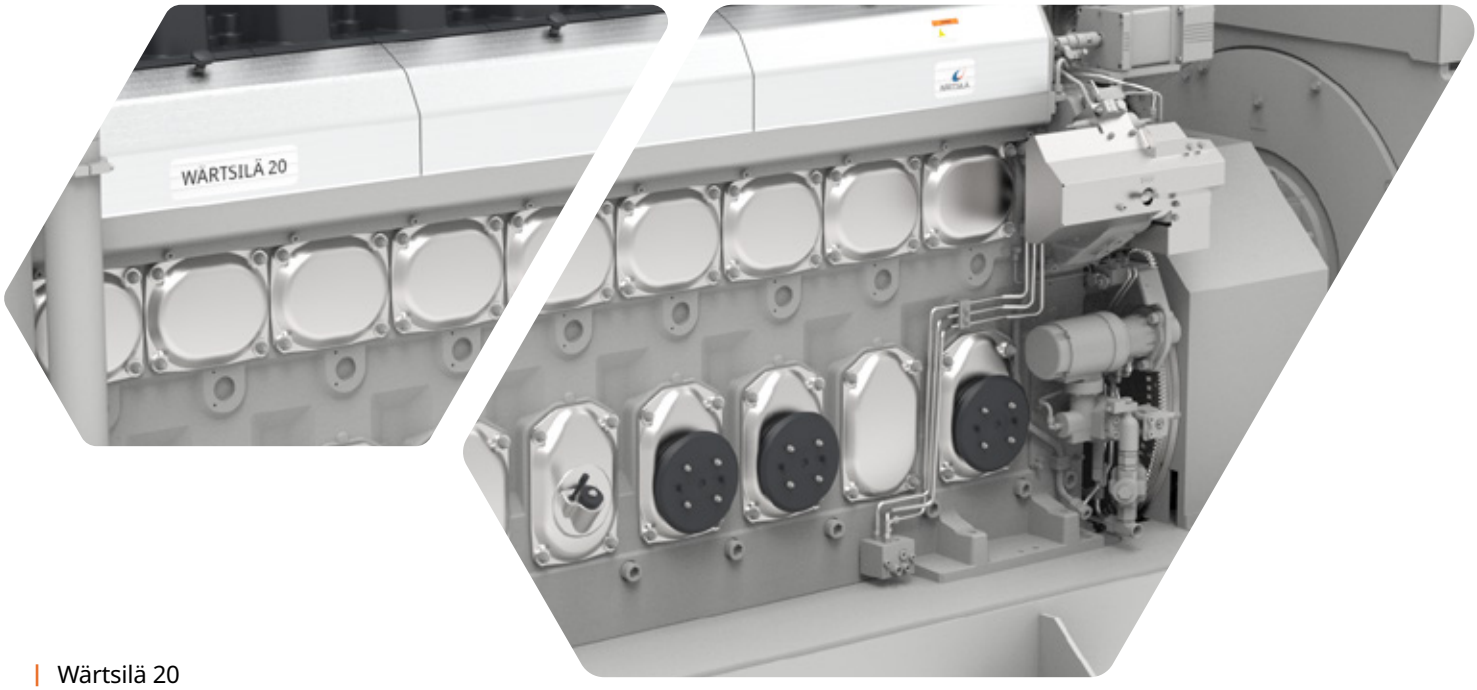
Key benefits

- Best-in-class power-to-weight ratio
- Suitable for all types of vessels
- Proven and reliable technology
- Fuel flexible with low sensitivity to varying fuel quality
- Seamless switch from one fuel to another without power loss
- Fuel-efficient over the entire engine operational range, especially at low loads
- Easy and cost-effective installation
- Long overhaul intervals
- Low exhaust gas emissions
- Low gas-feed pressure
- Embedded engine control and safety system for safe, optimised operation

Fuel flexibility

Fuel flexibility enables compliance with emission regulations in controlled areas while giving operators the option of determining the fuel according to cost and availability. Seamless switching from fuel oil to gas operation and vice versa takes place automatically after the operator's command without power interruption, or instantly in case of a supply interruption. Furthermore, the separate liquid fuel system makes it possible to switch over from LFO to HFO without power interruption.

In a dual-fuel engine, the natural gas is supplied to the engine through a gas valve unit, where the gas is filtered and gas pressure is controlled. The system includes the mandatory shut-off and venting valves to ensure safe and trouble-free low-pressure gas supply. The gas is supplied through a large manifold running along the engine. Each cylinder has an individual feed pipe to the gas admission valve close to the cylinder head. The gas piping is of double-wall design as standard. When running the engine in gas mode, the air/gas mixture is ignited with a small quantity of LFO pilot fuel. The amount of pilot fuel is optimised for optimal combustion by the embedded engine speed and load control and the monitoring system.



| Wärtsilä 20

Environmental compliance

Wärtsilä 20

- Fully compliant with the IMO Tier II exhaust emission regulations
- Option to reach IMO Tier III with an SCR catalyst such as the Wärtsilä NOX Reducer (NOR) exhaust treatment solution
- Certified to China Stage II (GB 15097-2016) marine engine emission regulation

Wärtsilä 20DF

- Fully compliant with the IMO Tier II exhaust emission regulations in diesel mode
- Option to reach IMO Tier III in diesel mode with an SCR catalyst such as the Wärtsilä NOX Reducer (NOR) exhaust treatment solution
- Compliance with IMO Tier III regulations in gas mode without aftertreatment
- Minimised SOx and CO2 emissions as well as smokeless operation in gas mode

Embedded engine control system

The advanced automation system provides a complete engine safety system and local monitoring. Thanks to the complete automation integration, the size of the external control system is significantly reduced, which saves space in the engine control room and eases installation at the yard.

Wärtsilä 20		
	Diesel	Dual fuel
Cylinder bore / Piston stroke (mm)	200 / 280	
Engine speed (rpm)	900 / 1000 / 1200	
Cylinder output (kW/cyl)	185 / 200 / 220	145 / 160 / 195
Piston speed (m/s)	8.4 / 9.3 / 11.2	
Emission standard	IMO Tier ll/lll or China Stage ll	IMO Tier II/III
SFOC*	SFOC 189.6 g/kWh at ISO conditions	SFOC 192.2 g/kWh at ISO conditions
BSEC*		BSEC 7825 kJ/kWh, BSGC 7700 kJ/kWh
Fuel type	LFO, HFO, LBF, low & ultra-low sulphur fuels	LNG, LFO, HFO, LBF, low & ultra-low sulphur fuels

Generator output can be estimated with the following calculation: engine power (kW) x 0.96
* 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 pump) and 5% tolerance.

Rated power - Wärtsilä 20						
	220 kW/cyl, 1200 rpm		200 kW/cyl, 1000 rpm		185 kW/cyl, 900 rpm	
	Engine	Generator (60 Hz)	Engine	Generator (50 Hz)	Engine	Generator (60 Hz)
4L20			800	770	740	710
6L20	1320	1270	1200	1150	1110	1065
8L20	1760	1690	1600	1535	1480	1420
9L20	1980	1900	1800	1730	1665	1600

Rated power - Wärtsilä 20DF						
	195 kW/cyl, 1200 rpm*		160 kW/cyl, 1000 rpm		145 kW, 900 rpm	
	Engine	Generator (60 Hz)	Engine	Generator (50 Hz)	Engine	Generator (60 Hz)
6L20DF	1170	1123	960	920	870	835
8L20DF	1560	1498	1280	1230	1160	1114
9L20DF	1755	1685	1440	1380	1305	1253

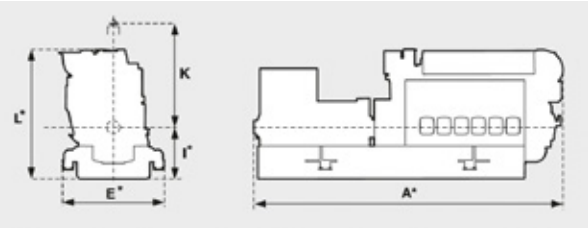
* Variable speed CPP 185 kW/cyl

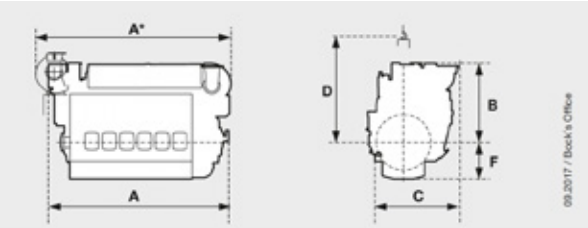
Engine dimensions (mm) and weight (tons)							
Engine	4L20	6L20	6L20DF	8L20	8L20DF	9L20	9L20DF
A*		3656	3383	4339	4099	4639	4401
A	2960	3560	3218	4242	3888	4542	4200
B*		1622	1767	1728	1767	1728	1767
B	1522	1522	1767	1522	1767	1522	1767
C*		1631	1690	1804	1860	1804	1845
C	1537	1630	1690	1761	1824	1761	1824
D	1800	1800	1800	1800	1800	1800	1800
F	725	624	624	624	624	624	624
Weight	6.8	8.3	8.8	10.5	11	11.1	11.9

* Turbocharger at flywheel end; dry weight without flywheel

Genset dimensions (mm) and weight (tons)							
Engine	4L20	6L20	6L20DF	8L20	8L20DF	9L20	9L20DF
A*	5000	5800	5600	6700	6500	7000	6700
E	1860	1960	1960	2010	2010	2010	2010
I*	895	895	895	1025	1025	1025	1025
K	1800	1800	1800	1800	1800	1800	1800
L*	2417	2417	2661	2547	2831	2547	2831
Weight*	15	18	18	23	22	25	25

* Dependent on generator type and size





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Work with Wärtsilä to navigate decarbonisation with confidence.

Build your success on Wärtsilä's broad portfolio of engines, propulsion systems, hybrid technology, exhaust treatment, shaft line solutions and digital technologies, as well as integrated powertrain systems. These building blocks offer you efficiency, reliability, safety and world-class environmental performance.

The offering includes performance-based agreements, lifecycle solutions and 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.