

# Wärtsilä 46F



The technologically advanced WÄRTSILÄ© 46F is a four-stroke diesel engine that can be run on either heavy fuel oil (HFO), marine diesel oil (MDO), or on light diesel when being operated within strict coastal or port emissions areas. This fuel switching can take place smoothly and without power interruption across all engine loads. This flexibility enables the operator to select the fuel according to price, availability, and the need to meet local emissions regulations. The Wärtsilä 46F offers best-in-class fuel economy, as well as outstanding power-to-weight and power-to-space ratios in its 7.2–19.2 MW power range at 600 rpm.

## Typical Application Areas

The Wärtsilä 46F is designed to meet specific customer needs in a wide range of shipping and power plant applications. For example, its modular and compact design makes it suitable for installation as the prime mover on most general cargo and passenger ships. Plus the outstanding power to weight and space ratios, as well as its

wide power range, often mean that fewer engines are needed, thereby creating significant savings in capital investment.

The Wärtsilä 46F engine can be installed and optimized for constant diesel electric propulsion, as well as direct drive main engine applications. It can operate at either constant speed or along a combinatory curve.

## Key Benefits

- Proven and reliable heavy fuel technology from an industry leader
- Thermal efficiency for complete combustion and minimal exhaust gas emissions
- Fuel economy throughout entire engine operational range, thanks to efficient twin-plunger fuel injection system, to give significant cost savings
- Advanced modular design means fewer components, lower inventory costs, less maintenance, and faster crew training
- Extended overhaul intervals provides greater engine availability and reduced operational costs
- Embedded automation system for optimal operating efficiencies



## Operational Features

Its flexibility in fuel choice allows the Wärtsilä 46F to operate on a broad range of fuel viscosities, from 2.0 cSt up to 700 cSt HFO (at 50 °C / 122 °F).

The engine is able to operate efficiently and economically on low Sulphur fuel oils (<0,1% S), making it suitable for operation in emission-controlled areas. The engine can also be equipped with a SCR catalyst, which can reduce the NO<sub>x</sub> emissions by up to 95%, thereby enabling the machinery to be IMO Tier III compliant.

The Wärtsilä 46F is equipped with a Variable Inlet Valve (VIC) system for improved overall engine performance at partial and low engine loads. It is also available with a twin pump (TP) fuel injection system as standard. With TP, the fuel injection process can be adjusted to match the prevailing engine operating condition and fuel characteristics. By optimizing the injection timing to the engine load in this way, the fuel efficiency is maximized while, because of this efficiency, emissions are minimized. TP works with one plunger controlling the dosage of fuel, while the other controls the injection timing.

## Lifecycle Costs

The Wärtsilä 46F has been designed to operate reliably on a range of fuels, even with the poorest quality heavy fuel. Overhaul intervals of up to 24,000 hours and the maintenance-friendly design reduce downtime, ease scheduling, and save operating costs. Since its launch in 2004, the Wärtsilä 46F has consistently proven its best-in-class fuel economy performance, especially at low engine loads, thanks largely to the VIC system that is included as standard.

The Wärtsilä 46F engine is fully compliant with the IMO Tier II exhaust emissions regulations set out in Annex VI of MARPOL 73/7



### Wärtsilä 46F

Cylinder bore	460 mm
Piston stroke	580 mm
Cylinder output	1200 kW/cyl
Speed	600 rpm
Mean effective pressure	24.9 bar
Piston speed	11.6 m/s

### IMO Tier II

Fuel specification: Fuel oil
700 cSt/50°C   7200 sR1/100°F
ISO 8217, category ISO-F-RMK 700
SFOC 175 g/kWh at ISO conditions
Option: Lubricating oil module integrated on engine.

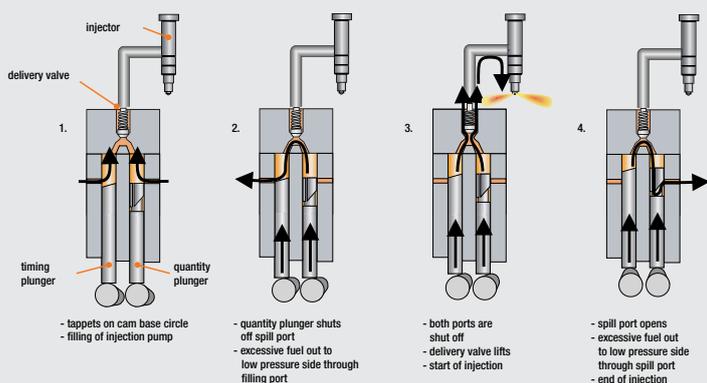
### Rated power

Engine type	kW
6L46F	7 200
7L46F	8 400
8L46F	9 600
9L46F	10 800
12V46F	14 400
14V46F	16 800
16V46F	19 200

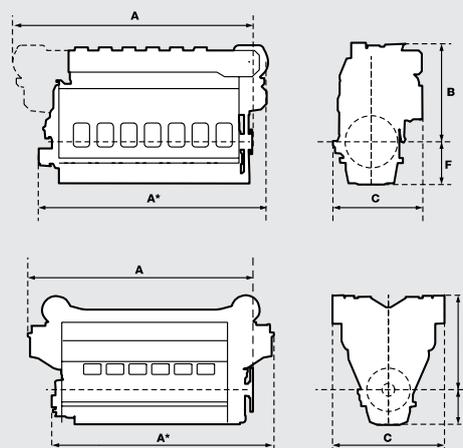
### Dimensions (mm) and weights (tonnes)

Engine type	A*	A	B	C	F	Weight
6L46F	8 470	8 620	3 500	2 905	1 480	97
7L46F	9 435	9 440	3 800	3 130	1 480	113
8L46F	10 255	10 260	3 800	3 130	1 480	124
9L46F	11 075	11 080	3 800	3 130	1 480	140
12V46F	10 950	10 280	3 770	4 050	1 820	177
14V46F	11 650	11 729	4 243	4 678	1 820	216
16V46F	12 700	12 880	4 243	4 678	1 820	233

\* Turbocharger at flywheel end.



Functional sketch of the twin pump fuel injection system.



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