

# Wärtsilä 46F – Tradition & Innovation

**Reliability, economy and environmental efficiency all rank high in shipowner values and shipbuilder requirements today. The Wärtsilä 46F, our most recent 4-stroke achievement, meets today's needs while adapting to tomorrow's demands.**

by Magnus Miemois  
Sales, 4-stroke, Wärtsilä Finland Oy



Shipping is an exciting and dynamic business. As a supplier and partner to the shipping community we feel privileged to have an insight into this fascinating field. Staying abreast of changes and trying to evaluate how they affect our line of business is not always easy and straightforward, but still a game we deeply enjoy.

In addition to the values of the shipowners, the changing needs of the shipyard industry also weigh heavily in the balance, translating through to the supplier chain as changing demands on the products and services they provide. These dynamics require companies like Wärtsilä to remain up-to-date and preferably ahead of the curve in terms of matching what they offer to the compound market needs of shipbuilders and shipowners.

The Wärtsilä 46F is our proud and most recent achievement. It is the result of a process where long experience and world-class engineering skills synthesize to create a concept that matches today's demands while being able to adapt to the forecast needs of tomorrow's marketplace. We summarize it under the phrase 'Tradition & Innovation'.

The various segments of the shipping industry have their own specific development trends and the market requirements differ to some degree from each other. However, we can identify several common denominators shared by all.

## **Reliability**

Reliability has always been a top priority for shipowners and will continue to be so. This is logical since disturbances in the scheduled operation of ships have dramatic economic consequences. A ship's machinery is one of its mission-critical systems and focuses the reliability requirements directly on the main elements in the machinery system, such as the main propulsion engine.

## **Economy**

Most shipping segments are experiencing an increasingly competitive marketplace. To remain competitive, shipowners must manage the magnitude of their capital spending (CAPEX), of course, but they must also make sure they are best able to manage the expense of operating their ships (OPEX).

Here product features and product performance come into the equation. Performance parameters such as efficiency and features that enable longer operation without extra maintenance will minimize OPEX. The combination of a balanced

CAPEX and the optimum OPEX sets the basis for economical operation throughout the useful lifetime of the asset.

## Environment

Shipowners also face an ever increasing focus on their activities from the perspective of the environmental impacts of shipping. This is evident from the successive tightening of environmental regulations, both globally and locally, as well as from the fact that environmental performance is becoming a differentiator between shipowners in their marketplace as they compete for cargoes.

Current environmental regulations and demands are quite easily quantifiable but the future scenarios must be considered with sufficient accuracy when large CAPEX decisions are made. Common evaluation criteria include more stringent global regulations, the built-in potential to trade on routes with local environmental legislation, the residual value of the asset if local regulations are extended, charterers' requirements, image, and so on.

## Easy installation

The majority of merchant ships today are built in Asia. The shipbuilding industries in Korea, Japan and China have taken the science of shipbuilding to new levels in terms of productivity, cost-efficiency and economies of scale through standardization and series production. Reflected on to the supplier chain, this has resulted in revised criteria for the required level of system knowhow, customer service and product compatibility with the high-efficiency shipbuilding process.

In large-scale series shipbuilding production, the ship's machinery systems must be pre-engineered, pre-fabricated and optimized for easy installation. The whole offering must be value-based and include a transparent and accessible way of working to integrate with the shipbuilding process in all relevant phases: design, fabrication, commissioning, sea trials and warranty. The company that masters all these aspects you would label 'a ship power supplier'.

## The Wärtsilä 46F

The Wärtsilä 46F concept is rooted in both the shipowners' values and the shipbuilders' requirements. The Wärtsilä 46F offers reliable, compact and economic power per unit, based on a further refinement of field-proven design aspects and complemented by new value-adding features.

## Built-on systems

Similar to all newer Wärtsilä engines, the Wärtsilä 46F has modular built-on systems and features such as lubricating oil module with oil cooler and filter, built-on crankshaft driven lubricating oil pump and cooling water pumps, and built-on thermostatic valves.

## Fewer cylinders

The output of 1250 kW per cylinder offers the possibility to have fewer cylinders for a given required output, contributing directly to OPEX savings and potentially to a more compact engine room design. Many typical single main engine applications, such as general cargo vessels and container feeder vessels, could use a Wärtsilä 46F main engine with one or two fewer cylinders compared to current ship designs (e.g. a 7-cylinder main engine compared to a 9-cylinder main engine). This can yield maintenance savings in the region of 20%.

## Optimum use of space

Compactness also offers shipbuilding advantages through optimum use of space in the vessel layout. A compact machinery can in many ship types yield more cargo capacity or, in the case of passenger and cruise ships, a higher degree of billable capacity. Alternatively, the vessel's material costs can be reduced for a fixed cargo capacity. The built-on modules allow for minimum installation cost.

## New monitoring technology

The Wärtsilä 46F enters the market as the first engine to have continuous temperature monitoring of the big end bearings as a standard feature. New monitoring technology makes this possible in a simple and reliable execution. This feature, in addition to main bearing temperature monitoring and exhaust gas temperature monitoring, now standard for many years, allows for a complete set of reliable real-time data to monitor the engine performance in all its crucial areas.

The monitoring system on the Wärtsilä 46F is configured for easy hook-up to Wärtsilä's Condition Based Maintenance (CBM) system. CBM is a data analysis and condition evaluation service that Wärtsilä provides for its customers.

The CBM service advises operators on how to perform engine fine-tuning in varying operational conditions and allows owners to get the maximum service lifetime between overhauls. This approach balances extended service times with maintaining reliable operation. The benefit to owners is

simply minimum OPEX with traceable reliability.

Wärtsilä offers all Wärtsilä 46F customers the CBM service for a free trial period during the warranty period of the engine.

## Common rail

Many shipping segments expect to see volume growth in the near future, e.g. container feeders, general cargo vessels and RoPax vessels operate in heavily populated areas where the environmental debate already has a loud voice. Some shipping segments are under greater pressure from the charterers or the cargo owners than from the regulatory bodies. This accelerates the growing need for environmentally friendly solutions.

Naturally, the Wärtsilä 46F features, as standard, the field-proven common rail fuel injection concept, introduced successively since 2000 as an option in other Wärtsilä engines. Common rail technology provides substantially improved emissions performance compared to traditional fuel injection technology. This is a core feature in these times of ever increasing focus on the environment.

## Fuel flexibility

Another unique benefit of the common rail system is the engine's ability to adapt to changes in fuel quality. The political initiatives to regulate marine fuel qualities regionally seem to be growing. Operating ships economically in the near and distant future will call for an ability to adapt to different fuel qualities, maybe even during the same voyage.

The Wärtsilä common rail system brings the flexibility needed to maintain optimum combustion and minimum emissions with various fuel qualities. The system can be set up with multiple sets of parameters to achieve perfect performance with different fuels, e.g. high ash fuel, low sulphur fuel, regular commercial bunker.

## Tomorrow's technology today

The Wärtsilä 46F is innovation and tradition in practice:

- Built on a platform of long experience and a track record of ground-breaking functionality
- Enhanced with the latest innovations to support environmentally friendly and economical ship operation
- Optimized to today's shipping and shipbuilding needs with built-in adaptability to the needs of tomorrow. ■