

Wärtsilä EnergoProFin



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Wärtsilä EnergoProFin
for controllable pitch propeller



Wärtsilä EnergoProFin
for fixed pitch propeller



In the fiercely competitive world of shipping, every drop of fuel matters. Naturally, any way to sail farther on less can translate into substantial cost savings for operators, not to mention benefits to the environment.

Wärtsilä is your reliable partner in improving your vessel's energy efficiency. Propulsion efficiency plays an important role in the reduction of fuel consumption and the operational costs of vessels. Our extensive knowledge and experience of the entire ship system helps us to develop efficient propulsion systems.

We optimise our solutions to specific customer requirements, by utilising the latest numerical methods for calculations such as computational fluid dynamics (CFD). Model testing for showing superior Hydrodynamics and the liaison with classification societies gives a competitive edge over the other players on the market.

The challenges of further optimising the propulsion efficiency by means of new propeller designs triggered a way to develop additional energy saving devices close to the propellers.

The Wärtsilä EnergoProFin is an energy saving device in form of a propeller cap with hydrofoil section fins, on the post-swirl side of the propeller. It can be easily mounted on fixed pitch propellers (FPP) and controllable pitch propellers (CPP) and it rotates with the propeller. The EnergoProFin can also be fitted on ducted propellers, resulting not only the fuel efficiency gains, but also positively impacting the Bollard pull.

The EnergoProFin is designed to minimise the losses in the rotating flow leaving the propeller, by transforming rotational energy into effective thrust, resulting in an efficiency increase that brings up to 5% fuel savings. Depending on the hull and propeller interactions, the payback time for the investment is less than a year.

The fluctuating fuel prices experienced in recent years along with increasing maritime energy efficiency regulations, and the quest to improve the attractiveness of the vessel on the market are some of the reasons why our customers choose our energy saving devices.

Improved propulsive efficiency by weakening the propeller hub vortex

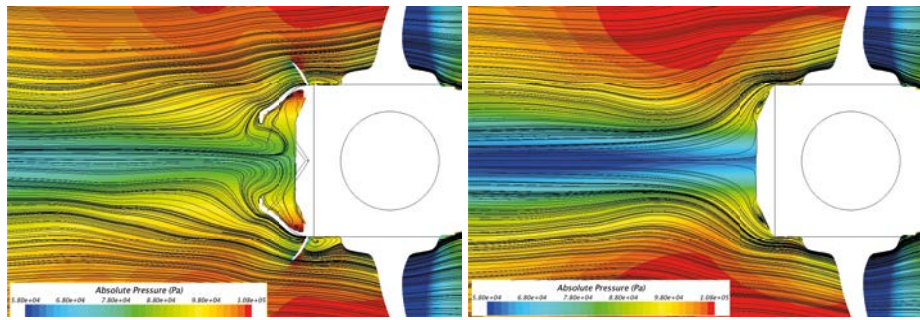
Weakening the propeller hub vortex behind the propeller decreases propeller resistance and manifests itself as increased thrust. The cap cuts down on the swirl, while the fins effectively catch and absorb the force of the rotating water, eliminating the vortex and feeding the energy back into the propulsion drive train. In addition to the improved propulsive efficiency, the EnergoProFin can also be applied to reduce propeller-induced noise and vibrations.

The EnergoProFin is made from the same material as the propeller (NiAlBronze) and replaces the normal propeller boss cap.

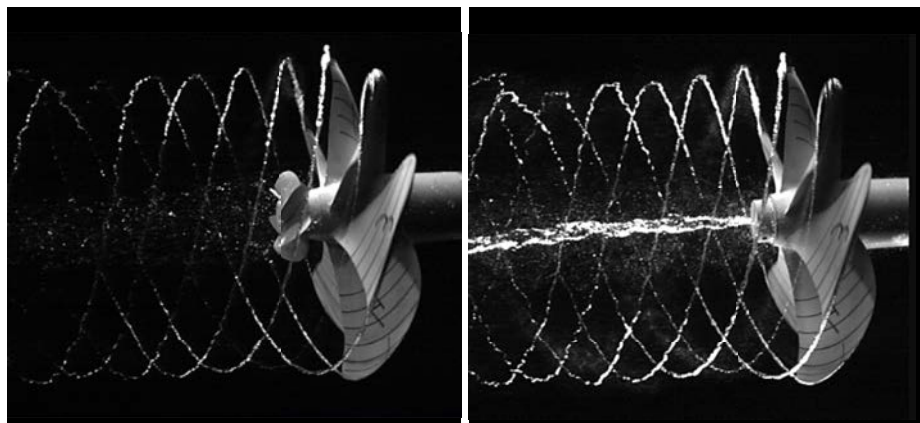
Installation

The EnergoProFin is easy to install; it can even be installed when the vessel is afloat provided the vessel can be sufficiently trimmed. Once the EnergoProFin is installed, the only required maintenance is polishing during regular cleaning intervals.

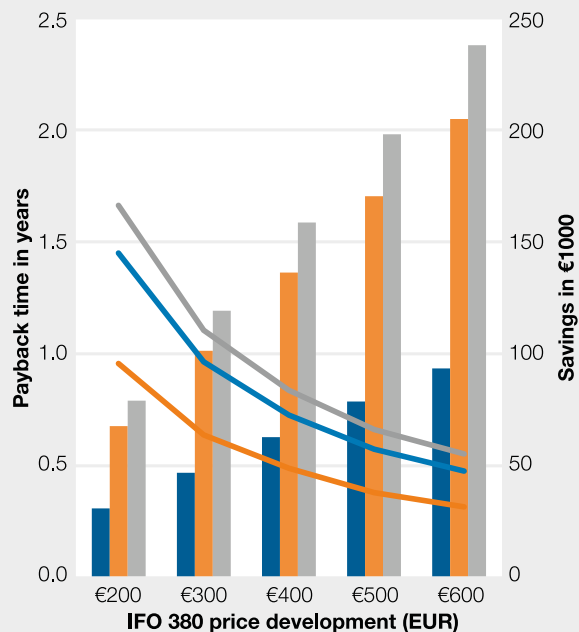
With Wärtsilä Underwater services we can provide underwater installation of most of the EnergoProFins quickly and efficiently without taking the vessel out of service.



CFD calculations showing the hub vortex with (left) and without EnergoProFin for a controllable pitch propeller



Model tests showing the hub vortex with (left) and without EnergoProFin for a fixed pitch propeller



Yearly savings:

- 50000 DWT Bulk Carrier (FPP)
- 2500 TEU Container ship (FPP)
- 1500 RoPax Ferry (CPP)

Payback time:

- 50000 DWT Bulk Carrier (FPP)
- 2500 TEU Container ship (FPP)
- 1500 RoPax Ferry (CPP)

Key benefits

- Brings fuel savings up to 5 %
- Increase in Bollard pull in case of Ducted Propellers
- Reduces propeller hub vortex
- Reduces emission levels
- Reduces vibrations & pressure pulses
- Reduces cavitation
- Easy to install, underwater installation also possible
- Return on investments less than one year even at low fuel prices.

At average fuel savings of 2% the payback times for the Wärtsilä EnergoProFin already starts after a few months of installation, even with low fuel prices. In the chart for 3 different vessels the payback time and savings [EUR] is shown as function of the fuel price development.

Computational fluid dynamics

The hydrodynamic effects of the EnergoProFin are quite extensive, comprising not only the interaction between EnergoProFin and propeller, but also the effect on the rudder.

Decades of in-house experience of hydrodynamics, in combination with the widespread use of the latest numerical techniques such as computational fluid dynamics (CFD) has allowed us to study these complex effects quite extensively and come up with more efficient designs with proven results.

Computer modelling was also employed during the design phase to optimise castability, thus minimising the chance of flaws forming in the structure of the finished product.

Applicability

The pitch for FPPs is optimised for energy efficiency in only one operating condition – a specific sailing speed in the case of for example bulk carriers and container ships, or maximum bollard pull in the case of tugs. Other types of ships, such as ferries and fishing vessels, use controllable pitch propellers (CPPs), where an actuating mechanism inside the hub can change the pitch depending on the operating needs, be they sailing, low-speed manoeuvrability or raw pulling power.

CPPs, with all the mechanics fitted within them, have relatively larger hubs compared to FPPs. The resulting higher hub ratio means that they can produce a more intense swirl. Additionally, when a cap and fin device is used, the angle of the fins is optimised to operate with a specific pitch angle. However, the Wärtsilä EnergoProFin also delivers efficiency gains, when deviating from the design pitch. Even at reduced pitch settings at 50% Maximum Continuous Rating (MCR) significant savings are recorded.

Experience gained from delivering EnergoProFins for FPPs and deeper knowledge of hydrodynamic principles, along with state-of-the-art CFD, offered a solid base for developing the EnergoProFin solution for CPPs.

The EnergoProFin is suitable for all existing propellers, retrofit programmes or new builds and can be applied to the majority of vessel types.

Scope of supply

The EnergoProFin will be delivered including all required mounting materials. Mounting of the EnergoProFin is simple and can be performed by the shipyards. A clear installation manual will be provided with the order. If required, Wärtsilä can provide skilled service engineers for local installation support.



Wärtsilä is a global leader in complete lifecycle power solutions for the marine and energy markets. By emphasising technological innovation and total efficiency, Wärtsilä maximises the environmental and economic performance of the vessels and power plants of its customers.

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