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Energy saving
efficiency
2% up
at maximum

Hub Vortex Release Fin

HVRF



Certified on designing and
manufacturing energy saving
devices for ships and model
ships for model tests.



Certified on information security
management system.
Certified on designing and
manufacturing energy saving
devices for ships and model ships
for model tests.

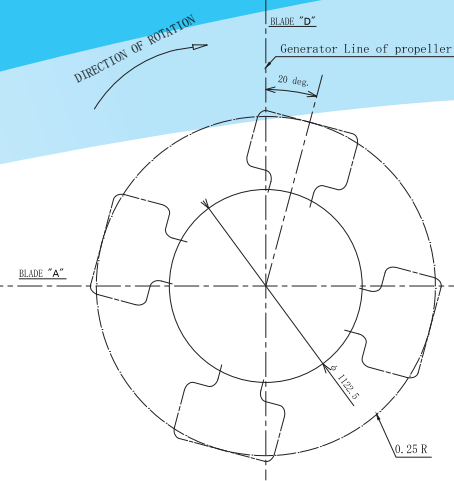


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iFTC Fluid Techno Co., Ltd.

HVRF strongly supports environmentally-friendly ships

Without distinction of newbuilding or retrofit, fuel oil cost can be saved by 2% at maximum by installation of HVRF. This small propeller cap leads the future of maritime transportation.



Features of HVRF

- ✓ **About 2% saving** of fuel oil consumption
- ✓ **Ship speed up** at constant output
- ✓ **Less damage to rudder** by rectifying inflow into rudder
- ✓ Applicable to short propeller cap, which **cuts the device manufacturing cost**
- ✓ **Reduction of noise and vibration** incurred by propeller
- ✓ **Recoverable installation cost less than a year** by saved fuel oil consumption
- ✓ **Installable to not only fixed pitch propeller but variable pitch propeller**
- ✓ **Installable to retrofit**



What is HVRF ?

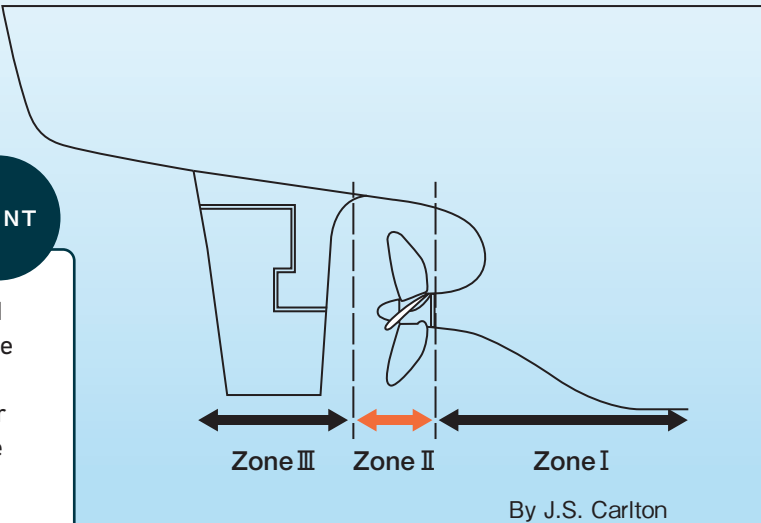
HVRF is an energy saving device installed to propeller cap, which has four or five fins. It works as to reduce hub vortex and helps propeller to reduce its torque and to enhance its thrust at minimized propulsion main engine output. Also, the device reduces noise and vibration incurred by propeller.

Principle of HVRF

HVRF is categorized in propeller cap type energy saving devices, Zone II. Propeller efficiency is improved by rectifying hub vortex and reducing its rotational flow.

POINT

Essential of HVRF design is to estimate flow field around hull and propeller accurately to determine its installation position. The best installation position and angle are determined combining our plenty experiences of hull form development, the latest CFD and accumulated model test results. Also, when propeller is simultaneously designed with HVRF, each of them exhibits the optimized performance.



Fuel Oil Consumption

Fuel oil cost can be saved by installation of HVRF. As installation fee is recovered less than a year, the cost performance is exceptional.

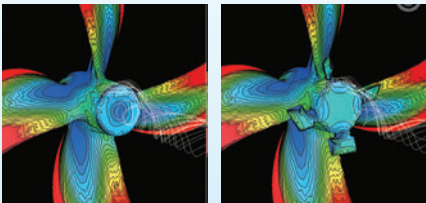
Annual fuel oil saving

	Bulk Carrier	Container	Tanker
Size	180,000DWT	4,000TEU	320,000DWT
MCR	17,000kW	20,000kW	22,500kW
Average speed	14.5knots	20knots	15.3knots
Annual Fuel Cost	9.6hundred million yen	9.8hundred million yen	1 billion yen
Average energy saving efficiency	2%	2%	2%
Annual saved fuel cost	19million yen	19.6million yen	20million yen

Energy saving efficiency
2% up
at maximum

CFD Simulation

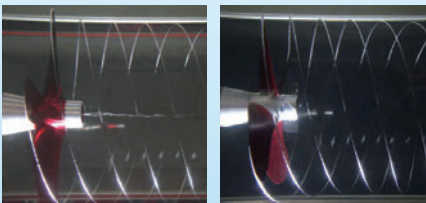
Interference of HVRF with propeller is checked by CFD calculation to estimate efficiency of HVRF. Its installing position and angle are determined by optimization software.



Without HVRF With HVRF

Tank Test

Propeller efficiency with HVRF designed by CFD is verified by model test



Without HVRF With HVRF

Track Record

HVRF shows effect for various ship types

Bulk Carrier	180,000DWT / 187,000DWT / 210,000DWT / VLCC
Tanker	VLCC
Chemical Tanker	13,000DWT

