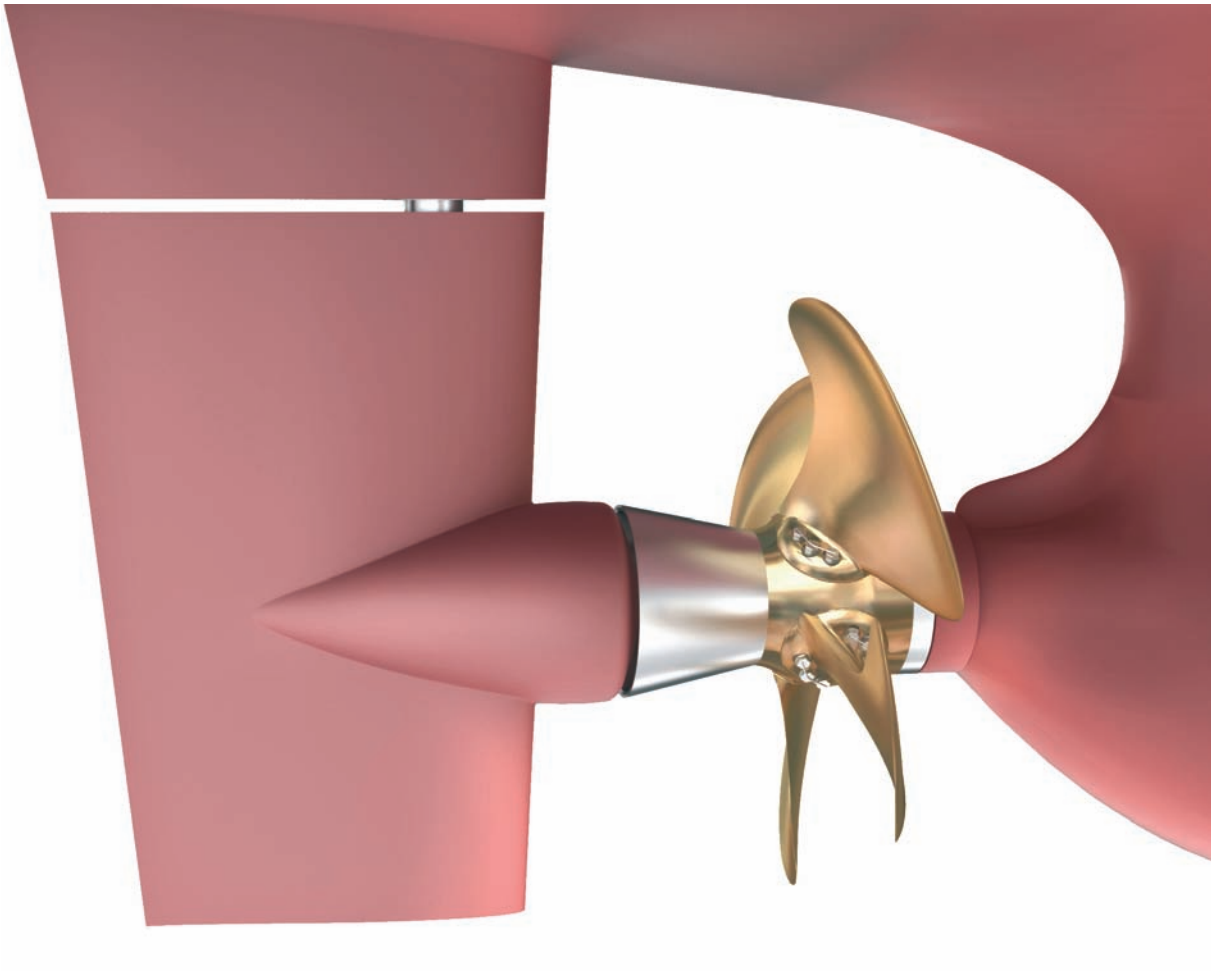
Fact Sheet

Rolls-Royce

Promas

High efficiency propulsion system



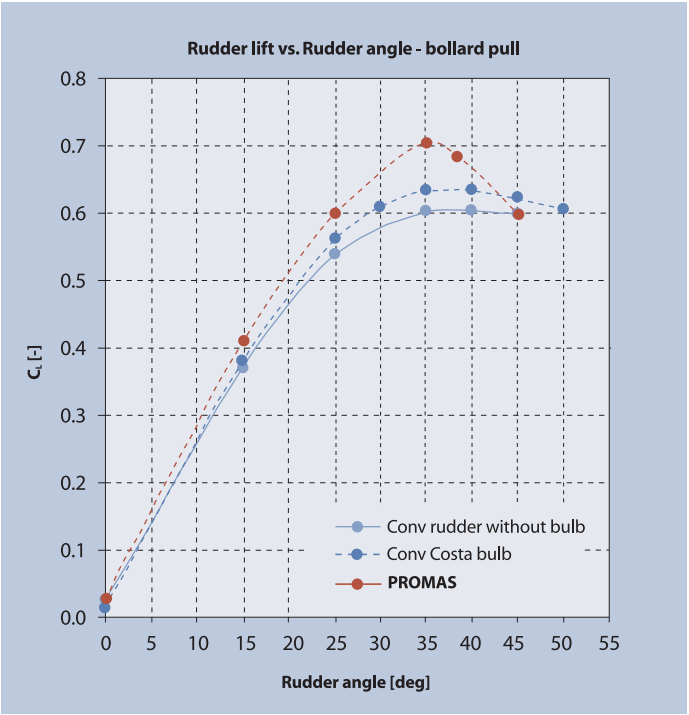
Promas integrates the propeller, a hub cap, a rudder bulb and the rudder itself into a hydrodynamically efficient entity.

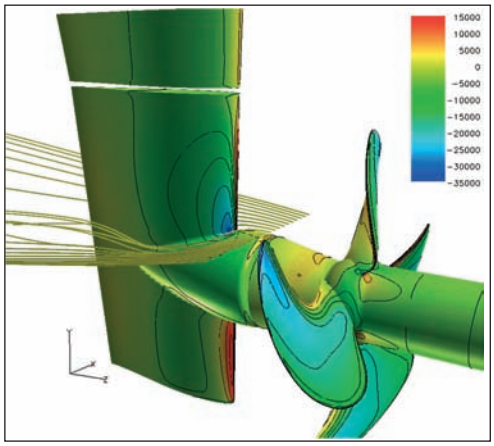
A tapered hubcap is fitted to the hub of the propeller and leads the water flow on to a bulb which forms part of the spade rudder. The rudder has a twisted leading edge, optimised for the flow from the propeller, which converts into additional forward thrust some of the swirl energy in the slipstream that is normally lost.

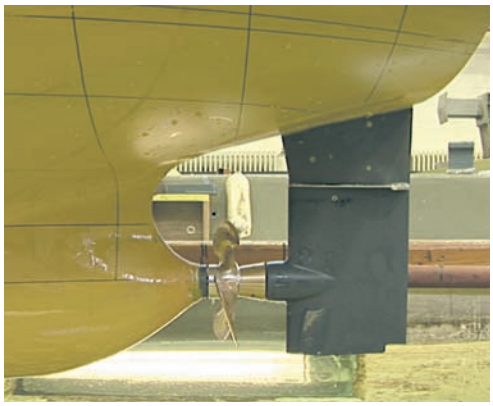
The result is an increase in propulsive efficiency of about 6 to 8 % depending on application, leading to reduced fuel consumption and emissions. Large steering forces can also be developed.

Fact Sheet

Manoeuvring at low speed - Maximum lift increased with 15%





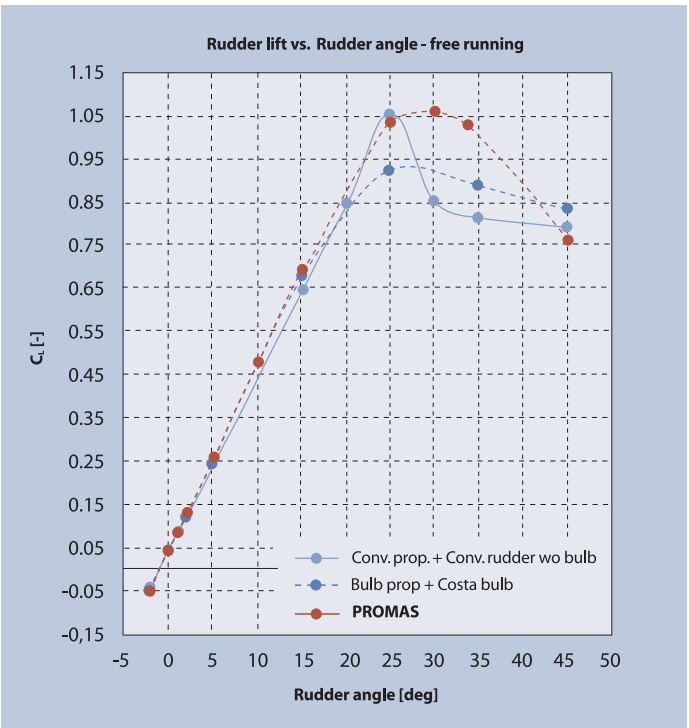


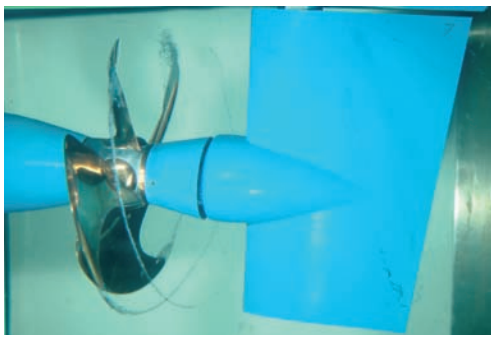
Manoeuvring at high speed

Lift / rudder angle +8%

Stall angle + 40%

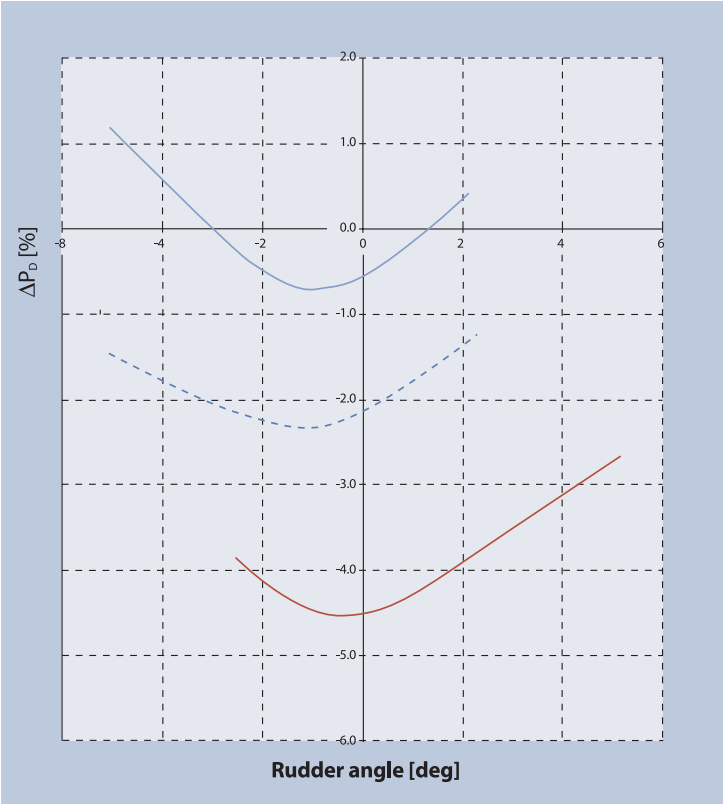
= Reduced turning circle diameter

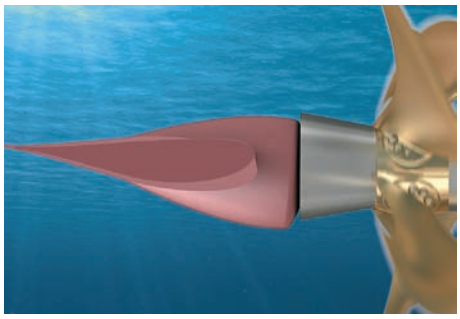




Promas has been developed using CFD (computational fluid dynamics), and the results verified by testing in the cavitation tunnel at the Rolls-Royce Hydrodynamic Research Centre and large sacle model testing with relevant hulls.

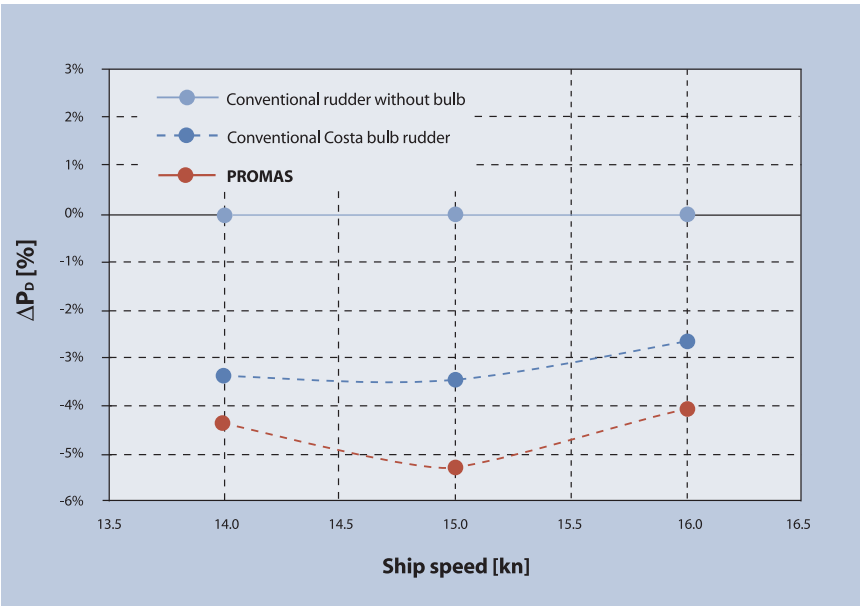
Fact Sheet

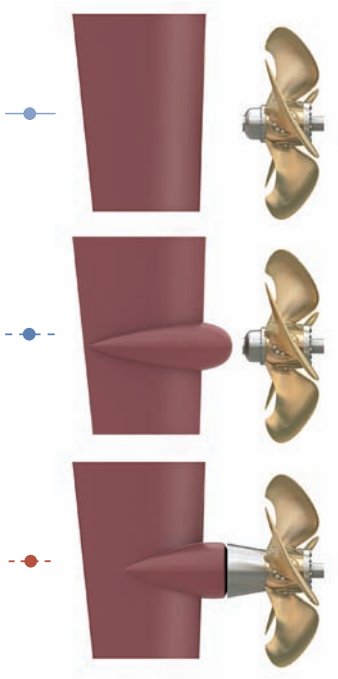




- Efficiency gain maintained with rudder angle
- Required steering angle reduced

Relative delivered power vs. Ship speed - Single screw chemical tanker





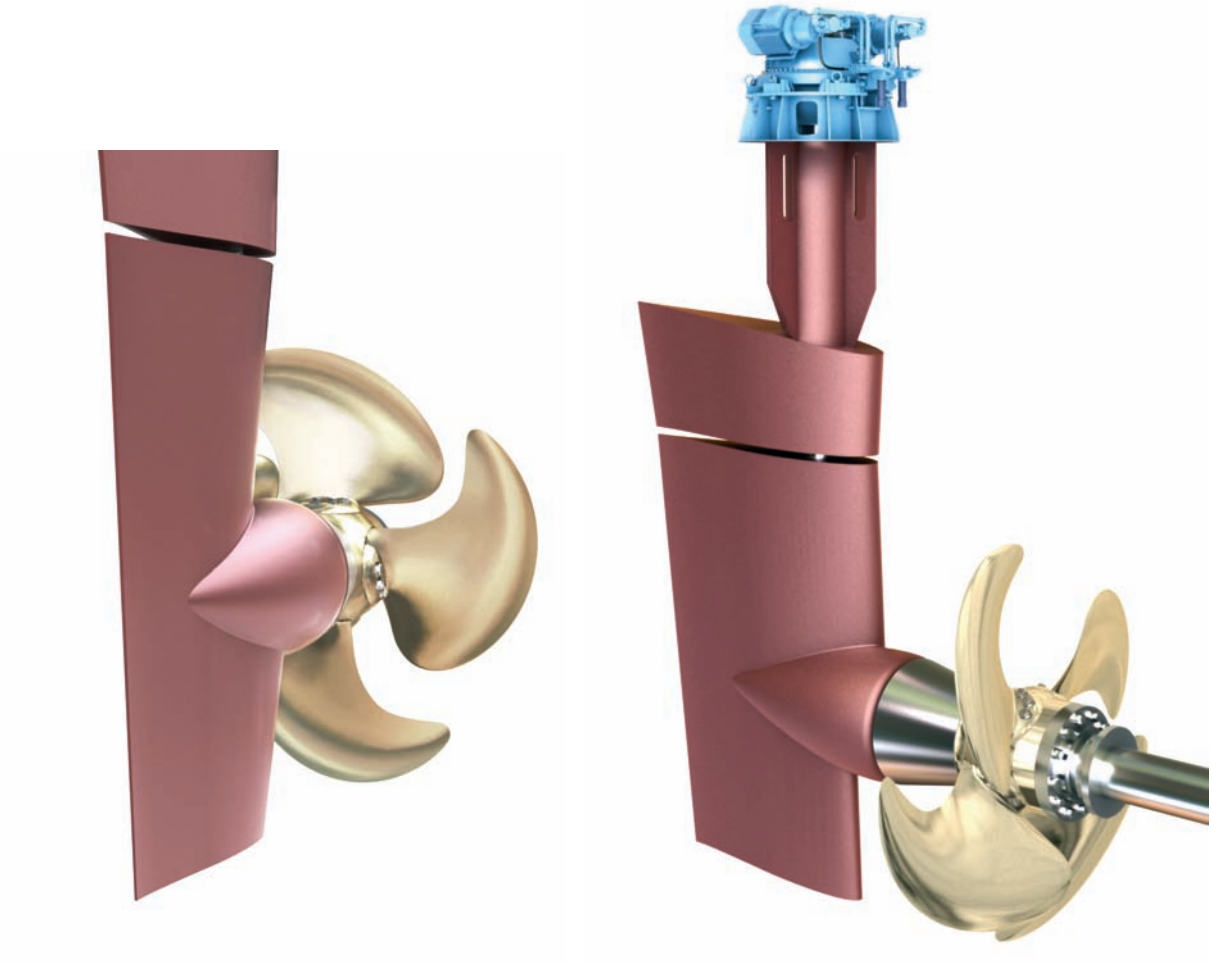
- Single screw – Chemical tanker
- Efficiency improvement by conv Costa bulb 2.5-3.5%
- Efficiency improvement by RR Rudder 4.0-5.1%

Fact Sheet

Installation of the Promas system follows normal shipyard practice. The rudder bulb is close to the propeller hub cap, but not attached to it. The nose of the bulb is curved, and gives good control of water flow from propeller to rudder even at large steering angles.

The risk of hub vortex cavitation is removed. Consequently the radial distribution of hydrodynamic loads on the propeller blades can be modified, reducing tip loading and helping to cut the intensity of blade pressure pulses and associated noise and vibration.

By twisting the leading edge of the rudder, the rudder blade forms a cambered hydrofoil profile enabling some of the swirl energy in the propeller slipstream to be converted into additional thrust that helps to propel the vessel.



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