

Flipper - DISTINCT RUDDER



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Geometric characteristics of the "flipper" rudder:

The stainless steel cylindrical rod is tangentially located to the leading edge, and not as usually at 30% of the chord length. This geometric disposition doesn't allow herb, algae, paper or other garbage retention in the rudder.

10 mm of the stainless steel cylindrical rod are involved with polycarbonate (material of the rudder body). This procedure gives more resistance to all the system and avoids premature polymer degradation polymer between the large section foil and the stainless steel, as in the old systems.

The leading edge inclination is 30° . This value is great to avoid garbage anchor and doesn't increase too much the tailing edge dimension.

Scalloped escape edge

This kind of geometry can be seen in some mammal animals. It is scientifically proved that the mammals with these flippers have lower friction movements and better rotation and flexibility.

The reason for this superior performance is related with an increase of 8% in lift and reduction of 32% in drag. The flippers geometry generate lateral and counter rotation vortices that anchor the air bubbles instead to separate them and generate turbulence.

"Scalloped or tubercles could be used in a variety of sea vessels or in a entirely different craft, such as airplanes. This is a case where the design of animals can be integrated into engineered devices."^[1]

"The scalloped fins actually increased lift, decreased drag, and could better withstand stall."^[2]

"The whale through millions of years have developed scalloped leading edges on their flippers. It has been shown in wind tunnel that scalloped edges produce vortices that break up laminar flow so that lift is better and turning faster for scalloped edges versus straight or curved edges."^[3]

^[1] www.sciencenews.org
^[2] www.findarticles.com
^[3] www.boatdesign.net

