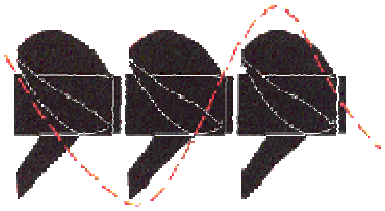
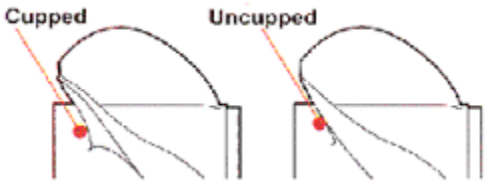
Propeller Basics

Diameter
Diameter is two times the distance from the centre of the hub to the tip of the blade. Also it can be looked
at as the distance across the circle that the propeller would make when rotating. It is the first number listed
when describing a propeller.

Pitch
Pitch is defined as the theoretical forward movement of a propeller during one revolution - assuming there is no
"slippage" between the propeller blade and the water. For most boats, there is slippage and therefore the distance
advanced is less than the design pitch. The amount of slippage varies from boat to boat. Pitch is the second number
listed in the propeller description.

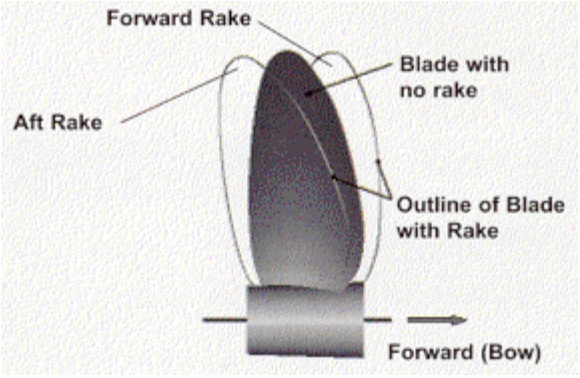


Cupping
Many of today's propellers incorporate a cup at the trailing edge of the propeller blade. This curved lip on the
propeller allows it to get a better bite on the water. This results in reduced ventilation, slipping, and allows for
a better hole shot in many cases. A cupped propeller also works very well where the motor can be trimmed so
that the propeller is near the surface of the water. The cup will typically result in higher top end speed on one
of these applications.



Rake
Rake is the degree that the blades slant forward or backwards in relation to the hub. Rake can affect the flow of
water through the propeller, and as implications with respect to boat performance.
Aft Rake helps to trim the bow of the boat upwards, which often results in less wetted surface area and therefore
higher top end speed. Aft rake propellers also typically "bite" better on ventilating type applications.
Forward, or negative rake, helps hold the bow of the boat down. This is more common in workboat

type applications.
F Blade with no rake Aft Rake Outline of Blade with Rake -F=d (Bow)



Ventilation
Ventilation is a situation where surface air or exhaust gasses are drawn into the propeller blades. When this
situation occurs, boat speed is lost and engine RPM climbs rapidly. This can result from excessively tight
cornering, a motor that is mounted very high on the transom, or by over-trimming the engine.

Cavitation
Cavitation, (which is often confused with ventilation), is a phenomena of water vaporizing or "boiling" due to
the extreme reduction of pressure on the back of the propeller blade. Many propellers partially cavitate during
normal operation, but excessive cavitation can result in physical damage to the propeller's blade surface due
to the collapse of microscopic bubbles on the blade.
There may be numerous causes of cavitation such as incorrect matching of propeller style to application,
incorrect pitch, physical damage to the blade edges, etc...
Be advised disturbances in the water flow forward of the 4 propeller can result in blade damage which appears
to be blade cavitation, but is actually due to non-favourable water flow into the propeller.