



PropElements®

What Is HydroComp PropElements?

HydroComp *PropElements* is software for detail propeller design and analysis.

Who Should Use PropElements?

Propeller specialists will find *PropElements* an essential addition to their propeller “design for performance” toolbox, but it also was developed to elegantly address the system-level hydrodynamic needs of naval architects.

What Propellers Can I Evaluate With PropElements?

PropElements is for the design and analysis of open or ducted sub-cavitating propellers. The blade is described by radially-varying foil parameters (such as chord, thickness, camber, pitch), and a variety of reference foil types are available to capture blade profile shape. For ducted propellers, *PropElements* supports standard nozzle styles (such as 19A and 37) and also tunnel thrusters and high-efficiency nozzles.

Does PropElements Consider The Vessel?

Through definition of the radial wake distribution, *PropElements* provides the ability to uniquely capture the performance of a particular propeller on a particular vessel. For a propeller design, a true “wake-adapted” optimal solution can be delivered.

How Does PropElements Work?

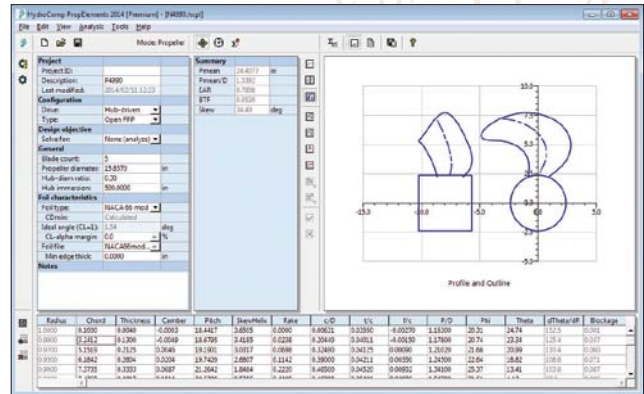
The method employed in *PropElements* is often referred to as a “hybrid lifting-line lifting-surface model”, with a unique implementation of a scalable viscous vortex lattice lifting-line code as its foundation. Much more than a simple academic lifting line utility, *PropElements* offers a reliable and accurate tool to predict propeller performance that is only made possible through HydroComp’s in-house R&D and our experience in hybrid empirical-numerical hydrodynamics.

Is PropElements Accurate?

Quantitative validation against test data is a crucial step in the development process at HydroComp. Extensive validations studies for *PropElements* have confirmed that it is unmatched in prediction accuracy.

Detail propeller design and analysis

$$\tan(\beta_i) = \frac{\tan(\beta)}{c n} \left(\frac{1-w}{1-w'} \right)^{1/2}$$



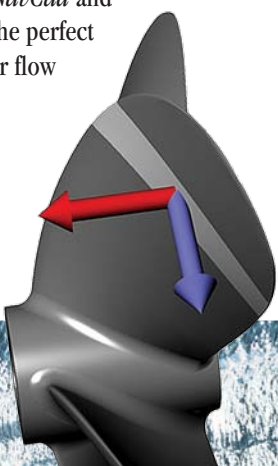
Sample PropElements Data Screen

How Are Data And Reports Managed In PropElements?

Data can be manually developed using *PropElements*’ own editing functions. Existing design data can also be transferred by spreadsheet copy-paste, or by editing the text-based *PropElements* design file. Output is provided in both reports and plots.

Does PropElements Interface With Other Software?

A design can also be shared with other software for a complete design cycle solution. A number of Import and Export options make *PropElements* an important companion for HydroComp’s *NavCad* and *PropCad* software, as well as the perfect pre-processor for higher-order flow codes and CFD.





PropElements®

$$\tan(\beta_i) = \frac{\tan(\beta)}{c \eta_i} \left(\frac{1-w}{1-w_i} \right)^n$$

Technical Specifications

Calculation Groups

Project • Geometry • Performance • Strength • KT-KQ

Water Types

Fresh • Salt • Brackish • Custom

Solve For

Pitch + Camber (ideal) • Pitch • Thrust

Configuration

Open FPP • Ducted FPP • In tunnel

Foil Definition

Generic • NACA 66 mod • Bi-Circular • Segmental • Custom

Velocities

Axial only • Axial and tangential

Wake Distribution

User entered • From wake file

Tip and Hub Corrections

Custom unloading • Hub image • Hub drag

Advanced Analyses

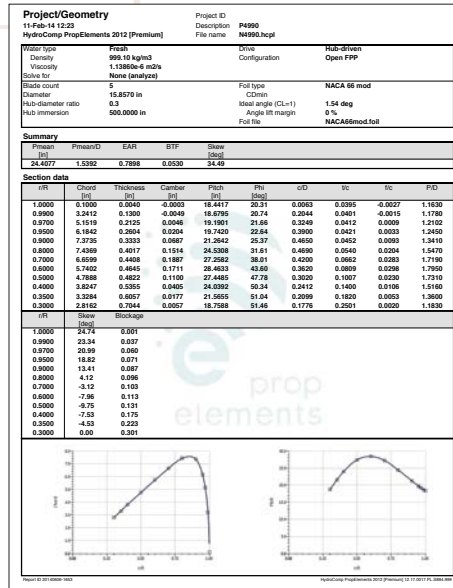
Proprietary HydroComp 3D corrections • Optimum circulation

Materials

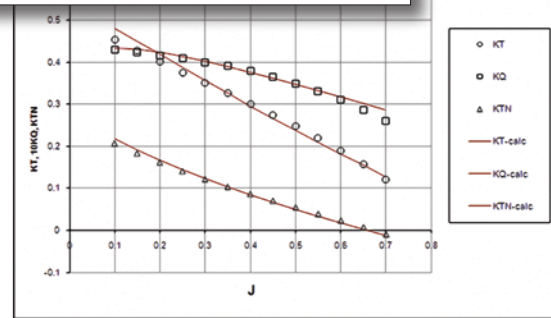
Mn bronze • NiAl bronze • St steel • Custom

KT-KQ

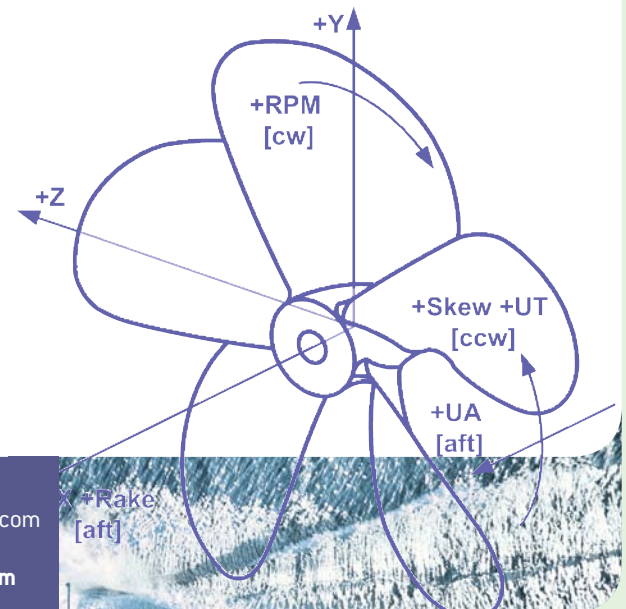
Constant speed • Constant RPM • Constant Rn07R



Sample PropElements Report (top) and Validation Study



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