

Correlating Propeller Performance with K_t/K_q Multipliers

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The *AU* and *M-AU* (modified AU) propellers are a series of aerofoil blade section propellers popular in Japan and the Far East. The basic geometry of the series is quite similar to the Wageningen *B-Series* developed at NSMB.

Unlike the B-series, the thrust and torque performance has never been developed into polynomial expressions for the calculation of K_t and K_q . It is possible to adequately predict the performance of the AU/M-AU series through the use of *K_t and K_q multipliers*. K_t and K_q multipliers shift the predicted curves for the chosen series (B-series in this case), to make them closer to what is expected from the actual propeller (AU/M-AU). HydroComp has identified that to predict AU/M-AU series performance:

- **Series: B-series**
- **K_t multiplier: 1.07**
- **K_q multiplier: 1.07**
- **Use suitable scale corrections and options as for the B-series**

A plot of actual AU/M-AU performance compared to multiplier-corrected B-series performance is shown below. This was performed at model scale for a 5-bladed propeller with 0.80 expanded area ratio and pitch/diameter ratio of 0.80. The multiplier was chosen to minimize the error in the range of the maximum efficiency. The calculation tended to overpredict (less than 4%) below the point of maximum efficiency, and underpredict above.

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