

Abstract Submitted
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Cavitation Characteristics of a NACA 63-424 Hydrofoil and Performance Comparison with a Bidirectional Version of the Foil IVAYLO NEDYALKOV, MARTIN WOSNIK, University of New Hampshire — A NACA 63-424 hydrofoil with a 75mm chord and a 152mm span was tested in the recently renovated 6-inch high-speed water tunnel at the University of New Hampshire. The NACA 63-424 foil is being considered for use on rotors of marine hydrokinetic turbines, including the US Department of Energy Reference Horizontal Axis Turbine (RHAT) for tidal and ocean current applications. For various angles of attack, the foil was tested at speeds ranging from 2m/s to 12m/s. Pressure in the test section was varied independently. For each angle, speed and pressure setting, high speed videos were recorded (at 3600 frames per second and above). Cavitation inception and desinance were obtained. Lift and drag were measured using a new 2-component force balance. In tidal turbines applications, bidirectional foils do not require pitch control, hence the experiments were repeated for a bidirectional version of the NACA 63-424 foil and the characteristics of the two foils were compared. The results can be used to predict cavitation inception and performance of marine hydrokinetic turbines, for a given site, deployment depth and and tip speed ratio.

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