Ocean Current Energy or more specifically, In-Stream tidal energy is very closely associated with wind power and is an extremely efficient form of alternative energy that utilizes an underwater turbine turned by a propeller in order to harvest the energy of moving water. The greater density of water allows for more efficient energy harvest in a turbine turned by water in comparison to its wind counterparts at the same rate of fluid movement. One of the most important components of these In-Stream water turbines is the propeller, which ranges from designs of two to upwards of ten or more blades, and exhibits varying angles and airfoil designs. In order to investigate the effects of propeller design on the efficiency and energy output of an Ocean Current turbine, a test chamber, built from 6” diameter PVC pipe 5’ in length, was constructed to simulate the constant flow of turbulence-free water found in many of the world’s large ocean currents and rivers. A simple electric DC motor, when fitted in the test chamber, confirmed the feasibility of producing a working underwater turbine by producing a constant flow of energy, which was measurable with a multi-meter. By fabricating 2” aluminum propellers, various variables, such as the number of blades and the blade angle, were compared and tested. Based on test results, the optimum propeller design consists of four blades at an angle between 20 and 30 degrees. This testing could also be useful in the creation of efficient micro-hydroelectric systems in households.