

Abstract

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Entropy Generation Due to Viscous Dissipation around a Wells Turbine Blade: A Preliminary Numerical Study

The present work analyzes, through a rigorous numerical investigation, the entropy generation due to viscous dissipation around a Wells turbine blade. Two-dimensional numerical models for four NACA airfoils were built and validated against experimental measurements under steady flow conditions. The models were used to assess the entropy generation for flows achieving 10 degrees angle of attack. It was found that the entropy generation around the NACA0015 airfoil blade is less by approximately 12% than the entropy generation around NACA0012, NACA0020 and NACA0021 airfoils. Then, the NACA0015 & NACA0021 airfoils were simulated under different flow conditions (i.e. Reynolds number and angle of attack). The results were discussed in the light of Wells turbine performance objectives.