

Simulation of Internal Flow Field of Pitot-Tube Jet Pump

Authors : Iqra Noor, Ihtaz Qamar

Abstract : Pitot-tube Jet pump, single-stage pump with low flow rate and high head, consists of a radial impeller that feeds water to rotating cavity. Water then enters stationary pitot-tube collector (diffuser), which discharges to the outside. By means of ANSYS Fluent 15.0, the internal flow characteristics for Pitot-tube Jet pump with standard pitot and curved pitot are studied. Under design condition, realizable k-ε turbulence model and SIMPLEC algorithm are used to calculate 3D flow field inside both pumps. The simulation results reveal that energy is imparted to the flow by impeller and inside the rotor, forced vortex type flow is observed. Total pressure decreases inside pitot-tube whereas static pressure increases. Changing pitot-tube from standard to curved shape results in minimum flow circulation inside pitot-tube and leads to a higher pump performance.

Keywords : CFD, flow circulation, high pressure pump, impeller, internal flow, pickup tube pump, rectangle channels, rotating casing, turbulence

Conference Title : ICAMAME 2021 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : February 15-16, 2021