

Heat Transfer Enhancement by Turbulent Impinging Jet with Jet's Velocity Field Excitations Using OpenFOAM

Authors : Naseem Uddin

Abstract : Impinging jets are used in variety of engineering and industrial applications. This paper is based on numerical simulations of heat transfer by turbulent impinging jet with velocity field excitations using different Reynolds Averaged Navier-Stokes Equations models. Also Detached Eddy Simulations are conducted to investigate the differences in the prediction capabilities of these two simulation approaches. In this paper the excited jet is simulated in non-commercial CFD code OpenFOAM with the goal to understand the influence of dynamics of impinging jet on heat transfer. The jet's frequencies are altered keeping in view the preferred mode of the jet. The Reynolds number based on mean velocity and diameter is 23,000 and jet's outlet-to-target wall distance is 2. It is found that heat transfer at the target wall can be influenced by judicious selection of amplitude and frequencies.

Keywords : excitation, impinging jet, natural frequency, turbulence models

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