ABSTRACT

This thesis deals with experimental investigation of turbulent slot jet impingement on a cylinder and a wedge of 90^{o} included angle in Reynolds number range of 4,000 to 20,000, slot widths of 10, 12.5, 15, 20 and 30 mm and for various positions of cylinder and wedge from the slot. Results are presented for the Nusselt number and pressure coefficient along with pressure and velocity distributions in the flow field.

The local and average Nusselt numbers for an isothermal wedge are presented for the first time for various orientations of the wedge with the jet axis. The velocity profiles over the cylinder surface are also presented for the first time. The zones where the velocity profile is self-similar, have been identified.

The common features for the cylinder and the wedge are that stagnation point and average Nusselt numbers both are maximum when the bodies are located at eight times the slot width. Empirical correlations are presented for stagnation point and average Nusselt numbers.

Numerical results are presented for laminar free slot jet and laminar slot jet impingement on a cylinder in the Reynolds number range of 10 to 30.

Key Words: Wall Jet, Slot Jet, Laminar Free Slot Jet, Jet Impingement, Cylinder, Wedge, SIMPLE, SIMPLER, Disc Type Pressure Probe, Stagnation Point, Self-Preseving, Heat Flux Sensor, Local Heat Transfer, Average Heat Transfer.