

EFFECT OF NOZZLE DIAMETER ON JET IMPINGEMENT COOLING SYSTEM

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## LIST OF SYMBOLS

$or\ t$	Thickness, ( $m$ )
$\mu$	Dynamic viscosity of the fluid, ( $Pa\cdot s$ or $N\cdot s/m^2$ )
$\dot{\cdot}$	Mass flow rate, ( $kg/s$ )
$\dot{\cdot}$	Heat convection rate, ( $Watt$ )
$\dot{\cdot}$	Rate of net heat transfer, ( $kJ/s$ )
$\rho$	Density of the fluid, ( $kg/m^3$ )
$\nu$	Kinematic viscosity, ( $\nu = \mu / \rho$ ), ( $m^2/s$ )
$d$	Nozzle diameter, ( $m$ )
$D$	Wall diameter, ( $m$ )
$h$	Convection heat transfer coefficient, ( $W/m^2 \cdot ^\circ C$ )
$k$	Thermal conductivity, ( $W/m\cdot K$ )
$A_c$	Plate cross-section area, ( $m^2$ )
$A_s$	Heat transfer surface area, ( $m^2$ )
$C_p$	Constant pressure specific heat, ( $kJ/kg\cdot K$ )
$L\ or\ r$	Radius of the impingement region, ( $m$ )
$L_h$	Hydrodynamic entry length, ( $m$ )
$Nu$	Nusselt number
$Q$	Volumetric flow rate, ( $m^3/s$ )
$Re$	Reynolds number
$S$	Exit nozzle to heat source plate distance, ( $m$ )
$\Delta T$	Temperature different, ( $K$ )
$T_\infty$	Ambient temperature, ( $^\circ C$ )
$T_s$	Surface temperature, ( $^\circ C$ )

$T_p$	Plate surface temperature, ( $^{\circ}C$ )
$T_{p\,avg}$	Average temperature of the plate surface, ( $^{\circ}C$ )
$V$	Mean fluid velocity, ( $m/s$ )

**LIST OF ABBREVIATIONS**

FKM	Fakulti Kejuruteraan Mekanikal
FYP	Final year project