











$C_p$	Specific heat capacity (kJ/Kg K)	$f$	Heat transfer coefficient (W/m <sup>2</sup> K)
$A = \pi DLn$	Area (M <sup>2</sup> )	$h$	Hydraulic diameter (m)
$m_f$	Mass flow rate (Kg/s)	$D_h$	Actual heat transfer (W)
$\phi$	Volume concentration of nanofluids	$q$	
$T$	Temperature (°C)		
$c$	Massin kg		
$k$	Thermal conductivity	<b>Subscripts</b>	
$\rho$	Density (kg/m <sup>3</sup> )	$p$	Nanoparticle
$\dot{v}$	Volume flow rate	$f$	Base fluid
$\mu$	Dynamic viscosity (Ns/m <sup>2</sup> )	$nf$	Nanofluid
$Nu$	Nusselt number	$c$	Cold fluid
$Re$	Reynolds number	$h$	Hot fluid
$Pr$	Prandtl number	$o$	Outlet
$P$	Pumping power (W)	$i$	Inlet
$\Delta P$	Pressure drop (N/m <sup>2</sup> )		
	Friction factor		