

Table Appendix D1 Inputs parameters of nanofluids

Parameters of nanofluid						
Mixture Species	H ₂ O + Al ₂ O ₃	H ₂ O + Al ₂ O ₃	H ₂ O + Al ₂ O ₃	H ₂ O + Al ₂ O ₃	H ₂ O + Al ₂ O ₃	H ₂ O + Al ₂ O ₃
Volume fraction	0% Al ₂ O ₃	1% Al ₂ O ₃	2.5% Al ₂ O ₃	5% Al ₂ O ₃	7.5% Al ₂ O ₃	10% Al ₂ O ₃
Mass fraction	-	0.03862176	0.09254122	0.17309185	0.24384052	0.30647378
Density (kg/m ³)	998.2000	1027.9180	1072.4950	1146.7900	1221.0850	1295.3800
Cp (J/kg-K)	4182.0000	4148.9800	4099.4500	4016.9000	3934.3500	3851.8000
Thermal conductivity (W/m-k)	0.613	Keff_Al2O3:: Keffspecies	Keff_Al2O3:: Keffspecies	Keff_Al2O3:: Keffspecies	Keff_Al2O3:: Keffspecies	Keff_Al2O3:: Keffspecies
Viscosity (kg/m-s)	0.0010030	Veff_Al2O3:: Veffspecies	Veff_Al2O3:: Veffspecies	Veff_Al2O3:: Veffspecies	Veff_Al2O3:: Veffspecies	Veff_Al2O3:: Veffspecies
Mass diffusivity (m ² /s)	-	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11
Thermal Diffusion coefficient(kg/m-s)	-	4.20836E-06	4.88335E-06	6.48528E-06	8.68340E-06	1.14777E-05
V at Re = 50000 (m/s)	5.024043278	5.294954948	5.888853211	7.313969864	9.197120286	11.45949451