Summary of dimensionless numbers

Symbol	Name	Variables	Description or usage
General number		UL/δ	convective to molecular transport
N_{Re}	Reynolds	$UL\rho/\mu$	inertial to viscous forces or convective to molecular momentum transfer
N_{Pe}	Peclet	$UL\rho c_p/k$	convective to molecular conductive heat transfer
N_{Pr}	Prandtl	$c_p\mu/k$	momentum to thermal diffusivity
$N_{Pe,\,mass}$	Peclet, mass	UL/D	convective to molecular mass transfer
N_{Sc}	Schmidt	$\mu/(\rho D)$	momentum to mass diffusivity
N_{Le}	Lewis	$k/(\rho c_p D)$	thermal to mass diffusivity; also, ratio of Schmidt to Prandtl number
N_{Eu}	Euler	$p/(\rho U^2)$	pressure to inertial forces or momentum generation to convective momentum transfer
N_{Fr}	Froude	$U^2/(Lg)$	inertial to gravitational forces or convective momentum transfer to gravitational momentum transfer
—	—	$(\rho c_p TL)/(\mu U)$	convective heat transfer to viscous dissipation heat generation
N_{Br}	Brinkman	$(\mu U^2)/(kT)$	viscous dissipation heat generation to molecular conductive heat transfer
N_{Dm1}	Damkohler 1	$Lk_nC_A^{n-1}/U$	chemical reaction generation to convective mass transfer
N_{Dm2}	Damkohler 2	$L^2k_nC_A^{n-1}/D$	chemical reaction generation to molecular diffusion mass transfer
N_{We}	Weber	$U^2L\rho/\sigma$	inertial to surface forces
N_{Nu}	Nusselt	hL/k	total heat transfer to molecular heat transfer
N_{Sh}	Sherwood	$k_c'L/D$	total mass transfer to molecular mass transfer
f	Fanning friction factor	$\tau_w/(\rho U^2/2) = [(d_o\Delta p)/(4L)]/(\rho U^2/2)$	shear stress at the wall to the kinetic energy of flow
N_{St}	Stanton	$h/(\rho c_p U)$	total heat transferred to total heat capacity: $N_{St} = N_{Nu}/(N_{Re}N_{Pr})$
$N_{St,\,mass}$	Stanton	$k_{L,\,ave}/U_{z,\,ave}$	$N_{St,\,mass} = N_{Sh}/(N_{Re}N_{Sc})$
N_{Ar}	Archimedes	$(\rho_p - \rho)(\rho g d_p^3)/\mu^2$	fluidization
N_{Bi}	Biot	hL/k	unsteady-state heat conduction
N_b	blend	Nt	agitation
j_H	Colburn heat	$(N_{St})(N_{Pr})^{2/3}$	Colburn factor for heat transfer analogy
j_M	Colburn mass	$(N_{St,\,mass})(N_{Sc})^{2/3}$	Colburn factor for mass transfer: $f/2 = j_H = j_M$
N_{co}	condensation	$(h/k)[\mu^2/(\rho^2 g)]^{1/3}$	condensation
N_{Dn}	Dean	$N_{Re}(d_o/d_c)^{1/2}$	flow in curved tubes
N_{De}	Deborah	$t_{fluid}/t_{process}$	flow of elastic fluids
C_D	drag coefficient	$2F/(\rho U^2 A)$	flow past immersed bodies
N_{Fo}	Fourier	$\alpha t/L^2$	nondimensional time parameter
N_{Gr}	Graetz	$(wc_p)/(kL)$	heat transfer, laminar forced convection
N_{Gr}	Grashof	$(L^3\rho^2 g\beta)(\Delta T)/\mu^2$	Reynolds number times the ratio of buoyancy force to viscous force (natural convection heat transfer)
N_{Kn}	Knudsen	λ/L	flow of gases at low pressure
N_{Ma}	Mach	U/c	flow above the speed of sound
N_{po}	power	$P/(\rho N^3 d_t^5)$	agitation
N_p	pumping	$Q/(ND^3)$	agitation
N_{St}	Strouhal	$f'L/U$	periodic flows
N_{VK}	von Karman	$N_{Re}(f)^{0.5}$	eliminates velocity in correlations for Δp