NOMENCLATURE

A_s	Surface area, m^2
A_c	Cross-sectional area, m^2
Bi	Biot number
C	Molar concentration rate, $kmol/m^3$
c	Specific heat, kJ/kg·K
C_c, C_h	Heat capacity rate, W/K
C_D	Drag coefficient
C_f	Friction coefficient
c_p	Constant pressure specific heat, kJ/kg·K
c_v	Constant volume specific heat, kJ/kg·K
COP	Coefficient of performance
d, D	Diameter, m
D_{AB}	Diffusion coefficient
D_h	Hydraulic diameter, m
e	Specific total energy, kJ/kg
$\dot{e}_{\text{gen}}$	Heat generation rate, W/m^3
erfc	Complementary error function
E	Total energy, kJ
$\dot{E}_{\text{gen}}$	Total heat generation rate, W
E_b	Blackbody emissive flux
$E_{b\lambda}$	Spectral blackbody emissive flux
f	Friction factor
f_λ	Blackbody radiation function
F	Force, N
F_D	Drag force, N
F_{ij}, $F_{i\to j}$	View factor
Fo	Fourier number
g	Gravitational acceleration, m/s^2
G	Incident radiation, W/m^2
Gr	Grashof number
h	Convection heat transfer coefficient, $W/m^2·K$
h	Specific enthalpy, $u + Pv$, kJ/kg
h_c	Thermal contact conductance, $W/m^2·K$
h_{fg}	Latent heat of vaporization, kJ/kg
I	Electric current, A
I	Modified Bessel function of the first kind
I	Radiation intensity, $W/m^2·sr$
j	Diffusive mass flux, $kg/s·m^2$
J	Radiosity, W/m^2; Bessel function
k	Thermal conductivity, W/m·K
k_{eff}	Effective thermal conductivity, W/m·K
K	Modified Bessel function of the second kind
L	Length; half thickness of a plane wall
L_c	Characteristic or corrected length
L_h	Hydrodynamic entry length
L_t	Thermal entry length
m	Mass, kg
$\dot{m}$	Mass flow rate, kg/s
M	Molar mass, kg/kmol
N	Number of moles, kmol
NTU	Number of transfer units
Nu	Nusselt number
p	Perimeter, m
P	Pressure, kPa
P_v	Vapor pressure, kPa
Pr	Prandtl number
$\dot{q}$	Heat flux, W/m^2
Q	Total heat transfer, kJ
$\dot{Q}$	Heat transfer rate, kW
r_{cr}	Critical radius of insulation
R	Gas constant, kJ/kg·K
R, r_o	Radius, m
R	Thermal resistance, K/W
R_c	Thermal contact resistance, $m^2·K/W$
R_f	Fouling factor
R_u	Universal gas constant, kJ/kmol·K
R-value	R-value of insulation
Ra	Rayleigh number
Re	Reynolds number
S	Conduction shape factor
Sc	Schmidt number
Sh	Sherwood number
St	Stanton number
SC	Shading coefficient
SG	Specific gravity
SHGC	Solar heat gain coefficient
t	Time, s
t	Thickness, m
T	Temperature, °C or K
T_b	Bulk fluid temperature, °C
T_f	Film temperature, °C
T_{sat}	Saturation temperature, °C
T_s	Surface temperature, °C or K
u	Specific internal energy, kJ/kg
u, v	x- and y-components of velocity
U	Overall heat transfer coefficient, $W/m^2·K$
v	Specific volume, m^3/kg
V	Voltage
V	Total volume, m^3
$\dot{V}$	Volume flow rate, m^3/s
V	Velocity, m/s
V_{avg}	Average velocity
w	Mass fraction
$\dot{W}$	Power, kW
y	Mole fraction

Greek Letters

α	Absorptivity
α	Thermal diffusivity, m^2/s
α_s	Solar absorptivity
β	Volume expansivity, 1/K
δ	Velocity boundary layer thickness, m
δ_t	Thermal boundary layer thickness, m
ΔP	Pressure drop, Pa
ΔT_{lm}	Log mean temperature difference
ε	Emissivity; heat exchanger or fin effectiveness
ε	Roughness size, m
η_{fin}	Fin efficiency
η_{th}	Thermal efficiency
θ	Total energy of a flowing fluid, kJ/kg
μ	Dynamic viscosity, kg/m·s or $N·s/m^2$
ν	Kinematic viscosity $= \mu/\rho$, m^2/s
ν	Frequency, l/s
ρ	Density, kg/m^3
σ	Stefan–Boltzmann constant
σ_n	Normal stress, N/m^2
σ_s	Surface tension, N/m
τ	Shear stress, N/m^2
τ	Transmissivity; Fourier number
τ_s	Wall shear stress, N/m^2
ϕ	Relative humidity
θ	Dimensionless temperature
ω	Specific or absolute humidity, kg H_2O/kg dry air

Subscripts

atm	Atmospheric
avg	Average
b	Boundary, bulk fluid
cond	Conduction
conv	Convection
cyl	Cylinder
e	Exit conditions
f	Saturated liquid; film
i	Inlet, initial, or indoor conditions
i	*i*th component
l	Liquid
m	Mixture
o	Outlet or outdoor conditions
rad	Radiation
s	Surface
surr	Surrounding surfaces
sat	Saturated
semi-inf	Semi-infinite medium
sph	Sphere
sys	System
v	Water vapor
1	Initial or inlet state
2	Final or exit state
∞	Far from a surface; free-flow conditions

Superscripts

$\dot{}$ (over dot)	Quantity per unit time
$\bar{}$ (over bar)	Quantity per unit mole