SI—British Conversion Factors

British Standard 3763 may be consulted for the definitions of SI units, and BS 350 for comprehensive tables of conversion factors.

Exact values are printed in **bold type.**

Mass: 1 kg $= \dfrac{\mathbf{1}}{\mathbf{0{\cdot}453\ 592\ 37}}$ lb $= 2{\cdot}205$ lb

Length: 1 m $= \dfrac{\mathbf{1}}{\mathbf{0{\cdot}3048}}$ ft $= 3{\cdot}281$ ft Volume: 1 m^3 $= 35{\cdot}31$ ft^3

Time: 1 s $= \dfrac{\mathbf{1}}{\mathbf{60}}$ min $= \dfrac{\mathbf{1}}{\mathbf{3600}}$ h

Temperature unit: 1 °K $= \mathbf{1{\cdot}8}$ °R

(see p. 11 for definitions of units and scales)

Force: 1 N (or kg m/s^2) $= \mathbf{10^5}$ dyn $= \dfrac{\mathbf{1}}{\mathbf{9{\cdot}806\ 65}}$ kgf

$= 7{\cdot}233$ pdl $= \dfrac{7{\cdot}233}{32{\cdot}174}$ or 0.2248 lbf

Pressure p: 1 bar $= \mathbf{10^5}$ N/m^2 $= 14{\cdot}50$ lbf/in^2 $= 750$ mm Hg $= 10{\cdot}20$ m H_2O

Specific volume v: 1 m^3/kg $= 16{\cdot}02$ ft^3/lb

Density ρ: 1 kg/m^3 $= 0{\cdot}062\ 43$ lb/ft^3

Energy: 1 kJ $= \mathbf{10^3}$ Nm $= \dfrac{\mathbf{1}}{\mathbf{4{\cdot}1868}}$ kcal $= 0{\cdot}9478$ Btu $= 737{\cdot}6$ ft lbf

Power: 1 kW$=$**1** kJ/s $= \dfrac{\mathbf{10^3}}{\mathbf{9{\cdot}806\ 65}}$ kgf m/s $= \dfrac{\mathbf{10^3}}{\mathbf{9{\cdot}806\ 65 \times 75}}$ metric hp

$= 737{\cdot}6$ ft lbf/s $= \dfrac{737{\cdot}6}{\mathbf{550}}$ or $\dfrac{1}{0{\cdot}7457}$ British hp

Specific energy etc. (u, h, ΔH): 1 kJ/kg $= \dfrac{\mathbf{1}}{\mathbf{2{\cdot}326}}$ Btu/lb $= 0{\cdot}4299$ Btu/lb

Specific heat etc. (c, R, s): 1 kJ/kg °K $= \dfrac{\mathbf{1}}{\mathbf{4{\cdot}1868}}$ Btu/lb °R $= 0{\cdot}2388$ Btu/lb °R

Thermal conductivity k: 1 kW/m °K $= 577{\cdot}8$ Btu/ft h °R

(Heat transfer coefficient: 1 kW/m^2 °K $= 176{\cdot}1$ Btu/ft^2 h °R)

Dynamic viscosity μ: 1 kg/m s $=$ **1** N s/m^2 $=$ **10** dyn s/cm^2 (or poise)
$= 2419$ lb/ft h $= 18{\cdot}67 \times 10^{-5}$ pdl h/ft^2

Kinematic viscosity ν: 1 m^2/s $= \mathbf{10^4}$ cm^2/s (or stokes) $= 38\ 750$ ft^2/h

Symbol	Quantity	International system of units
a	Velocity of sound	m/s
a	Thermal diffusivity= k/cρ	m^2/s
A	Area, A_c , cross-sectional area ; A_p , projected area of a body normal to the direction of flow; A_q , area through wich rate of heat flow is q; A_s , surface area; A_o , outside mean area; A_i , inside surface area; $\overline{A}$, logarithmic mean area	m^2
A	Azimuth of the sun	m^2
c	Specific heat; c_p ,specific heat at constant pressure; c_v , specific heat at constant volume; c_s , humid heat capacity	J/kgK
D	diameter; D_H , hydraulic diameter; D_o, outside diameter; D_i , inside diameter	m
E	emissive power of a radiating body; E_b , emissive power per micron at wavelength λ	w/m^2
f	Fanning friction coefficient for flow through a pipe or a duct	
F_{1-2}	geometrical shape factor for radiation feom one blackbody to another	
g	acceleration of gravity	m/s^2
G	mass velocity or flow rate per unit area (G=ρV)	kg/m^2s
h	enthalpy per unit mass	J/kg
$\overline{h}$	combined unit-surface, $h = \overline{h}_c + \overline{h}_r$; h_b ,unit-surface conductance of a boiling liquid; h_c , local unit convective conductance; $\overline{h}_c$, average unit convective conductance; $\overline{h}_r$, average unit conductance for radiation	w/m^2K
k	thermal conductivity; k_s , thermal conductivity of a solid; k_f , thermal conductivity of a fluid evaluated at the mean film temperature	w/m^2K
K	thermal conductance; K_k ,	w/K

	thermal conductance for conduction heat transfer; K_c , thermal convective conductance ; K_r , thermal conductance for radiation heat transfer	
l	**length, general**	**m**
$\dot{m}$	**mass flow rate**	**kg/s**
q	**rate of heat flow; q_k, rate of heat flow by conduction; q_c, rate of heat flow by convection; q_r , rate of heat flow by radiation; q_b , rate of heat flow by nucleate boiling**	**w(J/s)**
$\overline{q}$	**rate of heat flow per unit area or heat flux**	**w/m^2**
$\dot{q}$	**rate of heat generation per unit volume**	**w/m^3**
Q	**quantity of heat**	**J (joules)**
$\dot{Q}$	**volumetric fluid flow**	**m^3/s**
r	**radius; r_H , hydraulic radius; r_i , inner radius; r_o , outer radius**	**m**
R	**thermal resistance; R_c , thermal resistance to convection heat transfer; R_K , thermal resistance to conduction heat transfer; R_r ,thermal resistance to radiation heat transfer**	**s/w**
R_e	**electrical resistance**	**Ω (ohm)**
S_T	**distance between centerlines of tubes in adjacent transverse rows**	**m**
T	**temperature; T_b , temperature of bulk of fluid; T_f ,T_∞ , temperature of fluid far removed from heat source or sink; T_m ,mean bulk temperature of fluid floing in a duct; T_{abs}, temperature on absolute scale; T_s , temperature at surface of a wall; T_{sv} ,temperature of saturated vapor; T_{sl} , temperature of a saturated liquid; T_{fr} , greezing temperature; T_l , liquid temperature;T_o , total temperature; T_{as}, adiabatic wall temperature or adiabatic saturation**	**K**

	temperature; T_{wb} , wet-bulb temperature	
u	**internal energy per unit mass**	**J/kg**
u	**time average velocity in x direction; u' , instantaneous fluctuating x component of velocity; u_∞ , free stream velocity**	**m/s**
U	**overall unit conductance, onverall heat transfer coefficient, or overall transmittance**	**w/m^2K**
V	**volume**	**m^3**
V	**average velocity; V_i , velocity of light; V_∞ , free stream or flight velocity**	**m/s**
x	**distance from the leading edge; x_c , critical distance from the leading edge where flow becomes turbulent**	**m**
x	**coordinate**	
y	**coordinate**	
y	**distance from a solid boundary measured in direction normal to surface**	**m**
z	**coordinate**	

Greek letters

Symbol	quantity	international system of units
$\propto$	**absorptance for radiation;** α_λ, monochromatic absportance at wavelength λ	
β	**temperature coefficient of volume expansion**	**l/K**
β_k	**temperature coefficient of thermal conductivity**	**l/K**
γ	**specific heat ratio, c_p/c_v**	
Γ	**body force by unit mass**	**N/kg**
δ	**boundary layer thickness; δ_h hydrodynamic boundary layer thickness; $\delta_{m'}$, effective boundary layer thickness for mass transfer**	**m**
Δ	**difference between values**	
ϵ	**emittance for radiation; $\epsilon_\emptyset$, emittance in direction of Ø**	

θ	time	s
λ	wavelength; λ_{max} , wavelength at which monochromatic emissive power $E_{b\lambda}$ is a maximum	10^{-6} m
λ	latent heat of vaporization ; λ_M , molar latent heat of vaporization	J/kg
μ	dunamic viscosity	Ns/m^2
ν	kinematic viscosity, μ/ρ	m^2/s
ρ	mass density , l/ν; ρ_l, density of liquid; ρ_v, density of vapor	kg/m^3
ρ	reflectance for radiation	
τ	shearing stress; τ_s, shearing stress at surface; τ_w , shear at wall of a tube pr a duct	$Pa(N/m^2)$
τ	transmittance for radiation	
σ	Stefan-Boltzmann constant	W/m^2K^4
σ	surface tension	N/m
ψ	inclination for horizontal	rad
ω	angular velocity	l/s
χ	quality	