Engineering Conversion Chart

Multiply-by factors for the units engineers convert every day, with SI prefixes

For: Mechanical, civil, HVAC and process engineers; technicians and students

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EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
All factors derive from 1 in = 25.4 mm, 1 lb = 0.453 592 37 kg and g_0 = 9.806 65 m/s²	value in "To" units = value × factor	value in "From" units = value ÷ factor	250 psi × 6.894 757 = 1,723.7 kPa

Factors are given to 7 significant figures.

Conversion factors

From	To	Multiply by	Typical use
Inches (in)	Millimetres (mm)	25.4	Drawings, fasteners
Feet (ft)	Metres (m)	0.3048	Site dimensions
Miles (mi)	Kilometres (km)	1.609344	Distances
Nautical miles (nmi)	Kilometres (km)	1.852	Marine, aviation
Square inches (in²)	Square centimetres (cm²)	6.4516	Cross-sections
Square feet (ft²)	Square metres (m²)	0.09290304	Floor areas
Acres (ac)	Hectares (ha)	0.4046856	Land
Cubic inches (in³)	Cubic centimetres (cm³)	16.38706	Engine displacement
Cubic feet (ft³)	Litres (L)	28.31685	Tanks, rooms
US gallons (US gal)	Litres (L)	3.785412	US liquids
UK gallons (UK gal)	Litres (L)	4.54609	UK liquids
Pounds (lb)	Kilograms (kg)	0.4535924	Mass
Pound-force (lbf)	Newtons (N)	4.448222	Loads
Kips (kip)	Kilonewtons (kN)	4.448222	Structural loads
Kilogram-force (kgf)	Newtons (N)	9.80665	Legacy metric loads
psi (psi)	Kilopascals (kPa)	6.894757	Hydraulics, tyres
psi (psi)	Bar (bar)	0.06894757	Gauges
Bar (bar)	Kilopascals (kPa)	100	Gauges
Atmospheres (atm)	Kilopascals (kPa)	101.325	Standard atmosphere
Pound-force feet (lbf·ft)	Newton-metres (N·m)	1.355818	Bolt torque
Foot-pounds (ft·lbf)	Joules (J)	1.355818	Work, impact
British thermal units (BTU)	Kilojoules (kJ)	1.055056	Heat
Kilowatt-hours (kWh)	Megajoules (MJ)	3.6	Electricity
Therms (thm)	Kilowatt-hours (kWh)	29.30711	Gas billing
Horsepower (mech.) (hp)	Kilowatts (kW)	0.7456999	Motors, engines
BTU per hour (BTU/h)	Watts (W)	0.2930711	HVAC capacity
Tons of refrigeration (RT)	Kilowatts (kW)	3.516853	Chillers
Miles per hour (mph)	Kilometres per hour (km/h)	1.609344	Vehicles
Knots (kn)	Kilometres per hour (km/h)	1.852	Marine, aviation
Feet per second (ft/s)	Metres per second (m/s)	0.3048	Fluid velocity
US gallons per minute (US gpm)	Litres per minute (L/min)	3.785412	Pumps
Cubic feet per minute (CFM)	Cubic metres per hour (m³/h)	1.699011	Air flow

Temperature

Conversion	Formula
°C to °F	°F = °C × 1.8 + 32
°F to °C	°C = (°F − 32) ÷ 1.8
°C to K	K = °C + 273.15
°F to °R	°R = °F + 459.67
Temperature difference	1 K = 1 °C = 1.8 °F = 1.8 °R

SI prefixes

Prefix	Symbol	Factor	Prefix	Symbol	Factor
quetta	Q	10^{30}	deci	d	10^{-1}
ronna	R	10^{27}	centi	c	10^{-2}
yotta	Y	10^{24}	milli	m	10^{-3}
zetta	Z	10^{21}	micro	µ	10^{-6}
exa	E	10^{18}	nano	n	10^{-9}
peta	P	10^{15}	pico	p	10^{-12}
tera	T	10^{12}	femto	f	10^{-15}
giga	G	10^{9}	atto	a	10^{-18}
mega	M	10^{6}	zepto	z	10^{-21}
kilo	k	10^{3}	yocto	y	10^{-24}
hecto	h	10^{2}	ronto	r	10^{-27}
deca	da	10^{1}	quecto	q	10^{-30}

Sources and method

- **International Yard and Pound Agreement (1959)** — 1 in = 25.4 mm, 1 ft = 0.3048 m, 1 lb = 0.453 592 37 kg exactly
- **NIST Special Publication 811** — Guide for the Use of the International System of Units (www.nist.gov/pml/special-publication-811)
- **BIPM SI Brochure, 9th edition** — Definitions of the SI units, including the kelvin (www.bipm.org/en/publications/si-brochure)

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