

Engineering Unit Conversion Chart Pack

Pressure, power, and length reference charts for shop, lab, and design work. Cited to NIST SP 811 and the BIPM SI Brochure. No currency or FX charts.

Canonical page: <https://allunitconversions.com/charts/engineering-pack>

Pressure conversion chart

Pa, kPa, MPa, bar, atm, psi, Torr

Shop, HVAC, hydraulics, and process-plant pressures. Use the matrix for 1-unit factors, then the lookup table for common gauge values.

When to use: Spec sheets, compressor cut-in/cut-out, tire and vessel ratings, and lab work where psi, bar, and kPa appear on the same drawing.

1-unit factor matrix

1 unit equ	Pa	kPa	MPa	bar	mbar	atm	psi	Torr
Pascal (Pa)	1	0.001	1.0000e-6	1.0000e-5	0.01	9.8692e-6	0.000145038	0.00750062
Kilopascal	1000	1	0.001	0.01	10	0.00986923	0.145038	7.50062
Megapascal	1000000	1000	1	10	10000	9.86923	145.038	7500.62
Bar (bar)	100000	100	0.1	1	1000	0.986923	14.5038	750.062
Millibar (	100	0.1	0.0001	0.001	1	0.000986923	0.0145038	0.750062
Standard a	101325	101.325	0.101325	1.01325	1013.25	1	14.6959	760
Pound-forc	6894.76	6.89476	0.00689476	0.0689476	68.9476	0.068046	1	51.7149
Torr (Torr)	133.322	0.133322	0.000133322	0.00133322	1.33322	0.00131579	0.0193368	1

Common psi values

Tire, compressor, and process pressures in kPa, bar, and atmospheres.

psi	kPa	bar	atm	MPa
1	6.89476	0.0689476	0.068046	0.00689476
5	34.4738	0.344738	0.34023	0.0344738
10	68.9476	0.689476	0.68046	0.0689476
14.696	101.325	1.01325	1	0.101325
15	103.421	1.03421	1.02069	0.103421
20	137.895	1.37895	1.36092	0.137895
30	206.843	2.06843	2.04138	0.206843
40	275.79	2.7579	2.72184	0.27579
50	344.738	3.44738	3.4023	0.344738
60	413.685	4.13685	4.08276	0.413685
80	551.581	5.51581	5.44368	0.551581
100	689.476	6.89476	6.8046	0.689476
120	827.371	8.27371	8.16552	0.827371
150	1034.21	10.3421	10.2069	1.03421
200	1378.95	13.7895	13.6092	1.37895
250	1723.69	17.2369	17.0115	1.72369
300	2068.43	20.6843	20.4138	2.06843
500	3447.38	34.4738	34.023	3.44738
1000	6894.76	68.9476	68.046	6.89476
1500	10342.1	103.421	102.069	10.3421
2000	13789.5	137.895	136.092	13.7895

3000	20684.3	206.843	204.138	20.6843
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Common bar values

European and ISO process ratings in kPa, psi, and MPa.

bar	kPa	psi	MPa	atm
0.5	50	7.25189	0.05	0.493462
1	100	14.5038	0.1	0.986923
1.01325	101.325	14.6959	0.101325	1
2	200	29.0075	0.2	1.97385
3	300	43.5113	0.3	2.96077
4	400	58.0151	0.4	3.94769
5	500	72.5189	0.5	4.93462
6	600	87.0226	0.6	5.92154
8	800	116.03	0.8	7.89539
10	1000	145.038	1	9.86923
12	1200	174.045	1.2	11.8431
16	1600	232.06	1.6	15.7908
20	2000	290.075	2	19.7385
25	2500	362.594	2.5	24.6731
40	4000	580.151	4	39.4769
50	5000	725.189	5	49.3462
100	10000	1450.38	10	98.6923
160	16000	2320.6	16	157.908
250	25000	3625.94	25	246.731
400	40000	5801.51	40	394.769

Tables are absolute conversion factors. Gauge pressure still needs atmospheric context (add or subtract 1 atm ~ 101.325 kPa) when a datasheet mixes gauge and absolute.

1 atm (101.325 kPa) is not 1 bar (100 kPa). Mixing them is a common instrumentation error.

Torr is 101 325/760 Pa by definition. Conventional millimetre of mercury (mmHg) is extremely close but is a separate conventional value.

Power conversion chart

W, kW, hp, metric hp, BTU/h, RT

Motors, generators, HVAC, and engine ratings. Mechanical horsepower (550 ft.lbf/s) is the default hp column.

When to use: Nameplate conversions, generator sizing, refrigeration tons, and comparing US mechanical hp with metric PS.

1-unit factor matrix

1 unit equa	W	kW	MW	hp	hp(M)	BTU/h	RT
Watt (W)	1	0.001	1.0000e-6	0.00134102	0.00135962	3.41214	0.000284345
Kilowatt (k	1000	1	0.001	1.34102	1.35962	3412.14	0.284345
Megawatt (M	1000000	1000	1	1341.02	1359.62	3412140	284.345
Horsepower	745.7	0.7457	0.0007457	1	1.01387	2544.43	0.212036
Horsepower	735.499	0.735499	0.000735499	0.98632	1	2509.63	0.209136
IT British	0.293071	0.000293071	2.9307e-7	0.000393015	0.000398466	1	8.3333e-5
Ton of refr	3516.85	3.51685	0.00351685	4.71618	4.78159	12000	1

Common motor horsepower

NEMA / IEC motor sizes in kilowatts, watts, and metric horsepower.

hp	kW	W	hp(M)	BTU/h
0.25	0.186425	186.425	0.253467	636.108
0.5	0.37285	372.85	0.506935	1272.22
0.75	0.559275	559.275	0.760402	1908.33
1	0.7457	745.7	1.01387	2544.43
1.5	1.11855	1118.55	1.5208	3816.65
2	1.4914	1491.4	2.02774	5088.87
3	2.2371	2237.1	3.04161	7633.3
5	3.7285	3728.5	5.06935	12722.2
7.5	5.59275	5592.75	7.60402	19083.3
10	7.457	7457	10.1387	25444.3
15	11.1855	11185.5	15.208	38166.5
20	14.914	14914	20.2774	50888.7
25	18.6425	18642.5	25.3467	63610.8
30	22.371	22371	30.4161	76333
40	29.828	29828	40.5548	101777
50	37.285	37285	50.6935	127222
75	55.9275	55927.5	76.0402	190833
100	74.57	74570	101.387	254443
150	111.855	111855	152.08	381665
200	149.14	149140	202.774	508887
250	186.425	186425	253.467	636108
300	223.71	223710	304.161	763330
400	298.28	298280	405.548	1017770
500	372.85	372850	506.935	1272220

Common kilowatt ratings

IEC motor and generator ratings in mechanical hp and refrigeration tons.

kW	hp	hp(M)	W	RT
0.37	0.496178	0.50306	370	0.105208
0.55	0.737562	0.747792	550	0.15639
0.75	1.00577	1.01972	750	0.213259
1.1	1.47512	1.49558	1100	0.31278
1.5	2.01153	2.03943	1500	0.426518
2.2	2.95025	2.99117	2200	0.625559
3	4.02307	4.07886	3000	0.853035
4	5.36409	5.43848	4000	1.13738
5.5	7.37562	7.47792	5500	1.5639
7.5	10.0577	10.1972	7500	2.13259
11	14.7512	14.9558	11000	3.1278
15	20.1153	20.3943	15000	4.26518
18.5	24.8089	25.153	18500	5.26039
22	29.5025	29.9117	22000	6.25559
30	40.2307	40.7886	30000	8.53035
37	49.6178	50.306	37000	10.5208
45	60.346	61.183	45000	12.7955

55	73.7562	74.7792	55000	15.639
75	100.577	101.972	75000	21.3259
90	120.692	122.366	90000	25.5911
110	147.512	149.558	110000	31.278
132	177.015	179.47	132000	37.5336
160	214.564	217.539	160000	45.4952
200	268.204	271.924	200000	56.869

Mechanical hp ~ 745.700 W. Metric hp (PS) ~ 735.499 W. A "100 hp" European motor is not the same power as a 100 hp US motor.

1 ton of refrigeration (RT) = 12 000 BTU/h ~ 3.51685 kW. Used for chillers, not mechanical shaft power.

Electrical horsepower (746 W exactly) is not shown here; use mechanical hp unless a standard calls out hp(E).

Length conversion chart

mm, cm, m, in, ft, yd, km, mi

Workshop, drawing, and site lengths using the 1959 international inch and foot. Bookmark the millimetre-inch table for fab work.

When to use: Machining tolerances, architectural dimensions, pipe and fastener callouts, and survey-adjacent site work that still uses feet and miles.

1-unit factor matrix

1 unit equ	mm	cm	m	in	ft	yd	km	mi
Millimetre	1	0.1	0.001	0.0393701	0.00328084	0.00109361	1.0000e-6	6.2137e-7
Centimetre	10	1	0.01	0.393701	0.0328084	0.0109361	1.0000e-5	6.2137e-6
Metre (m)	1000	100	1	39.3701	3.28084	1.09361	0.001	0.000621371
Inch (in)	25.4	2.54	0.0254	1	0.0833333	0.0277778	2.5400e-5	1.5783e-5
Foot (ft)	304.8	30.48	0.3048	12	1	0.333333	0.0003048	0.000189394
Yard (yd)	914.4	91.44	0.9144	36	3	1	0.0009144	0.000568182
Kilometre	1000000	100000	1000	39370.1	3280.84	1093.61	1	0.621371
Mile (mi)	1609344	160934	1609.34	63360	5280	1760	1.60934	1

Workshop millimetres

Stock and fastener sizes in inches, centimetres, and metres.

mm	in	cm	m
1	0.0393701	0.1	0.001
2	0.0787402	0.2	0.002
3	0.11811	0.3	0.003
4	0.15748	0.4	0.004
5	0.19685	0.5	0.005
6	0.23622	0.6	0.006
8	0.314961	0.8	0.008
10	0.393701	1	0.01
12	0.472441	1.2	0.012
15	0.590551	1.5	0.015
16	0.629921	1.6	0.016
20	0.787402	2	0.02
25	0.984252	2.5	0.025
25.4	1	2.54	0.0254
30	1.1811	3	0.03

32	1.25984	3.2	0.032
40	1.5748	4	0.04
50	1.9685	5	0.05
75	2.95276	7.5	0.075
100	3.93701	10	0.1
150	5.90551	15	0.15
200	7.87402	20	0.2
250	9.84252	25	0.25
300	11.811	30	0.3
500	19.685	50	0.5
1000	39.3701	100	1

Fractional and whole inches

Drawing inches in millimetres, centimetres, and feet.

in	mm	cm	ft
0.0625	1.5875	0.15875	0.00520833
0.125	3.175	0.3175	0.0104167
0.25	6.35	0.635	0.0208333
0.375	9.525	0.9525	0.03125
0.5	12.7	1.27	0.0416667
0.625	15.875	1.5875	0.0520833
0.75	19.05	1.905	0.0625
1	25.4	2.54	0.0833333
1.5	38.1	3.81	0.125
2	50.8	5.08	0.166667
3	76.2	7.62	0.25
4	101.6	10.16	0.333333
6	152.4	15.24	0.5
8	203.2	20.32	0.666667
10	254	25.4	0.833333
12	304.8	30.48	1
18	457.2	45.72	1.5
24	609.6	60.96	2
36	914.4	91.44	3
48	1219.2	121.92	4
60	1524	152.4	5

Site and storey feet

Architectural and civil feet in metres, inches, and yards.

ft	m	in	yd
1	0.3048	12	0.333333
2	0.6096	24	0.666667
3	0.9144	36	1
4	1.2192	48	1.33333
5	1.524	60	1.66667
6	1.8288	72	2
8	2.4384	96	2.66667
10	3.048	120	3.33333

12	3.6576	144	4
15	4.572	180	5
16	4.8768	192	5.33333
20	6.096	240	6.66667
25	7.62	300	8.33333
30	9.144	360	10
40	12.192	480	13.3333
50	15.24	600	16.6667
75	22.86	900	25
100	30.48	1200	33.3333

1 inch = 25.4 mm exactly. Fractional inches in the lookup table use that exact relationship.

This pack uses the international foot (0.3048 m), not the US survey foot (1200/3937 m). For new US work, NIST retired the survey foot in 2022-2023.

Nautical miles (1 852 m exactly, BIPM) are not included here; use the aviation distance tools for NM.

Defined factors and sources

Exact SI and conventional relationships are preserved. Displayed cells are rounded to six significant figures.

Relationship	Status	Note
1 in = 25.4 mm	Exact	International inch, Yard and Poun
1 ft = 0.3048 m	Exact	International foot = 12 x 0.0254
1 yd = 0.9144 m	Exact	International yard = 3 internatio
1 mi = 1 609.344 m	Exact	Statute mile = 5 280 internationa
1 km = 1 000 m	Exact	SI prefix kilo (103).
1 Pa = 1 N/m2	Exact	SI derived unit of pressure.
1 bar = 100 000 Pa	Exact	The bar is accepted for use with
1 atm = 101 325 Pa	Exact	Standard atmosphere. Distinct fro
1 Torr = 101 325/760 Pa	Exact	Torr is defined from the standard
1 psi ~ 6 894.757 Pa	Derived	Pound-force per square inch, deri
1 W = 1 J/s	Exact	SI derived unit of power.
1 kW = 1 000 W	Exact	SI prefix kilo (103).
1 hp (mechanical) = 745.699872 W	Derived	Mechanical horsepower = 550 ft.lb
1 hp (metric) = 735.499 W	Derived	Metric horsepower (PS / cv) ~ 75

BIPM - The International System of Units (SI Brochure, 9th edition)
https://www.bipm.org/en/publications/si-brochure

Defines the SI base and derived units used in this pack, including the metre, pascal (N/m2), and watt (J/s).

NIST Special Publication 811 - Guide for the Use of the International System of Units (SI)
https://www.nist.gov/pml/special-publication-811

US guidance for SI usage and conversion factors, including the international inch, foot, yard, and mile.

NIST - SI Units
https://www.nist.gov/pml/owm/metric-si/si-units

Plain-language NIST reference for SI base units and common derived engineering units.

NIST - Standard atmosphere (101 325 Pa)
https://physics.nist.gov/cgi-bin/cuu/Value?stdatm

The standard atmosphere is an exact conventional value: 1 atm = 101 325 Pa.