Pilot Reference Pack

RVR and visibility, the ICAO standard atmosphere, crosswind components, speed, temperature, fuel volume and mass in one PDF

For: Student and private pilots, flight instructors, dispatchers and aviation students

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By Miguel Coelho · Edition 2.0
9 November 2026

Seven sheets for the flight bag or the ground-school classroom: the 14 CFR 91.175(h) RVR to visibility table with metric RVR, the ICAO standard atmosphere with density altitude, crosswind and headwind components, speed in knots, mph, km/h and m/s, temperature, US and imperial gallons to litres, and kilograms to pounds. For study and planning only: always use the approved flight manual and current published procedures.

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Conversion values in this pack are generated by the AllUnitConversions conversion library and automatically checked against exact definitions (NIST SP 811, BIPM SI Brochure, 1959 International Yard and Pound Agreement) before the PDF is produced. Reference data taken from standards and regulations is cited to its source on each sheet. Free to print, copy and share with attribution (CC BY 4.0).

Printing tip: print double-sided and staple at the top left, or print single sheets from each chart's own page.

RVR and Visibility Conversion Chart

Runway visual range in feet and metres, the 14 CFR 91.175 RVR-to-visibility table, and statute miles to metres

For: Pilots, flight students, dispatchers and flight instructors

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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
1 ft = 0.3048 m; 1 statute mile = 5,280 ft = 1,609.344 m (exact)	metres = feet × 0.3048; statute miles = feet ÷ 5,280	feet = metres ÷ 0.3048	RVR 2,400 ft = 731.5 m; the 91.175(h) table equates it to 1/2 SM visibility

Metres to the nearest metre, miles to 2 decimals. The regulatory table is not a unit conversion: use it only as 91.175(h) allows.

RVR to ground visibility, 14 CFR 91.175(h)(2)

Use when RVR is not reported for the runway of intended operation. The distance columns show how the regulatory values compare with a straight conversion.

RVR (feet)	Visibility (statute miles)	RVR in metres	RVR as a distance (SM)
1,600	1/4	488	0.30
2,400	1/2	732	0.45
3,200	5/8	975	0.61
4,000	3/4	1,219	0.76
4,500	7/8	1,372	0.85
5,000	1	1,524	0.95
6,000	1 1/4	1,829	1.14

RVR in feet to metres and statute miles

RVR (ft)	Metres	Statute miles	Nautical miles
300	91	0.06	0.05
400	122	0.08	0.07
500	152	0.09	0.08
600	183	0.11	0.10
700	213	0.13	0.12
800	244	0.15	0.13
1,000	305	0.19	0.16
1,200	366	0.23	0.20
1,400	427	0.27	0.23
1,600	488	0.30	0.26
1,800	549	0.34	0.30
2,000	610	0.38	0.33

RVR (ft)	Metres	Statute miles	Nautical miles
2,200	671	0.42	0.36
2,400	732	0.45	0.39
2,600	792	0.49	0.43
2,800	853	0.53	0.46
3,000	914	0.57	0.49
3,500	1,067	0.66	0.58
4,000	1,219	0.76	0.66
4,500	1,372	0.85	0.74
5,000	1,524	0.95	0.82
5,500	1,676	1.04	0.91
6,000	1,829	1.14	0.99
6,500	1,981	1.23	1.07

RVR or visibility in metres to feet and statute miles

Metres	Feet	Statute miles	Nautical miles
50	164	0.03	0.03
75	246	0.05	0.04
100	328	0.06	0.05
125	410	0.08	0.07
150	492	0.09	0.08
175	574	0.11	0.09
200	656	0.12	0.11
225	738	0.14	0.12
250	820	0.16	0.13
275	902	0.17	0.15
300	984	0.19	0.16
325	1,066	0.20	0.18

Metres	Feet	Statute miles	Nautical miles
700	2,297	0.43	0.38
750	2,461	0.47	0.40
800	2,625	0.50	0.43
900	2,953	0.56	0.49
1,000	3,281	0.62	0.54
1,100	3,609	0.68	0.59
1,200	3,937	0.75	0.65
1,300	4,265	0.81	0.70
1,400	4,593	0.87	0.76
1,500	4,921	0.93	0.81
1,600	5,249	0.99	0.86
1,700	5,577	1.06	0.92

Metres	Feet	Statute miles	Nautical miles
350	1,148	0.22	0.19
375	1,230	0.23	0.20
400	1,312	0.25	0.22
450	1,476	0.28	0.24
500	1,640	0.31	0.27
550	1,804	0.34	0.30
600	1,969	0.37	0.32
650	2,133	0.40	0.35

Metres	Feet	Statute miles	Nautical miles
1,800	5,906	1.12	0.97
1,900	6,234	1.18	1.03
2,000	6,562	1.24	1.08
3,000	9,843	1.86	1.62
5,000	16,404	3.11	2.70
8,000	26,247	4.97	4.32
9,999	32,805	6.21	5.40

Visibility in statute miles to metres and kilometres

Statute miles	Metres	Kilometres	Feet
1/16	101	0.10	330
1/8	201	0.20	660
3/16	302	0.30	990
1/4	402	0.40	1,320
5/16	503	0.50	1,650
3/8	604	0.60	1,980
1/2	805	0.80	2,640
5/8	1,006	1.01	3,300
3/4	1,207	1.21	3,960
7/8	1,408	1.41	4,620
1	1,609	1.61	5,280

Statute miles	Metres	Kilometres	Feet
1 1/4	2,012	2.01	6,600
1 1/2	2,414	2.41	7,920
1 3/4	2,816	2.82	9,240
2	3,219	3.22	10,560
2 1/2	4,023	4.02	13,200
3	4,828	4.83	15,840
4	6,437	6.44	21,120
5	8,047	8.05	26,400
6	9,656	9.66	31,680
7	11,265	11.27	36,960
10	16,093	16.09	52,800

RVR and visibility: what to know

Point	Detail
RVR	Runway visual range: how far a pilot on the runway centreline can see the runway lights or markings, measured by instruments.
Ground visibility	Prevailing visibility reported by an observer or automated system (statute miles in the US, metres elsewhere).
91.175(h)	Applies only when RVR is not reported for the runway of intended operation, and not to Category II or III minimums.
Not a conversion	RVR 1,600 ft is 0.30 SM as a distance, but the rule equates it to 1/4 SM: use the table, not arithmetic.

Sources and method

- **14 CFR 91.175(h), Comparable values of RVR and ground visibility** — Converts an RVR minimum to ground visibility when RVR is not reported (not for Category II or III minimums) (www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-91/subpart-B/subject-group-ECFR1d8a5dbf4a51ac3/section-91.175)
- **International Yard and Pound Agreement (1959)** — 1 ft = 0.3048 m exactly; 1 statute mile = 5,280 ft; 1 nautical mile = 1,852 m (exact by definition)

The RVR-to-visibility equivalences are quoted from 14 CFR 91.175(h)(2); every other value is an exact distance conversion. Interactive version, corrections and more charts: **allunitconversions.com/rvr-visibility-chart**

Standard Atmosphere Table

ICAO standard atmosphere (ISA) temperature, pressure, density and speed of sound by altitude, with density altitude

For: Pilots, flight students, aerospace engineers, meteorology and physics students

allunitconversions.com/standard-atmosphere-chart
By Miguel Coelho · Edition 2.0
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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
Sea level 15 °C, 1013.25 hPa (29.92 inHg), 1.225 kg/m³; −6.5 °C per km up to 11 km, then −56.5 °C	T = 288.15 − 0.0065 × h; p = 1013.25 × (T ÷ 288.15)^5.2559	h = (288.15 − T) ÷ 0.0065 (troposphere)	At 10,000 ft: −4.8 °C, 696.8 hPa, density 0.7385 of sea level

Geopotential altitude, as used for pressure altitude. About −2 °C per 1,000 ft and roughly 1 hPa per 30 ft near sea level.

Standard atmosphere by altitude in feet

Altitude (ft)	Metres	Temp. (°C)	Temp. (°F)	Pressure (hPa)	Pressure (inHg)	Density ratio σ	Speed of sound (kt)
−1,000	−305	17.0	62.6	1,050.41	31.02	1.0296	663.7
0	0	15.0	59.0	1,013.25	29.92	1.0000	661.5
1,000	305	13.0	55.4	977.17	28.86	0.9711	659.2
2,000	610	11.0	51.9	942.13	27.82	0.9428	656.9
3,000	914	9.1	48.3	908.12	26.82	0.9151	654.6
4,000	1,219	7.1	44.7	875.11	25.84	0.8881	652.3
5,000	1,524	5.1	41.2	843.07	24.90	0.8617	650.0
6,000	1,829	3.1	37.6	812.00	23.98	0.8359	647.7
7,000	2,134	1.1	34.0	781.85	23.09	0.8106	645.4
8,000	2,438	−0.8	30.5	752.62	22.22	0.7860	643.0
9,000	2,743	−2.8	26.9	724.28	21.39	0.7620	640.7
10,000	3,048	−4.8	23.3	696.82	20.58	0.7385	638.3
11,000	3,353	−6.8	19.8	670.20	19.79	0.7156	636.0
12,000	3,658	−8.8	16.2	644.41	19.03	0.6932	633.6
13,000	3,962	−10.8	12.6	619.43	18.29	0.6713	631.2
14,000	4,267	−12.7	9.1	595.24	17.58	0.6500	628.8
15,000	4,572	−14.7	5.5	571.82	16.89	0.6292	626.4
16,000	4,877	−16.7	1.9	549.15	16.22	0.6090	624.0
17,000	5,182	−18.7	−1.6	527.22	15.57	0.5892	621.6
18,000	5,486	−20.7	−5.2	506.00	14.94	0.5699	619.2
19,000	5,791	−22.6	−8.8	485.48	14.34	0.5511	616.8
20,000	6,096	−24.6	−12.3	465.63	13.75	0.5328	614.3
21,000	6,401	−26.6	−15.9	446.45	13.18	0.5150	611.9
22,000	6,706	−28.6	−19.5	427.91	12.64	0.4976	609.4
23,000	7,010	−30.6	−23.0	410.01	12.11	0.4807	606.9
24,000	7,315	−32.5	−26.6	392.71	11.60	0.4642	604.4
25,000	7,620	−34.5	−30.2	376.01	11.10	0.4481	601.9
26,000	7,925	−36.5	−33.7	359.89	10.63	0.4325	599.4
27,000	8,230	−38.5	−37.3	344.33	10.17	0.4173	596.9
28,000	8,534	−40.5	−40.9	329.32	9.72	0.4025	594.4
29,000	8,839	−42.5	−44.4	314.85	9.30	0.3881	591.9
30,000	9,144	−44.4	−48.0	300.90	8.89	0.3741	589.3
31,000	9,449	−46.4	−51.6	287.45	8.49	0.3605	586.8
32,000	9,754	−48.4	−55.1	274.49	8.11	0.3473	584.2
33,000	10,058	−50.4	−58.7	262.01	7.74	0.3345	581.6
34,000	10,363	−52.4	−62.2	249.99	7.38	0.3220	579.0
35,000	10,668	−54.3	−65.8	238.42	7.04	0.3099	576.4

Altitude (ft)	Metres	Temp. (°C)	Temp. (°F)	Pressure (hPa)	Pressure (inHg)	Density ratio σ	Speed of sound (kt)
36,000	10,973	−56.3	−69.4	227.29	6.71	0.2981	573.8
37,000	11,278	−56.5	−69.7	216.63	6.40	0.2844	573.6
38,000	11,582	−56.5	−69.7	206.46	6.10	0.2710	573.6
39,000	11,887	−56.5	−69.7	196.77	5.81	0.2583	573.6
40,000	12,192	−56.5	−69.7	187.54	5.54	0.2462	573.6
41,000	12,497	−56.5	−69.7	178.74	5.28	0.2346	573.6
42,000	12,802	−56.5	−69.7	170.35	5.03	0.2236	573.6
43,000	13,106	−56.5	−69.7	162.36	4.79	0.2131	573.6
44,000	13,411	−56.5	−69.7	154.74	4.57	0.2031	573.6
45,000	13,716	−56.5	−69.7	147.48	4.35	0.1936	573.6
50,000	15,240	−56.5	−69.7	115.97	3.42	0.1522	573.6
55,000	16,764	−56.5	−69.7	91.20	2.69	0.1197	573.6
60,000	18,288	−56.5	−69.7	71.72	2.12	0.0941	573.6
65,000	19,812	−56.5	−69.7	56.40	1.67	0.0740	573.6

Standard atmosphere by altitude in metres

Altitude (m)	Feet	Temp. (°C)	Pressure (hPa)	Density (kg/m³)	Density ratio σ	Speed of sound (m/s)
0	0	15.00	1,013.3	1.225	1.0000	340.3
500	1,640	11.75	954.61	1.167	0.9529	338.4
1,000	3,281	8.50	898.75	1.112	0.9075	336.4
1,500	4,921	5.25	845.56	1.058	0.8637	334.5
2,000	6,562	2.00	794.95	1.006	0.8216	332.5
2,500	8,202	−1.25	746.83	0.9569	0.7811	330.6
3,000	9,843	−4.50	701.09	0.9091	0.7421	328.6
3,500	11,483	−7.75	657.64	0.8632	0.7047	326.6
4,000	13,123	−11.00	616.40	0.8191	0.6687	324.6
4,500	14,764	−14.25	577.28	0.7768	0.6341	322.6
5,000	16,404	−17.50	540.20	0.7361	0.6009	320.5
5,500	18,045	−20.75	505.07	0.6971	0.5691	318.5
6,000	19,685	−24.00	471.81	0.6597	0.5385	316.4
6,500	21,325	−27.25	440.35	0.6238	0.5093	314.4
7,000	22,966	−30.50	410.61	0.5895	0.4812	312.3
7,500	24,606	−33.75	382.51	0.5566	0.4544	310.2
8,000	26,247	−37.00	356.00	0.5252	0.4287	308.1
8,500	27,887	−40.25	330.99	0.4951	0.4042	305.9
9,000	29,528	−43.50	307.42	0.4663	0.3807	303.8
9,500	31,168	−46.75	285.24	0.4389	0.3583	301.6
10,000	32,808	−50.00	264.36	0.4127	0.3369	299.5
10,500	34,449	−53.25	244.74	0.3877	0.3165	297.3
11,000	36,089	−56.50	226.32	0.3639	0.2971	295.1
11,500	37,730	−56.50	209.16	0.3363	0.2746	295.1
12,000	39,370	−56.50	193.30	0.3108	0.2537	295.1
12,500	41,010	−56.50	178.65	0.2873	0.2345	295.1
13,000	42,651	−56.50	165.10	0.2655	0.2167	295.1
13,500	44,291	−56.50	152.59	0.2454	0.2003	295.1
14,000	45,932	−56.50	141.02	0.2268	0.1851	295.1
14,500	47,572	−56.50	130.33	0.2096	0.1711	295.1
15,000	49,213	−56.50	120.45	0.1937	0.1581	295.1
15,500	50,853	−56.50	111.31	0.1790	0.1461	295.1
16,000	52,493	−56.50	102.87	0.1654	0.1350	295.1
16,500	54,134	−56.50	95.075	0.1529	0.1248	295.1
17,000	55,774	−56.50	87.867	0.1413	0.1153	295.1

Altitude (m)	Feet	Temp. (°C)	Pressure (hPa)	Density (kg/m³)	Density ratio σ	Speed of sound (m/s)
17,500	57,415	−56.50	81.205	0.1306	0.1066	295.1
18,000	59,055	−56.50	75.048	0.1207	0.0985	295.1
18,500	60,696	−56.50	69.358	0.1115	0.0910	295.1
19,000	62,336	−56.50	64.100	0.1031	0.0841	295.1
19,500	63,976	−56.50	59.240	0.09526	0.0778	295.1
20,000	65,617	−56.50	54.749	0.08803	0.0719	295.1

Density altitude (feet) from pressure altitude and temperature

Rows: pressure altitude (set 29.92 inHg / 1013 hPa and read the altimeter). Columns: outside air temperature. Calculated exactly from ISA density.

Pressure alt. (ft)	−10 °C	0 °C	10 °C	20 °C	30 °C	40 °C
0	−3,130	−1,840	−600	590	1,720	2,820
1,000	−1,870	−590	640	1,820	2,940	4,030
2,000	−620	660	1,880	3,040	4,160	5,230
3,000	640	1,900	3,110	4,270	5,380	6,440
4,000	1,900	3,150	4,340	5,490	6,590	7,640
5,000	3,150	4,390	5,580	6,710	7,800	8,850
6,000	4,400	5,630	6,800	7,930	9,010	10,050
7,000	5,650	6,870	8,030	9,150	10,220	11,240
8,000	6,890	8,100	9,260	10,360	11,420	12,440
9,000	8,140	9,330	10,480	11,570	12,630	13,630
10,000	9,380	10,560	11,700	12,790	13,830	14,830
11,000	10,620	11,790	12,920	13,990	15,030	16,020
12,000	11,850	13,020	14,130	15,200	16,220	17,200

ISA constants and formulas

Quantity	Value or formula
Sea-level temperature	288.15 K (15 °C, 59 °F)
Sea-level pressure	101,325 Pa = 1013.25 hPa = 29.921 inHg = 14.696 psi
Sea-level density	1.225 kg/m³ (0.002377 slug/ft³)
Lapse rate	6.5 K per km (1.98 °C per 1,000 ft) up to 11 km (36,089 ft)
Tropopause to 20 km	Constant 216.65 K (−56.5 °C); p = 22,632 Pa × e^(−(h − 11,000) ÷ 6,341.6 m)
Speed of sound	a = √(1.4 × 287.053 × T); 340.29 m/s = 661.5 kt at sea level
ISA deviation	ISA temperature at altitude: 15 − 1.98 × (altitude ÷ 1,000 ft) °C

Sources and method

- **ICAO Doc 7488, Manual of the ICAO Standard Atmosphere (3rd edition, 1993)** — Identical to ISO 2533:1975 up to 32 km; defining constants used for every value
- **FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25)** — Density altitude, crosswind and headwind components (www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak)

Every value is calculated from the ICAO Doc 7488 defining constants (T_0 288.15 K, p_0 101,325 Pa, R 287.052 87 J/(kg·K), g_0 9.806 65 m/s²); density altitude inverts the ISA density exactly. Interactive version, corrections and more charts: **allunitconversions.com/standard-atmosphere-chart**

Crosswind Component Chart

Crosswind and headwind components for wind angles from 0° to 90° and wind speeds up to 50 knots

For: Pilots, flight students and flight instructors

allunitconversions.com/crosswind-component-chart
By Miguel Coelho · Edition 2.0
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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
Wind angle = difference between wind direction and runway heading	Crosswind = wind speed × sin(angle); headwind = wind speed × cos(angle)	Angle = arcsin(crosswind ÷ wind speed)	Runway 27, wind 300° at 20 kt: 30° off, crosswind 10 kt, headwind 17.3 kt

Components to 1 decimal place of a knot. Use the gust value as well as the steady wind when checking a crosswind limit.

Component factors by wind angle

Angle	Crosswind factor (sin)	Headwind factor (cos)	Clock rule
0°	0.000	1.000	0
5°	0.087	0.996	
10°	0.174	0.985	
15°	0.259	0.966	1/4
20°	0.342	0.940	
25°	0.423	0.906	
30°	0.500	0.866	1/2
35°	0.574	0.819	
40°	0.643	0.766	
45°	0.707	0.707	3/4
50°	0.766	0.643	
55°	0.819	0.574	
60°	0.866	0.500	all
65°	0.906	0.423	
70°	0.940	0.342	
75°	0.966	0.259	
80°	0.985	0.174	
85°	0.996	0.087	
90°	1.000	0.000	

Crosswind component (knots)

Rows: wind speed (kt). Columns: angle between wind and runway.

Wind (kt)	10°	20°	30°	40°	45°	50°	60°	70°	80°	90°
5	0.9	1.7	2.5	3.2	3.5	3.8	4.3	4.7	4.9	5.0
10	1.7	3.4	5.0	6.4	7.1	7.7	8.7	9.4	9.8	10.0
15	2.6	5.1	7.5	9.6	10.6	11.5	13.0	14.1	14.8	15.0
20	3.5	6.8	10.0	12.9	14.1	15.3	17.3	18.8	19.7	20.0
25	4.3	8.6	12.5	16.1	17.7	19.2	21.7	23.5	24.6	25.0
30	5.2	10.3	15.0	19.3	21.2	23.0	26.0	28.2	29.5	30.0
35	6.1	12.0	17.5	22.5	24.7	26.8	30.3	32.9	34.5	35.0
40	6.9	13.7	20.0	25.7	28.3	30.6	34.6	37.6	39.4	40.0
45	7.8	15.4	22.5	28.9	31.8	34.5	39.0	42.3	44.3	45.0
50	8.7	17.1	25.0	32.1	35.4	38.3	43.3	47.0	49.2	50.0

Headwind component (knots)

Beyond 90° the wind is behind the aircraft: the same values become a tailwind.

Wind (kt)	10°	20°	30°	40°	45°	50°	60°	70°	80°	90°
5	4.9	4.7	4.3	3.8	3.5	3.2	2.5	1.7	0.9	0.0
10	9.8	9.4	8.7	7.7	7.1	6.4	5.0	3.4	1.7	0.0
15	14.8	14.1	13.0	11.5	10.6	9.6	7.5	5.1	2.6	0.0
20	19.7	18.8	17.3	15.3	14.1	12.9	10.0	6.8	3.5	0.0
25	24.6	23.5	21.7	19.2	17.7	16.1	12.5	8.6	4.3	0.0
30	29.5	28.2	26.0	23.0	21.2	19.3	15.0	10.3	5.2	0.0
35	34.5	32.9	30.3	26.8	24.7	22.5	17.5	12.0	6.1	0.0
40	39.4	37.6	34.6	30.6	28.3	25.7	20.0	13.7	6.9	0.0
45	44.3	42.3	39.0	34.5	31.8	28.9	22.5	15.4	7.8	0.0
50	49.2	47.0	43.3	38.3	35.4	32.1	25.0	17.1	8.7	0.0

Using the chart

Point	Detail
Runway heading	Runway number × 10 is the approximate magnetic heading: runway 27 ≈ 270°.
Wind source	METAR and TAF winds are relative to true north; ATIS and tower winds are magnetic. Use magnetic wind with runway headings.
Clock rule	15° ≈ 1/4, 30° ≈ 1/2, 45° ≈ 3/4 and 60° or more ≈ all of the wind speed as crosswind.
Limits	Compare with the maximum demonstrated crosswind in the aircraft flight manual, and your own limits; include gusts.

Sources and method

- **FAA Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25)** — Density altitude, crosswind and headwind components (www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak)

Every component is calculated with sin and cos of the wind angle; the clock rule is shown for comparison. Interactive version, corrections and more charts: **allunitconversions.com/crosswind-component-chart**

Speed Conversion Chart

km/h, mph, m/s, knots and ft/s, with the Beaufort wind scale

For: Drivers, pilots, sailors, cyclists and weather watchers

allunitconversions.com/speed-conversion-chart
By Miguel Coelho · Edition 2.0
9 November 2026

EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
1 mph = 1.609 344 km/h; 1 kn = 1.852 km/h; 1 m/s = 3.6 km/h (all exact)	mph = km/h ÷ 1.609 344; km/h = m/s × 3.6	km/h = mph × 1.609 344; kn = km/h ÷ 1.852	100 km/h = 62.14 mph = 27.78 m/s = 54.0 kn

Matrix values use 6 significant figures; tables to 1–2 decimal places.

Factor matrix — 1 unit in every other unit

1 unit =	m/s	km/h	mph	kn	ft/s
1 m/s	1	3.6	2.23694	1.94384	3.28084
1 km/h	0.277778	1	0.621371	0.539957	0.911344
1 mph	0.44704	1.60934	1	0.868976	1.46667
1 kn	0.514444	1.852	1.15078	1	1.68781
1 ft/s	0.3048	1.09728	0.681818	0.592484	1

km/h to mph, m/s and knots

Kilometres per hour (km/h)	Miles per hour (mph)	Metres per second (m/s)	Knots (kn)
10	6.2	2.78	5.4
20	12.4	5.56	10.8
30	18.6	8.33	16.2
40	24.9	11.11	21.6
50	31.1	13.89	27.0
60	37.3	16.67	32.4
70	43.5	19.44	37.8
80	49.7	22.22	43.2
90	55.9	25.00	48.6
100	62.1	27.78	54.0

Kilometres per hour (km/h)	Miles per hour (mph)	Metres per second (m/s)	Knots (kn)
110	68.4	30.56	59.4
120	74.6	33.33	64.8
130	80.8	36.11	70.2
140	87.0	38.89	75.6
150	93.2	41.67	81.0
160	99.4	44.44	86.4
170	105.6	47.22	91.8
180	111.8	50.00	97.2
190	118.1	52.78	102.6
200	124.3	55.56	108.0

mph to km/h

Miles per hour (mph)	Kilometres per hour (km/h)
5	8.0
10	16.1
15	24.1
20	32.2
25	40.2
30	48.3
35	56.3
40	64.4
45	72.4
50	80.5

Miles per hour (mph)	Kilometres per hour (km/h)
55	88.5
60	96.6
65	104.6
70	112.7
75	120.7
80	128.7
85	136.8
90	144.8
95	152.9
100	160.9

Miles per hour (mph)	Kilometres per hour (km/h)
105	169.0
110	177.0
115	185.1
120	193.1
125	201.2
130	209.2
135	217.3
140	225.3
145	233.4
150	241.4

Beaufort wind scale

Force	Description	Knots	km/h
0	Calm	< 1	< 1

Force	Description	Knots	km/h
7	Near gale	28–33	50–61

Force	Description	Knots	km/h
1	Light air	1–3	1–5
2	Light breeze	4–6	6–11
3	Gentle breeze	7–10	12–19
4	Moderate breeze	11–16	20–28
5	Fresh breeze	17–21	29–38
6	Strong breeze	22–27	39–49

Force	Description	Knots	km/h
8	Gale	34–40	62–74
9	Strong gale	41–47	75–88
10	Storm	48–55	89–102
11	Violent storm	56–63	103–117
12	Hurricane force	≥ 64	≥ 118

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)
- **World Meteorological Organization** — Beaufort wind force scale (knots); Met Office km/h equivalents

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Temperature Conversion Chart

Celsius, Fahrenheit and Kelvin side by side

For: Students, scientists, engineers and cooks

allunitconversions.com/temperature-conversion-chart
By Miguel Coelho · Edition 2.0
9 November 2026

EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
K = °C + 273.15 and °F = °C × 9/5 + 32 (exact)	°F = (°C × 1.8) + 32; K = °C + 273.15	°C = (°F − 32) ÷ 1.8; °C = K − 273.15	25 °C = 77 °F = 298.15 K

Values are rounded to 2 decimal places.

−50 °C to 300 °C in 5-degree steps

Celsius (°C)	Fahrenheit (°F)	Kelvin (K)
−50	−58.0	223.15
−45	−49.0	228.15
−40	−40.0	233.15
−35	−31.0	238.15
−30	−22.0	243.15
−25	−13.0	248.15
−20	−4.0	253.15
−15	5.0	258.15
−10	14.0	263.15
−5	23.0	268.15
0	32.0	273.15
5	41.0	278.15
10	50.0	283.15
15	59.0	288.15
20	68.0	293.15
25	77.0	298.15
30	86.0	303.15
35	95.0	308.15
40	104.0	313.15
45	113.0	318.15
50	122.0	323.15
55	131.0	328.15
60	140.0	333.15
65	149.0	338.15
70	158.0	343.15
75	167.0	348.15
80	176.0	353.15
85	185.0	358.15
90	194.0	363.15
95	203.0	368.15
100	212.0	373.15
105	221.0	378.15
110	230.0	383.15
115	239.0	388.15
120	248.0	393.15
125	257.0	398.15

Celsius (°C)	Fahrenheit (°F)	Kelvin (K)
130	266.0	403.15
135	275.0	408.15
140	284.0	413.15
145	293.0	418.15
150	302.0	423.15
155	311.0	428.15
160	320.0	433.15
165	329.0	438.15
170	338.0	443.15
175	347.0	448.15
180	356.0	453.15
185	365.0	458.15
190	374.0	463.15
195	383.0	468.15
200	392.0	473.15
205	401.0	478.15
210	410.0	483.15
215	419.0	488.15
220	428.0	493.15
225	437.0	498.15
230	446.0	503.15
235	455.0	508.15
240	464.0	513.15
245	473.0	518.15
250	482.0	523.15
255	491.0	528.15
260	500.0	533.15
265	509.0	538.15
270	518.0	543.15
275	527.0	548.15
280	536.0	553.15
285	545.0	558.15
290	554.0	563.15
295	563.0	568.15
300	572.0	573.15

Reference points

Reference	Celsius (°C)	Fahrenheit (°F)	Kelvin (K)
Absolute zero	−273.15	−459.67	0
Celsius equals Fahrenheit	−40	−40	233.15
Water freezes	0	32	273.15
Room temperature	20	68	293.15
Body temperature	37	98.6	310.15
Water boils (sea level)	100	212	373.15

Sources and method

- **BIPM SI Brochure, 9th edition** — Definitions of the SI units, including the kelvin (www.bipm.org/en/publications/si-brochure)
- **NIST Special Publication 811** — Guide for the Use of the International System of Units (www.nist.gov/pml/special-publication-811)

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Gallons to Litres Conversion Chart

US and UK (imperial) gallons to litres

For: Drivers, boaters, brewers, gardeners and aquarium keepers

allunitconversions.com/gal-to-l-conversion-chart
By Miguel Coelho · Edition 2.0
9 November 2026

EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
1 US gal = 3.785 411 784 L; 1 UK gal = 4.546 09 L (both exact)	L = US gal × 3.785 412	US gal = L ÷ 3.785 412	15 US gal × 3.785412 = 56.78 L

Litres are rounded to 2 decimal places.

US gallons to litres

US gallons (US gal)	Litres (L)	US gallons (US gal)	Litres (L)	US gallons (US gal)	Litres (L)	US gallons (US gal)	Litres (L)
1	3.79	**26**	98.42	**51**	193.06	**76**	287.69
2	7.57	**27**	102.21	**52**	196.84	**77**	291.48
3	11.36	**28**	105.99	**53**	200.63	**78**	295.26
4	15.14	**29**	109.78	**54**	204.41	**79**	299.05
5	18.93	**30**	113.56	**55**	208.20	**80**	302.83
6	22.71	**31**	117.35	**56**	211.98	**81**	306.62
7	26.50	**32**	121.13	**57**	215.77	**82**	310.40
8	30.28	**33**	124.92	**58**	219.55	**83**	314.19
9	34.07	**34**	128.70	**59**	223.34	**84**	317.97
10	37.85	**35**	132.49	**60**	227.12	**85**	321.76
11	41.64	**36**	136.27	**61**	230.91	**86**	325.55
12	45.42	**37**	140.06	**62**	234.70	**87**	329.33
13	49.21	**38**	143.85	**63**	238.48	**88**	333.12
14	53.00	**39**	147.63	**64**	242.27	**89**	336.90
15	56.78	**40**	151.42	**65**	246.05	**90**	340.69
16	60.57	**41**	155.20	**66**	249.84	**91**	344.47
17	64.35	**42**	158.99	**67**	253.62	**92**	348.26
18	68.14	**43**	162.77	**68**	257.41	**93**	352.04
19	71.92	**44**	166.56	**69**	261.19	**94**	355.83
20	75.71	**45**	170.34	**70**	264.98	**95**	359.61
21	79.49	**46**	174.13	**71**	268.76	**96**	363.40
22	83.28	**47**	177.91	**72**	272.55	**97**	367.18
23	87.06	**48**	181.70	**73**	276.34	**98**	370.97
24	90.85	**49**	185.49	**74**	280.12	**99**	374.76
25	94.64	**50**	189.27	**75**	283.91	**100**	378.54

UK (imperial) gallons to litres

UK gallons (UK gal)	Litres (L)	UK gallons (UK gal)	Litres (L)	UK gallons (UK gal)	Litres (L)
1	4.55	**18**	81.83	**35**	159.11
2	9.09	**19**	86.38	**36**	163.66
3	13.64	**20**	90.92	**37**	168.21
4	18.18	**21**	95.47	**38**	172.75
5	22.73	**22**	100.01	**39**	177.30
6	27.28	**23**	104.56	**40**	181.84
7	31.82	**24**	109.11	**41**	186.39
8	36.37	**25**	113.65	**42**	190.94

UK gallons (UK gal)	Litres (L)	UK gallons (UK gal)	Litres (L)	UK gallons (UK gal)	Litres (L)
9	40.91	**26**	118.20	**43**	195.48
10	45.46	**27**	122.74	**44**	200.03
11	50.01	**28**	127.29	**45**	204.57
12	54.55	**29**	131.84	**46**	209.12
13	59.10	**30**	136.38	**47**	213.67
14	63.65	**31**	140.93	**48**	218.21
15	68.19	**32**	145.47	**49**	222.76
16	72.74	**33**	150.02	**50**	227.30
17	77.28	**34**	154.57		

US and UK liquid measures

From	To	Multiply by
US gallons (US gal)	Litres (L)	3.785412
UK gallons (UK gal)	Litres (L)	4.54609
US quarts (US qt)	Litres (L)	0.9463529
UK quarts (UK qt)	Litres (L)	1.136522
US pints (US pt)	Litres (L)	0.4731765
UK pints (UK pt)	Litres (L)	0.5682612
UK gallons (UK gal)	US gallons (US gal)	1.20095

Sources and method

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

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Kilograms to Pounds Conversion Chart

Body weight, luggage and kitchen weights in pounds and ounces

For: Fitness, travel, shipping and cooking

allunitconversions.com/kg-to-lb-conversion-chart
By Miguel Coelho · Edition 2.0
9 November 2026

EXACT DEFINITION	FORMULA	REVERSE	WORKED EXAMPLE
1 lb = 0.453 592 37 kg exactly, so 1 kg = 2.204 62 lb	lb = kg ÷ 0.453 592 37	kg = lb × 0.453 592 37	23 kg ÷ 0.45359237 = 50.71 lb (a typical checked-bag limit)

Pounds are rounded to 2 decimal places; ounces to 0.1 oz.

1 to 100 kg

Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)
1	2.20	**26**	57.32	**51**	112.44	**76**	167.55
2	4.41	**27**	59.52	**52**	114.64	**77**	169.76
3	6.61	**28**	61.73	**53**	116.84	**78**	171.96
4	8.82	**29**	63.93	**54**	119.05	**79**	174.17
5	11.02	**30**	66.14	**55**	121.25	**80**	176.37
6	13.23	**31**	68.34	**56**	123.46	**81**	178.57
7	15.43	**32**	70.55	**57**	125.66	**82**	180.78
8	17.64	**33**	72.75	**58**	127.87	**83**	182.98
9	19.84	**34**	74.96	**59**	130.07	**84**	185.19
10	22.05	**35**	77.16	**60**	132.28	**85**	187.39
11	24.25	**36**	79.37	**61**	134.48	**86**	189.60
12	26.46	**37**	81.57	**62**	136.69	**87**	191.80
13	28.66	**38**	83.78	**63**	138.89	**88**	194.01
14	30.86	**39**	85.98	**64**	141.10	**89**	196.21
15	33.07	**40**	88.18	**65**	143.30	**90**	198.42
16	35.27	**41**	90.39	**66**	145.51	**91**	200.62
17	37.48	**42**	92.59	**67**	147.71	**92**	202.83
18	39.68	**43**	94.80	**68**	149.91	**93**	205.03
19	41.89	**44**	97.00	**69**	152.12	**94**	207.23
20	44.09	**45**	99.21	**70**	154.32	**95**	209.44
21	46.30	**46**	101.41	**71**	156.53	**96**	211.64
22	48.50	**47**	103.62	**72**	158.73	**97**	213.85
23	50.71	**48**	105.82	**73**	160.94	**98**	216.05
24	52.91	**49**	108.03	**74**	163.14	**99**	218.26
25	55.12	**50**	110.23	**75**	165.35	**100**	220.46

105 to 300 kg

Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)
105	231.5	**155**	341.7	**205**	451.9	**255**	562.2
110	242.5	**160**	352.7	**210**	463.0	**260**	573.2
115	253.5	**165**	363.8	**215**	474.0	**265**	584.2
120	264.6	**170**	374.8	**220**	485.0	**270**	595.2
125	275.6	**175**	385.8	**225**	496.0	**275**	606.3
130	286.6	**180**	396.8	**230**	507.1	**280**	617.3
135	297.6	**185**	407.9	**235**	518.1	**285**	628.3
140	308.6	**190**	418.9	**240**	529.1	**290**	639.3

Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)	Kilograms (kg)	Pounds (lb)
145	319.7	**195**	429.9	**245**	540.1	**295**	650.4
150	330.7	**200**	440.9	**250**	551.2	**300**	661.4

Kitchen and parcels: 0.1 to 2 kg in pounds and ounces

Kilograms (kg)	Pounds (lb)	lb + oz	Kilograms (kg)	Pounds (lb)	lb + oz
0.1	0.220	3.5 oz	**1.1**	2.425	2 lb 6.8 oz
0.2	0.441	7.1 oz	**1.2**	2.646	2 lb 10.3 oz
0.3	0.661	10.6 oz	**1.3**	2.866	2 lb 13.9 oz
0.4	0.882	14.1 oz	**1.4**	3.086	3 lb 1.4 oz
0.5	1.102	1 lb 1.6 oz	**1.5**	3.307	3 lb 4.9 oz
0.6	1.323	1 lb 5.2 oz	**1.6**	3.527	3 lb 8.4 oz
0.7	1.543	1 lb 8.7 oz	**1.7**	3.748	3 lb 12.0 oz
0.8	1.764	1 lb 12.2 oz	**1.8**	3.968	3 lb 15.5 oz
0.9	1.984	1 lb 15.7 oz	**1.9**	4.189	4 lb 3.0 oz
1.0	2.205	2 lb 3.3 oz	**2.0**	4.409	4 lb 6.5 oz

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)

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