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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
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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**