

1.34. Tabular calculation of the wind triangle using a mechanical computer

1.34.1.General

Tab.1.34.1. shows the section of a table with the help of which wind triangles can be calculated. However, the precondition for their application is the prior calculation of the wind angle, which is more convenient with mechanical computers, which also often allow a simple reading of wind correction angle and ground speed.

Wind angle	10-mile wind		15-mile wind		20-mile wind		25-mile wind		30-mile wind		40-mile wind		Wind angle
	Wind corr.	Track speed, m.p.h.	Wind corr.	Track speed, m.p.h.	Wind corr.	Track speed, m.p.h.	Wind corr.	Track speed, m.p.h.	Wind corr.	Track speed, m.p.h.	Wind corr.	Track speed, m.p.h.	
Air Speed 180 Miles per Hour													
0°	0°	170	0°	165	0°	160	0°	155	0°	150	0°	145	0°
10°	1°	170	1°	165	1°	160	1°	155	2°	150	2°	145	1°
20°	1°	170	2°	166	2°	161	3°	156	3°	151	4°	146	2°
30°	2°	171	2°	167	3°	162	4°	157	5°	152	6°	147	3°
40°	2°	172	3°	168	4°	163	5°	158	6°	153	7°	148	4°

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1.34.2.Calculation of the wind triangle using the Schiffmann-Dodd Navigator

The following example explains the application:

- true course 360°
- wind direction 1 050°
- wind direction 2 230°
- wind speed 40 kt
- true airspeed 100 kt

- wind angle 50°
- wind corr. angle α WCA $\pm 17.8^\circ$
- ground speed 1 69.5 kt
- ground speed 2 120.9 kt

Solution (see Fig.1.34/1):
 After setting the course, the wind angle of 50° can be read opposite the wind direction. The same angle is determined opposite the wind direction 230° (not shown in the figure). In the center of the computer for the wind from 050° is indicated >HEAD WIND right< and for the wind from 230° >TAILWIND left<. The upper disk is then adjusted so that these values can be read in the window for TAS =100 kt and the wind speed 40 kt (see Fig. 1.34/2):

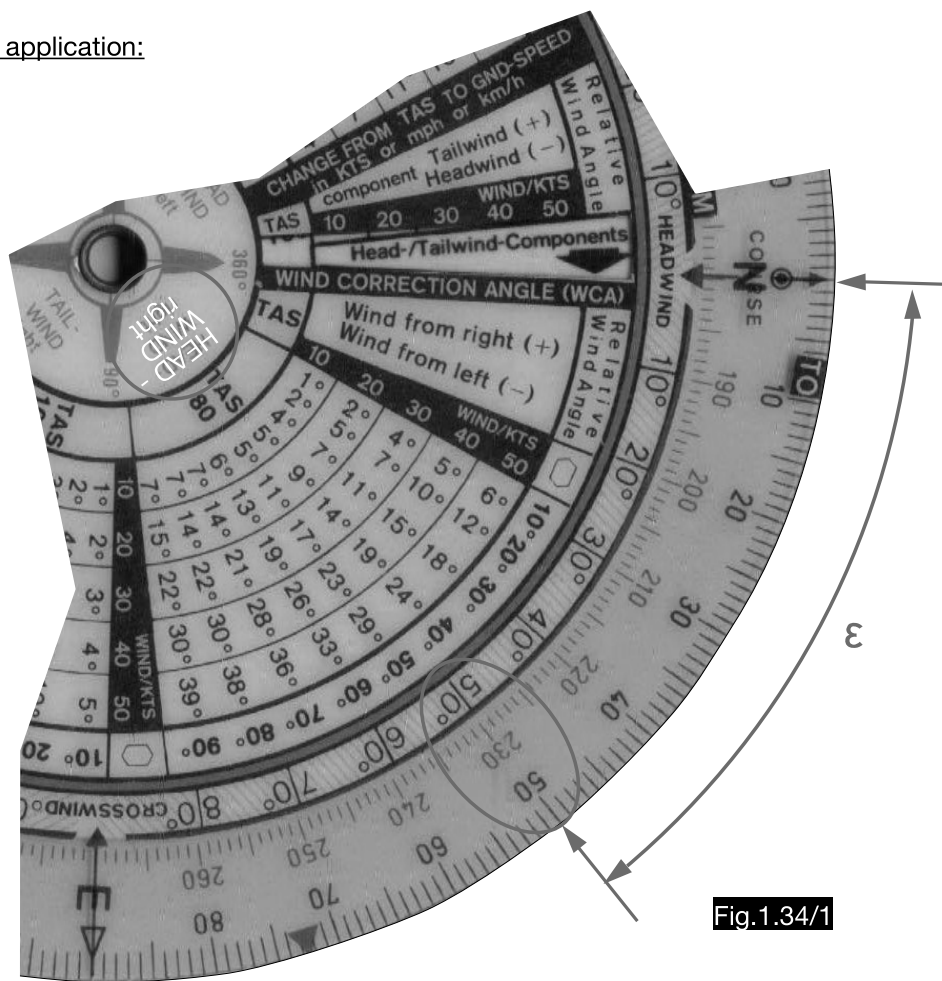


Fig.1.34/1

- wind correction angle 18°
- change from TAS to GND -SPEED (tailwind) +21
- change from TAS to GND -SPEED (headwind) - 31

With these values one gets for the wind direction 050° a wind correction angle of +18° and a ground speed of 69 kt (100 - 31) and for the wind direction 230° a wind correction angle of -18° and a ground speed of 121 kt (100 + 21).

Note 1:

The ground speed calculation using the amount "change from true air speed to ground speed" (see note 1 in Fig.1.34/2) is not done with the longitudinal component of the wind (which here is 25.7 kt), but with a signed true airspeed correction. This avoids the need to calculate a $V_{TAS_{eff}}$.

Note 2:

On this computer, the angle between course and wind direction is called the "relative wind angle", but this usually applies to the angle between heading and wind direction (see Fig.1.1/2). It can be an indication that the ambiguity of the results must be taken into account, since the wind angles used here are never greater than 90° (see note 2 in Fig.1.34/2).

note 2

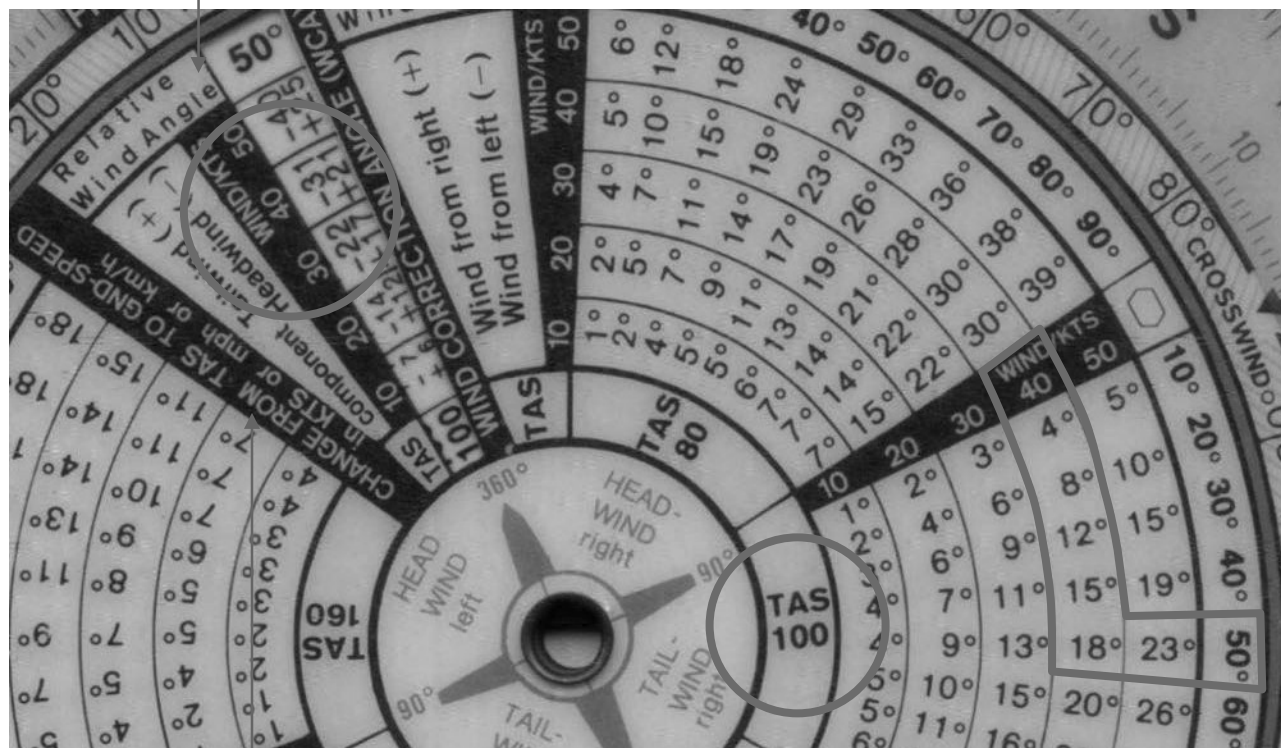


Fig.1.34/2

note 1