Determining Still-Air Glider Ratio from a Polar Diagram

The glide ratio for any glider is found by comparing the airspeed to the vertical speed.

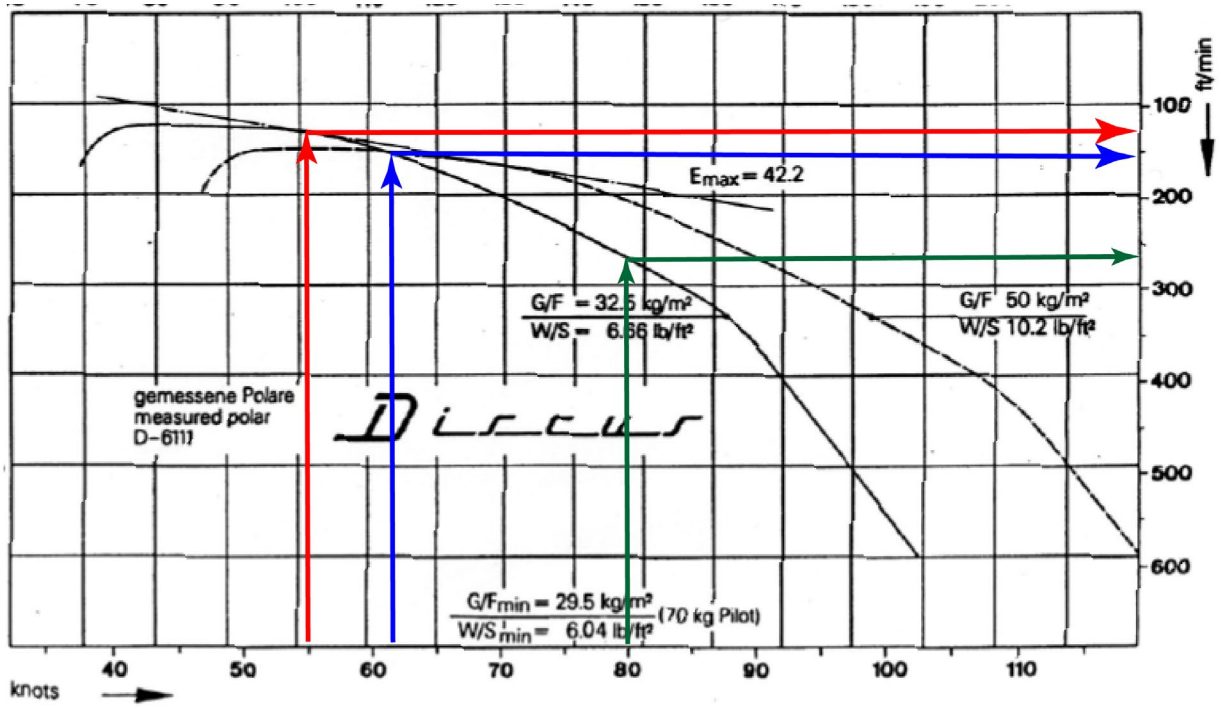
When dealing in knots the math is easy as the same unit of measurement is used in each axis.

$$\frac{airspeed\ (kts)}{sink\ rate\ (kts)} = glide\ ratio$$

For example: if the glider sinks at 2 knots at an airspeed of 50 knots then the glide ratio is $\frac{50}{2}$ or 25:1.

If the chart is labeled as ft/min just consider 100 ft/min as 1 knot. (1 knot is actually 101.2 ft/min, but the difference is too small for any practical purpose).

Here's an example from a Discus polar. We'll use the curve for the lighter of the two given weights. (the upper left curve)



At about 55 knots (red line) the sink rate is about 125 ft/min (1.25kts) , $\frac{55}{1.25}$ = 44 :1

At 62 knots (blue line) the sink rate in still air should be about 160 ft/min (1.6 kts) $\frac{62}{1.6}$ = 38:1

At 80 knots (green line) the sink rate in still air will be about 260 ft/min (2.6 kts) $\frac{80}{2.6}$ = 30.7 :1

(45% faster than best glide while retaining 69% of its glide ratio)

Schweizer Polar Diagram

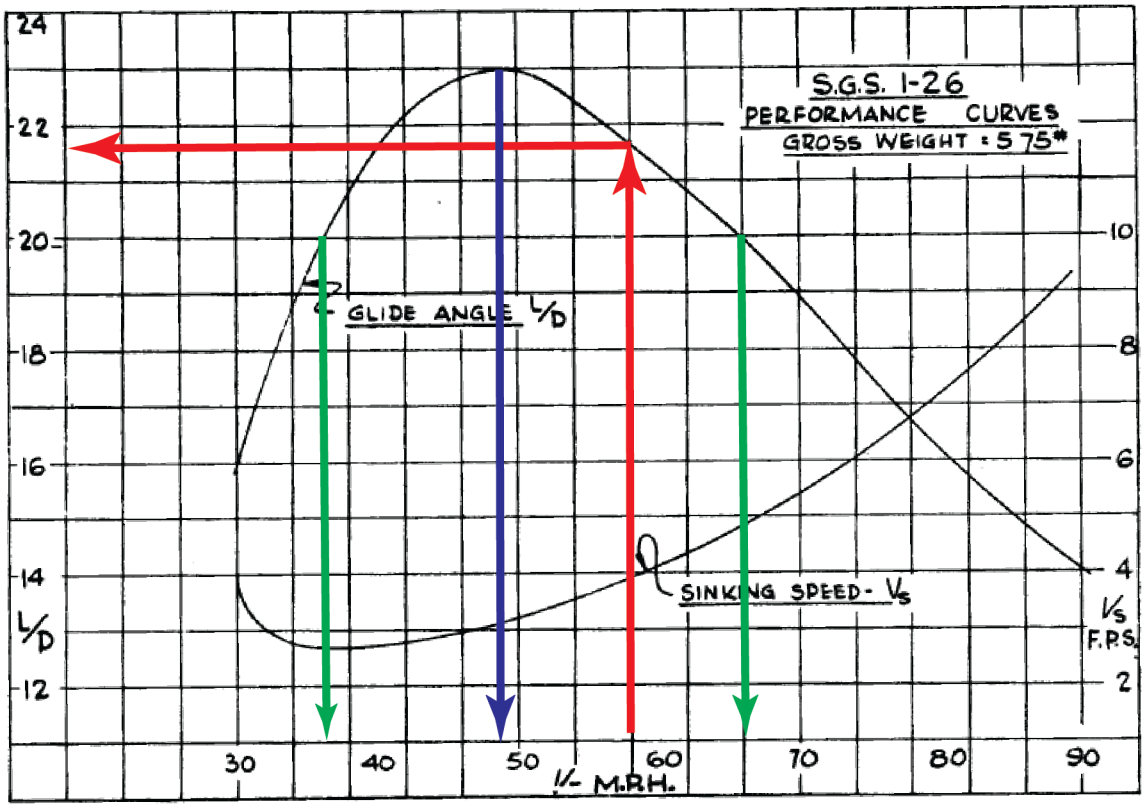
Schweizer polar diagrams have an additional L/D line included on their polars that depict the L/D glide ratio at any speed. No math is required. Simply start at the desired airspeed and move up until intersecting the Glide Angle L/D line and then read the glide ratio from the scale on the side of the diagram.

For example, follow the red line, for this early mode SGS 1-26 at 60 mph the glide ratio is about 22.7:1

To determine the best L/D, read from the peak of the L/D curve at 23:1 (blue line) for 48 mph/

We can also see what speeds will yield a given glide ratio. Following the green lines we see that both 36 and 66 mph result in a still air glide ratio of 20:1

Note the vertical lines on this diagram are every 4 mph, and the vertical scale is in feet per second instead of ft/min. (yes, whoever drew the scale of this diagram did not have pilots in mind)



Indicated or True Airspeed?

The charts are to be used with indicated airspeed. The higher true airspeed at increased altitude is made up by a corresponding higher sink rate, yielding the same glide ratio. However, wind factors will be a function of true airspeed, slightly reducing the effect of headwinds aloft.