

Cable tray cut-out formulas

cheat sheet · trays.work



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Symbols

W tray width, mm
H side height, mm
θ turn angle, degrees
L cut each way, mm

O sideways offset, mm
ΔH change in height, mm
R arc radius at centre, mm
n notches on the arc

Formulas

Horizontal turn

$$L = W \cdot \tan(\theta/2)$$

Wedge in the base. Full opening 2L. Cut the base and the inner side.

300 tray at 45°: $L = 300 \cdot 0.4142 = 124$ mm

Vertical bend

$$L = H \cdot \tan(\theta/2)$$

Wedge in both sides, the base folds. The side height sets the size.

60 side at 45°: $L = 60 \cdot 0.4142 = 25$ mm

Offset

$$D = O / \sin \theta \quad \text{centre to centre} = D + L$$

Two notches facing each other, on opposite sides. The cut is added to the diagonal to allow for metal removed by the saw.

250 offset at 45° on 300 tray: $D = 354$, centres 478 mm

Change between levels

$$\text{sloped length} = \Delta H / \sin \theta$$

Horizontal reach = $\Delta H / \tan \theta$. One angle is inside, the other outside.

250 rise at 45°: length = 354 mm

Arc from segments

$$\theta = \Phi / n \quad L = W \cdot \tan(\theta/2) \quad \text{pitch} = 2(R + W/2) \cdot \sin(\theta/2)$$

Φ is the full arc angle. Deviation from a circle = $(R + W/2)(1 - \cos(\theta/2))$.

Ø2000, 300 tray, 90° in 6 notches: $\theta = 15^\circ$, $L = 39$, pitch = 300 mm

Trunking

$$\text{cut offset} = W \cdot \tan(\theta/2)$$

No wedge: both pieces are cut on the diagonal. At 90° the offset equals the width.

40 trunking at 90°: 40 mm. Same at 45°: 17 mm

Cut each way, mm

Width	30°	45°	60°	90°
50	13	21	29	50
100	27	41	58	100
150	40	62	87	150
200	54	83	115	200
300	80	124	173	300
400	107	166	231	400

For a vertical bend use the height of the side instead of the tray width.

The full working is at trays.work

This is the short version. On the site the calculator works to your own tray: any angle, offsets, radius runs, tee branches without a fitting and trunking — with drawings and marking out. From there you can save a PDF of the figures for your own job, or print a full-size template. It works offline and installs on your phone.

The geometry is exact but ignores metal thickness and the fold radius. Try the first cut of a new size on an offcut.