V-Die Opening, Inside Radius and Minimum Flange

SheetMetal · Engineering reference · Checked 2026-11-02

Typical engineering values — confirm against the applicable standard and your machine before quoting.

Starting tooling values for mild steel, stainless steel and aluminium from 0.5 mm to 8 mm, with the selection rules written out.

Selection rules

The V opening is a multiple of sheet thickness, with the multiple set by material. Stainless steel is published as a range, so both the 10t and the 12t opening are shown rather than an invented 11t average. The inside radius range is a second material multiple applied to thickness. The minimum flange is half the chosen V opening plus the sheet thickness.

Material	V opening	Inside radius
Mild steel	8 × t	1.00–1.25 × t
Stainless steel	10–12 × t	1.50–2.00 × t
Aluminium	6 × t	0.80–0.80 × t

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Minimum flange = 0.5 × V opening + thickness
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The half-V coefficient in the minimum-flange rule is an industry rule of thumb, not a tested factory figure. Correct it with a trial bend before releasing a part.

V opening, inside radius and minimum flange

Each row is one recommended V opening. Stainless steel therefore appears twice at each thickness (10t and 12t), because the two openings give different minimum flanges. The minimum flange is calculated at the V opening shown in that row.

Material	Thickness (mm)	V opening (mm)	Inside radius (mm)	Minimum flange (mm)
Mild steel	0.5	4	0.50–0.63	2.5
Stainless steel	0.5	5	0.75–1.00	3
Stainless steel	0.5	6	0.75–1.00	3.5
Aluminium	0.5	3	0.40	2
Mild steel	1	8	1.00–1.25	5
Stainless steel	1	10	1.50–2.00	6
Stainless steel	1	12	1.50–2.00	7
Aluminium	1	6	0.80	4
Mild steel	2	16	2.00–2.50	10
Stainless steel	2	20	3.00–4.00	12

Stainless steel	2	24	3.00–4.00	14
Aluminium	2	12	1.60	8
Mild steel	3	24	3.00–3.75	15
Stainless steel	3	30	4.50–6.00	18
Stainless steel	3	36	4.50–6.00	21
Aluminium	3	18	2.40	12
Mild steel	4	32	4.00–5.00	20
Stainless steel	4	40	6.00–8.00	24
Stainless steel	4	48	6.00–8.00	28
Aluminium	4	24	3.20	16
Mild steel	6	48	6.00–7.50	30
Stainless steel	6	60	9.00–12.00	36
Stainless steel	6	72	9.00–12.00	42
Aluminium	6	36	4.80	24
Mild steel	8	64	8.00–10.00	40
Stainless steel	8	80	12.00–16.00	48
Stainless steel	8	96	12.00–16.00	56
Aluminium	8	48	6.40	32

Input assumptions

- The thickness is the nominal sheet thickness. Coated or clad sheet may need the core thickness plus an allowance.
- The V opening is the actual die opening measured across the V, not the die width or the machine slot spacing.
- The inside radius is the formed radius after springback, not the punch tip radius. A small punch tip in a wide V die can leave a larger inside radius than the tip suggests.
- The material categories are broad. High-strength steel, hardened stainless and tempered aluminium can need a larger V opening than the table shows.
- A very short flange, a hemmed edge or a bend near a cut-out needs a tooling review rather than the rule of thumb alone.

Using the table

Use the V opening to choose tooling and the minimum flange to check whether the drawing can be bent at all. If the flange is shorter than the minimum, the part needs a different die, a special tool or a process change. For thinner sheet the V opening becomes very small and tooling availability is the limiting factor; for thicker plate the machine tonnage usually decides the die before the radius rule does.