

# Sheet metal design guide

Ten rules for accurate, affordable parts. Rules of thumb for steel and stainless; aluminium and thick plate are reviewed per part. The drawing always governs.

## 01 Minimum flange length

The flange must span the V-die opening (6-8 x t).

$$\geq 4 \times t$$

## 02 Inner bend radius

Standard tooling; tighter radii risk cracking.

$$\sim 1 \times t$$

## 03 Hole to bend line

Holes near bends deform into ovals.

$$\geq 2.5 \times t + R$$

## 04 Bend relief

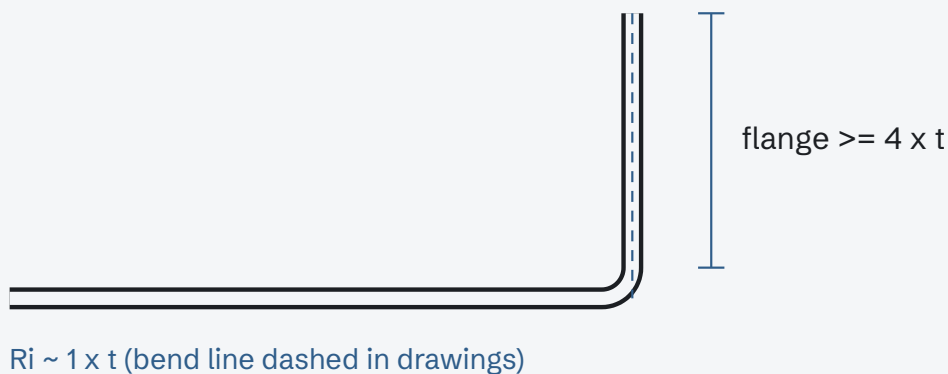
Prevents tearing at corners.

$$w \geq t, d \geq R + t$$

## 05 Minimum hole diameter

Small holes in thick sheet lose roundness.

$$\geq t \text{ (SS } 1.5 \times t)$$



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# Design guide – continued

Rules 06-10 cover webs, inserts, tooling and the files we need for a review.

## 06 Slot / web width

Thin webs warp from heat input.

$\geq 1.5 \times t$

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## 07 Press-in nut to edge

Sheet needs material to flow into the nut.

$\geq 2 \times \text{diameter}$

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## 08 One radius per part

Fewer tool changes, more stable angles.

same R

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## 09 Tolerances

Fine values only where they matter.

ISO 2768-m + functional

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## 10 Files

3D for geometry, drawing for tolerances and finish.

STEP + PDF

# Typical tolerances (indicative)

Indicative values for this demonstration, in line with ISO 2768-m unless the drawing states otherwise.

| Feature                      | Base value  | Larger parts           |
|------------------------------|-------------|------------------------|
| Laser contour, $t \leq 3$ mm | +/- 0.10 mm | 3-10 mm: +/- 0.20 mm   |
| Hole position, $t \leq 3$ mm | +/- 0.10 mm | 3-10 mm: +/- 0.15 mm   |
| Flange length, 1 bend        | +/- 0.20 mm | > 3 bends: +/- 0.50 mm |
| Bend angle, 1 bend           | +/- 0.5 deg | > 3 bends: +/- 1.0 deg |
| Welded part $\leq 400$ mm    | +/- 0.5 mm  | > 1000 mm: +/- 1.5 mm  |