

DFM Checklist for Sheet Metal

The manufacturability checks our engineers run on every drawing before it is quoted — grouped by the operation that rejects the part. Tick them off before you send a file and your quotation comes back faster, with fewer DFM notes to argue with.

Holes, slots and cutouts

- Minimum hole diameter $\geq 1.0 \times$ material thickness (laser) / $\geq 1.4 \times t$ (turret punch).
- Hole-to-edge distance $\geq 2.0 \times$ thickness, or the edge bulges at the punch.
- Hole-to-hole clearance $\geq 2.0 \times$ thickness between adjacent cutouts.
- Countersink depth $\leq$ half the material thickness; deeper sinks leave a knife edge.
- Slot width follows the hole rule; slot ends are specified as radiused or square.

Bending

- Minimum flange length $\geq 3.0 \times$ thickness + inside radius, or the tool marks the web.
- Hole-to-bend distance $\geq 2.5 \times$ thickness + radius, or the hole distorts into an oval.
- Inside radius $\geq 1.0 \times$ thickness for steel, $\geq 1.5 \times t$ for 5052 aluminium to avoid orange peel.
- Relief cuts where two bends meet a corner, so the flanges do not tear into each other.
- Bend line vs. rolling direction flagged for 5052 — bending across the grain cracks tight radii.

Welding and assembly

- Lap-joint gap held ≤ 0.5 mm, or the weld chases the gap and burns through.
- Weld access confirmed for the torch and the hand — a beautiful seam you cannot reach is not a seam.
- Long continuous welds flagged for distortion; stitch or fixture instead.
- Dissimilar metals isolated (nylon washer / coating) to stop galvanic corrosion.

Stamping and deep drawing

- Web between features $\geq 2.0 \times$ thickness so the strip carries through the die.
- Draw ratio (height ÷ diameter) ≤ 1.8 per operation without an intermediate anneal.
- Corner radii on drawn shells $\geq 3.0 \times$ thickness, or the corners thin and split.
- Burr direction specified — it decides which face the customer sees and deburrs.

Tolerances, finish and hardware

- Default tolerance class stated (we quote ISO 2768-m unless the drawing says otherwise).
- Every tolerance tighter than ± 0.1 mm justified — tighter costs inspection time, not machine time.
- Finish specified with the environment, not just the colour: indoor, outdoor, coastal.
- Hardware (PEM nuts, studs) placed $\geq 2.0 \times$ hole diameter from edges and ≥ 3.0 mm from bends.
- Hardware installed before powder coating and masked; coating after insertion damages the joint.

Fail a check? It is cheaper to change the drawing now than to argue with the part later. Upload your file at werixmetal.com/quote and our engineers return these notes with the price, inside 24 hours.