

DESIGN FOR MANUFACTURABILITY

DFM Checklist for Sheet Metal

A pre-quotation drawing review for laser cutting, CNC punching, bending, welding, stamping and assembly. Use it before release to remove avoidable manufacturing problems.

ENGINEERING RESOURCE / 2026

01

Drawing release

The drawing should define the functional requirements while leaving the manufacturing process enough freedom to work efficiently.

CHECK	WORKING GUIDANCE	VERIFY
Material	Grade, temper and thickness are explicit.	No generic material labels.
Quantity	Prototype, low-volume or production quantity is stated.	Process selection follows volume.
Datums	Functional datums locate mating features.	Avoid unnecessary tolerance chains.
Finish	Appearance and service environment are defined.	Indoor / outdoor / coastal / cosmetic.
Revision	Released revision is unambiguous.	Quote and inspect against one revision.

02

Cut features

FEATURE	DESIGN REFERENCE	WHY
Hole diameter	Laser $\geq 1.0 \times t$; turret punch $\geq 1.4 \times t$ as source-checklist starting points.	Small holes become more process-sensitive as thickness increases.
Hole to edge	Target $\geq 2.0 \times t$.	Reduces edge bulging and distortion.
Hole to hole	Target $\geq 2.0 \times t$.	Protects the web between features.
Slots	Follow the hole-width rule; specify end geometry where functional.	End shape affects stress and tooling.
Countersinks	Keep depth conservative relative to sheet thickness.	Avoid a weak knife edge.

03

Bending

FEATURE	DESIGN REFERENCE	WHY
Flange	$\geq 3.0 \times t$ + inside radius as a screening rule.	Supports stable forming and tool clearance.
Hole to bend	Target $\geq 2.5 \times t$ + inside radius.	Reduces hole distortion.
Inside radius	Source checklist: $\geq 1.0 \times t$ steel; $\geq 1.5 \times t$ for 5052.	Final limit depends on alloy, temper, grain and tooling.
Relief	Add relief where bends meet at corners.	Prevents tearing and flange interference.
Grain	Flag critical 5052 bends.	Orientation can affect cracking at tight radii.

04

Welding and assembly

WERIX's sheet-metal workflow includes MIG, TIG, spot and laser welding. Joint design should be considered together with access, heat input, fixture strategy and final finish.

CHECK	PRACTICE	PRODUCTION EFFECT
Joint gap	Control lap-joint gaps; source checklist uses ≤ 0.5 mm as a working target.	Reduces burn-through and weld chasing.
Access	Confirm torch / electrode access before release.	Inaccessible joints are not repeatable.
Long welds	Use stitch welding or fixtures when continuous welding is not functional.	Controls heat distortion and cycle time.
Dissimilar metals	Isolate interfaces where galvanic corrosion is possible.	Use suitable washers, coatings or interface design.
Sequence	Plan hardware, welding and finishing together.	Prevents inaccessible hardware and finish damage.

05

Stamping and deep drawing

CHECK	SOURCE REFERENCE	DESIGN IMPLICATION
Web between features	$\geq 2.0 \times t$.	Protects strip strength through the die.
Draw ratio	Height $\div$ diameter ≤ 1.8 per operation without intermediate anneal.	Deep forms may need staged operations.
Drawn corners	$\geq 3.0 \times t$.	Reduces thinning and split risk.
Burr direction	Specify functional / visible face.	Controls presentation and deburring.

06

Tolerance, hardware and finish

ITEM	PRACTICE	COST EFFECT
General tolerance	State the default class; WERIX reference uses ISO 2768-m unless otherwise specified.	Clear inspection baseline.
Critical dimensions	Tighten only functional interfaces.	Inspection effort follows function.
PEM / hardware	Source checklist: $\geq 2\times$ hole diameter from edges and ≥ 3 mm from bends.	Reduces interference and deformation.
Coating sequence	Plan insertion, masking and coating as one sequence.	Protects threads and contact surfaces.

PROCESS SELECTION

WERIX currently positions flexible sheet-metal fabrication for prototype-to-production work and progressive die stamping for higher volumes. The current website recommends stamping from about 1,000 units and considers 5,000+ units an ideal volume; actual economics depend on part geometry and die complexity.

07

Release review

PASS	DRAWING CHECK
01	Material grade, temper and thickness are explicit.
02	Critical datums and functional interfaces are identified.
03	Bend radii, bend direction and relief are manufacturable.
04	Holes, slots and hardware are checked against edges and bends.
05	Weld locations and access are clear.
06	Surface finish includes appearance and environment.
07	Quantity and production volume are stated.
08	Latest revision and referenced files are included.

ENGINEERING NOTE

The ratios in this document are screening guidance, not universal limits. Final feasibility depends on material, temper, thickness, tooling, grain direction, feature geometry and the required cosmetic standard.

WERIX / FROM DRAWING TO PRODUCTION

WERIX is a direct source factory in Dongguan, founded in 2015, with a 3,000+ m² facility and in-house laser cutting, CNC punching, bending, welding, stamping and finishing. The current website states 24-hour quote response, 3–7 day sheet-metal samples, 5,000+ customers across 30+ countries and one engineer assigned per project.

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