

DIMENSIONAL CONTROL

Sheet Metal Tolerance Reference

A working reference for general drawing tolerances and routine process capability. Use general tolerances as the baseline, then reserve tighter requirements for the features that control fit, function or interchangeability.

ENGINEERING RESOURCE / 2026

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ISO 2768-1 — class m

The supplied WERIX reference uses ISO 2768-m for linear dimensions unless the drawing states otherwise.

NOMINAL RANGE (mm)	0.5–3	>3–6	>6–30	>30–120	>120–400	>400–1000	>1000–2000	>2000–4000
Permitted deviation ± mm	0.1	0.1	0.2	0.3	0.5	0.8	1.2	2.0

02

Routine production capability

PROCESS	PUBLISHED WORKING RANGE / SCOPE	ROUTINE REFERENCE
Fiber laser cutting	0.3–5.0 mm sheet; 1,500 × 3,000 mm bed	±0.10 mm linear
CNC turret punching	0.5–4.0 mm; louvers and extruded holes	±0.15 mm
Shearing	Up to 3,000 mm cut length	±0.20 mm
CNC press brake	Parts to 2,200 mm; CNC backgauge	±0.5° angle
TIG welding	0.8–6.0 mm; leak-tight seams	±0.30 mm assembly
MIG welding	1.5 mm and up; structural frames	±0.50 mm assembly
Hardware insertion	M2–M10 press nuts, studs, standoffs	±0.10 mm position
Progressive stamping	0.2–3.0 mm strip; up to 200 strokes/min	±0.01 mm
Fine blanking	0.5–6.0 mm; square cut edge	±0.01 mm
Deep drawing	Cups and shells to 150 mm depth	±0.05 mm diameter

Routine capability is not a blanket guarantee. Feature geometry, material, thickness, tooling, datum strategy, heat distortion and inspection method can change the achievable result.

03

Where to spend tolerance

A drawing becomes easier to manufacture when its tolerance scheme follows function. Tightening every dimension usually increases inspection, sorting and rework without improving the product.

DRAWING SITUATION	PREFERRED APPROACH	WHY
Non-functional edge	Use the general tolerance.	No functional benefit from extra inspection.
Mounting hole pattern	Control from a stable datum.	Assembly depends on the relationship between holes.
Sealing interface	Call out the sealing surface and critical dimensions.	Inspection follows the actual leak path.
Welded assembly	Dimension from functional datums and allow realistic weld movement.	Avoids impossible tolerance stacks.
Stamped production part	Separate die-critical dimensions from secondary features.	Tooling and inspection follow volume and function.

04

Tolerance stack-up

STEP	ENGINEERING PRACTICE
1	Choose a primary datum that represents how the part is actually located.
2	Reference mating features to the same datum structure where possible.
3	Avoid long chains of dependent dimensions.
4	Evaluate the complete assembly stack when several parts determine one fit.
5	Identify critical features explicitly so inspection effort protects function.

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Inspection and release

REQUIREMENT	GOOD DRAWING PRACTICE
General tolerance	State the default class in the title block or drawing notes.
Critical dimensions	Mark the feature and specify its tolerance.
Inspection method	Define CMM, gauge, optical or other method when it affects acceptance.
FAI / NPI	For new or critical assemblies, request first-article inspection before production release.
Revision control	Freeze the drawing revision used for sampling and quotation.

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A practical release example

If a cover must align to four mounting holes, the hole pattern and its datum relationship normally control assembly; the exact outside edge may not. Protect the hole pattern and let the non-functional perimeter remain within the general tolerance.

CRITICAL FEATURE / Hole pattern → controlled to the assembly datum

GENERAL FEATURE / Outside edge → controlled by the general tolerance

WERIX PROCESS REFERENCE

WERIX currently publishes fiber laser cutting at 0.3–5.0 mm with a 1,500 × 3,000 mm bed and ±0.1 mm positional accuracy, CNC press-brake bending to 2,200 mm with ±0.5° angle accuracy, and CNC punching with up to 72 tools and up to 500 hits/min.