



Local 3D Printing

CUSTOMER HANDBOOK · EDITION 1 - OCTOBER 2026

Design for 3D Printing

A short guide for people who model their own parts and send them to us to print. The rules that matter, the numbers we work to, and what to tell us when you order.



local3dprinting.com

Elk Grove, California · Shipping to all 50 states

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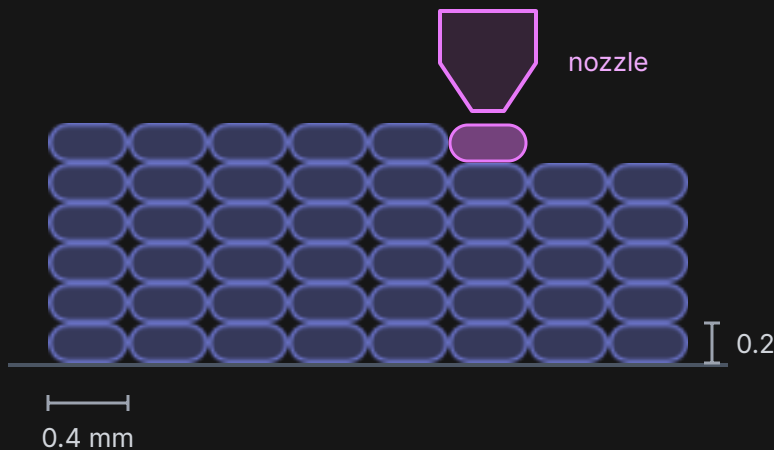
Eleven short sections, one page each. Read it front to back, or jump to the rule you need.

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SECTION 01

How Your Part Gets Made

A nozzle draws one thin line of melted plastic at a time, one layer on top of the last. Nearly every rule in this handbook follows from that: lines have a width, layers have a height, and every layer needs something underneath it.



Lines. Each pass of the nozzle lays a line about as wide as the nozzle opening.

Layers. Lines are stacked in thin layers, so curves and slopes are built as tiny steps.

Support. A new layer can only reach a little past the one below it before it droops.

0.4 mm

Walls come in multiples of this. Need a different line width? We also run 0.2, 0.6 and 0.8mm on demand.

0.2 mm

Typical layer height. The smallest step in Z. Specify 0.12mm or 0.16mm for higher resolution.

45°

The flattest overhang that prints clean without support.

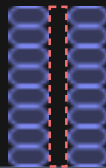
SECTION 02

Walls & Thin Features

Make walls at least 0.8 mm thick, ideally 1.2 mm or more, in steps of 0.4 mm. A wall is really a number of lines side by side, and the slicer can only fit whole lines.

✗ AVOID**0.4 mm · one line**

Fragile, wobbles as it grows, and may be dropped by the slicer.

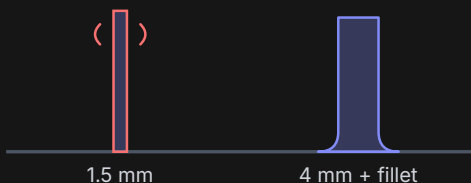
✗ AVOID**1.0 mm · two lines + gap**

No room for a third line, so a seam or void runs up the middle.

✓ PRINTS WELL**1.2 mm · three lines**

Solid, stiff and clean. A good default for most walls.

Pins & posts



Thin, tall features wobble as the nozzle passes and snap easily. Keep pins 3 mm or thicker, and add a fillet where they meet the part.

THE NUMBERS

Minimum wall	0.8 mm
Recommended wall	1.2–1.6 mm
Load-bearing wall	2.0 mm +
Wall step	0.4 mm
Minimum pin diameter	3 mm

i Thicker is not always stronger. Past about 2.4 mm, extra wall mostly adds weight and cost. Need it stiffer? Tell us and we'll adjust walls and infill.

SECTION 03

Overhangs & Bridges

Slopes up to 45° from vertical print clean. Flatter ones need support, which we remove by hand and which leaves a rougher surface.

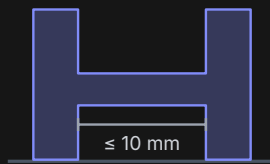
✓ PRINTS WELL



Gentle slopes

Each layer steps out a little. At 45° or steeper, no support needed.

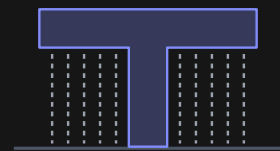
✓ PRINTS WELL



Short bridges

Flat spans up to about 10 mm print fine. Longer ones sag.

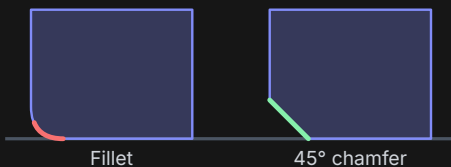
⚠ NEEDS SUPPORT



Flat overhangs

Nothing to build on, so the slicer adds supports. Those marks show.

Chamfer bottom edges



A fillet on a downward edge starts as a flat overhang and droops. A 45° chamfer prints clean.

THE NUMBERS

Unsupported overhang **45° from vertical**

Unsupported bridge **up to 10 mm**

Bottom-edge chamfer **45°**

First-layer edge chamfer **0.5 mm**

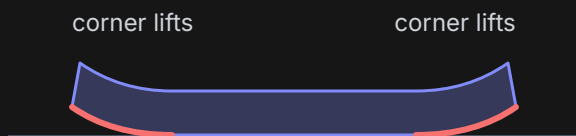
Try rotating before you add supports. Many parts that look like they need support don't once they're turned over. If one face has to look good, tell us and we'll orient the part to keep supports off it.

SECTION 04

Corners, Edges & Warping

Plastic shrinks as it cools, and sharp corners are where that pull concentrates. Round the corners and break the edges, and the part stays flat on the bed.

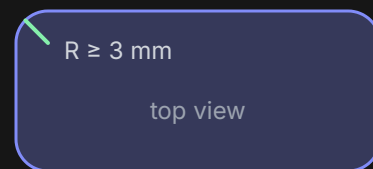
✗ AVOID



Sharp, square footprint

Cooling pulls hardest at sharp corners, so they peel off the bed mid-print.

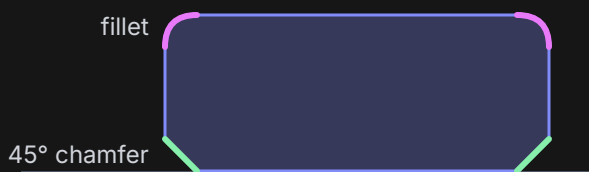
✓ PRINTS WELL



Rounded vertical corners

A radius spreads the pull around the corner, so the footprint stays down.

Chamfer the bottom, round the top



A chamfer on the bottom edge hides first-layer squish and needs no support. Fillets suit top edges, where they print clean.

THE NUMBERS

Vertical corner radius **3 mm +**

Corner radius, parts over 100 mm **5 mm +**

Bottom-edge chamfer **0.5–1 mm at 45°**

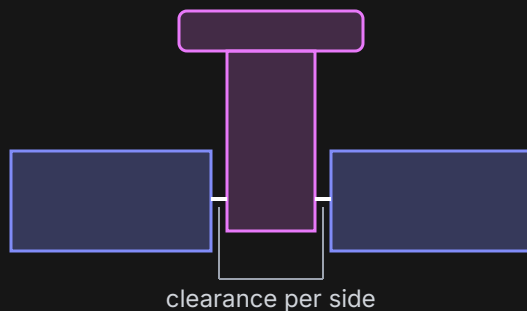
Inside corner fillet **1 mm +**

i Big, flat and thin is the hardest shape to print. ASA warps more than PLA or PETG. Round sharp inside corners too, since cracks start there. Tell us about large flat parts and we'll add a brim if one is needed; it trims off but can leave a slight edge.

SECTION 05

Holes, Pins & Fits

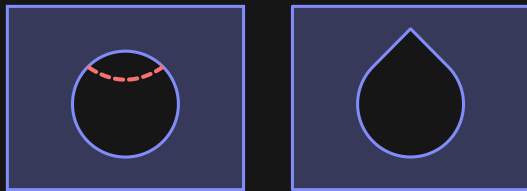
Holes print slightly small and pins slightly big, because each line spreads a little as it's laid. Model holes 0.2 mm larger than nominal, and leave a gap between parts that fit together.



CLEARANCE PER SIDE

Press fit · pushes in hard, stays put	0.1 mm
Sliding fit · moves with light friction	0.2 mm
Free fit · turns or slides freely	0.3–0.4 mm
Print-in-place · hinges printed assembled	0.4–0.5 mm

Sideways holes: use a teardrop



The top of a round hole printed on its side is a flat overhang, so it sags. A pointed 45° top, as a teardrop or diamond, prints clean.

THE NUMBERS

Minimum hole	2 mm
Hole oversize	+0.2 mm
Gap between separate parts	0.5 mm +
Typical accuracy	±0.2 mm
Teardrop point angle	45°

Fit values are a starting point for PLA and PETG. TPU needs more room.

i Precise bores: add 0.2 mm, then check. For bearings and dowels, model the hole 0.2 mm over nominal and finish it with a reamer if the fit must be exact. If a fit really matters, ask us before you order.

SECTION 06

Splitting Large Parts

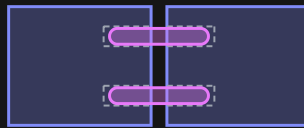
Bigger than our build plate, or better in pieces? Split it. We join the pieces with dovetails, dowel pins or heat-set inserts.



Dovetail

The halves slide together and line themselves up. No hardware, and easy to glue for a permanent joint.

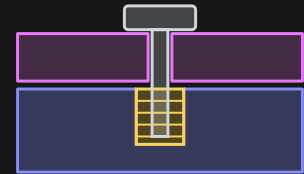
Best for panels, signs, props and long flat parts.



Dowel pins

Pins sit in matching holes on both halves for precise alignment, pressed in or glued.

Best for enclosures, models and parts with a visible seam.



Heat-set inserts

We melt threaded brass inserts into one half, so the parts bolt together and come apart again.

Best for parts you'll open for service or ship flat.

WHERE TO SPLIT

- **On a flat face**, so each half has a clean side to sit on the bed.
- **Away from show faces**, where a seam would be seen.
- **Away from high-load areas**, since the joint is the weakest point.
- **Where it cuts supports**, so each piece prints cleanly on its own.

THE NUMBERS

Dovetail clearance per side	0.2 mm
Dowel hole, press fit	pin + 0.2 mm
Dowel hole, glued	pin + 0.4 mm
Dowels per joint	2 +
Wall around an insert	2 mm +

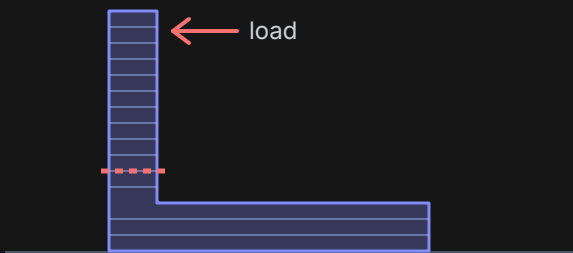
i Not sure where to split? Send us the whole model and the size you need. We'll suggest where to split it and which joint to use before you pay.

SECTION 07

Orientation & Strength

A printed part is strongest along its layers and weakest between them. Orient it so the load runs along the lines, not across the joins between layers.

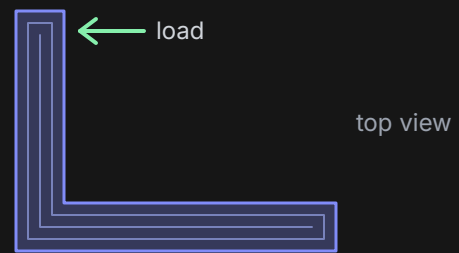
× AVOID



Printed standing up

Layers stack across the upright arm. A push on the top peels them apart at the corner.

✓ PRINTS WELL



Printed lying on its side

Lines run the full length of both arms and round the corner. Same part, many times tougher.

HOW EACH FACE WILL LOOK

- **Top faces** are the smoothest, with a fine line pattern.
- **Side walls** show fine horizontal layer lines.
- **Supported faces** are rougher wherever support touched.
- **The bottom face** is flat and takes the texture of the build plate.
- **Shallow slopes** show visible steps. Steeper reads smoother.
- **Round holes** come out roundest when they point straight up.

i Tell us which way is up. Strength, looks and support all pull on orientation, and sometimes they disagree. If one face has to look good or one direction takes the load, say so when you order.

SECTION 08

Text, Detail & Color

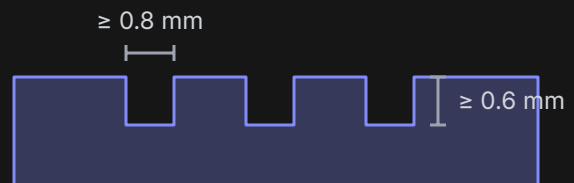
Raised and engraved text both print well if the strokes are thick enough. Keep letters at least 10 mm tall so they read clearly. Bold sans-serif fonts survive; hairline serifs don't. To make text stand out, color often works better than depth.

Embossed (raised)



Strokes at least 0.8 mm wide, standing at least 0.6 mm proud. Best on top faces.

Engraved (cut in)



Strokes at least 0.8 mm wide, cut at least 0.6 mm deep. Reads well on side walls.

MULTICOLOR

13

colors in one print

Send a 3MF with colors painted or assigned per part. Bambu Studio and OrcaSlicer both save this. Tell us which filament each color should be.

Every color change adds print time, so a few colors over large areas cost less than many colors in small spots.

THE NUMBERS

Text stroke width	0.8 mm +
Raise or depth	0.6 mm +
Letter height	10 mm +
Smallest detail, X / Y	0.4 mm
Smallest detail, Z	0.2 mm

i Details smaller than a line don't print. The slicer drops or merges anything under about 0.4 mm. If a logo or label is tiny, scale it up or let color carry it instead of relief.

SECTION 09

Picking a Material

Most parts fit one of these. Choose by where the part will live and what it has to survive, then design to that material's limits.

**PLA**

Rigid, crisp detail

Good for display pieces, prototypes, indoor enclosures. Widest color range.

Watch for heat. It softens around 55 °C, so not for a hot car or near a heater.

**PETG**

Tough, a little flex

Good for functional parts, clips, brackets, light outdoor use.

Watch for fine detail and bridges, which come out a little softer than in PLA.

**PCTG**

Impact resistant, clearer

Good for parts that get dropped or knocked, snap fits, translucent parts.

Watch for the same heat limits as PETG. It isn't a high-temperature material.

**ASA**

Built for outdoors

Good for parts that live in sun and weather, or near heat: garden, vehicle and exterior fittings.

Watch for warping on large, flat parts. Round sharp corners and avoid long thin slabs.

**TPU · PEBA**

Soft and flexible

Good for gaskets, bumpers, grips and feet. PEBA is lighter and springier than TPU. PEBA coming soon.

Watch for bridges and thin overhangs. Keep walls 1.2 mm or more and fits loose.

**Engineering Grade**

Fiber blends, nylon, PC

Good for stiffness, higher heat or chemical exposure. Tell us the load and environment and we'll recommend one, and what it costs, before you pay.

Watch for brittleness across layers. Add fillets and loosen fits.

i Solid infill: rarely necessary, and rarely stronger. Wall count and orientation usually matter more than how full the inside is. Ask us before you pay for solid.

SECTION 10

Designing With AI

ChatGPT and Claude don't sculpt. They write code that builds the shape. Describe the part like an engineer, ask for the right file, and check it before you send it.

PUT IN THE PROMPT

- **What it does**, in a sentence
- **Every key dimension**, in millimeters
- **What it fits onto**, and how tight
- **Hardware by name**: screws, magnets
- **Load, heat** and which face sits down

ASK FOR BACK

- **STL** for single-color parts
- **3MF** for multicolor (see below)
- **The source code**, for later changes
- **Millimeters**, asked for by name
- **Proof of a mesh check**, not a claim

PASTE INTO EVERY PROMPT

Design for FDM printing with a 0.4 mm nozzle:

- Minimum wall thickness 1.2 mm; no feature thinner than 0.8 mm.
- Keep overhangs at 45 degrees or less from vertical where possible.
- Put a 0.5 mm chamfer on bottom edges instead of a fillet.
- Make holes 0.2 mm larger than the nominal size.
- Clearance between parts that must fit together: 0.2 mm for snug, 0.4 mm for loose.
- Raised or recessed text at least 0.6 mm deep and 10 mm tall.
- The model must be a single watertight solid with no internal faces.

Multicolor: ask for a Bambu Studio painted 3MF

Each triangle carries a `paint_color` code naming a filament slot, in uppercase, up to AC for slot 13. Open it in Bambu Studio, set each slot's color, then File > Save Project and upload that file, so our quote form can price every color.

Slot 1
4

Slot 2
8

Slot 3
0C

Slot 4
1C

Slot 5
2C

Slot 6
3C

Slot 7
4C

Slot 8
5C

SECTION 11

Sending Us Your File

A clean file and a few lines of context get you the right part the first time. Run through this before you upload.

FILE CHECKLIST

- ✓ **STL or 3MF.** Use 3MF if you've assigned colors.
- ✓ **Millimeters.** Check the size on export; inches turn a 50 mm part into a 2 mm one.
- ✓ **Watertight.** No holes in the mesh, no zero-thickness faces.
- ✓ **Smooth enough.** Enough triangles that curves aren't faceted, not millions.
- ✓ **One part per file,** or tell us how the parts go together.
- ✓ **Clear file names,** so we can match them to your notes.

WHAT TO TELL US

- **What it's for,** in a sentence.
- **What it fits with,** and the size of that thing.
- **Which faces are seen,** so we keep supports off them.
- **Which way the load goes,** so we orient for strength.
- **Where it will live:** indoors, outdoors, in a car, near heat.
- **How many** you need, now and later.

Get an Instant Quote

Upload your model and we'll price it from a real slice of your part, not an estimate. Most orders are printed and shipped within 2-3 days.

local3dprinting.com →

Not sure your design will print? Ask us first.