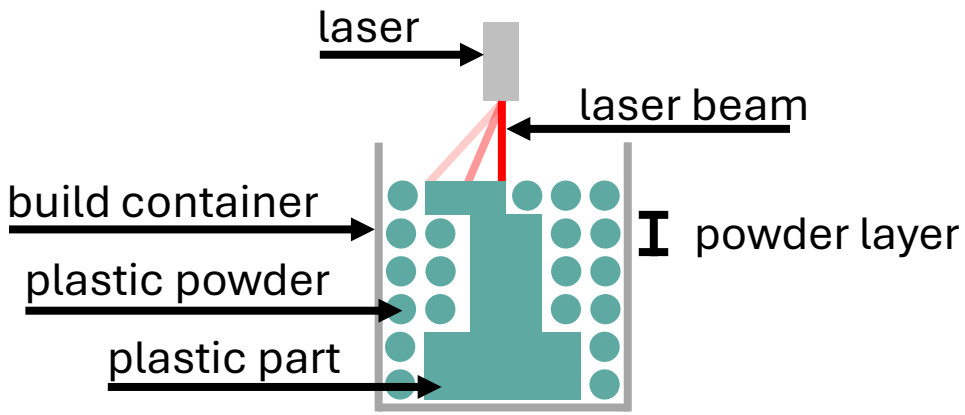
prioadd
ADDITIVE MANUFACTURING

Construction Guidelines SLS

September 2025

Selective Laser Sintering

- SLS is a 3D-printing process, where plastic powder is locally melted, layer by layer with a laser, to form the finished component
- Complex geometries, for example with undercuts, can be easily produced by using the SLS technology

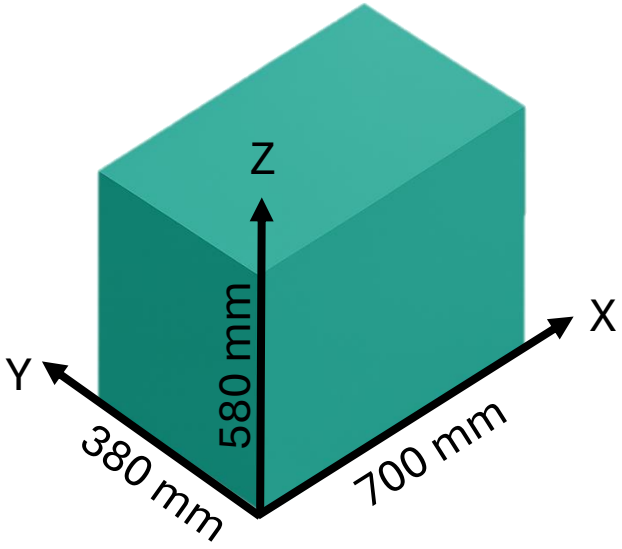


Component Dimensions

- Maximum possible component dimensions:

  X × Y × Z = 700 × 380 × 580 mm

- Drill holes and cylindrical geometries such as pins should be produced in the Z-direction if possible

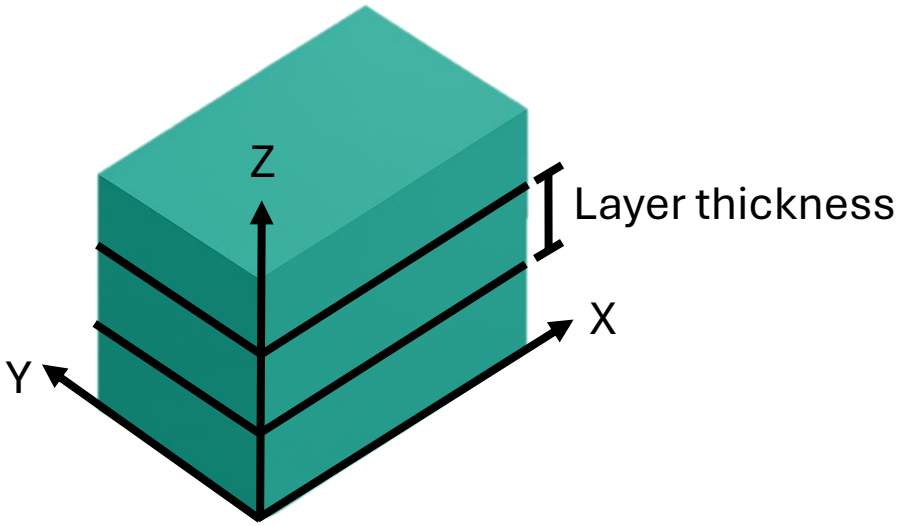


Materials

Material	Composition	Colour	Features
PA2200	PA12	white	Multipurpose material, Balanced material properties, Good strength, Good stiffness, Good chemical resistance, Suitable for food contact
PA2201	PA12	translucent	Multipurpose material, Balanced material properties, Good strength, Good stiffness, Good chemical resistance
PA3200 GF	PA12 filled with glass balls	white	High stiffness, Good elongation at break, High wear resistance, Improved temperature property profile compared to PA2200
Alumide	PA12 filled with aluminium	metallic grey	High stiffness, Very high temperature resistance, Dimensional stability at high temperatures, Improved temperature property profile compared to PA2200, Easy to rework (good machinability and grindability)
PA2241FR	PA12 with flame retardant	white	With halogencontaining flame retardant, Good tensile strength, Good stretchability, Refresh optimised material, Suitable for use in the aviation industry
PA2210FR	PA12 with flame retardant	white	With halogenfree chemical flame retardant, Fire protection class UL 94 / V-0 fulfilled from 3 mm wall thickness onwards, Suitable for use in the aerospace industry and in the electrical and electronics industry
PA1101	PA11	white	Multipurpose material, Balanced material properties, High ductility, High impact strength, Shatterproof in case of breakage, More temperature resistant than PA12, Based on renewable raw materials
TPU1301	TPU	white	High resilience after deformation, Good hydrolysis resistance, High UV stability

Layer Thickness

- We always manufacture with the ideal layer thickness for your component and material
- Generally we manufacture with layer thicknesses of 100 µm, 120 µm or 150 µm



Wall Thickness

- The minimum wall thickness (X-, Y- and Z-direction) is approximately 0.8 mm
- The minimum diameter of a cylindrical pin is approximately 0.8 mm
- For repeatable measurements and mechanical properties, the minimum wall thickness is approximately 1.5 mm and the minimum pin diameter is approximately 1.8 mm

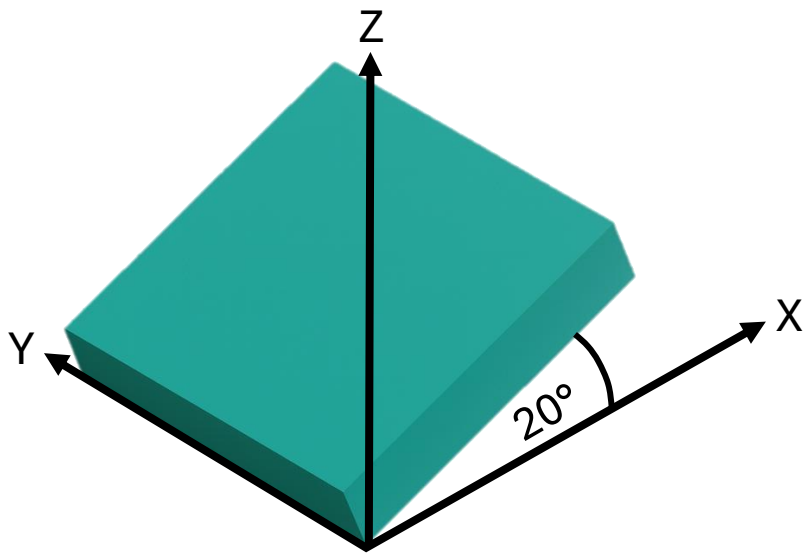
Drill Holes

- For each wall thickness, there is a minimum diameter for a drill hole that can be produced directly in the SLS process
- The following table can be used as an orientation

Wall thickness	Minimum diameter
0,5 bis 0,6 mm	0,8 mm
0,6 bis 1,0 mm	0,9 mm
1,0 bis 1,8 mm	1,1 mm
1,8 bis 2,4 mm	1,2 mm
2,4 bis 4,0 mm	1,5 mm
4,0 bis 6,0 mm	1,8 mm

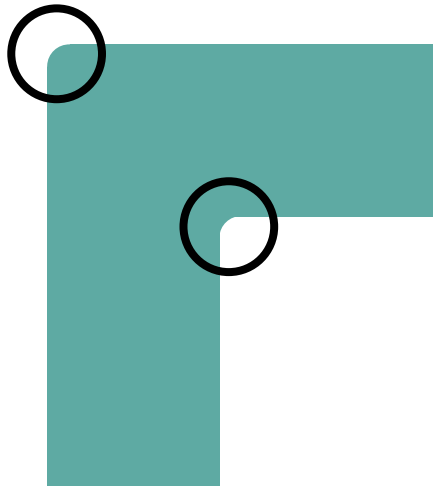
Building Layers

- If the surface of a component is inclined by 20° or less in relation to the XY-plane, the single layers on the surface of the component are visible



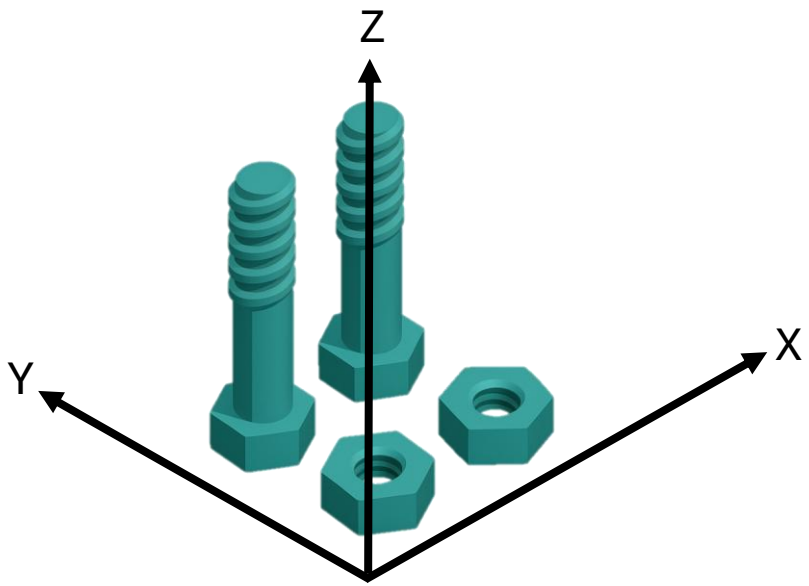
Corners and Edges

- Sharp corners and edges are not manufacturable
- If possible, use a minimum radius of 0.3 mm at corners and edges



Threads

- Internal and external threads can be produced from a size of M4 if they are manufactured in Z-direction
- For smaller threads, thread inserts should be pressed in

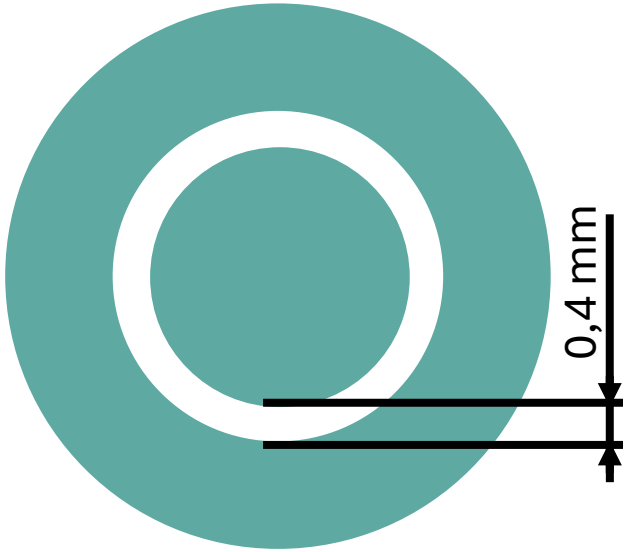


Fits

- A gap of 0.1 mm between a male and female component creates a loose connection
- No gap between a male and female component creates a press fit
- This only applies to components that are assembled after the manufacturing process (otherwise see joints)

Joints

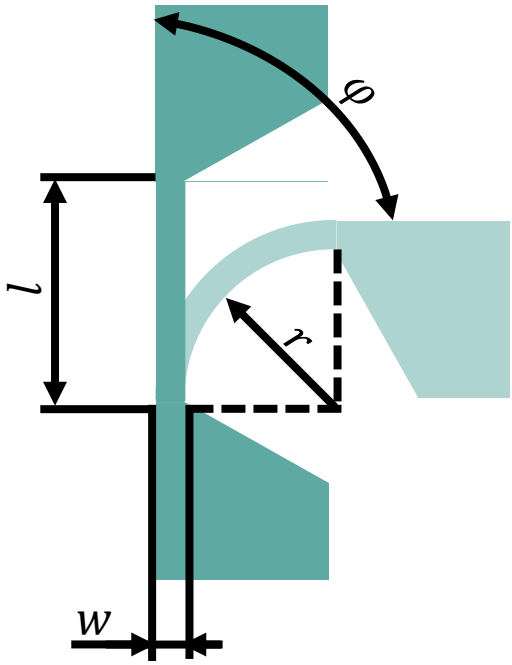
- The gap size for joints that are manufactured in the X-, Y- or Z-direction should be 0.4 mm



Integral Hinges

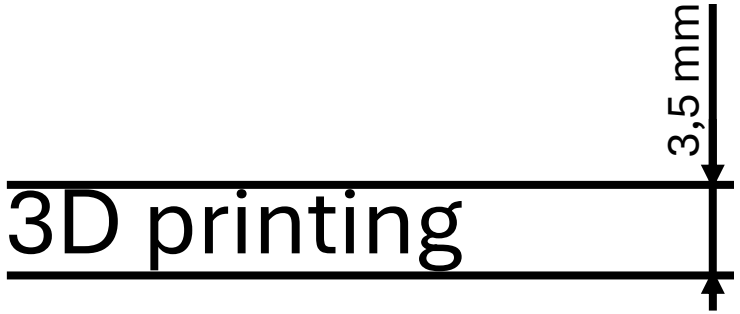
- Possible for the materials PA2200, PA2201 and PA1101
- Integral hinges should be designed open and attached to thick walls if possible
- The following guide values can be used for the design integral hinges with a radius r of 0.5 mm:

Opening Angle φ	Length l	Wall Thickness w
180°	1,60 mm	0,30 bis 0,45 mm
90°	0,72 mm	0,30 bis 0,45 mm



Font Size

- The minimum font size that can be manufactured (negative and positive) in all directions (X, Y and Z) is approximately 10
- A font size of 10 corresponds approximately to a font height of 3.5 mm
- The inscription should be recessed or raised at least 1 mm
- If possible, use fonts without serifs, such as Arial or Calibri



Tolerances

- SLS manufactured components can only fulfil tolerances with symmetrical deviations (for example 20 ± 0.2 mm)
- Tolerances depend on geometry and material
- Guide values for the expected tolerances are:

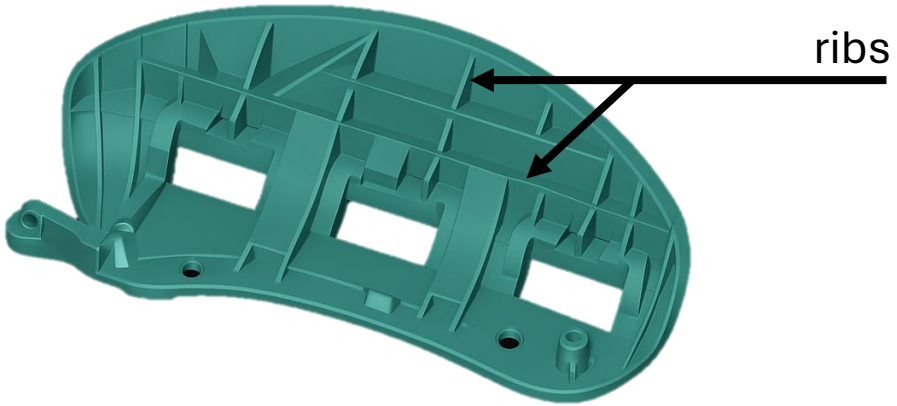
Nominal dimension	Upper or lower deviation
0 bis 30 mm	± 0,2 mm
30 bis 100 mm	± 0,3 mm
Ab 100 mm	± 0,3 % des Nennmaßes

Powder Removal

- Residual powder must be removable from the component
- The component must not enclose any powder (no internal chambers)
- Thin and long inner tubes, as well as complex inner structures complicate the removal of residual powder
- All components are media blasted and blown off with compressed air to remove the residual powder

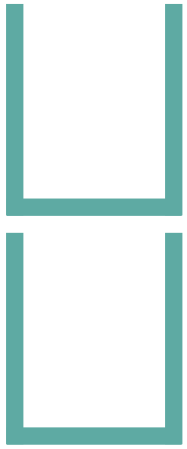
Warpage

- Components with large surfaces in combination with thin wall thicknesses are process-related and at risk of warpage
- Reinforcement of large surfaces, for example with ribs, can significantly minimise warpage-effects



Price Optimization

- If possible, use geometries which can be nested inside each other in order to save space in the build container and save manufacturing costs



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Post-processing

Procedure	Explanation
Shot peening	In shot peening, laser-sintered components are blasted with plastic beads under high pressure. The beads strike the surface of the components and smooth it.
Chemical smoothing	Chemical smoothing raises the surface quality of SLS parts up to injection moulding level. The pores on the surface of chemically smoothed SLS 3D-printed components are completely closed after applying this process, so that these parts are 100 % waterproof, even under pressure.
Vibratory finishing or barrel finishing	Mechanical smoothing of the surface of SLS components by a slight removal of material from the surface by using vibrating grindstones.
colouring	Colouring of SLS components without changing the geometry or the dimensions of the components. Colouring is possible in all standard colours such as yellow, orange, red, blue, green, brown, grey and black.
Water- or gastight infiltration	Infiltration of the slightly porous surface of SLS components with a 1-component high-performance polymer. Components finished in this way are are waterproof and gastight and approved for contact with drinking water and foodstuffs.
Mecanical finishing	For example, cutting threads, pressing in thread inserts or reaming drill holes.
Pad printing	Printing logos or inscriptions on the surface of SLS parts. For this finishing process, the surface of the component should be chemically smoothed before.
Painting	Painting the surface of laser sintered components.

Quality Assurance

- Creation of initial sample inspection reports, measurement protocols or false colour target/actual comparisons for your 3D-printed parts
- False colour target/actual comparisons are created with a GOM ATOS Capsule 3D scanner, by placing the additively manufactured component over the digital twin and indicat the deviations in colour

Quotations

- The quotation is free of charge and without obligation
- To prepare a quotation, we need the following data and informations mailed to info@prioadd.de:
  - CAD data (ideally as .stl, .stp or .step)
  - Number of pieces
  - Desired material
  - Desired post-processing or quality assurance