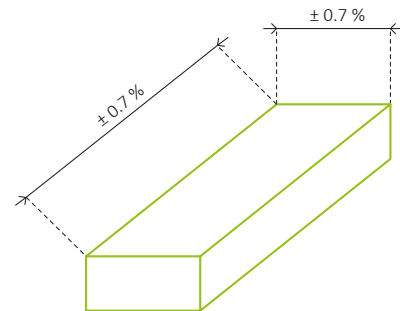


Design recommendations for selective laser sintering

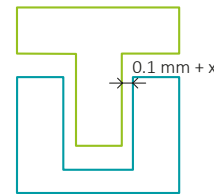
Tolerances

- Shrinkage processes during cooling influence the component dimensions depending on the component size and the material used. Shape and position tolerances depend on the individual case.
- Manufacturing precision $\pm 0.7\%$ of the linear dimension (minimum tolerance $\pm 0.1\text{ mm}$).



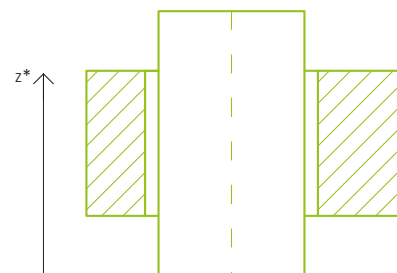
Bonded parts

- When designing joining parts, a gap of at least 0.1 mm plus tolerances should always be provided.



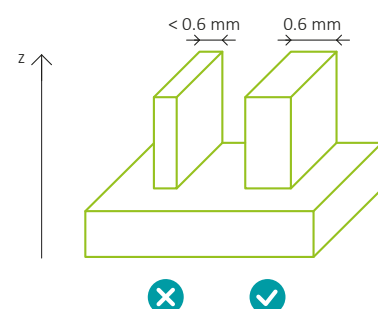
Joints

- Axes of rotation should be oriented in the Z direction and should be solid, so that they won't break when the powder is being removed.
- Cavities must be accessible for powder removal without causing damage to the component.
- The distance between two walls should be at least 0.6 – 0.8 mm.
- For the utmost precision, joints can be constructed as two-part assemblies.



Wall thickness

- The minimum required wall thickness depends on the relations of the entire component.
- For filigree elements: Walls must be at least 0.6 – 0.7 mm thick.
- Whether or not a wall thickness of $< 0.6\text{ mm}$ is realistically producible can be checked in each individual situation.



*Z = direction of layer construction

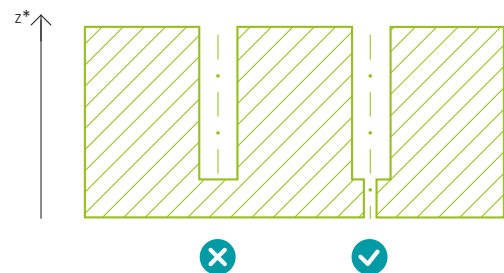
Still have questions on the design of your component?
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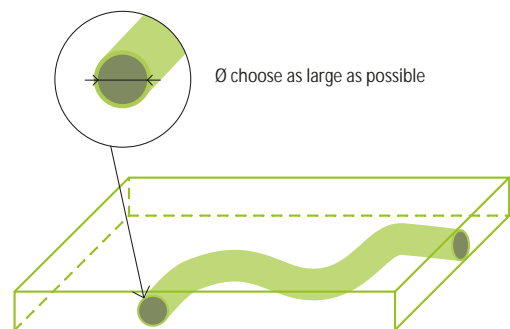
Drilled holes

- ▶ Components can be produced with blind holes, but through holes are more suitable.
- ▶ In order to minimize the stepped layer effect and achieve a high level of precision, cylindrical components and drilled holes should be oriented in the Z direction.
- ▶ The minimum dimensions for drilled holes can be reviewed on a case-by-case basis.



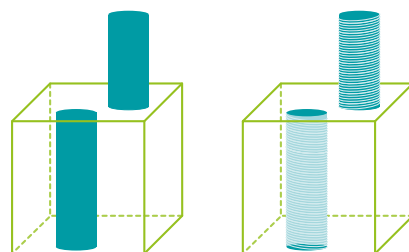
Channels

- ▶ Channels should be easily accessible from both sides to ensure adequate removal of the powder.
- ▶ Note: The longer and more complex a duct is designed, the larger the diameter should be. For very complex ducts, a case-by-case assessment should be conducted with PROTIQ experts.



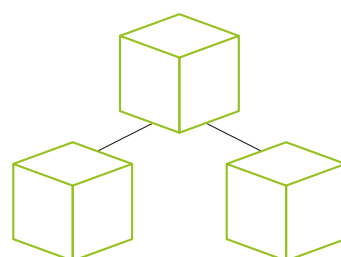
Thread

- ▶ With 3D printing, components are produced directly from CAD data. Since most CAD programs only show threads schematically, these must be created during the design phase.
- ▶ The smallest printable thread size is M6.
- ▶ Threads as small as M2 can be created manually after production is completed. The appropriate core diameter must be created for this.



Related assembly groups

- ▶ For assembly groups with multiple components, the same material should be used on all of them so that the same tolerances and deviations apply to each element.
- ▶ Individual elements should be stored as assembly groups.
- ▶ Enough space should be left between the components being assembled to avoid damage.



*Z = direction of layer construction