Design guide

H13

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ζetamix by NANOE

The printing limits of a H13 part :

- The values given below are found with the "Template H13 – 0.6 Diameter" print profile with a 0,6mm nozzle. By changing some parameters or the size of the nozzle, some features can be improved, but at the expense of others.
- Part shrinkage: Due to post-printing treatments, the dimensions of the final piece will be different from the printed one. It is recommended to create the .stl file with the dimensions of the final piece, then change the scale. The values of oversize factor depend on the batch number you can read on the spool. Please refer to the guidelines to find the correct values for the batch you have.

MAXIMUM PART SIZE

The maximum size of a workpiece is determined by the size of the thermal debinding/sintering furnace chamber.

Thus, a part cannot exceed the following dimensions (after printing)
X = 200mm X=100mm (recommended)
Y=70mm
$Z1$=55mm
$Z2$=70mm

MINIMUM PART SIZE

7mm x 7mm x 7mm

The minimum final dimensions are a cube of 7mm. A smaller piece could have non protruding edges.

Limiting factors are the width and height of the layer. Decreasing the layer height as well as the printing speed can improve the sharpness of the print.

MINIMUM WALL THICKNESS

1mm

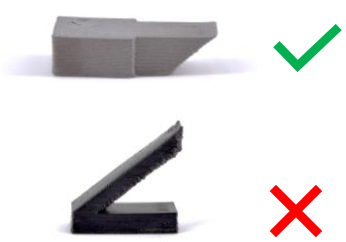
The width of the wall must be proportional to the width of a layer, since such a thin wall does not have an infill.

2 shells (so 4-layer widths) are required, i.e. about 1mm thick. It is possible to print a single shell but considering the fragility of the part this is not recommended.

If the Height/Width ratio > 6, there is a risk of the wall collapsing during the postprocess

MINIMUM UNSUPPORTED OVERHANG

$\theta = 35°$



The angle between the floor and the piece must be at least 35°. If it is not the case or your angle isn't reinforced by your part, supports will be required or else your part will collapse during the postprocess.

MINIMUM PIN DIAMETER

$\emptyset$=3mm

The minimum size of the diameter for a pin is 3mm.

Be careful, if the height is too important compared to the diameter, the piece will be very brittle. It is therefore recommended to reinforce the base.

MINIMUM VERTICAL HOLE SIZE

$\emptyset = 1{,}5mm$

The minimum size of a vertical hole is 1,5mm in diameter. A smaller hole may be closing up.

MINIMUM HORIZONTAL HOLE SIZE

$\emptyset = 1{,}5mm$

The minimum size of a horizontal hole is 1,5mm in diameter. A smaller hole may be closing up.

MINIMUM EMBOSSED FEATURE

In Z :
Width = 1mm
Depth = 0.4mm
In X/Y :
Height = 0.6mm
Height = 0.2mm

This information is especially useful for writing a text on a surface. Printing too small may cause the material to be indistinguishable from the rest of the surface.

MINIMUM DEBOSSED FEATURE

In Z :
Width = 1mm
Depth = 0.4mm
In X/Y :
Height = 0.6mm
Height = 0.2mm

This information is especially useful for writing a text on a surface. Printing too small may cause the material to be indistinguishable from the rest of the surface.

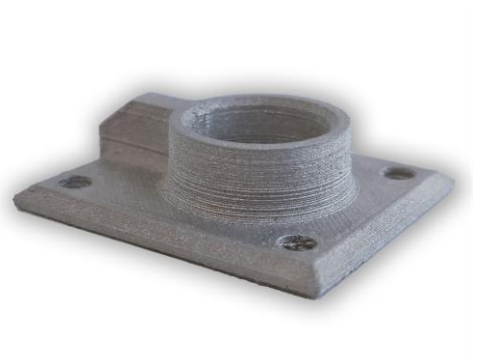
SOME EXAMPLE

Geometry

Small details

Complex parts

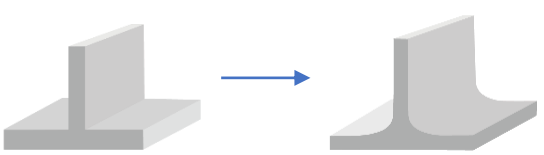
Complex parts



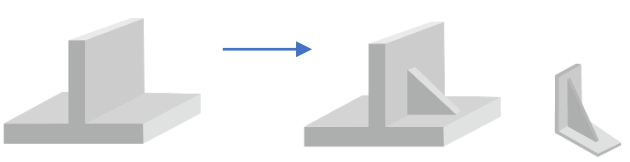
Different constraints related to metals

- **Beware of critical angles in the printing part :**

Make sure that the characteristics of the part match the criteria mentioned above. Furthermore, reinforcing the part at critical points will limit the risk of fracture during the various processes



Avoid abrupt change of size.
Prefer rounded corners to steep angles



Possibility to reinforce thin walls

- **Optimise the contact of the surface with the bed**

The direction in which the piece is printed will have a significant impact. It can:

- Reduce printing time
- Increase surface quality
- Increase mechanical properties (FDM printing of Zetamix is anisotropic due to the orientation of the layers)
- Avoid the presence of support

The presence of a large flat surface can help along with the choice of the side to be printed first.

- **Twisted parts**

Some parts can twist during the postprocess depending on the geometry and the way you printed them.

If your part is indeed twisting, it is necessary to print one layer clockwise and the other one counterclockwise