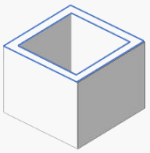
Design guidelines

For PA11, TPU and ALUMIDE parts produced with Selective Laser Sintering

DESIGN FEATURES

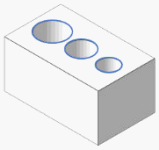


Walls

Recommended wall thickness

Maximum part dimensions	Minimum thickness [mm]*	Optimum thickness [mm]	Maximum thickness [mm]
100 x 100 x 100 mm	1.0	1.5-4.0	6.0
250 x 250 x 250 mm	1.5	2.0-5.0	8.0

** polishing not possible*

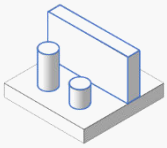


Holes

Recommended hole diameter

Maximum part dimensions	Minimum diameter [mm]	Optimum diameter [mm]	Accuracy* diameter [mm]
100 x 100 x 100 mm	2.5	≥ 3.0	+ 0.10 – 0.40
250 x 250 x 250 mm	3.0	≥ 3.5	+ 0.10 – 0.40

**valid for nominal sizes between 4 and 50 mm*



Feature size

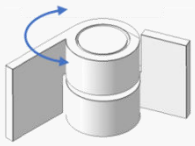
The recommended width of a feature to ensure it will not fail to print[1]

Maximum part dimensions	Minimum width [mm]	Optimum width [mm]	Maximum width [mm]
100 x 100 x 100 mm	1.5	≥ 2.0	n/a
250 x 250 x 250 mm	2.0	≥ 3.0	n/a

Channels

The recommended channel diameter[2]

Maximum part dimensions	Minimum diameter [mm]	Optimum diameter [mm]	Maximum diameter [mm]
100 x 100 x 100 mm	4.0	≥ 4.0	n/a
250 x 250 x 250 mm	5.0	≥ 5.0	n/a

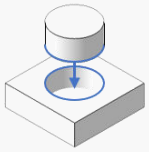


Connecting parts: Moving

The recommended clearance between two moving parts

Maximum part dimensions	Minimum* clearance [mm]	Optimum** clearance [mm]	Maximum clearance [mm]
100 x 100 x 100 mm	0.4	0.6-0.8	n/a
250 x 250 x 250 mm	0.5	0.6-0.8	n/a

** printed separately* *** printed as one*



Connecting parts: Press fit

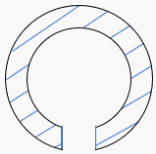
The recommended clearance between two parts to obtain press fit

Maximum part dimensions	Minimum clearance [mm]
100 x 100 x 100 mm	0.2
250 x 250 x 250 mm	0.3

Embossed or engraved details or text

The recommended dimensions for features raised or recessed below the model surface

Maximum part dimensions	Minimum feature width/height [mm]	Optimum feature width/height [mm]	Minimum font height [mm]
100 x 100 x 100 mm	0.5	1.0	5.0
250 x 250 x 250 mm	0.5	1.0	5.0



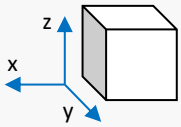
Escape holes

The recommended hole diameter to ensure powder free hollow parts

Maximum part dimensions	Minimum diameter [mm]	Minimum amount of escape holes
100 x 100 x 100 mm	8.0	2
250 x 250 x 250 mm	8.0	2

1 - Maximum feature height to width ratio of 5:1
2 - Maximum channel length = 100 mm

PART QUALITY

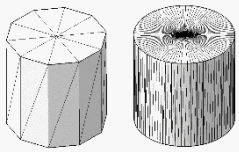


Tolerances

Valid for nominal sizes between 10 and 250 mm

Max. part dimensions	Linear dimensions XY [mm]	Dimensions Z [mm]
100 x 100 x 100 mm	IT12 [ISO 286-1] or ±0.3% of the longest diagonal	+ 0.5% – 0.3%
250 x 250 x 250 mm	IT12 [ISO 286-1] or ±0.4% of the longest diagonal	+ 0.6% – 0.3%

** with a minimum of ±0.30 mm*



Required data format

Oceanz printing technology uses .STL format, all files are converted to this format

STL conversion	Surface deviation [mm]	Angle tolerance [°]
Export settings	0.01	10-20

This guide covers specific details and design rules how to avoid unintended failures when designing for SLS. To avoid print failure, values for each specification must stay within the minimum-maximum range. To guarantee our manufacturing tolerances, your design should meet the optimum values for each specification. Please note that due to the layer by layer production process and the specific design of each individual product values may differ.

If your design contains specific details or features not mentioned in our design rules, or your design exceeds the maximum part dimensions, please contact us, so we can advise you how to obtain required part quality.

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Revision date: 01/05/2022

Tolerance grades

ISO 286-1:2010

Table 1 – Values of standard tolerance grades for nominal sizes up to 800 mm, extracted from ISO standard ISO 286-1:2010.

Nominal size (mm)		IT12[1][3] Standard tolerance values [mm]	IT13[1][3] Standard tolerance values [mm]
Above	Up to and including		
-	3	n/a	n/a
3	6	0.12[2]	0.18[2]
6	10	0.15[2]	0.22[2]
10	18	0.18	0.27
18	30	0.21	0.33
30	50	0.25	0.39
50	80	0.30	0.46
80	120	0.35	0.54
120	180	0.40	0.63
180	250	0.46	0.72
250	315	0.52	0.81
315	400	0.57	0.89
400	500	0.63	0.97
500	630	0.70	1.10
630	800	0.80	1.25

[1] To guarantee IT12 tolerances values, your design should meet the optimum values of the Oceanz design guidelines. For parts that do not meet these values or are larger than 250x250x250 mm IT13 tolerance values can be expected.

[2] For nominal values between 3 and 10 mm, tolerance values of line 10-18 mm are valid

[3] Tolerance values in z-direction may slightly differ due to z-growth (technology dependent)

This classification can be compared with ISO 2768-1:1990 for linear dimensions. For parts up to 250x250x250 mm classification '*m*' will be valid for linear dimensions of 6 mm and larger. For bigger parts tolerance class '*c*' will apply.

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