

3D PRINTING GUIDELINES AND REQUIREMENTS

Not all processes are equal, and each design is unique in its own way. Because of this, we have put together some guidelines to help produce the best quality parts for you.

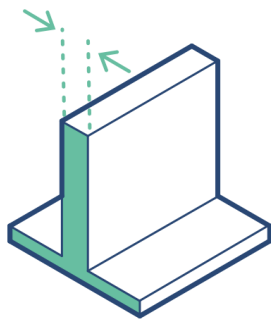
Although these guidelines are based on average geometries, they will be a great starting point to follow when producing your designs for us to print. Always consider your particular application and geometry.

The IPFL team are always on hand to speak to if you would like some further guidance on your design.

Guidelines are generalised and are much geometry dependant.

Results and requirements can vary between technologies and materials.

Whilst we take every care to check your parts for below features, potential failing features sometimes make it past. Please check your data against the notes below and let us know if a further discussion is required.



01

MINIMUM WALL THICKNESS

Technology	Size
HP MJF	0.8 mm
FDM	1 mm
Polyjet	0.6 - 1.0 mm
SLA	0.6 mm

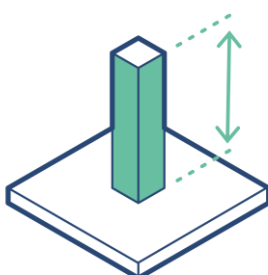
Please double check tapered edges and pointed features. (HP MJF over 14mm thickness is required to be honeycombed to maintain surface quality)



02

ENGRAVED/EMBOSSSED DETAILS

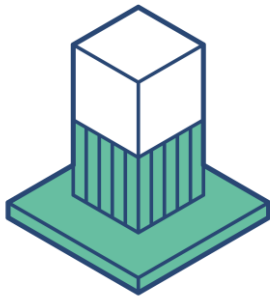
Technology	Size
HP MJF	0.6 mm
FDM	0.8 mm
Polyjet	0.6 mm
SLA	0.3 mm
Micro	0.1 mm



03

UNSUPPORTED WALLS, PINS, RODS

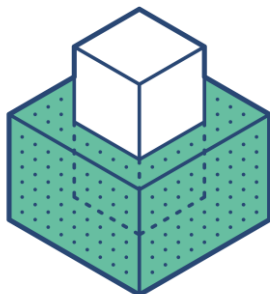
Thin and high aspect ratio features have a higher likeliness to break during clean-up. Please consider size and geometry for your chosen material and technology.



04

FDM
SUPPORT
REMOVAL

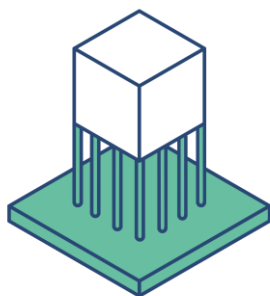
Whilst some materials have soluble support structures, this is not the case for all. Access is required to removal rigid supporting structures much like SLA. Parts will have witness marks from rigid support structures. The required level which these are smoothed down will be discussed at quote stage. Please identify the level of finishing required.



05

HP MJF
SUPPORT
REMOVAL

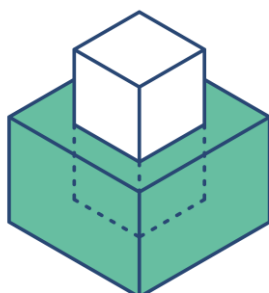
No support structures are needed for HP MJF; however, we do need access to blast away loose material powder. Avoid hollow features or cavities with limited access.



06

SLA
SUPPORT
REMOVAL

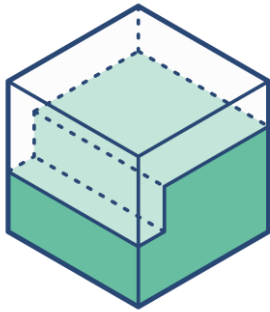
SLA parts will have small pip marks from rigid support structures. The required level which these are smoothed down should be discussed at quote stage. Access is also required to break away and finish these support structures. Please identify the level of finishing required.



07

POLYJET
SUPPORT
REMOVAL

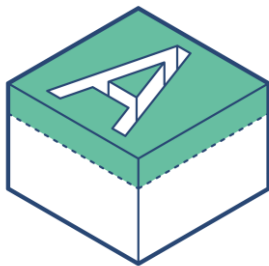
Access is required for support material to be removed by jet wash post-print. If access is limited in cavities and hollow features, we will always try our best to notify you and remove as much as possible, but this cannot be guaranteed.



08

POLYJET
GLOSSY TOP

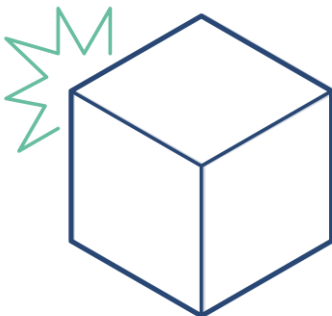
Polyjet parts can be printed with glossy upward facing surfaces. This can improve clarity. The geometry must be considered for this as a transitional witness can be seen from glossy to matte finishes at 90 degrees.



09

ADDITIONAL
FINISHING
TOLERANCE
CHANGES

Consider accounting for your required finishing processes ahead of production by adding or reducing dimensions. Painting, sanding, smoothing or coatings will make slight adjustments to part dimensions.



10

POLISHING
ACCESS

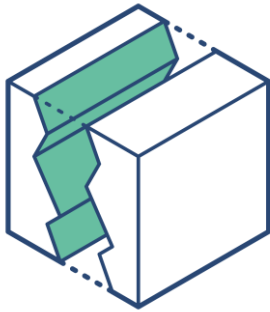
Clear materials, or high-resolution surface finishes, that require polishing need to be assessed by our team for polishing access and viability. Access is required for both sanding and buff polishing..



11

CONNECTING,
ASSEMBLY,
MOVING PARTS

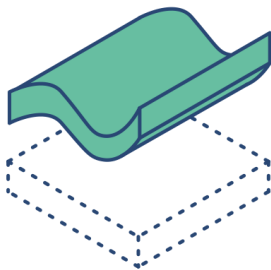
Minimum clearance of 0.4mm is required but it would be sensible to allow for more whilst considering your geometry and application.



12

LARGE, SPLIT PARTS AND BONDING

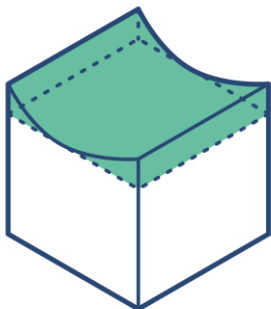
If parts are too large for a single print, we may need to digitally split them and bond them together post-print. We will always let you know when this is required and discuss the level of bonding you require for your application.



13

WARPAGE

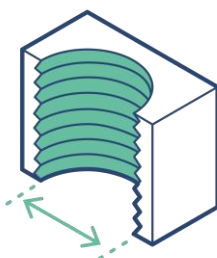
Parts with high aspect ratios (long & thin parts) are more likely to warp but every effort will be made to orientate parts to reduce this. This is inherent to additive manufacturing across all technologies.



14

HP MJF CAPILLARITY EFFECT

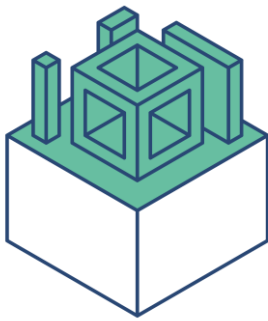
Surfaces orientated upwards on the HP MJF technology are subject to a capillarity effect much like surface tension of a glass of water. To avoid this, add chamfers, radii, or specify your 'B' surface to us when being quoted. Parts are always orientated to reduce this effect as much as possible.



15

THREADS

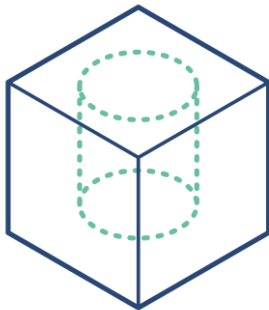
Threads M8 and above can usually be printed. Below M8 we suggest either a cut thread post-print or a threaded brass insert. Inserts must have sufficient space to be accommodated. Please request our Threaded Inserts guidance document. Micro 3D printing threads can be much smaller. Please request discussion. For threaded inserts please see hole guidelines: Please request to see our Tappex insert guidelines or see: <https://www.tappex.co.uk/products/brass-threaded-inserts/multisert>



15

SMALL,
INTRICATE
FEATURES

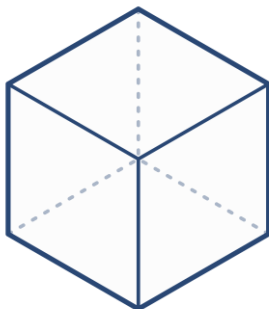
Features which do not meet minimum wall thickness guidelines and engraving/embossing guidelines will potentially lack clarity or fail to form. Please refer to guidelines above, consider your technology/material options or get in touch with the team.



16

HOLLOW
PARTS,
BOWLS AND
CAVITIES

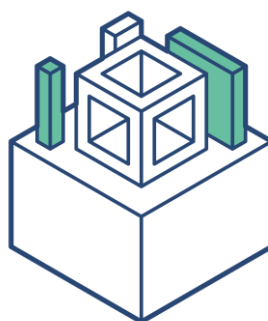
Both closed and open volumes have the potential to encase support material, trap resin, cause warpage or weakness or even cause parts to fail. This is also to be considered for small holes and channels. Please allow access/escape holes for resin and support material.



17

CLEAR
CLARITY

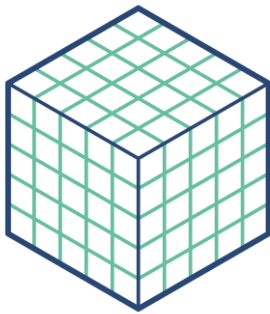
Resin based materials which are branded 'clear' tend to be more translucent or frosted. For optical results or optimal clarity please discuss glossy tops, polishing and lacquering options with the IPFL team.



18

KEY FEATURES

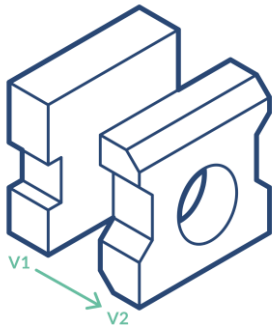
Please make the IPFL team aware of key features or surfaces on your parts. We can accommodate special treatment and orientations for best results on accuracy and surface finishes



19

DATA FILE QUALITY

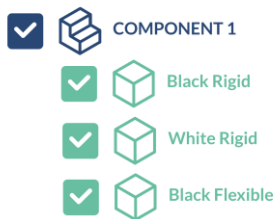
STEP/STP files are ideal. If using STL, please ensure the resolution deviation is at least 0.37mm and the resolution angle is 2.3°



20

DATA ITERATIONS/ VERSIONS/ UPDATES

Where possible, please notify us if the data is likely to be updated before an order is placed. Please amend files names (eg. V01, V02...) and request acknowledgement from the team.



21

ASSEMBLY/ MULTI-MATERIAL PARTS

Supplying multi-component STEP files along with a detail drawing is best practice for assemblies. Naming assembly components is also very helpful for our team to identify your material allocations.



22

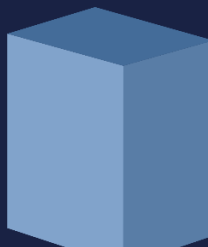
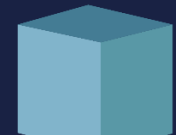
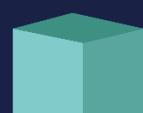
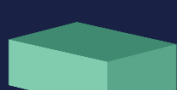


























SPECIAL APPLICATION REQUIREMENTS

Please inform us if your part has a special requirement for:

- Heat
- Flame retardancy
- Specific material
- Ductility
- Surface finish
- Accuracy
- Strength or performance features

The IPFL team will be able to make recommendations to best accommodate your requirements

TECHNOLOGIES COMPARISON

FDM Fused Deposition Modelling	SLA Resin based printing	MJF Powder based printing	POLYJET Multi material printing	MICRO DLP Micro resin based printing
				
Build Volume: 914 x 610 x 914 mm	Build Volume: 450 x 450 x 400 mm	Build Volume: 380 x 284.5 x 380 mm	Build Volume: 400 x 500 x 200 mm	Build Volume: 94 x 52 x 45 mm
				
Layer Height: 127 - 330 mm	Layer Height: 50 - 100 µm	Layer Height: 80 µm	Layer Height: 16 - 30 µm	Layer Height: 10 - 40 µm
				
Resolution: 200 µm	Resolution: 80 µm	Resolution: 120 µm	Resolution: 43 µm	Resolution: 10 µm
				
Tolerances: ± 0.2%	Tolerances: ± 0.1%	Tolerances: ± 0.3%	Tolerances: ± 0.1%	Tolerances: ± 0.05%
				
Minimum Feature Size: 1 mm	Minimum Feature Size: 0.6 mm	Minimum Feature Size: 0.8 mm	Minimum Feature Size: 0.6 - 1 mm	Minimum Feature Size: 0.05 mm
				
Materials: Rigid	Materials: Rigid	Materials: Rigid & Flexible	Materials: Rigid & Flexible	Materials: Rigid