

# 3D PRINTING TECHNOLOGIES, MATERIALS & APPLICATIONS FOR POLYMERS



## SLS

Selective Laser Sintering

## SAF™

Selection Absorption Fusion

## MJF

Multi Jet Fusion

## FDR

Fine Detail Resolution

## SLA

Stereolithography

## FDM

Fused Deposition Modelling

## PolyJet™

Material Jetting

SLS, SAF™, MJF and FDR are all part of the powder bed fusion technology branch within industrial 3D printing. This branch of technologies has high dimensional accuracy, is used for various applications, and can supplement traditional manufacturing technologies in small- to mid-sized serial production

### Technology Application

FDR is also a powder bed fusion technology based on SLS. However, FDR excels at very small parts with very fine details

SLA has one of the best dimensional accuracies within 3DP technologies, but due to its chemical properties, its longevity is lower, which is why SLA is mainly used for prototypes and models

FDM has lower dimensional accuracy but offers a vast selection of materials. It is used for prototypes, models, or niche production with specific material property requirements

PolyJet™ has exceptionally high dimensional accuracy and can combine 500,000 different colors and varying hardnesses in the same print, making it ideal for prototypes and models

### Material Selection

PA 2200  
PA 3200 GF  
PA 2210 FR  
PA 2241 FR  
PA 603-CF  
PA 640-GSL  
PA 12 Alu  
TPU (59A & 88A)

Polypropylene (PP)

PA 11  
PA 12  
PA 12 White  
PA 12 GB

PA 1101

Accura ClearVue  
Accura Extreme  
Accura 25  
Accura HPC  
Somos® WaterClear Ultra

Ultem (9085 & 1010)  
Polycarbonate (PC)  
PC/ABS & PC-ISO  
ABS (ESD7, M30 & M30i)  
ASA  
SR-30  
PEKK & PEKK-ESD  
PA 12 CF  
Polypropylene (PP)  
& other engineering materials

Digital Materials

Manufacturing via ultraviolet laser from nylon (PA) or thermoplastic polyurethane (TPU) powder

Manufacturing via infrared light from polypropylene powder

Manufacturing via infrared light from nylon powder

Manufacturing via infrared laser from biobased nylon powder

Manufacturing via ultraviolet laser from epoxy resin

Manufacturing via extrusion from a polymer thread

Manufacturing via ultraviolet laser from acrylic based fluid

### Maximum Build Sizes

700 x 380 x 580 mm

315 x 208 x 293 mm

380 x 284 x 380 mm

200 x 250 x 125 mm

1500 x 750 x 550 mm

900 x 600 x 900 mm

490 x 390 x 200 mm

### Post-processing Offerings

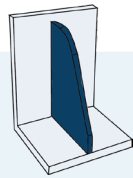
Blasting, assembly, sanding, vapour smoothing (max 385 x 585 x 385 mm), coating, coloring, lacquering, painting, metal plating, threaded/non-threaded inserts & vibration grinding

Blasting, vapour smoothing (max 385 x 585 x 385 mm) & coloring

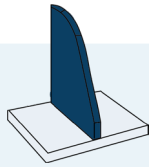
Assembly, support removal, sanding, coating, lacquering, painting, metal plating, threaded/non-threaded inserts

Support removal, sanding & threaded/non-threaded inserts

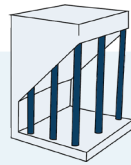
# 3D PRINTING GUIDELINES FOR EVERY POLYMER TECHNOLOGY



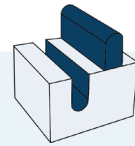
**Supported Walls**



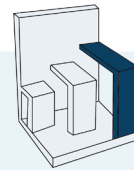
**Unsupported Walls**



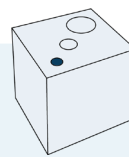
**Support & Overhangs**



**Embossed & Engraved Details**



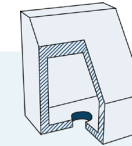
**Horizontal Bridges**



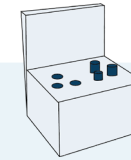
**Holes**



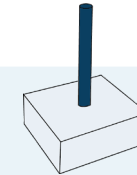
**Connecting & Moving Parts**



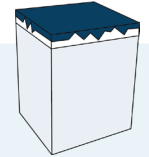
**Escape Holes**



**Minimum Features**



**Pin Diameter**



**Tolerance**

	Supported Walls	Unsupported Walls	Support & Overhangs	Embossed & Engraved Details	Horizontal Bridges	Holes	Connecting & Moving Parts	Escape Holes	Minimum Features	Pin Diameter	Tolerance
<b>SLS</b>	P1XX 0.6 mm P3XX 0.8 mm P5XX 0.6 mm P7XX 0.8 mm	1 mm	N/A	1 mm width & height	N/A	> Ø1.5 mm depending on thickness	>0.3 mm for moving parts; > 0.1 mm for connection assemblies; > 0.5 mm radial	> 12 mm multiple holes are preferred	P1XX 0.5 mm P3XX 0.6 mm P5XX 0.5 mm P7XX 0.6 mm	> 1 mm diameter < 15 mm height	Minimum ± 0.2 mm & ± 0.25% of dimension
<b>MJF</b>	0.5 mm	1 mm	N/A	0.4 mm width & height	N/A	> Ø0.8 mm depending on thickness	>0.3 mm for moving parts; > 0.3 mm for connection assemblies; > 0.3 mm radial	> 6 mm multiple holes are preferred	0.5 mm	> 1 mm diameter < 15 mm height	Minimum ± 0.2 mm & ± 0.25% of dimension
<b>SAF™</b>	0.8 mm	1 mm	N/A	1 mm width & height	N/A	> Ø1.5 mm depending on thickness	>0.3 mm for moving parts; > 0.1 mm for connection assemblies; > 0.5 mm radial	> 12 mm multiple holes are preferred	2 mm	> 2 mm diameter < 15 mm height	Minimum ±0.2 mm & ±0.25% of dimension
<b>FDR</b>	0.2 mm	0.4 mm	N/A	0.4 mm width & height	N/A	> Ø0.6 mm depending on thickness	>0.3 mm for moving parts; > 0.1 mm for connection assemblies; > 0.5 mm radial	> 6 mm multiple holes are preferred	0.25 mm	> 0.5 mm diameter < 15 mm height	1-3 mm ± 0.08 mm; > 3-6 mm ± 0.11 mm; > 6-10 mm: ± 0.14 mm; >10-18 mm: ± 0.17 mm; >18-30 mm: ± 0.20 mm; >30-50 mm: ± 0.23 mm
<b>SLA</b>	HR 0.25 mm NR 0.5 mm	HR 0.5 mm NR 1 mm	Support ≤ 30°	0.4 mm width & height	N/A	> Ø0.5 mm depending on thickness	> 0.1 mm for moving parts; > 0.1 mm for connections	> 3 mm multiple holes are preferred	0.25 mm	> 0.5 mm diameter < 15 mm height	Minimum ± 0.1 mm & ± 0.15% of dimension
<b>PolyJet™</b>	0.8 mm	1 mm	Support always required	0.5 mm width & height	N/A	> Ø0.5 mm	>0.2 mm for moving parts; >0.1 mm for connection assemblies; >0.8 mm for radial	> 20 mm multiple holes are preferred	0.5 mm	> 1 mm diameter < 15 mm height	Minimum ± 0.2 mm & ± 0.25% of dimension
<b>FDM</b>	0.8 mm	1 mm	Support ≤ 45°	0.6 mm width & height	10 mm	> Ø2 mm	> 0.5 mm	> 20 mm	2 mm	> 3 mm diameter < 15 mm height	Minimum ± 0.2 mm & ± 0.25% of dimension

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\*The guide above is designed for a trouble free 3D printing experience, smaller tolerances and smaller details are possible, but will have to be verified for every geometry. The guide is intended for parts with uniform wall thickness throughout the entire model, variation in wall thickness is equal to wall thickness x 0.7 (e.g. 2 mm x 0.7 = 1.4 mm growing wall this also minimize warping). Recommended font size for embossed and engraved text is Arial Black. Use bold and font size minimum of 12 (details smaller than the recommended size can disappear). Best result is in the planar region in the z-direction. Preferred file format is .STL.