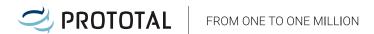
3D PRINTING TECHNOLOGIES, MATERIALS & APPLICATIONS FOR POLYMERS





SLS	SLS SAF™ MJF		FDR SLA		FDM	PolyJet™		
Selective Laser Sintering	stering Selection Absorption Fusion Multi Jet Fusion		Fine Detail Resolution	Stereolithography	Fused Deposition Modelling	Material Jetting		
Technology Application								
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.			FDR is also a powder bed fusion technology based on SLS. However, FDR excells 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)	PA 11 PA 12 POlypropylene (PP) 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 Details								
Manufacturing via ultraviolet laser from nylon (PA) or thermoplastic polyuretane (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			



Prototal is Europe's largest service provider of additive manufacturing, vacuum casting, and injection molding, including tools. With more than 5,000 customers, 400 employees, 263 machines, and 123 industrial 3D printers, we have a presence in seven countries across Europe. We are your trusted partner in manufacturing, offering an advanced digital distributed manufacturing network combined with highly regarded experts in the field. Prototal is an EOS End-to-End Production Partner and an HP Digital Manufacturing Partner. To request a quote from our Swedish facilities, contact us at 3dp@prototal.se, give us a call at +46(0)36-38 72 00, or visit www.prototal.se.

3D PRINTING GUIDELINES FOR EVERY POLYMER TECHNOLOGY











Overhangs

















Walla	Supported
waiis	Walls

Unsupported Walls

Support &

Embossed & Engraved Details

Horizontal **Bridges**

Holes

Connecting & Moving **Parts**

Escape Holes

Minimum **Features**

Pin Diameter

Tal	ora	nce
10	ei a	HUCE

				Details			i ui to				
SLS	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 ± 0.3 mm & ± 0.25% of dimension
MJF	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 ± 0.3 mm & ± 0.25% of dimension
SAF™	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 ±0.3 mm & ±0.25% of dimension
FDR	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
SLA	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
PolyJet™	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
FDM	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



^{*} The guide above is designed to ensure a trouble-free 3D printing experience. Smaller tolerances and finer details are possible but must be verified for each geometry. This guide is intended for parts with uniform wall thickness throughout the entire model. Variations in wall thickness should be equal to wall thickness \times 0.7 (e.g., 2 mm \times 0.7 = 1.4 mm), which helps minimize warping. The recommended font for embossed and engraved text is Arial Black. Use bold and a minimum font size of 12, as details smaller than the recommended size may disappear. The best results are achieved in the planar region along the Z-direction. The preferred file format is .STL.