Please note this is what we offer across Prototal Industries. For local materials, please go to our "Materials" section on the site.

3D PRINTING TECHNOLOGIES, MATERIALS & APPLICATIONS FOR **POLYMERS**

	SLS	SAF™	MJF	FDR	SLA	FDM	PolyJet™
	Selective Laser Sintering	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 1101 (FDR only) PA 12 for Food Contact PA 12 Aluminium (Alumide) TPU 59A & 88A	PA 11 Polypropylene (PP)	PA 11 PA 12 PA 12 White PA 12 Glass Filled	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 PA6-CF PEEK & PEEK-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 ultraviolet laser from 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	

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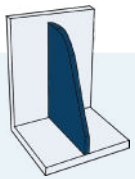
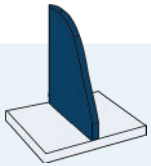
Prototal is Europes biggest service provider of additive manfacturing, vacuum casting & injection moulding incl. tools, with more than 5.000 customers, 400 employees, 263 machines, 123 industrial 3D printers & with a presence in 7 countries across Europe. We are your trusted partner in manufacturing with an advanced digital distributed manufacturing network combined with highly regarded experts from the fields of manufacturing. Prototal is an EOS End-to-End Production Partner and HP Digital Manufacturing Partner. Request quote from our UK site via **info@prototaluk.com** or give us a call at +44 01635 635855 or visit www.prototaluk.com

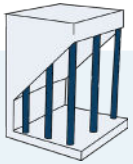
3D PRINTING GUIDELINES FOR EVERY POLYMER TECHNOLOGY



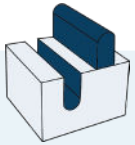
Supported Walls



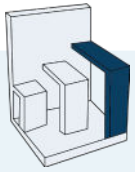
Unsupported Walls



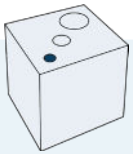
Support & Overhangs



Embossed & Engraved Details

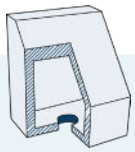


Horizontal Bridges

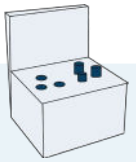


Holes

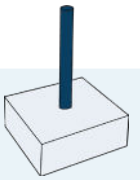
Connecting & Moving Parts



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
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 / ± 0.3% over 100mm
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 ± 0.2 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 ±0.2 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

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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.