

Decisionmatrix

	SLS	SLA	FDM	VAC	CNC	RT /FIM
Online Calculator	Yes	Yes	Yes	No	No	No
Technique	Selective laser sintering	Stereolithography	Fused deposit modelling	Vacuum casting	CNC machining	Injection moulding from Rapid Tool (RT) or soluble mould (FIM)
Process	Melting of thermoplastic in powder form with a CO2 or fibre laser with a nitrogen atmosphere	Hardening of photosensitive resin using a 385nm UV laser projection	Extruding of thermoplastics layer-by-layer	Casting of thermoset PU under vacuum in a flexible silicon mould which is made using 3D printing	Computer-controlled machining of plastics and metals based on a 3D model	Plastic injection moulding into a aluminium or steel mould. FIM (free-form injection moulding) in a water soluble mould.
Materials	PA12 (nylon) PA12/GF (glass-filled Nylon)	ABS-like (GPPlus) PBT-like (G8228) Semi-transparent (Watershed)	PC-ABS blend (black/white) ABS-CF10 (carbon filled ABS 10%)	ABS-like PU PP/HDPE-like PU (2K) POM-like PU PC/PMMA-like PU PA-GF like PU Rubber like PU (40-90A)	All general purpose plastics (HDPE, ABS, POM, PA ,PC ,PMMA etc) All engineering plastics (Noryl, PA/GF30, PSU, PES, PPS, PVDF, PTFE/Teflon, PEEK etc) Metals: Aluminium, stainless steel, brass etc	Generally suitable for every injectable thermoplastic and rubber
Machine	EOS P100/P110	UnionTech RSpro 600/800	Stratasys F370	RTV tooling (various)	HAAS 3/4/5 axis	Arburg 221K/370C
Standard layer thickness	0,1mm	0,08mm	0,25mm	-	-	-
Build volume	Max. 440x440x440mm	Max. 800x800x500mm	Max. 350x250x350mm	Max. 2200x800x800mm	Max. 2300x1500x1500mm	Max. 250cm3 shot volume
Ideal wall thickness	0,8-1.2mm	0.8-20mm	from 0.8mm	0.8-8mm	from 1mm	1,0 - 5mm
Minimal detail	0.4mm	0,3mm	0,8mm	0,3mm	0,3mm	0,3mm
General tolerance	ISO2768-M (min +/- 0.2mm)	ISO2768-M (min +/- 0.15mm)	ISO2768-M (min +/- 0.15mm)	ISO2768-M (min +/- 0.2mm)	ISO2768-F (min +/- 0.1mm)	ISO2768-F (min +/- 0.15mm)
Surface / finish	Product can be drilled, sanded and tapped. Inserts can be molten in. Surface is lightly structured, can be improved by tumbling or vapour polishing. Colour impreg.: Material is white and can be dyed in various colours. Nano impreg.: Material is white, watertight.	Smooth surface Optional coating in RAL/PMS colour, additionally with VDI texture. Exposition quality finish Assemblies/inserts/scale model Practically every finish possible as desired	Visible extrusion surface. Parts can be drilled, tapped or welded. Good glueability with solvent glue.	Technical smooth surface. Casted in colour (appr. RAL) Optional coating in RAL/PMS colour, additionally with VDI texture. Optional EMC shielding UV protection assemblies/inserts	Technical smooth surface Optional coating in RAL/PMS colour, additionally with VDI texture. UV protection Assemblies/inserts Anodised/chemically blackened Powder coating	Technical smooth surface Inserts/overmoulding possible Surface texture coloured in mass
Typical Series	1-1000	1-20	1-20	1-150	1-50	1-10(FIM)/500-5000 (RT)
Description	Strong functional parts, even with a thin wall thickness. Suitable for prolonged strain and snap connections. Watertight under pressure when using nanoimpreg. or vapour smoothening. Good chemical resistance.	Affordable products, especially for large sizes. (crates, (bike) frames, bodywork) Products from small to very large with a smooth surface achievable with almost any finish. Due to ABS-like mechanical properties parts are easy to handle and use.	A technique with a very short lead time. Strong and stiff material with the option to produce solid parts with a honeycomb structure inside. ABS-CF10 is a good metal replacement for brackets and machine parts.	Injection mould-like parts with very low mould cost. Rubbers from 40 to 90A, transparent materials, UL94-V0, heat-resistant, 2k-hard/soft combinations etc. Visual parts are typically coated as per preference.	CNC machining produces very accurate parts for prototypes or machine building. Most material is in stock, therefore fast turnaround time.	Injection mould parts out of a rapidtool or water-soluble mould using FIM technology Can produce products which can typically not be moulded due to geometric restrictions.
Points of attention	Material turns yellow under UV light. Impregnated colours are moderately waterproof. SLS parts are prone to shrinkage, therefore thick parts are not suitable for this technique (1cm+)	Parts age under UV light. Coating the material slows/prevents this from happening. Material is more brittle than ABS thermoplastic (injection moulding)	Parts are not isotropically strong. Due to support structures not all forms are possible.	Vacuum casting is a pressureless technique in silicone moulds. Max wall thickness up to 7-8mm everything above may give shrinkage and warping.	Sharp corners and edges may have milling radiuses. Products are made out of full material, therefore surface tooling lines are visible.	Products up to 200cm3 are possible in an RT mould. Lifetime of mould depends on complexity of the parts. May be max. 3 years not used. FIM works with a soluble mould using a 3D printing technique
Typical products	Brackets, clips, clamps, covers, grippers, canisters,	Covers, crates, trays, casings, (bike)frames, show models, scale model	Concept models, brackets, jigs & fixtures, hollow products, profiles.	Electronic casings, covers, display bezels, construction parts, brackets, lens parts, seals etc	Machine parts, suitable for XXL prototype parts: crates, pallets, bumpers, cars	RT: Typically used for brackets, casings, and other components. FIM: Typically used for more complex parts, e.g. seals and turbines Also used for prototypes made from specialized plastics (e.g. fibre orientation)
Leadtime	2-4 workdays	5-6 workdays	2-3 workdays	2 weeks	1,5 - 2 weeks	3-4 weeks (RT) FIM in consultation

SLS
SLA

FDM
CNC Frezen

Vacuumgieten
Sheet metal

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