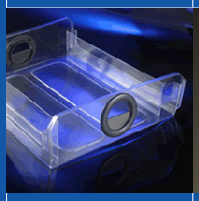
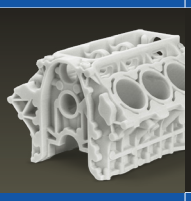
THE TECHNOLOGY HOUSE

Standard Plastic Additive Processes and Best Uses

Processes & Best Uses	Stereolithography (SLA)	Laser Sintering (SLS)	Fuse Deposition Modeling (FDM)	Polyjet/ Objet	CLIP Digital Light Synthesis (DLS)	HP Multi Jet Fusion (MJF)
						
	SLA builds a 3D model of a component using a vat of liquid ultraviolet-curable photopolymer resin and an ultraviolet laser to form one thin layer at a time.	SLS builds parts using a high power laser to fuse small particles of powdered material into a desired three-dimensional shape.	FDM is an additive manufacturing technique, also known as direct digital manufacturing (DDM) or 3D printing, that builds parts by depositing production-grade thermoplastic material layer by layer.	PolyJet or Objet 3D printers work like an inkjet printer. Instead of jetting drops of ink, the printer jets drops of photopolymer that solidify when exposed to UV light. These layers accumulate on the build tray until the part is complete.	DLS process using CLIP technology works by projecting UV images, generated by a digital light projector, through an oxygen-permeable window into a reservoir of UV curable resin. The UV images when projected are solidified as the build platform rises.	MJF is a powder-based technology but does not use lasers. The powder bed is heated uniformly at the outset. A fusing agent is jetted where particles need to be selectively molten, and a detailing agent is jetted around the contours to improve part resolution.
Fit Checks With rapid prototyping, engineers need to know if their design fits when assembled and functions as needed.	■	■	■	■	■	■
Testing Additive processes that require testing for tougher materials and materials that are closer to production grade.		■	■		■	■
Patterns Master patterns are commonly used to create tools for both metal and plastic parts. 3D printed master patterns are used for plastic urethane castings and plastic vacuum castings and in metal for plaster castings, sand castings, and quickcast investment castings.	■		■		■	
Rapid Tools 3D printed molds or Rapid Tooling allow you to design and print a mold that you can use to injection mold 10-25 parts for testing with the actual production materials.	■			■	■	
Fixtures 3D printing has the ability to make fast and complex fixtures to aid in production, and are most commonly used for assembly, quality and CNC machine tooling.			■		■	
High Surface Finish Each 3D printing technology has a different finish because of the process and material. Some are rougher, but some have a nice smooth finish that is easier to finish, paint and mimic a molded part finish.	■			■	■	
Accuracy When fit and function is critical for your design checks, the accuracy of the printed part becomes extremely important.	■			■	■	

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	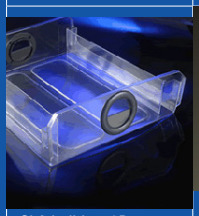	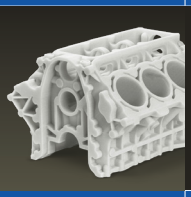	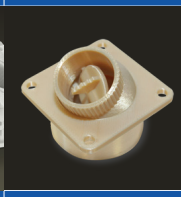			
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Durability When doing field tests or functional tests, you want a part that is going to hold up in tough environments.		■	■		■	■
Production Though each process can be used for end use production, there are more commonly used processes for making a functional end use production part.		■	■		■	■
Marketing Create samples to showcase at a tradeshow or to use as examples for your sales team. This process offers the best finish and can mimic the actual production part.	■			■	■	
Heat-Resistant Parts that need to hold up to extreme heats need specific heat resistant materials. These processes offer the best solutions for high heat applications.	■	■	■	■	■	■
Moisture-Resistant Parts that will be exposed to liquids for flow or underwater analysis need materials that work well in these conditions. Here are the best processes to reduce leaking and do not absorb.	■	■			■	

Headquarters: 10036 Aurora-Hudson Road, Streetsboro, OH 44241 • **Machining Facility**: 30555 Solon Industrial Parkway, Solon, Ohio 44139
Telephone: (440) 248-3025 • FAX: (440) 248-3882 • Email: sales@tth.com (Sales Dept.) • purchasing@tth.com (Purchasing Dept.) • info@tth.com (General Information)

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	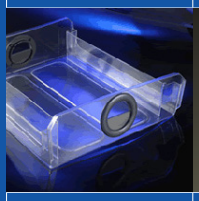	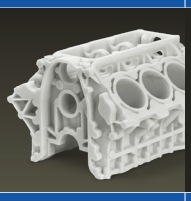	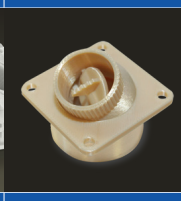			
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Clear Transparent materials are available. Parts can be finished and painted to be clear or see-through.	■			■		
UL 94-Rated Underwriters Laboratories (UL) has a rating for a quality mark for safety. UL 94 is the standard for safety of flammability of plastic materials for devices and appliances. Most medical, aerospace and electronic devices require materials to have a rating of HB, V-2, V-1 or V-0.		■	■		■	
Bio-Compatible These plastics and materials are not harmful to living tissue. There are different ratings depending on the product and industry.	■	■	■		■	
Overmold Parts made in this process use both a rigid and a soft durometer part. These parts mimic grips on handles for consumer goods, like kitchen utensils or bike grips.				■	■	
Color Printing Parts can be printed in vibrant colors. Parts are used for medical modeling, art and marketing samples for all industries.			■	■	■	■

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