GETTING TO KNOW WHAT RAPID MEANS TO YOU!

Success in today's competitive marketplace demands quicker, faster, speedier evolution of product ideas. Accompany this with cost efficiency, accuracy, minimal space requirements and simplicity of operation of key component steps and you have just defined what the rapid prototyping industry is accomplishing at a remarkable pace. Still early in its evolution, boundaries are falling and footprints shrinking. Life will never be the same.

Close your eyes and fast forward into the not too distant future. You have just completed a three dimensional design on your office or home computer. You're thinking about obtaining intellectual property but first have to prove your idea does what you expect it to do, hoping it performs even better! No one else has knowledge of what you have created.

Your finger reaches over to the mouse and clicks on the print command. Time to take a well-earned break. Your printer begins its journey similar to its earlier relative, the ink jet printer. The printer roller passes back and forth dispensing new "ink-like materials" and binders, layer upon layer upon layer. Minutes pass then hours but before you call it a day, your printer has given birth to your baby - a 3-D working prototype of your own creation! You analyze it hoping for perfection but knowing it is critical to be realistic.

The first prototype turns out to be very close to everything you envisioned but some tweaking on the computer image . . . there now . . . should achieve perfection. The printer gets to work while you call it a day. Expectation of tomorrow's miracle provides fuel for tonight's dreams of success.

Is it fantasy or reality? Take a look at what is becoming an everyday occurrence and what expectations accompany the term rapid! The future IS HERE and improving . . . hummm. . . RAPIDLY!

Rapid prototyping technologies are evolving at a fast pace. Here is information on what is available today. This is a very progressive field with new equipment and materials currently pushing faster processing, increasing accuracy and quality, simultaneous printing of more than one material, and the capability to range in size from micro to macro prototypes.

SLA (steriolithography) also referred to as 3-D printing is the first and most popular of the rapid prototyping technologies. A liquid resin polymer sensitive to UV light is applied in layers. Application of UV light then cures and solidifies the piece. These are among the most economical to produce but are usually less durable.

FDM (fused deposition modeling) is similar to SLS with faster hardening times and improved tolerance accuracy to within 0.005 " repetitively. This works well with larger parts. Bottom line, the overall process takes a little longer than SLS, offers a higher quality part, and greater expense than SLA or SLS

ARCAM uses an electron beam to melt metal powder layer upon layer, each 100 microns thick. Accuracy is very good. Metals such as titanium, cobalt and chrome alloys can approximate the functionality of the metal that will be used in large scale production.

DMLS (direct metal laser sintering) uses 20 micron layers to build finer detailed resolution. This is a more time consuming process than ARCAM.

Digital Prototypes allow for visual examination of parts and projecting performance data with the intent of reducing the number of hands on prototypes. Benefits include being able to apply new product performance criteria beyond the physical model.

Rapid Injection Molding (RIM)
Global competition can demand speeding up the production of a new product. RIM enables creation of a prototype that can be put to the test or allow for small runs to bridge the gap until more permanent steel tooled molds are brought on line. There are limitations in CAD compatibility and product size.

This process is capable of handling miniature parts more precisely with better surface finishes than SLA, SLS, or FDM. Injection molding is the process of injecting liquefied plastic under high pressure into a mold. RIM utilizes automation to create the inverted shape of the product to produce the mold. A vital consideration in tooling a mold must be safe and complete fill and release of the part from the mold cavity. Automation enables verification of the process in significantly less time and for less expense than actual steel mold production.

The story does not end here. Plastics come from petroleum, the same limited resource that fuels our modes of transportation and heats our homes. On other fronts, ingenuity is tapping into growing plants for renewable plastic resources. A scientific frontier is underway and the race to get to the finish line is just beginning.
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