

Rapid prototyping



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Rapid Prototyping can be defined as a group of techniques used to quickly fabricate a scale model of a part or assembly using three-dimensional computer aided design (CAD) data. What is commonly considered to be the first RP technique, Stereolithography, was developed by 3D Systems of Valencia. Rapid Prototyping has also been referred to as solid free-form manufacturing, computer automated manufacturing, and layered manufacturing. RP models can be used for testing, such as when an airfoil shape is put into a wind tunnel.

RP models can be used to create male models for tooling, such as silicone rubber molds and investment casts. In some cases, the RP part can be the final part, but typically the RP material is not strong or accurate enough. When the RP material is suitable, highly convoluted shapes (including parts nested within parts) can be produced because of the nature of RP. The reasons of Rapid Prototyping are •To increase effective communication. •To decrease development time. •To decrease costly mistakes. To minimize sustaining engineering changes. •To extend product lifetime by adding necessary features and eliminating redundant features early in the design. Rapid Prototyping decreases development time by allowing corrections to a product to be made early in the process. By giving engineering, manufacturing, marketing, and purchasing a look at the product early in the design process, mistakes can be corrected and changes can be made while they are still inexpensive.

The trends in manufacturing industries continue to emphasize the following:

- Increasing number of variants of products.
- Increasing product complexity.
- Decreasing product lifetime before obsolescence.
- Decreasing delivery

time. Rapid Prototyping improves product development by enabling better communication in a concurrent engineering environment. The basic methodology for all current rapid prototyping techniques can be summarized as follows: 1.

A CAD model is constructed, then converted to STL format. The resolution can be set to minimize stair stepping. 2. The RP machine processes the . STL file by creating sliced layers of the model. 3. The first layer of the physical model is created. The model is then lowered by the thickness of the next layer, and the process is repeated until completion of the model. 4. The model and any supports are removed. The surface of the model is then finished and cleaned.