

**T-Square Drafting Service
Wilmington, MA 01887**

Quick Start Rapid Prototyping Summary

Stereolithography part manufacturing use 3D CAD data to produce models in hours instead of weeks. This process makes prototype parts from plastic. Models can be built from layers of liquid plastic, fused plastic powders, or cut from partially cured polymer.

Though large manufacturers increasingly have rapid-prototyping capabilities in house, smaller firms generally work with service bureaus such as ours to obtain rapid prototyped parts. Here are some things to keep in mind when contracting these services.

CAD drawings: What you send to us, 2D drawings, CAD files, or STL files determines the amount you pay in up-front processing costs.

For example, sending only 2D drawings of a part to be RP fabricated dictates that T-Square Drafting must create the solid model from your prints. For relatively simple parts, it will probably take about as long to create a solid model with one CAD program as it would with another. But the situation changes dramatically as parts become more and more complex. Use of SolidWorks software can usually generate models very quickly. This modeling time becomes more pronounced in complicated models that incorporate features such as sculpted surfaces, numerous bends and radii, and so forth.

It basically comes down to this, we charge by the hour to create a solid model from your prints. So the longer it takes us to create a CAD solid model from your drawings, the higher the cost. Medium-complexity parts might take eight to 12 hr of CAD time. Simple parts may take from one half-hour to a few hours. Ask us for a time estimate, and we will do our best to see that you are not surprised at the end of the assignment.

Surface models: Many surface modelers generate STL files. But for the few surface or wire-frame modelers that can't generate STL files, T-Square Drafting Service will often end up creating a new solid model.

Solid models: When a customer sends a CAD solid model that has not been generated with the same brand of CAD program as used us, there must be a conversion into a compatible format through an IGES file transfer. The conversion process tends to be imperfect at times. We may still be forced to clean up the solid model before generating the STL file for fabrication instructions. This cleaning-up process typically involves adding features that sometimes get lost in the IGES translation, such as surface normals or information about certain kinds of radii.

Model from scratch or conversion: Starting from scratch is often easier than converting a CAD surface model into a compatible format and making the necessary modifications.

STL files: STL files created by most major CAD systems execute without any glitches. A few off-brand CAD programs do indeed create STL files that have problems, however. These problems typically consist of gaps on surfaces or areas where the fabrication software cannot identify the surface. When this happens, we typically go back into the model and patch up these areas, then recreate the new STL file.

Molds: Most RP parts made today are prototypes of molded components. Service bureaus that also having some experience in injection molding, casting, or thermo-forming are your best choice to fabricate parts made in this category. T-Square Drafting Service has made hundreds of these parts.

Our experience with molding can often provide advice about design factors such as adding drafting to the part. If the original model doesn't have draft, we are sufficiently experienced to add these features to the model.

Machining: T-Square Drafting Service will be able to give advice about the trade-offs for either machining prototype parts, or building them using stereolithography or with some other RP technology. Large part size and simplicity generally dictate a fabricated or machined approach.

Pricing: Parts small enough to fit in your hand could cost from \$500 to \$1,000. A part that fits in a 1-in. cube may normally be in the \$200 to \$350 price range. For a part that would fit inside a 6-in. cube could push the cost up to \$1,500 or more. Other costs could include paint, hardware, and other issues to get your prototype ready to show. T-Square will provide you with cost estimates upon request.

For low volume production RTV molds, a simple single-sided mold with a flat bottom might cost from \$300 to \$400. That figure could rise for medium complexity parts from \$500 to \$1,200. You must also keep in mind that these molds have a life of approximately 25 cast parts.

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