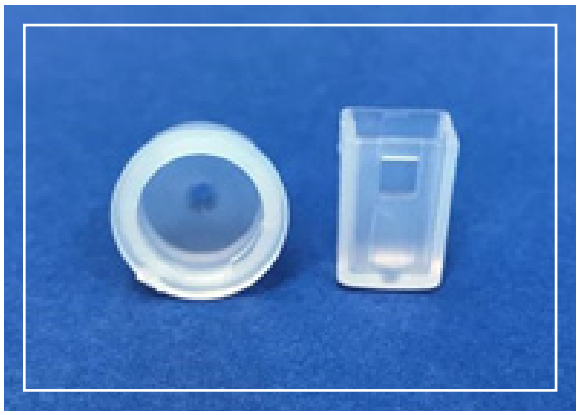
High Volume Production of Consumable Parts

Stratasys, located in Eden Prairie, Minnesota is a global leader in 3D printers for rapid prototyping, and 3D production systems for direct digital manufacturing.



The innovative equipment that Stratasys manufactures allows engineers and technologists to develop new products and concepts in a fraction of the time originally required.

As well, Stratasys' 3D production systems provide manufacturers with cost-effective, streamlined solutions for producing tools, jigs, fixtures – and even production parts.

One of the most critical components of a plastic 3D printer used by Stratasys is the extrusion tip. This tip directs molten plastic to parts as they are being constructed during the 3D printing process. In order to protect the somewhat fragile extrusion tip, a tip shield is installed over it. One key requirement for the tip shield is that it must be constructed of a heat resistant material. The tip shield should also have release properties that allow plastics to cleanly break away from its surface.

Engineers at Stratasys initially selected PTFE (polytetrafluoroethylene) as the tip shield material. But because PTFE could not be molded into the required shape, the parts were instead produced by CNC machining operations. Tip shields, however, are frequently replaced due to high wear and damage. This is what led Stratasys engineers to contact Savillex in hopes of finding a more cost-effective, injection-molded solution.

Savillex engineers reviewed the tip shield design requirements with Stratasys and proposed using a molded PFA part. Subsequent testing by Stratasys confirmed that PFA was a suitable material for the application. The current design, however, was not suitable for a PFA injection molded part; wall sections had to be thickened and fillets added.

Savillex engineers worked with Stratasys to optimize the design for PFA molding. Once the design was finalized, several processing scenarios were analyzed to meet the targeted costs. Savillex tool designers determined that a stand-alone, four-cavity tool would be required.

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Another consideration in the tool design was that one of the part features critical to function had a very tight tolerance of +/- .001 inches. Due to the very high shrink factor with PFA, molding tolerances such as this are not easily predictable. That aspect of the tool was kept “tool safe” until molded parts could be analyzed. The tool was then adjusted, and the molding process locked down.

The result of this entire process was that Savillex used its expertise in PFA molding to provide Stratasys with a high volume of fully functional tip shields that met their cost reduction targets.

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