APPLICATION BRIEF

Drilling 3D Printed Parts

3D Systems MultiJet Printing Technology

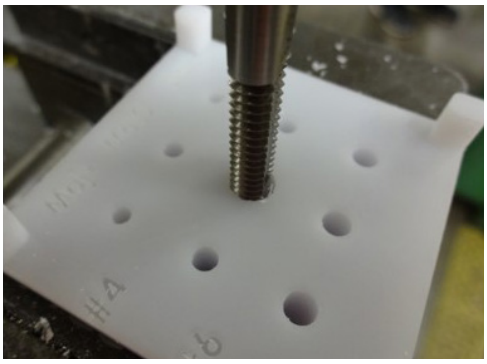
The ability to post-machine a 3D printed part lends greater flexibility and versatility to workflows and applications. Processes such as machining, drilling, tapping and pressing allow designs to be modified without reprinting, can help reinforce a part with metal inserts, and can enhance a part's overall functionality, among other benefits.

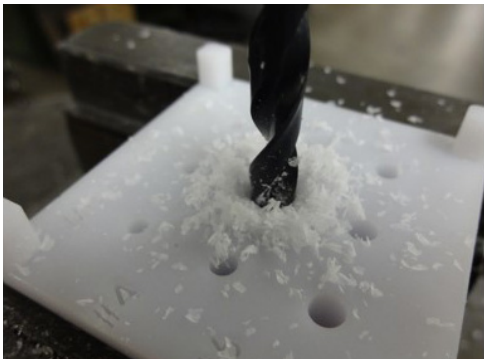
These best practices will give you the information you should know before successfully machining or modifying a 3D printed part made with 3D Systems' MultiJet Printing (MJP) technology.

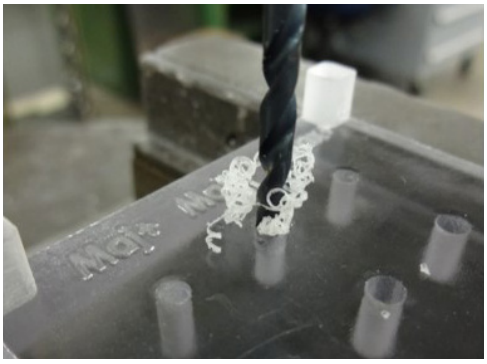
MJP is an ideal technology for your prototyping application if:

1. You need high fidelity, true-to-CAD parts
2. You require robust material properties and functional versatility
3. Good surface quality is important for your use case
4. You need repeatable accuracy with fine details and complex geometries

The following highlights key considerations for drilling a 3D printed MJP part to help advance your design and engineering goals.







MJP materials

All the VisiJet® Rigid and Engineering materials for MJP printers can be machined, drilled, and tapped and can be treated like traditional thermoplastics, such as acrylic, polypropylene, polycarbonate and ABS. VisiJet MJP materials are a rigid or semi-rigid thermoset that will not melt or easily gum-up with heat. Slow to medium drill speeds are recommended for best results.

Key considerations for drilling a 3D printed MJP part

These tips and tricks can increase the quality and productivity of any drilling or tapping you do into 3D printed MJP parts. If a scrap or test part is available, you may wish to use it for practice as you gain confidence in applying these techniques.

1. **Consider a specialty drill bit for plastics** — Use plastic drill bits (they have a sharper point) to reduce the risk of damage and potentially allow higher productivity speeds and feeds.
2. **Use a pilot hole** — A pilot hole of a smaller diameter than the final drilling will help ensure drilling accuracy and is suggested for best results. This hole can be manual (using a smaller bit) or digital (designed in CAD).
3. **Slow your drill speed when entering and exiting a drill hole** — The slowest drill speed is best when entering and exiting the hole to prevent the tendency to grab. A slow speed drill at exit can also prevent excessive bending force and chipping.
4. **Frequently remove scrap material and allow the part to cool** — A dull drill bit will generate more heat than normal and will require a slower feed rate. Sharp bits can drill quicker, but more bit retraction is recommended to remove chips and allow the material cool. Use a counter sink bit to relieve the sharp 90-degree corner from both sides of the hole.
5. **Use a cutting fluid** — A cutting fluid (water or water-soluble oil is recommended) helps avoid overheating. Also jog the bit to remove plastic chips and release heat.

3D Systems Corporation
333 Three D Systems
Circle Rock Hill, SC 29730
www.3dsystems.com