

Omega Tool Corp

Use Case – Custom Paint Masks

Customer Profile

Founded in 1981, Omega Tool Corp is a global leader specializing in designing and manufacturing large, complex injection molds. In addition to mold making, the company excels in engineering, production, painting, and additive manufacturing, delivering comprehensive solutions to OEMs across the mobility, aerospace, and consumer sectors.

Challenge

In its ongoing efforts to increase manufacturing efficiency and precision, Omega Corp wanted a more effective solution for creating masking fixtures for its paint operations. Specifically, Omega needed masks that would withstand the temperatures of its high-heat paint line (200-265 °F / 93-129 °C) for 40 minutes minimum while remaining rigid and be effective for repeated use. Typical solutions, such as tapes and injection molded masks, don't have the temperature capabilities or are more costly and time-consuming to develop. Omega Corp sought a more time- and cost-efficient solution for this application.

Solution

To alleviate the deficiencies of other masking solutions, Omega engineers chose to 3D print the masks using ULTEM™ 9085 resin material on the company's Stratasys F3300® FDM® production system. The F3300 embodies next-generation FDM technology, which can print at up to 3X the speed of legacy extrusion printers. Additionally, the ULTEM™ polyetherimide material can withstand high temperatures (HDT of 353 °F/178 °C @66 psi) and is resistant to various chemicals, making it suitable for Omega Corp's paint environment.

Impact

The Omega team conducted multiple tests on the 3D printed masks, evaluating heat resistance, dimensional retention, and masking efficiency, which yielded the following positive results:

- No warpage or loss of rigidity
- No deformation after repeated use
- Minimal dimensional change of 0.047 in./1.2 mm (within design limits of + 0.079 in./2 mm)
- Effective coverage with no paint contamination in masked areas

Additional benefits provided by 3D printing with the F3300 also include:

- Faster production of paint masks relative to other solutions due to the F3300's print speed
- Design freedom to accommodate complex masking shapes

Based on the successful results, Omega Corp established the 3D printed masks using the F3300 printer an effective solution to other masking approaches.



Two examples of 3D printed masks (highlighted) installed on a part in the paint fixture.



The tape applied to the 3D printed paint masks checks for masking effectiveness.