Freeform Injection Molding in packaging

Flip Caps

The part is a classic flip cap in different designs.
The materials used are both recycled polypropylene and food grade polypropylene.

Part design

Part Design

The flip cap often come in unique designs. The challenging aspect is often around the 'living hinge'. STEP files are preferred.

90 minutes

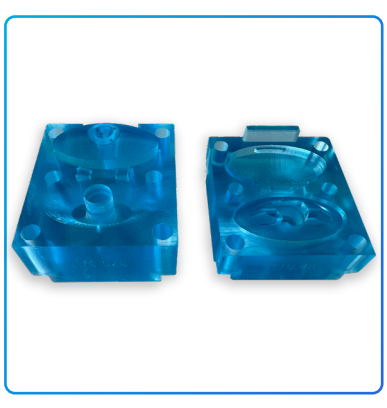
Mold Design

Next step is converting the STEP file into a mold design which is done by inverting the part into a cavity, in a block of material, and then adding the inlet gate(s) and initial venting.

The 2-part initial design allows for quick visual Quality Assurance.

30 minutes

Printed Tooling



The molds were printed at a 100µm resolution to ensure good mold quality while optimizing the build for fast production.

5 minutes

Freeform Injection Molding (FIM)

The parts were molded on a 50-ton press. However, the molds work hand-in-hand with any installed base molding unit.

An aluminum mold frame was used to hold the assembled mold, cycle time per part was around 5 minutes, and 1 minute cooling time after each shot.

1 day

Demolding

The Nexa3D alkaline solution was used for demolding these parts, over a 2 day period.

This time can be optimized through mold re-design or by removing a part of the mold before demolding.

Total time to injection molded part:
95 minutes + 1 day of demolding

Observations

- The mold design is an easy process; similar to building a mold box around the design, and then make it a cavity.
- The polypropylene materials filled the molds nicely in the first test rounds and 4 other polypropylene materials were tried successfully as well.
- Optimization of the demolding process is recommended when running next iterations. The more material that can be removed or reused, the faster the process will be.
- Standard material data was used for molding data, settings, pressure, temperatures, and more.
- Early hands-on testing for verification of assembly and performance using first-out-of-tool parts is valuable for most team members.

  This includes materials, design, process, and regulatory compliance.

  Should you need, the Freeform Injection Molding process enables further same day iterations.

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