

Freeform Injection Molding medical-grade breathing apparatus

MiMo personal protective equipment

THE CHALLENGE

Shortage of PPE in regulated healthcare environments.

THE SOLUTION

Rapid production of customized adapter for Ocean Reef mask.

The part is a medical-grade adapter for a divers mask.
The material used is Medico TPE.

Part design

Part Design

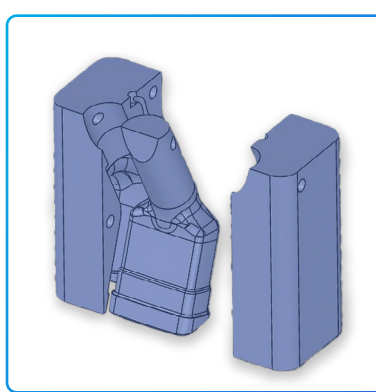


The adapter was designed as designed in partnership with Medical Officer Michael Mølmer to connect the mask to a HEPA air filter.

The part was the perfect fit for the divers mask while in a medical grade material that needed to maintain it's quality and performance after repeated sterilization.

90 minutes

Mold Design



The next step is converting the digital STEP file into a three-part 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.

30 minutes

Printed Tooling



The molds were printed at a 200 micron z-resolution to maximize speed.

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.

5 minutes

Part Removal



In this specific case the split mold allowed for manual demolding. Meaning no part of the mold to had get dissolved, as the part could be pulled off.

Total time to injection molded part:

130 minutes



Observations

- The mold design is an easy process; similar to building a mold box around the design, and then make it a cavity.
- The Medico TPE material filled the molds nicely.
- Standard material data was used for molding, 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.