



Case Study

# Boost Innovations



## Silicone Breast Form Moulds

Boost's breast form revolution started by listening to the experiences of women who had treatment for breast cancer. When Sam Jackman's mum had a mastectomy, she found the traditional silicone gel prosthesis was hot, sweaty, uncomfortable and unsuitable due to inhibition when using the platinum catalyzed silicone. After a frustrating search for an alternative, Sam, and her co-founder Rosie Brave, decided to solve the problem themselves.

Rosie and Sam believed that breast forms didn't have to be beige, boring and heavy, instead they set out to make the wearer feel good.

Silicone forms restore a realistic body shape following a mastectomy. They are required to be comfortable, practical to wear, lightweight, breathable, easy to clean, and flexible enough to be worn in wet environments and when used in energetic physical activity.

Having established an off the shelf product range, Boost embarked on an Innovate UK research project to explore the process of the production of custom prosthesis. The development stage required multiple design variations each tailored to customers' individual sizes, then for them to be tested by those users. Customer feedback and experience was reviewed and the product was optimised.

Printer	Resins used	Industry	Application
 Liquid Crystal MAGNA	 HighTemp DL401 Daylight resin	 Health	 Moulds

## Challenge

Boost needed multiple bespoke tools tailored to individual customers' requirements. Metal moulds were not appropriate with each one costing £2,500 and taking two weeks to CNC.

The forces when demoulding were significant and a printed tool would need to be strong enough to withstand them.

3D printed parts for low-cost resins had been explored before, but were unsuitable because the resin inhibited the platinum curing the silicone. In addition any trace residue of uncured resin would prevent the silicone from curing fully.

A solution was needed that would enable high quality injection moulding tools to be created, rapidly at an acceptable cost to the customer.

## Solution

The availability of new rigid HighTemp DL401 daylight resin proved ideal and viable moulds were created on the

Photocentric Liquid Crystal Magna 3D printer. This gave a consistent quality of silicone form, with no surface inhibition, proving that customisation was possible.

The moulds could be printed in less than twelve hours for just €83 each, orders of magnitude cost and time improvements on conventional tooling.

Boost then used 3D printing to design, prototype and test off the shelf designs more quickly, expediting their path to market. This de-risked the scale up to production hard tooling, enabling a much more flexible approach to design.

Photocentric's Print Support Team supported Boost throughout their validation. Using 3D printed moulds was proven to be a cost effective, quick solution for manufacturing custom breast forms. It allowed Boost to serve their community of users, giving women with more complex issues like partial mastectomies a cost effective functional solution.

**“3D printing enabled us to test and perfect our designs faster and much more cost effectively than using traditional manufacturing methods. We’re already thinking about what else we can do, now the technology has been proven.”**

Sam Jackman.  
Co-Founder, Boost Innovations

## Why choose 3D Printing over Injection Moulding?

**Flexibility and speed:** Increased design flexibility with moulds printed in hours

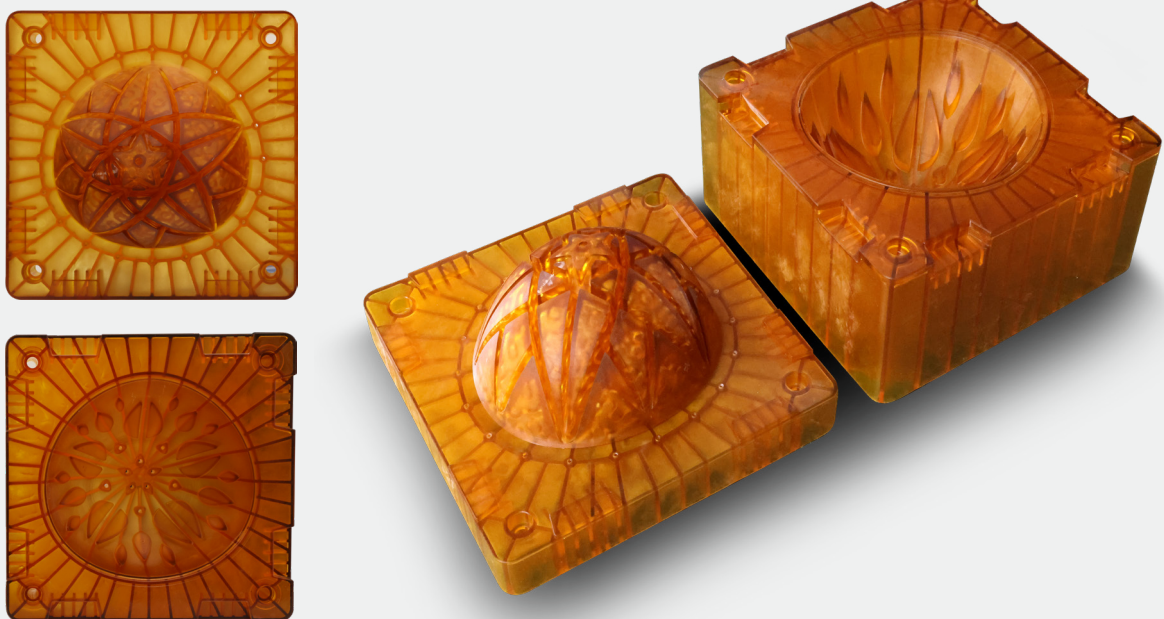
**Complexity:** Print complex structures straight from CAD

**Customisation:** Enable custom product for individuals

**Lower Cost:** Magna is proven for cost-effective manufacturing in large volumes

Moulds for breast forms		Costs	
Resin used	High Temp DL401	Material	€57.93 (Resin €54.87, resin cleaner €3.06)
Time to print (hrs)	11:45	Electricity	€5.33 (€4.48 to print, €0.57 to cure, €0.28/kwh)
Height of print (mm)	132	Ancillaries	€0.28
Width of print (mm)	487	Depreciation	€5.04
Depth of print (mm)	256	Labour	€14.59
Layers (µm)	1324	<b>Total</b>	€83.17**
Weight (kgs)	1.9		
Support (kgs)	0.27		

Price shown for each mould half





## Equipment list

### Material



#### HighTemp DL401

Handles temperatures up to 230°C simulating the strength and rigidity of glass filled Nylon 6.



### Printer



#### Liquid Crystal Magna

Liquid Crystal Magna 3D printer is the proven workhorse for volume digital manufacturing. Magna delivers high resolution and high definition across a large area, delivering rapid, reliable and cost-effective printing. Daylight resins enable the prototyping of complex parts and scaling up to volume production.



### Wash



#### Air Wash L

Air Wash L is designed for large scale production. It features an air agitation system that cleans highly effectively with Photocentric resin cleaner. Designed to hold a Magna platform with full z-build volume, Air Wash L cleans both the parts and platform.



### Cure



#### Cure L

Cure L takes a Magna platform and cures the parts effectively with digital timing, combining heat and light, delivering dry, clean parts with the ultimate properties possible.

