



CASE STUDY
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Eye for detail: specs start-up collaborates with FANUC

An Oxford-based start-up that specialises in affordable, adjustable eyewear has partnered with FANUC to bring its designs to market.

At the heart of the Eyejusters product is its SlideLens™ technology. This has a profile containing both positive and negative power areas. When two of these lenses are placed together, the power areas cancel each other out, but when one lens is moved across the other, the amount by which they cancel each other out varies, changing the focus.

Creating the Eyejusters design by injection moulding would be particularly challenging. As with all lenses, they would need to be optically perfect, but they would also need to be as thin as possible in order for the two lenses, plus the protective rear cover, to remain neat and compact.

Due to the varying thickness profiles of the Eyejusters lens design, it is impossible to mould the lens with conventional injection moulding techniques because of the increased likelihood of hairline marks and air traps. This is because the injection melt front tends to move around the thicker sections before completing the fill at the thin sections, which, in this case, are located at the centre of the lens.

FANUC supported the company over an extended period by running a series of moulding development tests. Meanwhile, Eyejusters strove to perfect the tool design so that it could collaborate with the special functions of FANUC's CNC ROBOSHOT, by gradually calculating the workable boundaries to achieve the thinnest possible lens of the highest possible quality.

This resulted in a patented mould design combined with ROBOSHOT's 'Pre-Injection / compression' function. The material was injected into the tool under reduced clamp force. At a precise injection point, full clamp force was applied to compress the moulding. Due to the precision of the ROBOSHOT CNC, selected positions to control the process were repeatable within 0.001mm.

For the next stage, FANUC employed its long-standing industry partner, Hi-Tech Automation, to develop a working specification for each of the production processes within the cell.

The team decided to attach the individual moulded parts to a runner / sprue for handling and orientation. Hi-Tech then used FANUC's ROBOGUIDE simulation software to design, model and create the layout of the lens coating, component de-gating, ultrasonic welding and final packing processes.

The de-gating and welding techniques in particular would need to eliminate the potential for contamination of lens components. Using ROBOGUIDE, Hi-Tech selected laser de-gating and ultrasonic welding processes because of their cleanliness and precision.

Hi-Tech then specified a Class 5 Clean Room, which would be built around the cell. With this in place, production could finally begin.

The collaboration of Eyejusters, FANUC and Hi-Tech has allowed the start-up to enter volume production, while maintaining a high level of quality, performance and predictable productivity. The efforts of each of the partners have since been recognised by the Plastic Industry Awards.

*To find out more about FANUC's ROBOSHOT product range, please visit
<http://www.fanuc.eu/uk/en/roboshot>*