Edging Equipment

OW Technical Editor ***Tony Jarratt***

When the subject of edging equipment was reviewed just a few years ago, we stated that 'the last few years have seen an almost unbelievable change in the design and sophistication of ophthalmic edging equipment.' This comment is now even more pertinent, with many edging systems offering fully automated workflows.

Until the last few years, the glazing of a pair of spectacles meant that each task was carried out as an independent operation, using a separate piece of equipment, each one being specific to the task it was designed for. Now, many of these individual tasks are carried out by one machine or system module - including grooving and rimless drilling.

For example, some edging systems now 'check' the powers and axes of a lens and then automatically block and edge it, without the need for a lens meter. This means that it is impossible to glaze a lens '90 off' – previously one of the most common mistakes.

Furthermore, the machine will not accept a 'right' lens as the second lens of a job - when one has already been cut – thus eliminating the other common problem, that of edging both lenses for the same eye, usually two right eyes. Both of these 'mistakes' can be very costly, especially where a pair of high value coated progressives is being handled.

Removing the need to remove the lens from the machine to carry out secondary processes has obvious benefits for lab profitability, due to increased throughput rates and lower incidence of error.

Historical

As noted above, the changes in equipment design and use have been dramatic over the past few years and it may be interesting to compare them with some of the earlier techniques employed.

Initially, the technique included cutting the lenses into a shape roughly approximating that of the required finished lens, using a diamond cutter. The lens was then hand edged to the final shape, using a ceramic wheel of large diameter (about 24 inches), the quality of the finished result depending entirely on the expertise of the glazer. At this period automatic edgers were not available.

The first improvement, which took place in the middle of the last century, was the introduction of rudimentary auto-edgers. These used mechanical controls and the lens was cut using two wheels – one for rough cutting to shape and the other to apply a 'V' bevel to the edge. This meant that thick lenses always had a wide unsightly bevel, which protruded beyond the rim of the frame. On minus lenses 'power rings' were inevitable, due to internal reflection at the lens edges.

To obtain the correct shape, the machines required a 'former' (as still used today), which would either be supplied by the manufacturer, or cut on the premises. To cut the former, the operator had two options – either to use a thin plastic blank, or to cut one from a metal sheet. These metal formers were cheap, but quite effective if used correctly. However, cutting them did require some skill. A metal blank would be placed on a cutting table and the frame clamped above it; the rim shape was then traced onto the metal, using a sharp stylus. This cut a line into the metal, leaving an outline of the required shape. A pair of tinsmith's 'snips' were then used to hand cut around the shape. This may sound very crude, and by today's standards it was, but in the hands of a skilled operator, the results were normally excellent.

The lens was then cut in a similar fashion to that used on today's auto-edgers, but the finished size after the first cut might not be what was required. In fact it normally wasn't. A second 're-sizing' cut had then to be carefully carried out, but the accuracy of the machines was not always as good as it should have been.

It was quite easy to take off too much material, especially for plastic lenses, where the softer material could be cut away too quickly – especially at sharp corners. The resultant lens might then have gaps around the edge, necessitating the frequent use of packing material.

The types of mechanical control and earlier types of drive motor, prevented designers from overcoming these problems. The machines produced the best results possible at that time.

Wheels

To consider the next improvement in technique, we need to look at the types of edging wheel then available and how they have evolved. Originally, there was only one profile available – the flat ceramic wheel. This had to suffice for hand cutting to shape and then for applying the bevel. The first improvement was the introduction of diamond wheels and these were produced in 'flat' and 'V' profiles. The flat wheels had a coarse finish for rough edging to size and shape and the 'V' wheel was provided with a finer finish for applying the bevel.

A fine diamond or ceramic wheel, with a flat profile, was then used for hand edging the periphery of the bevel, to remove stars and to provide a safety chamfer.

The next introduction was the 'mini bevel' wheel; this produced a smaller 'V' bevel around the edge of the lens, running along the circumference, which is flat in profile. The edge shape