

Lens Molder Increases Yield Rates by dramatically Reducing Acrylic Particle Contamination

Dust Particles blamed for white specs and streaking on MagEyes magnifying lenses

As a small capacity molder of acrylic lenses for its two product lines, MagEyes, Inc. of Kerrville, Texas, is all too familiar with the challenges of clear-part molding.

Soon after he started MagEyes in 2000, Jack Schubert, president and CEO, learned that his contract molder was doubling the price of its services. "The price increase forced me into molding the lenses myself sooner than I expected," said Schubert. He brought the molding function in house, purchasing the necessary molding machine and raw materials.

MagEyes produces hands-free magnification lenses used for two different applications. The first – MagEyes® – is used primarily for sewing, crafting, fly-tying, gun cleaning, woodcarving, and other hobbies. The lenses attach to a headband worn by the user. The second – HatEyes™ – is for fishermen who like to tie lures while enjoying their hobby, and is easily attached to any hat.

Each year, MagEyes produces about 80,000 lenses using less than 5,000 pounds of clear acrylic in the process. But the company's small production does not minimize the need for optical-grade lenses.

In the initial ramp up of his in-house molding operation, Schubert experienced difficulties in molding acceptable lenses in short runs. After a test run using 500 pounds of acrylic, the production yield rapidly slipped from 80 percent to 40 percent. Schubert's frustration mounted.

MagEyes' material supplier suspected that the fines contamination of the acrylic was higher than anticipated. Dust was also infiltrating the material, causing an increase in rejected lenses because of streaking or white spots. Lint and other contaminants were also present because of acrylic's high susceptibility to static.

"The clear acrylic that we work with is extremely sensitive and any kind of movement or conveyance of the material increases the concentration of dust particles," Schubert said.

For a solution, Schubert turned to Pelletron Corporation of Lancaster, Pa., makers of dedusting products. Pelletron provides dedusting solutions to manufacturers in various industries including automotive, medical equipment, product design and development, plastics, textiles, and food.

Pelletron's dedusting technology features a flux field generator that produces a low power electromagnetic field, disrupting the electrostatic bond between a plastic pellet and dust particles. Manufacturers can install a DeDuster™ in-line to the process flow – preferably at the feed throat of the injection molding or extruder machine – or off-line as a regrind or scrap recovery system. The DeDuster™ requires a gravity feed of material and is equipped with a built-in Pellefeeder that provides a consistent material flow to avoid surges.

The pellets and dust fall to the surface of a primary air wash deck where they are washed by air that lifts the lighter contaminants above the main product stream. Pellets pass through a patented Venturi chamber, which regulates updraft air velocity to a sufficient level to remove streamers, the heaviest of dust particles. The dust is carried out of the DeDuster™ and into a dust collector. The cleaned pellets are discharged through the product outlet at the base of the DeDuster™.

Schubert, who learned of the dedusting system through an industry trade publication, selected the Pelletron P1 Mini-DeDuster™, the company's smallest capacity machine. The P1 processes up to 150 pounds of raw material per hour and separates particles smaller than 10 micron.

“Rarely do we have complaints of lens quality because we catch any flaws before the product goes out the door,” Schubert said. “But with our high internal reject rates, we knew we had a problem.”

Since installing the leased P1 Mini-DeDuster™, Schubert said MagEyes’ yield rates have dramatically improved, reaching 92 percent for the thinner of the company’s two lenses, and 86 percent for the thicker lens. The yield rates were reached after running more than 2,000 shots.

“We’re talking about lenses that far exceed the quality of what our outside molder was providing,” Schubert said. “In fact, we went from cleaning virtually every lens after production to not touching them at all and going straight to the clam shell packaging.”

Schubert said he expects to increase the yield even further by making additional adjustments unrelated to dust removal. “The process, especially working with acrylic, is very sensitive to outside influences such as static, ambient air temperature, and humidity,” he said. “We’re tackling those issues and we fully expect the yield to increase even more.”

Dedusting the acrylic, Schubert said, has helped MagEyes reduce the cost of its lens production from the \$2.36 Mageyes was paying the west coast molder before the price increase, to less than 75 cents per set.

Schubert said the phenomenal success of the dedusting process will enable him to mold a year’s worth of lenses in less than three months, allowing him to lease his molding machine to others, adding still another source of earnings.

“The Pelletron machine has more than paid for itself in only a few weeks,” Schubert concluded.

For more information please contact our sales department at Pelletron Corporation, Lancaster, Pa. (T:717-293-4008) or visit our web site at www.pelletroncorp.com.