

Microscan Systems, Inc., Renton, Washington, is a manufacturer of laser scanners and readers. Weighing just 3 ounces, the recently introduced VS 310 scanner is the company's smallest, lightest and most affordable fixed-mount scanner ever. The scanner is used for clinical analyzers, automated tape libraries, office/library automation applications, photofinishing equipment, and any system requiring a low-cost, ultracompact scanner.



In the fall of 1996, Microscan engineers were ready to involve suppliers in component development. At this point an experienced die caster was brought in as an expert in small and miniature die casting design and production.

Die-Cast Zinc Bracket Aids in the Miniaturization of Scanner Technology

Because of the scanner interior's restrictions, certain dimensions are fixed, such as the laser

mount and mirror bracket. In addition, the application requires the elimination of sharp edges. This presented a number of challenges for the die-cast tool designers, specifically parting line location. Another tooling challenge was to design a runner system that would break off easily without distorting critical flatness requirements in the post-casting tumbling operation.

The zinc die-cast optics bracket, 1-7/16 in. x 1-5/8 in. x 9/16 in., consolidates four to five parts, (depending on the model), and several functions. The bracket combines a laser mount and mirror bracket into a unified package. This provides required critical accuracy between the laser and mirrors and eliminates assembly and adjustment.

Overall, the bracket is produced to ± 0.005 in. tolerances with ± 0.002 in. held in the critical areas of the

laser mount and mirror bracket. In addition, there are critical angle dimensions of ± 0.005 in. All holes are cast with zero draft, including the two 0.070 in. locating holes in the mirror bracket. Interestingly, the zinc die-cast production brackets are held to tighter tolerances than the CNC machined versions.

Microscan engineers chose zinc die casting to produce the optics bracket for two reasons—the extreme precision inherent in the process, and zinc's thermal conductivity properties. The Zamak 3 bracket functions as a heat sink, diverting heat away from



the laser. This adds efficiency because in a fixed-power system, as heat rises, light power declines.

Cost effectiveness extends beyond the optics bracket fabrication. By combining functions and parts into one component, assembly time was reduced 50 percent, from 30 minutes per scanner to 15 minutes. The majority of this time efficiency is gained in the elimination of the laser setting and adjustment.

The optics bracket was developed for Microscan Systems by Miniature Casting Corp., Cranston, RI.

Editor's note: Miniature Casting Corp. won NADCA's 1997 Excellence in Zinc Die Casting Award for this part.

The VS 310 scanner measures 0.70 in. D x 2.15 in. H x 2.61 in. W. To accommodate the small internal envelope, Microscan designers looked to consolidate parts and functions. An excellent example of this is the optics bracket. The design goal was to create a single mounting bracket which would accommodate a laser module, a rotating polygon mirror and a pair of mirrors positioned 90 degrees to each other. If accomplished, it would be the first time Microscan combined these functions into a single component.

Microscan utilized 3-D modeling to conceptualize the configuration and to view relationships between components. The modeling also allowed designers to work around light paths. After the configuration was conceived, prototypes were machined and tested.

