



ALLOY DIE CASTING

A Sanders Industries Company

CASE STUDY

Customer

ViaSat, Inc.

Location

Carlsbad, CA

Situation

A key customer presented ViaSat engineers with a difficult challenge: reduce the cost of a 5-part assembly on control indicators for military avionics, cutting the expense, but meeting the same strict standards for performance and aesthetics.

Results

With the help of some innovative engineering and manufacturing, Alloy Die Casting has helped to reduce the total cost of the five parts by an estimated 60%, despite low volumes of only about 2,000 parts per year, allowing ViaSat to begin enjoying payback after just 600 parts.

VIASAT CUTS CONTROL INDICATOR COSTS WITH ALUMINUM DIE CASTING

When the Department of Defense asked one of its contractors to reduce the cost of a 5-part assembly on control indicators for military avionics, engineers were faced with a difficult challenge: cut the expense, but continue to meet the same strict standards for performance and aesthetics. The unlikely goal has been achieved with the help of innovative die castings, which have been able to reduce total cost of the five parts by an estimated 60%, despite low volumes of only about 2,000 parts per year, without sacrificing the reliability, longevity or visual appeal of the original design.



ViaSat, Inc. (Carlsbad, CA) had been machining all five of the parts individually to maintain the close tolerances and smooth finish required to pass the customer's 100% testing requirements. Faced with the new cost-cutting request, the firm turned to Alloy Die Casting to see if there was a way to reach the same quality standards with greater cost efficiency.

"These indicators are used in standard military airborne avionics," explained ViaSat Design Engineer Lon Plourde. "The assembly involves a heat sink, front panel or bezel, access door and two door pivots. At first, we were concerned that die casting wouldn't be cost-effective, because of the low volumes and high quality requirements," he recalled. "But ADC showed us how it could be done so efficiently that our investment would pay off after just 600 parts." The repeatability of the die casting process was an additional benefit for ViaSat.

About Alloy Die Casting

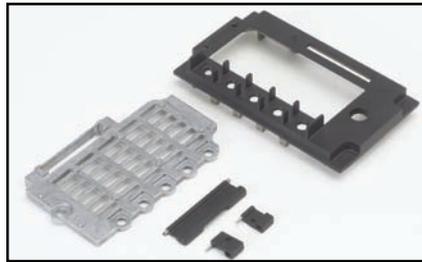
Alloy Die Casting, a Sanders Industries company, has been manufacturing complex die castings using aluminum and zinc/aluminum alloys for more than 50 years. Customer-furnished or jointly-developed designs are produced with great precision to satisfy applicable military, aerospace, medical, automotive and industrial requirements. ADC is registered under ISO-9001:2000 and AS-9100B, and meets stringent industrial and military specifications, including MIL-I-45208. The company can furnish castings up to 600 square inches in surface area, with engineering support, custom tool design and fabrication, CNC machining and complete turnkey finishing.

Casting Process

Even though ViaSat's Carlsbad location had never specified a die cast part before, they had one advantage: instead of presenting a blueprint and requesting a quote, Plourde and his team sat down with ADC tool designers, who made suggestions for minor changes to improve manufacturability and strength, while optimizing tool performance and durability. "ADC provided intuitively sound advice throughout the process," Plourde observed.

The heat sink is the most complex of the five parts, approximately 5" x 3" with a series of 25 rectangular "windows" arranged in five columns. Cast on a Toshiba 250-ton press, the 2-inch plunger delivers a gate velocity of about 1,200 inches per second, for a 30 millisecond fill time. "The large gates on this tool help us get a quick fill, without a lot of turbulence," commented ADC Design Engineer Gary Gray. Weighing in at .13 pounds, the heat sink also has a flatness tolerance of just $\pm .010$ " to maximize thermal transfer.

The control indicator bezel measures about 5.75" x 3.35". Cast on the same size press as the heat sink, this panel requires a 35 millisecond fill time, yielding about 60 of the 1/4-pound parts each hour. Because the heat sink is designed to transfer thermal energy away from components inside the indicator and out through the panel, it must make complete surface contact with the bezel for maximum heat transfer, so the same flatness tolerances apply.



Alloy Die provides a complete assembly, with door pivots, springs and other components all in place.

Measuring just 2-1/2" x less than 3/4", the door has a cast weight of under 1/10 of a pound. With so little metal, the fill time is very short: about 20 milliseconds even at a reduced gate velocity of 1,100 inches per second on the 135-ton press. Like the bezel, the door gets a chemical film after machining, then is masked and powder coated.

The two door pivots are a matching pair, cast in zinc to take advantage of its superior flow properties and ability to maintain close tolerances. Because of the hole locations and small part size (less than 3/4" x 1/2"), the door pivots are cast on a 4-slide machine. ADC also provides final assembly of the door pivots, with springs and other components in place, ready for subsequent manufacturing steps in the ViaSat facility.

About ViaSat

ViaSat produces innovative satellite and other wireless communication products that enable fast, secure and efficient communications to virtually any location, frequently bringing new communications technology to people out of reach of terrestrial networks. The company serves both commercial and government markets.



For more information, contact:

Jennifer Harding

6550 Caballero Blvd.

Buena Park, CA 90620

Tel: (714) 521-9800 Fax: (714) 562-5510

Email: jharding@alloydie.com

FOR MORE INFORMATION

visit our web site:

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