



RedEye

PARTS FOR PROTOTYPE AND
PRODUCTION • ON DEMAND

Come Rain or Come Shine

RedEye On Demand delivers fast, accurate, repeatable prototypes.

A tipping bucket rain gauge has several components that allow it to accurately measure rainfall. As precipitation falls, it lands in the funnel of the rain gauge. The precipitation travels down the funnel and drips into one of two very carefully calibrated 'buckets' balanced on a pivot. In order to develop a rain gauge bucket that gives consistent readings of rainfall, it must be designed and produced with an easily repeatable, accurate eccentric mass.



Monitor Sensors designs and manufactures a full range of meteorological and environmental monitoring products including: instruments, sensors, and data loggers. Having been in business for more than 20 years, they are not new to the product development and prototyping process.

From Metal Casting to FDM® (Fused Deposition Modeling)

Over the years, Monitor Sensors has used several types of rapid prototyping technologies to design and test new products. In fact, they had previously prototyped this rain gauge using metal castings which were made in three separate moulds. The three metal castings were then soldered together and powder coated. Unfortunately, producing prototypes in metal castings proved to be an inaccurate, expensive, and lengthy process.

"The previous version (of the rain gauge bucket) was made from three metal castings which were individually stamped and punched through. Repeatability was difficult and hole locations skewed. Our previous prototyping service provider also required a high minimum order which created inventory management headaches," reported Monitor Sensors Design Engineer, Ralph Loveday.

Loveday turned to the web to find a new way to make quality, repeatable parts. He found RedEye On Demand and was immediately intrigued with FDM technology. After speaking with a RedEye representative, he was assured they could produce the accurate repeatable parts he needed.

They chose to have their prototypes constructed using black ABS-M30 because of its appearance, strength and durability. The prototype was then hand-finished by RedEye to ensure watertightness.

"We chose FDM technology because it gave us consistent, accurate parts and simplified assembly. For example, we can now use a stainless steel M8 bolt as a standard counter weight. When we used



A standard tipping bucket rain gauge used to measure rainfall.

metal castings to prototype, the buckets did not have the same weight distribution due to manufacturing inaccuracies. With FDM, the weight distribution is always the same so we no longer need to individually calibrate the buckets to achieve consistent measurements,” says Loveday.

Monitor Sensors was also able to order the quantity they required, a maximum of 10, for a fraction of the cost compared to metal castings. And best of all, they received their accurate, repeatable parts in only a couple of days.

“We have been able to shave months off the design cycle, have improved our accuracy and can order fully repeatable parts in quantities that match our manufacturing schedules,” concludes Loveday.

What is FDM?

FDM or fused deposition modeling is an additive manufacturing process patented by Stratasys, Inc. Additive manufacturing applications include: rapid prototyping, tooling patterns and masters, jigs and fixtures and the creation of production parts. The FDM process begins by processing an STL file, mathematically slicing and orienting the model for the build process. If required, support structures are automatically generated. During operation, thermoplastics are heated to a semi-liquid state and deposited in layers as fine as 0.005-inch thick. Each part is built from the bottom up - one layer at a time.



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