Cutting Food Down to Size

Urschel Labs, a manufacturer of industrial food reduction equipment, relies on in-house metalcasting to support its reputation for quality and customer service.

*Shannon Wetzel, Senior Editor*
Rick Urschel jokes that his great-grandfather was just two years behind the mechanical genius of Orville and Wilbur Wright, and if he had been born a couple of years earlier... well, who knows? Instead, William E. Urschel used his mechanical aptitude to build a gooseberry snipper, and 97 years later, his namesake company is the largest manufacturer in the world of food size reducers—slicers, dicers and shredders. It’s not quite flying, but if you’ve enjoyed a potato chip, baby carrot, chicken nugget, salad-in-a-bag, canned green bean or peanut butter, you probably have Urschel to thank.

Urschel Laboratories Inc., Valparaiso, Ind., claims a 90% market share in fresh fruits and vegetable size reduction and manufactures its precision equipment at a 5-acre facility in northwest Indiana, shipping to 100 countries.

The facility includes machining, heat treating, assembly, finished goods inventory, fabrication, knife production and laboratory testing of the finished slicers and dicers. Its cast parts are produced in its captive in-house metalcasting facilities, which currently include green sand, nobake and investment casting.

For decades, the majority of the castings were bronze parts produced in green sand. But five years ago, Bob Urschel, president of Urschel Labs, and his son Rick, vice president of operations, recognized their customers’ growing demand for stainless steel parts.

“Our engineering department wanted to move away from bronze, not because of quality, but because of looks. The acidity from certain foods gives bronze an ugly green color,” Rick Urschel said. “Our customers have a desire for all stainless steel. We thought we needed to be a little proactive about it.”

In order to accommodate the conversion of many parts to stainless steel, while still having the ability to successfully cast some parts in bronze, Urschel Labs invested $4.5 million to install a nobake metalcasting facility within its existing campus to eventually replace the green sand facility. When the demand for stainless steel inevitably grew stronger, the company wanted to be ready to compete.

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Only Solution

Urschel Lab’s investment casting facility was used for small, low volume stainless steel casting jobs. But with only a 60-lb. and 100-lb. furnace, the facility was limited in size and scope. The existing green sand facility was fine-tuned to produce high-quality bronze castings, and the company had been pleased with the results for years. But early experiments to adjust the green sand mixture to accommodate stainless steel led to lower-quality bronze castings and subpar stainless steel castings.

“That left us with building a new nobake line,” Rick Urschel said. “We had very few options.”

Nobake molding, like green sand, is known for its versatility. It can be used to cast virtually all metals, and casting size is limited only by the equipment. It features good dimensional tolerances because the rigidity of the mold can withstand the pressures exerted by the molten metal during casting, and it exhibits fine surface finishes. At Urschel, a new nobake line would be able to accommodate the different melting temperatures of the two metals—the 300 series of stainless steel and magnesium aluminum bronze.

What wasn’t an option was outsourcing. The Urschels feel their most important advantage in their market is the quality of their products. The only way they felt they could guarantee the quality they wanted was to make everything in-house.

Urschel Labs’ new in-house nobake metalcasting facility will enable it to meet its customer demand for stainless steel machinery.
“We’ve outsourced very few things, but when we have, we found that we weren’t receiving the quality we were used to producing in our own facility,” Rick Urschel said. “The quality of our machines is most important. We still supply replacement parts to equipment we sold 70 years ago.”

Every company strives for quality, but the Urschels felt so adamant about it that the efficiency of the new line was not a main driver. They wanted a molding process that would accommodate their two alloys and result in superior castings. The new line saves time and probably money, but Rick Urschel said he didn’t care if it didn’t.

“We didn’t build the nobake line to save money, we did it to save customers,” he said. “The process here is almost priceless. We didn’t have any other solution, and if we did, it wasn’t a good one.”

450 to Go

The nobake metalcasting facility poured its first casting 11 months after Urschel broke ground for the new line. By August, the staff was putting the nobake line to consistent use, although full production will have to wait for the engineering department to sift through the 450 parts that will either be converted to stainless steel or kept as bronze parts.

Bronze castings still will be needed in certain situations, despite aesthetics. Aluminum bronzes feature strength and oxidation resistance. In places where two parts rub or wear against each other, bronze castings are paired with stainless steel because of the copper-base alloy’s natural lubricity. These castings are located in housing chambers separate from the path of the food in order to avoid bacteria and E. coli fears, as unfounded as they are.

“We built this ahead of our time, and now we’re growing into it,” said Kevin Leffew, metalcasting manager. “Right now is our chance to examine every part, see which ones work as castings and figure out how to convert the bronze parts to stainless steel. Because it’s a new molding process and new material, we need new patterns and new gating systems.”

Originally, Urschel Labs expected the final casting ratio to be around 80% stainless steel and 20% bronze, but now Leffew thinks the percentage of bronze castings could be higher, in part due to new findings of anti-microbial properties in copper-base alloys. If that turns out to be the case, they can use one of the 600-lb. furnaces for bronze.

Just in Case

Urschel Labs’ small metalcasting section runs as a department of the entire company rather than a business unit. As a small company (fewer than 300 employees), it is comfortable relying on the experience of its staff to produce high quality products. The price of the individual parts is not as big of a concern. When the engineering department gives
a new casting job to the metalcasting facility, Leffew said he'll provide a rough estimate of the cost of the pattern, and then figure out how long it will take to abrasive finish and grind it after casting a few trial pieces. There is no formal costing procedure.

But as Rick Urschel said, the company doesn't run its own metalcasting facility in order to cut costs. The flexibility and availability of the facility to respond to new jobs or order changes is worth the dollars the company might have saved through a bidding process.

Urschel Labs works with lead times of eight to 10 weeks on new orders and is ready to send replacement parts or equipment within hours. It is able to do this by keeping $17 million worth of part inventory, operating on what Urschel calls a "just-in-case" philosophy.

"In an industry working with perishable goods, no customer wants to be stuck with a dock full of green peppers and a broken dicer," Urschel said.

When a customer needs a part as soon as possible, the company can ship what they have in the inventory and order up more parts from the metalcasting department to replenish the stock. In this way, the casting facility is a lot like a job shop, working on various orders of different sizes and volumes.

Urschel Labs' new molding line is designed to facilitate frequent changing of patterns and metal. The sand mixer can dispense different recipes with a push of a button from one mold to the next. And although the line is equipped to run 30 molds an hour, Leffew can't imagine running it to that speed. The time invested in making sure each mold is precise is worth it to him if it means less time spent in finishing, less scrap and a higher quality part.

With the automation of the new line, Leffew expects it will be more economical overall than the matchplate green sand lines, although some parts may increase in cost due to the change in material. Eliminating the wear and tear on the employees is a bonus, as well.

**Growing Pains**

Eventually, all the casting work will be transferred from the green sand room to the nobake line, but it will take some time as patterns are changed and the process is mastered.

For a metalcasting department that is used to bronze and green sand, it still has a lot to learn about stainless steel and nobake. But Urschel doesn't feel the pressure yet to push the transition to move quicker.

“We're pushing Kevin, but the window has always been big,” he said. “Because it's a new process, and there's the green sand facility to manage, we understand it won't be quick.”

Urschel Labs also has the liberating ability to think long-term when it comes to paying back the investment. Its 97-year history has helped gain a comfortable position in the market, and as the fourth generation, Rick Urschel has decades ahead of him to want to map out a plan to keep the company successful.

“The shareholders that we have to answer to are here,” he said. “We don't have the pressure to get a fast return.”