BUCHER EMHART GLASS

the past and present of refractories

As the first step in melting and shaping glass, refractories play a vital role in the container manufacturing process. In this article, Refractories Lab Manager Larry Finn looks back over the history of BEG's refractory operations and outlines some major recent developments.

Larry Finn - Refractories Lab Manager
BUCHER EMHART GLASS

FROM STARTING YEARS TO THE PRESENT

Bucher Emhart Glass' involvement with refractories dates back to the company's early years. In 1926, Hartford-Empire, forerunner of BEG, formed Corhart Refractories with Corning Glass Works to design and manufacture refractory systems. The joint venture ended in the 1960s, but Hartford-Empire continued to make refractories at Bloomfield, Connecticut.

In 1980, Emhart Corporation (as it was by then) acquired refractory specialists Laclede-Christy of Owensville, Missouri. Since the Owensville facility included a research laboratory as well as a manufacturing plant, it was logical that it should become Emhart's sole refractory plant.

Today, Owensville continues to develop expandable compositions and parts for glass refractories, as part of BEG's global setup. It is certified under ISO9001:2015 by NSAI, the National Standards Authority of Ireland.

BIG CHANGES AT THE OWENSVILLE PLANT

The last few years have seen some big changes at Owensville. In 2016, the cost of our raw materials was rising – but switching to cheaper ones would have risked impurities and quality problems. Through a partnership between R&D and manufacturing, we worked to reduce costs without sacrificing purity, setting up new quality tests for raw materials and the manufacturing process that helped to reduce the number of rejected parts. We also began gathering data to support a future implementation of statistical process control (SPC).

With all this statistical analysis, part design and quality testing going on, our lab became increasingly crowded! It was great to be so busy, but the quality work left less room for R&D, which was engaged in major efforts to develop new production lines and two potential products. It became clear that the lab should consolidate some functions while gaining some extra space.

Extra space and equipment for testing

So, later in 2017, managers approved the reallocation of the west side of the second floor at Owensville for our R&D lab. The space had been a casting area for manufacturing as recently as 2015, and still contained the equipment for these past production lines: three counters with overhead hoists and rails, and a much larger central area with an overhead hoist system.

The extra space and equipment has allowed us to streamline activities in the lab. Standard testing now includes batch moistures, mix flow rates, density, porosity, modulus of rupture, green shrinkage and fired shrinkage, along with chemistry and XRD tests carried out at universities. All incoming materials are controlled via certificate of analysis parameters, and all fine raw materials undergo an additional flow test to control mixing parameters.

Developing new mixes

Using our expanded research area, we can develop new mixes, some with new raw materials, right through to manufacturing sized parts for customer trial. We've also begun pilot-scale manufacturing with new forming processes, to test for further material property enhancements. Materials for experiments can be pre-staged, allowing us to use the same material lots throughout. We've also been able to run controlled tests with raw material suppliers to find better specifications that boost the performance of our mixes – all in the lab, with no interruption to manufacturing.

We've appointed a ceramic engineer, Andrew Domann, and given him his own area to run tests and manage our links with industry consultants and universities. These include our work with the nearby Missouri University of Science and Technology, where we collaborate with experts in glass, ceramics and refractories and access some of the world's most advanced analytical equipment.

BENEFITS FOR MANUFACTURING TOO

Manufacturing has benefitted too. In the past, if casting was having an issue with a part or mix, we would have to trace the process in manufacturing – effectively, watching them lose another part so we could find out what to fix. Now, parts are sent to the lab for process improvements, changes are recorded in standard operating procedures and the part is passed back to manufacturing for implementation. We still follow the implementation, but without getting in the way of normal production.

Finally, customers will also benefit from our new equipment for processing lab specimens. Previously, we would usually have to use manufacturing equipment for this, after normal production hours. As a result, preparing customers' test specimens had to be scheduled, and often took too long. We've also sharpened up our processes for managing customer projects and tracking parts, samples and reports.

Very soon, we will have collected enough SPC data to offer the best refractory offering for specific applications to manage-

ment and sales personnel. In parallel, we'll be testing new and upcoming offerings so sales can keep customers informed of new developments. The tests included in this system include blister potential, dynamic corrosion, thermal shock and vapour corrosion.

Suppliers and customers often visit the Owensville plant to see these new tests in action, and to see for themselves BEG's refractory expertise. ■