

Smooth production, optimal results – RATH Emhart Glass System

2019 has been a milestone in the history of RATH Group, a specialist in refractory technology: **RATH took over the Bucher Emhart Glass production facility in Owensville (USA)**, which produces refractory materials for the container glass industry, while retaining the know-how and original technical documentation.

So, the refractories producer is further expanding its leadership in glass expertise – also thanks to a strengthened R&D team. In addition, RATH completes its service and product portfolio with the acquisition of the Owensville production facility. RATH is now the original equipment manufacturer for original Emhart feeder refractory parts. The new refractory system called RATH Emhart Glass System combines the advantages and expertise of both companies. RATH will therefore become a stronger and even more reliable partner for its glass customers worldwide.

More than 100 years ago, Bucher Emhart developed the basic method and equipment for the feeder systems that have been in use until recently. Since then – in parallel with technological developments – the feeders changed, but the fundamentals remain the same. With the acquisition of the production site in Owensville, RATH now owns the original drawings, the original refractory production methods and the production technology, and has extended its production capacities as well. The refractory specialist is therefore the original equipment manufacturer for the original Emhart feeder refractory parts. The spout's design and characteristics remain the same and a bright future beckons, given RATH's research, development and engineering background.

RATH technology for a longer service life

Refractory spouts funnel the molten glass to the orifice ring in order to form the gob. They are joined to the tube so that the flow of glass can be stopped when the orifice ring is replaced. The spout is a critical component

of the glass feeder system. One of the highlights of RATH's products are feeder spouts with special inserts, which have a longer service life and reduce downtime in production due to the lower number of the spout changes.

Most traditional refractory spouts last for approximately one year. As the glass pours through the throat, the refractory is eventually eroded away to the point that the tube is no longer able to sit properly on the spout bottom surface and the flow of glass can no longer be stemmed. The best way to address this issue and to significantly increase the service life of the spout is to use a high-quality refractory that has a higher resistance to constant erosion.

Advanced manufacturing process developments have been implemented for spout bowls to meet the stringent demands of the glass container forming process. RATH Group 333, 315, and 301 are bonded AZS (zircon-mullite) materials containing various percentages of ZrO_2 . They are produced at high firing temperatures, resulting in improved density and a highly corrosion-resistant matrix. The inserted refractory spout service life is 2-3 times longer than the standard 315 or 301 body without insert. The result is reduced downtime in production due to less frequent spout changes.

All standard RATH Group spouts and metering spouts are available with chrome oxide or fused AZS inserts.

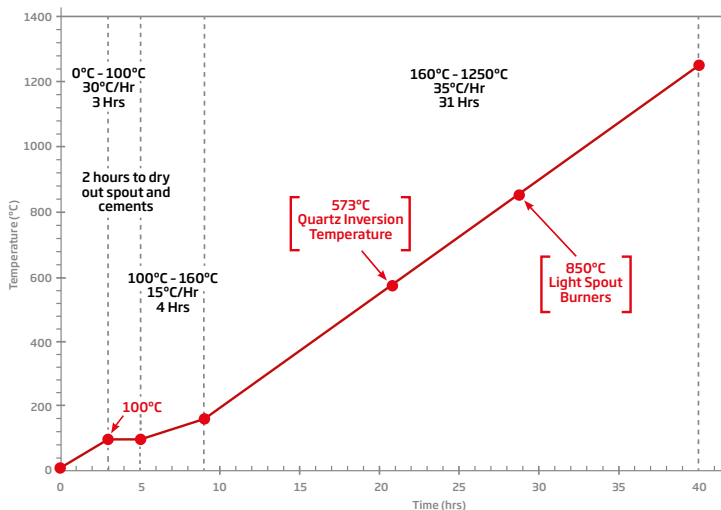
Special spout insert design increases production safety

Thanks to the meticulous design, the spout sits on top of the metal casing and creates a seamless join with the

refractory body. Due to this solution and the conic inside shape of the insert, there is no possibility that the insert can accidentally fall out of the refractory body, which greatly improves production safety compared to existing solutions on the market.

Heat-up curve for inserted spouts

The inserted spouts are sensitive to thermal shock, so they have to be heated up very gradually.



The typical spout body refractory mixes are as follows: The premium refractory body mix for spouts is 301. Its average service life is 12-18 months, depending on temperature, glass pull volume and chemical composition of the molten glass.

The 301 mix provides good thermal shock resistance with high glass corrosion resistance in flint, amber or green container glass. Spout refractory life of the 301 mix is increased by 25-35% compared to the 315. 301 is a bonded AZS material that contains 35% zirconia. This mix is perfect for container glass production.

333 spouts are mainly used in the tableware glass industry, where there is a demand for low-zircon containing refractory.

The glass quality in the spout is largely determined by the temperature distribution. Comprehensive investigations and testing revealed the following facts:

- The range of thermal conductivity of the refractory materials is similarly low.
- No noticeable difference in terms of heat flow.
- The insulation material is the most important factor.

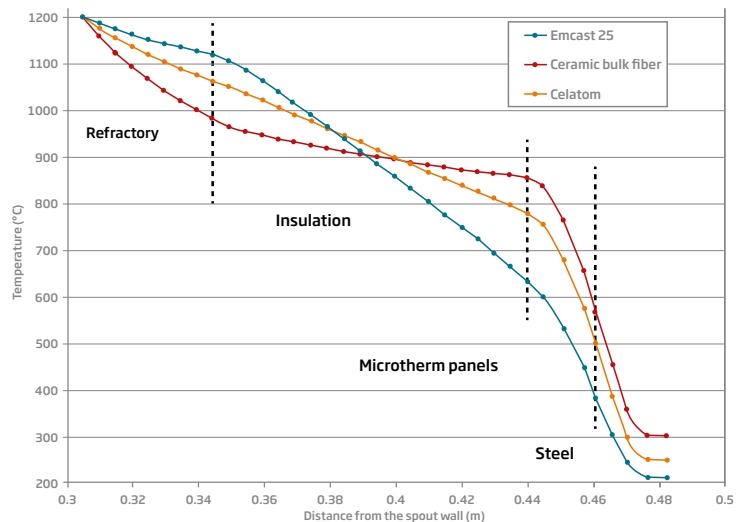
EmCast 25: the ideal insulation solution

Three different insulation materials were tested: EmCast 25 – a castable, light-weight insulation mortar –, Celatom (a dry diatomaceous earth) and a standard ceramic bulk fiber. (See illustration below)

The glass temperature at the spout was 1147.8°C for EmCast 25, 1138.9°C for Celatom and 1125.2°C for ceramic fiber.

The tests provided the following findings:

- EmCast 25 provides the best insulation
- Temperature was 200°C to 300°C higher in the insulation section
- 10°C to 20°C difference in glass temperature at the orifice using Celatom and ceramic fiber vs. EmCast 25



Conclusion

RATH recommends the use of the original RATH Emhart Glass System to achieve optimal results and smooth production. The solid refractory background of RATH Group ensures continued excellent product quality and flexible customer care.

About RATH

RATH specializes in refractory technology with a broad product range of refractory materials for application temperatures of up to 1800° C. RATH AG, headquartered in Vienna, has established itself internationally as a renowned supplier of refractory solutions, with over 640 employees and branch offices in more than 30 countries.

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