‘Glasy’ has STOELZLE and BRANTNER reclaiming cullet

Enabling thousands of tons of recovered material to return to the furnace, ‘Glasy’ technology delivers 99.9999 percent glass purity – all to reduce raw material demand, energy consumption and CO_2 emissions.

For Stoelzle, a global leader in premium glass packaging, the decarbonisation of glass manufacturing begins with the batch itself. Working alongside circular economy specialist Brantner green solutions, the company has helped develop and validate 'Glasy' - a globally unique recycling technology that recovers exceptionally pure glass from incineration residues and upgrades it into high quality cullet suitable for demanding packaging applications.

In Austria alone, residual waste incineration generates around 600,000 tons of residues each year, with glass accounting for up to 30 percent of the material. Historically, available sorting technologies could not process this glass to a quality level that met the glass industry's stringent standards, particularly for high end flint glass. Contaminants such as metals, and ceramics limited the use of recovered glass and meant that a large potential resource remained locked in the waste stream.

'Glasy' changes this equation. By the upstream thermal process step of the incineration the material is already free of organic making it an ideal potential source for cullet. Downstream, an advanced sorting process isolates the glass fraction and delivers a recovered material whose purity reaches 99.9999 percent - a level that opens the door to sensitive packaging applications rather than relegating the material to lower value uses.

WHY ULTRA-PURE CULLET MATTERS

As a manufacturer of premium glass packaging, Stoelzle depends on a consistently available supply of extremely pure cullet. Recycled glass substituted into the batch reduces the consumption of virgin raw materials, lowers energy demand in melting and cuts associated CO_2 emissions. However, to protect the performance and appearance of high end packaging, even minute contaminants can be problematic. Metals, ceramics or mineral particles can negatively influence the batch and reduce the quality of the finished container, particularly in colour-sensitive flint glass.

Stoelzle's research and development team at Stoelzle Oberglas in Austria therefore played an active role in the development and validation of 'Glasy'. In the company's in-house glass laboratory, cullet samples from the new recycling process were analysed in detail and subjected to lab scale melting trials. These series of tests were designed to verify whether the cullet quality achieved by Brantner's system met Stoelzle's internal requirements for industrial production of premium packaging glass.

The tests confirmed that the 99.9999 percent purity level delivered by 'Glasy' satisfies Stoelzle's strict specifications. Laboratory analyses of material composition supported the melting results, confirming that

the recovered cullet can be used safely in high end glass packaging without compromising quality. For Stoelzle, this means that a previously unusable secondary resource can now be integrated into the batch on an industrial scale, contributing directly to the company's circular economy ambitions.

RETHINKING RESIDUAL WASTE INCINERATION

The innovation lies not only in the purity of the recovered glass but also in the way the process redefines residual waste incineration residues as a raw material source. Without advanced treatment, these residues have traditionally been treated as a disposal challenge, despite containing significant quantities of recoverable materials. Brantner's 'Glasy' technology reframes them as a valuable feedstock for the glass industry, closing a loop that previously remained open.

Thanks to the innovative recycling plant, around 20,000 tons of glass can now be recovered from waste incineration residues in Austria every year and made available to the glass industry as secondary raw material. In doing so, the system returns thousands of tons of previously discarded glass to the furnace, transforming incineration residues into a high quality resource and reinforcing the circular economy in the Austrian glass sector.

INSIDE THE 'GLASY' RECOVERY LINE

From a technological perspective, the 'Glasy' process incorporates several advanced features that ensure consistent quality and traceability. One key element is integrated advance sampling taken directly from the product stream of the sorting system. These real-time samples feed into an AI-based evaluation of the cullet quality, assessing parameters such as colour distribution and the presence of residual contaminants.

The combination of in-line sampling and artificial intelligence analysis enables near real time determination of the recovered product's properties. For Stoelzle as a glass manufacturer, this translates into seamless traceability of cullet quality, strengthening process control from the recycling plant through to the melting furnace. The system is described as globally unique, and Brantner green solutions has filed a patent application to protect the technology.

The success story at Brantner Glasy plant underlines the industrial reality of this innovation: the first recovery system is already successfully in operation, supplying high quality cullet for glass production and demonstrating that the concept has moved beyond pilot scale into real-world application.

WHAT STOELZLE'S TESTING CONFIRMED

In Stoelzle's glass laboratory, the cullet obtained from 'Glasy' underwent thorough analysis before being cleared for use in premium packaging applications. Lab-scale melts were designed to replicate industrial conditions as closely as possible, allowing the R&D team to observe how the cullet behaved in the batch and in the resulting glass. Any traces of metal or ceramic contamination would have revealed themselves through defects or colour shifts - effects that Stoelzle cannot

accept in its high value product portfolio.

The melting tests showed that the ultra-high purity achieved by 'Glasy' meets Stoelzle's strict standards and that the cullet can be safely used in the production of high-end flint glass packaging. Complementary laboratory analyses confirmed the excellent material composition of the recovered glass. As a result, Stoelzle can incorporate this new cullet stream into its production processes with confidence, using it as a direct substitute for part of the primary raw materials previously required.

FROM WASTE STREAM TO CIRCULAR ECONOMY

The impact of this substitution is significant. For every ton of cullet used at Stoelzle, around 1,200 kilograms of primary raw materials can be saved. At the same time, using cullet avoids the release of approximately 200 kilograms of CO_2 that is bound in this quantity of primary raw materials. These savings are additional to the energy benefits associated with melting recycled glass.

Each 10 percent share of cullet in the overall batch reduces the energy required for melting by about 2 to 3 percent. With Stoelzle's glass furnaces currently fired with natural gas, that means that every 10 percent cullet content can avoid roughly 6 kilograms of CO_2 emissions per ton of glass produced in the melting process itself. As 'Glasy' enables the recovery of around 20,000 tons of glass annually from Austrian waste incineration residues, the cumulative potential in terms of raw material and CO_2 savings is considerable.

Looking ahead, the cooperation between Brantner green solutions and Stoelzle is set to deepen. The aim is for Stoelzle to use a significant proportion of the cullet recovered with 'Glasy' in the production of packaging glass for the pharma and consumer segments at its Köflach plant. This move will convert incineration residues into a stable, high quality secondary raw material stream and further reinforce the circular economy in the Austrian glass industry.

PARTNERS IN TRANSFORMATION

The 'Glasy' project also reflects the complementary strengths of the partners involved. Stoelzle, founded more than two centuries ago in Austria and part of the family-owned CAG Group since 1987, has grown into an international specialist in glass packaging for premium spirits, beauty, healthcare and consumer brands. Six production sites and four decoration facilities across Europe and North America, supported by an international network of sales offices, allow the company to serve brands of all sizes with solutions that blend quality, creativity and responsibility.

Brantner green solutions, in turn, brings deep expertise in waste management and the circular economy. With a philosophy that 'the waste of today is the resource of tomorrow,' Brantner operates a wide portfolio of recycling and treatment facilities, including 12 sorting plants, one biogas plant, 13 landfills and 11 composting plants across Europe. The company serves around 1,000 municipalities and more than 26,000 customers, acting as both an innovation driver and a key regional employer.

Together, Stoelzle and Brantner green solutions are demonstrating how cross sector collaboration can unlock new secondary raw materials for glass production and translate circular economy principles into industrial reality. By enabling ultra-pure cullet recovery from waste incineration residues and validating its use in high-end packaging, 'Glasy' offers the glass industry a concrete pathway to reduce its reliance on virgin raw materials, cut CO_2 emissions and keep more glass circulating where it belongs: in the loop. ■